

School of Public Health

**A Cohort Study of Maternal Obesity and Breastfeeding
Outcomes for Malay Women in Selangor, Malaysia**

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AUTHOR'S DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature:

Date: 25th November 2016

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ABSTRACT

Data show that prevalence of overweight and obesity among women at reproductive age has increased in the last decade. National prevalence of obesity in Malaysia itself has shown a four-fold increase, surging from 4.4 % in the Second National Study to 17.7 % in the Fifth National Study, a period of 20 years, in women of childbearing age (Ministry of Health, 2008). More women (20.6 %) were found to be obese compared to men (15.0 %) in the latest survey (Ministry of Health, 2015). These surveys have ranked Malaysia as the highest prevalence of overweight/obesity in South East Asia region whilst Laos was listed as the lowest (2.8 %).

Maternal pre-pregnancy obesity with body mass index (BMI) of more than 30 kg/m² is associated with delayed breastfeeding initiation, shorter duration as well as early cessation of breastfeeding (Amir & Donath, 2007; S. M. Donath & Amir, 2000; Oddy et al., 2006; Rasmussen, Kathleen M.Kjolhede, 2004; Turcksin, Bel, Galjaard, & Devlieger, 2014b). However, breastfeeding has been shown to be the optimum feeding method for infants. Breastmilk is sometimes described as ‘liquid gold’ for a newborn, since it is rich in nutrients, minerals and antibodies that provide the most complete nutrition for infants for their optimal growth and development. In addition, breastfed infant experienced lower childhood morbidity and mortality rates. Benefits of breastfeeding to mothers have also been well documented. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life and then continued breastfeeding while appropriate complementary foods are introduced and then as long as the mother wishes.

Despite the abundant research evidence on the benefits of breastfeeding and the strategies formulated by the Ministry of Health Malaysia, ‘exclusive breastfeeding’ is still not generally practised in Malaysia. Data from the Third National Health and Morbidity Survey (NHMS) show that only 19.3 % and 14.5 % of infants were exclusively breastfed up to four months and six months, respectively (Ministry of Health, 2008). These results show that Malaysia had one of the lowest prevalence rates of ‘exclusive breastfeeding’ compared to other countries in the South East Asia. The highest was in Cambodia (74.0 %) and the lowest was in Singapore (1.0 %).

With such low prevalence of breastfeeding, and the increasing prevalence of obesity in women, it is necessary to explore the association between high BMI and poor lactation performance. There is limited information available on infant feeding practices and no previous cohort studies on the association of maternal obesity and breastfeeding outcomes in Malaysia. The objectives of this study were to document the prevalence of maternal overweight and obesity in Malay women; to compare breastfeeding outcomes (intention, initiation, intensity and duration) between women with different BMI levels; explore the risk factors that are associated with cessation of breastfeeding among overweight/obese and normal weight women; investigate the association between knowledge of breastfeeding and the initiation and duration of breastfeeding among obese and non-obese women; explore the association between maternal weight retention and breastfeeding and finally to investigate the association between infant growth and breastfeeding.

A prospective cohort study on infant feeding practices was carried out between September 2013 and April 2015 in the Selangor State, Malaysia. Selangor is the most populous state in Malaysia with a population of 5.46 million persons. This study focused on four major districts in Selangor which were Klang, Gombak, Shah Alam and Petaling. This study focused on four major districts in Selangor which were Klang, Gombak, Shah Alam and Petaling. The Petaling district is the most heavily populated with 1,812,633 people, Klang was 848, 149 and Gombak was 682, 996 people, respectively as tabulated by the Department of Statistics, Malaysia.

Expectant mothers of singleton babies who had an antenatal examination between September 2013 until November 2014 at ten selected Mother and Child Health government clinics were invited to participate in this survey. The inclusion criteria were Malay mothers aged between 20 to 40 years old with a singleton pregnancy. They will be excluded if they were unable to answer the questionnaires due to limited understanding, illness or if health professionals advised that participation could be detrimental to the participant. Those mothers who agreed to participate by signing the consent form were interviewed face-to-face by the principal researcher or trained research assistant using a structured baseline breastfeeding questionnaires. The mothers were then followed up for one month, three months, and six months after delivery to

obtain information on breastfeeding and infant feeding practices. postpartumThe questionnaires used in this study were based on validated questionnaires that have been previously used in breastfeeding cohort studies conducted in China and Australia while the Iowa Infant Feeding Scale was used to measure the maternal attitudes towards infant feeding. BMI status of the mothers in this study was calculated by dividing one's recalled pre-pregnancy weight in kilograms by the square of one's height in meters . Overweight is defined by BMI of more than 25 and less than 30 kg/m² while obesity is defined as BMI of more than 30 kg/m².

All data were entered and analysed using SPSS 20.0 (Statistical Package for Social Sciences). A two-sided level of significance of 0.05 was used. Descriptive statistics were used to describe the rate of 'exclusive breastfeeding' and the prevalence of overweight and obesity. Chi-square, student's t-test, paired samples t-test, one-way analysis of variance (ANOVA) test and multivariate logistic regression were used to accommodate each of the objectives.

This study was approved by the Curtin University Human Research Ethics Committee and the Medical Research and Ethics Committee, Ministry of Health Malaysia and permission was given to conduct this study at government health clinics in the districts. The participants were informed of the objectives and nature of the research by the information sheet and were assured of the confidentiality of all information that was collected. Thereafter, they were asked to complete a consent form and they were informed that they could withdraw from participating in this study at any point of time without prejudice.

A total of 700 expectant mothers were recruited during their second and third antenatal medical examinations. The response rate was 93.1 % with 652 mothers continued to participate until end of the study.

The prevalence of overweight was 26.5 % and of obese was 15.3 % in this population. Just over two thirds (67.8 %) of the mothers initiated breastfeeding within one hour after delivery. There was a weak significant association between breastfeeding initiation and BMI status ($\chi^2 = 9.722$, df 3, p=0.021) but delayed initiation was found to be more prevalent among obese mothers. Further analysis proved that mothers who attended

antenatal class were 1.8 times more likely to initiate breastfeeding within one hour than mothers who never attend antenatal class (adjusted OR: 1.842, 95% CI of adjusted OR: 1.272 – 2.666). On top of that, mothers who perceived their biological mothers had preference towards breastfeeding and had breastfeeding experience of more than one month were 2.8 times (adjusted OR: 2.873, 95% CI of adjusted OR: 1.678 – 3.396) and 2.3 times (adjusted OR: 2.387, 95% CI of adjusted OR: 1.678 – 3.396) more likely to initiate breastfeeding within one hour. Overweight and obese mothers were less likely to initiate breastfeeding within one hour than mothers with lower BMI values were (crude OR: 0.712, 95% CI of crude OR: 0.508 – 0.998) but the strength of association is not significant after some adjustments. Lastly, mothers who had vaginal delivery were nearly 3.47 times more likely to initiate breastfeeding within one hour than mothers who had undergone Caesarean-section (adjusted OR: 3.472, 95% CI of adjusted OR: 2.216 – 5.440).

The rates of ‘exclusive breastfeeding’ and ‘any breastfeeding’ at six months were 50.0 % and 25.9 %, respectively. Higher educated (adjusted OR: 1.774, 95% of adjusted CI: 1.076 – 2.927), being housewives (95% CI of adjusted OR: 2.687 – 6.406), attended antenatal class (adjusted OR: 1.622, 95% CI of adjusted OR: 1.075 – 2.446), had more than one child (adjusted OR: 0.620, 95% CI of adjusted OR: 0.437 – 0.880), had prenatal maternal intention of breastfeeding (adjusted OR: 4.491, 95% CI of adjusted OR: 3.138 – 6.428), received breastfeeding support from close family members (spouses: adjusted OR: 1.462, [95% CI of adjusted OR: 1.038 – 2.060], biological mothers: adjusted OR: 2.162, [95% CI of adjusted OR: 1.437 – 3.252]), early initiation of breastfeeding (adjusted OR: 2.589, 95% CI of adjusted OR: 1.825 – 3.674), being breastfed herself or biological mothers had breastfeeding experience (adjusted OR: 1.974, 95% CI of adjusted OR: 1.274 – 3.058) were associated with longer duration of ‘exclusive breastfeeding’.

Meanwhile, being obese (adjusted OR: 0.464, 95% CI of crude OR: 0.251 – 0.857), having health problems during pregnancy (adjusted OR: 0.372, 95% CI of crude OR: 0.244 – 0.565), caesarean section delivery (adjusted OR: 0.557, 95% CI of crude OR: 0.345 – 0.897) and experiencing breastfeeding difficulties such as insufficient colostrum/breastmilk, longer time to initiate breastmilk production, and babies had

sucking problems were the risk factors of discontinuing 'exclusive breastfeeding' before the recommended six month.

After 6 months delivery, formula fed mothers (5.69 kg) had greater weight retention compared to breastfed mothers (1.45 kg). Women who retained more weight at six months postpartum were those who had a higher BMI of more than 25 kg/m² before pregnancy, housewives and mothers who formula-fed their babies. Fully breastfed (exclusive and predominant breastfeeding) babies grew more rapidly by 0.72 kg at one month than non-exclusively breastfed babies, only 0.66 kg gained at one month. Meanwhile, exclusively breastfed babies had greater significant weight increment of 2.11 kg at three months compared to only 1.99 kg gained for non-exclusively breastfed babies. At six months, exclusively breastfed babies gained greater weight of 4.03 kg more than non-exclusively breastfed babies whom gained only 3.91 kg.

In summary, this is the first cohort study undertaken in Malaysia focusing on the association between maternal obesity and poor breastfeeding outcomes. Obese women were more likely to delay breastfeeding initiation and to cease breastfeeding earlier. Hence, more interventions aiming to decrease obesity rates in women of reproductive age should be introduced. This could usefully include education on breastfeeding benefits and interventions to improve breastfeeding outcomes among women in Malaysia. This group of women should continue to be advised on the importance of continued breastfeeding during their antenatal follow-up, as this would benefit both infants and mothers.

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DEFINITIONS

The definitions of breastfeeding used in this thesis are from the following sources (C. W. Binns, Fraser, Lee, & Scott, 2009; The NSW Centre for Public Health Nutrition, 2007; UNICEF, 2015; WHO, 2008a)

Other definitions used in this thesis are from academic publications which are cited in the specific definitions.

Any breastfeeding: The child has received breastmilk (direct from the breast or expressed) with or without other drink, formula or other infant food.

Baby Friendly Hospital Initiative (BFHI): An approach to transforming maternity practices as recommended in the joint WHO/United Nations Children's Fund (UNICEF) statement on Protecting, Promoting and Supporting Breastfeeding: the special role of maternity services. It was launched in 1991 by UNICEF and WHO following the Innocenti Declaration of 1990. The initiative is a global effort to implement practices that protect, promote and support breastfeeding. Hospitals under this initiative practise the 'Ten steps to successful breastfeeding' (part of the joint statement) and observe the principles and aim of the International Code of Marketing of Breastmilk Substitutes, including not accepting free or low cost supplies of breastmilk substitutes, feeding bottles, teats and pacifiers. To acquire the 'baby friendly' designation, a hospital must be externally assessed according to an agreed procedure using the Global criteria.

Body mass index (BMI): a weight-to-height ratio, calculated by dividing one's weight in kilograms by the square of one's height in meters

Bottle feeding: Feeding an infant from a bottle with either expressed breastmilk, formula, water and etc.

Breastfeeding: It is the same as ‘any breastfeeding’. The child receives some breastmilk (including expressed breastmilk or from a wet nurse) but also receives any food or liquid including non-human milk and formula.

Breastmilk: Human milk and colostrum.

Cessation of breastfeeding: Complete cessation of breastfeeding including suckling.

Child growth: The period of physical, cognitive, and social growth that begins at birth and continues through early adulthood.

Cohort study: A longitudinal or prospective study in which to assess the exposure or event of interest (for example; breastfeeding) that is hypothesised to influence the probability of an outcome (for example, ovarian cancer) in an identified subsets of a defined population.

Complementary feeding: The child receives both breast milk (including expressed breastmilk or from a wet nurse) and solid (semi-solid or soft) foods. It is not recommended to provide any solid, semi-solid or soft foods to children less than six months of age.

Complementary food: Any food, whether manufactured or locally prepared, used as a complement to breastmilk or infant formula, when either becomes insufficient to satisfy the nutritional requirement of the infant. Such food is also commonly referred to as weaning food or breastmilk supplement.

Confidence interval: The computed range of values that contains the population or ‘true’ value, estimated by a certain statistic, such as a mean, proportion, or rate, with a given probability, e.g. 95% (Nakagawa & Cuthill 2007).

Cross-sectional survey: An investigation in which information is systematically collected, typically to describe the distribution of an attribute (e.g. breastfeeding) as it exists in a particular population at one point in time (Australian Food and Nutrition Monitoring Unit 2001).

Early initiation of breastfeeding: Putting newborns to the breast within one hour of birth.

Exclusive breastfeeding: The child receives breast milk only (including expressed breastmilk or from a wet nurse) while giving no other food or liquid, not even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines.

Exclusive breastfeeding duration: Length of time an infant receives breastmilk only.

Expressed breastmilk: Breast milk can be expressed by hand or by using a manual or electric breast pump. Expressed breast milk can be fed to an infant by finger feeding, cup, spoon or bottle teat.

Ever breastfed: An ever breastfed infant has been put to the breast at least once or has received expressed breastmilk, even if he or she has never been put to the breast.

Formula milk: Artificial milks for babies made out of a variety of products, including sugar, animal milks, soybean, and vegetable oils. They are usually in powder form, to mix with water (UNICEF, 2015)

Full breastfeeding: Exclusive breastfeeding or predominant breastfeeding (or almost exclusive breastfeeding). Breastmilk is the only source of milk given to the infant regardless of supplementation with other fluids such as water and orange juice.

Incidence: The number of new occurrences (of health events, risk behaviour or factor) in a population, over a period of time.

Infant: Refers to those less than 12 months old. Children are defined as 12 months old or more.

Odds ratio (OR): An odds ratio is a measure of the strength of association between disease (or problem) and exposure. The ratio of the probability of an event occurring to the probability of non-occurrence. In a clinical setting this would be equivalent to the odds of a condition occurring in the exposed group divided by the odds of it occurring in the non-exposed group (Mann, 2012).

Obesity: BMI value of more than 30.0 kg/m²

Overweight: BMI value of more than 25 but less than 30 kg/m²

Predominant breastfeeding: The predominant source of nourishment received by an infant is breastmilk. Though, the infant may also receive liquids (water and water-based drinks such as sweetened and flavoured water, teas, infusions etc.); fruit juice; oral rehydration solution (ORS); drop and syrup forms of vitamins, minerals and medicines; or ritual fluids (in limited quantities). All other food-based fluids (e.g. fruit juice and sugar water), in particular breastmilk substitutes, and solids are excluded.

Prevalence: The number of cases of a disease that exist in a defined population at a specified point in time (Mann, 2012).

Randomized controlled trial (RCT): An epidemiologic experimental study in which participants are allocated randomly to receive either an experimental or a control treatment or intervention. The relative effectiveness of the intervention is assessed by comparing event rates and outcomes in the two groups. Randomized control trials are generally regarded as the most scientifically rigorous method of hypothesis testing available in epidemiology (Last JM 2001).

Relative risk (RR): Ratio of the probability of developing the condition if exposed to a certain variable compared with the probability if not exposed (Mann, 2012)

Rooming-in: The practice of having infants remain with their mothers on a 24 hour basis.

Solid foods: Any nutrient-containing foods (non-drinkable, semi-solid or solid), e.g. dilute infant cereals. Does not include breastmilk or breastmilk substitutes, fruit and vegetable juices, sugar water, etc.

Timely initiation of breastfeeding: Same as 'early initiation of breastfeeding'.

Weaning: The period during which infants are introduced to breastmilk substitutes and/or solid foods with the intention of replacing some or all of the breastmilk in the diet.

ABBREVIATIONS

Abbreviations

AAP	American Academy of Pediatrics
aOR	Adjusted odds ratio
aHR	Adjusted hazard ratio
BMI	Body Mass Index(unit: kg/m ²)
BFHI	Baby Friendly Hospital Initiative
CI	Confidence interval
FBF	Full breastfeeding
HR	Hazard ratio
IOM	Institute of Medicine
IQ	Intelligence quotient
LBW	Low birthweight
OR	Odds ratio
ORS	Oral rehydration solution
PROM	Preterm rupture of membrane
RCT	Randomized Clinical Trial
RR	Relative risk
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations Children's Fund
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The recommendations by Ministry of Health Malaysia in the Malaysian National Breastfeeding Policy that was formulated in 1993 and revised in 2005, include 12 key messages guiding mothers on breastfeeding and its benefits. The Policy recommends breastmilk as the optimal food for infants, and advises mothers to breastfeed exclusively from birth until six months and to continue to breastfeed until two years of age. This is consistent with the recommendations made by World Health Organization (WHO), who also recommends the introduction of complementary foods to infants at six months of age while continuing breastfeeding.

This recommendation is also in line with the Muslims best practice as stated in the Holy Quran in that mothers are instructed to breastfeed their children up to two years of life, as narrated by Allāh (SWT) in Surat al-Baqarah, verse 233:

{ وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ لِمَنْ أَرَادَ أَنْ يُتِمَّ الرَّضَاعَةَ }

“Mothers shall suckle their children for two full years, - that for such as desire to complete the suckling.”

Prophet (S) also has proclaimed: “For a child, there is no milk better than the milk of the mother (Mustadrak al-Wasāil, vol. 15, pg. 156) and there is nothing that can take the place of food and water except milk (Tibb an-Nabī, pg. 25). Likewise, it is narrated from Imām °Alī (as) that for a child, there is no milk that has more blessings than the milk of a mother (al-Kāfī, vol. 6, pg. 40).

Many studies have proved the importance of breastmilk to babies as well as to the mothers. Breastmilk is sometimes described as ‘liquid gold’ for a newborn, since it is rich in nutrients and vital antibodies that provides the most complete nutrition for infants for their optimal growth and development, as well as for the prevention of childhood morbidity and mortality. It is also beneficial for pre-term babies as it is

suitable for their immature digestive system and reduces morbidity (e.g: necrotising enterocolitis) and mortality. It contains high quality protein and immunological components, living cells, vitamins and minerals (Ballard and Morrow, 2013).

1.1.1 Overview of the Importance of Breastfeeding

Breastfeeding provides both short and long term benefits for child's well-being, protecting against morbidity and mortality.

Adults who were breastfed experienced lower mean blood pressure and total cholesterol as well as higher performance in intelligence test and lower possibilities of being overweight/obesity (Binns, Lee, and Low, 2016; Horta, Bahl, Martines, and Victora, 2007). Breastfeeding also reduces the likelihood of having other chronic diseases include cardiovascular disease and some types of cancer (Binns et al., 2016a). Breastfeeding is associated with a significant reduction in the risk of acute otitis media, atopic dermatitis, non-specific gastrointestinal infections and lower respiratory tract diseases in breastfed infants. There are also associations between history of breastfeeding and lower risks of asthma, leukaemia and Sudden Infant Death Syndrome (SIDS) compared to those without a history of breastfeeding (Ip et al., 2007).

Meanwhile, breastfeeding also benefits maternal health. Breastfeeding is associated with postpartum weight loss and body fat percentage reduction (Lopez-Olmedo et al., 2015; Neville, McKinley, Holmes, Spence, and Woodside, 2014).

Breastfeeding is also related to a decline in the risk of having breast cancer and ovarian cancer among the breastfeeding women (Ip et al., 2007). Breastfeeding is also linked to lower risks of longer-term metabolic risk factors and cardiovascular disease including diabetes, hypertension and hyperlipidaemia (Bimla Schwarz et al., 2009).

1.2 PROBLEM STATEMENTS

However, despite the extensive research showing numerous benefits of breastfeeding and the strategies commenced by the government, 'exclusive breastfeeding' is still not generally practised in Malaysia. In 2006, the Third National Health and Morbidity Survey (NHMS), a cross-sectional study, reported that 19.3 % and 14.5 % of infants were exclusively breastfed up to four months and six months,

respectively (Ministry of Health, 2008). These results ranked Malaysia among the lowest prevalence of ‘exclusive breastfeeding’ compared to other countries in South East Asia. The highest was in Cambodia (74.0 %) and lowest was in Singapore (1.0 %) (Chua and Aye Mya Win, 2013; OECD/WHO, 2012).

Meanwhile, in the second and the latest Malaysia’s National Health and Morbidity Surveys in 1996 and 2015 respectively also described a four-fold increase in obesity prevalence among adults, surging from 4.4% to 17.7% over the 20-year period including women of childbearing age (Ministry of Health, 2008). In the most recent national survey done in 2015, the proportion of obese adults has increased to 17.7 %. More women were obese compared to men by 20.6 % and 15.0 %, respectively (Ministry of Health, 2015). These surveys have ranked Malaysia as the highest prevalence of overweight/obesity in South East Asia region while Laos was listed as the lowest (2.8 %).

The association between high BMI and adverse breastfeeding outcomes is of concern because the prevalence of obesity was reported significantly higher over the years in females as compared to males and in the meantime, the rate of ‘exclusive breastfeeding’ dropped. There are many factors that have been reported in studies globally associated with reduced intention and initiation or early cessation of breastfeeding among obese mothers that will be discussed in the literature review and has been simplified in the Figure 1.1, the Theoretical Framework of Maternal Obesity and Poor Breastfeeding Outcomes.

Consequent to the above concern, a systematic review was conducted to investigate the relationship between maternal obesity and breastfeeding intention, initiation, intensity, duration and milk supply. The study concluded that more obese mothers had no intention to breastfeed their babies and they intended to wean breastfeeding earlier. Maternal obesity is also associated with a low likelihood of initiating breastfeeding, shorter duration of breastfeeding, inadequate milk supply and delayed onset of lactogenesis II (Turcksin, Bel, Galjaard, and Devlieger, 2014).

1.3 AIM

This study aims to investigate the prevalence of maternal obesity, knowledge of infant feeding among the Malaysian mothers and the associations with breastfeeding outcomes in the State of Selangor, Malaysia. This will include investigating the breastfeeding problems and factors associated with the initiation and duration of breastfeeding and any problems faced by mothers within six months postpartum.

1.3.1 Research Objectives

1. To determine the prevalence of maternal overweight and obesity (including excess gestational weight gain and postnatal weight retention) in Malay women
2. To compare the breastfeeding outcomes (intention, initiation, intensity and duration) between women with different BMI classifications
3. To investigate risk factors that are associated with discontinued 'exclusive breastfeeding' among overweight/obese and normal weight women
4. To explore the association between knowledge of breastfeeding and the initiation and duration of breastfeeding among obese and non-obese women
5. To determine association between maternal weight retention and breastfeeding
6. To investigate the relationship between infant growth and breastfeeding

1.4 SIGNIFICANCE OF RESEARCH

A better understanding of how maternal obesity affects the initiation and continuation of breastfeeding is vital for meeting public health goals for infant feeding in Malaysia. This study is significant for three reasons.

Currently in Malaysia, there is limited published data regarding prevalence of obesity among women of child-bearing age and determinants of 'exclusive breastfeeding' and the association between them.

Secondly, 'not-breastfeeding' has an association with childhood obesity and this appears to be stronger in infants born to obese mothers. Therefore, it is crucial to understand the difficulties of this target population in initiating and maintaining breastfeeding.

This study will provide data for the planning of future interventions. It is important that health care professionals should pay extra attention to these ‘at risk’ mothers by providing additional education and supports to breastfeed beginning before conception until six months postpartum (Rivka Turcksin, Sarah Bel, Sander Galjaard, and Roland Devlieger, 2012). Enhanced interventions and counselling practices should target specifically on this group to ensure the success of breastfeeding policy nationally

1.5 RESEARCH FRAMEWORK OF MATERNAL OBESITY AND BREASTFEEDING OUTCOMES IN SELANGOR, MALAYSIA

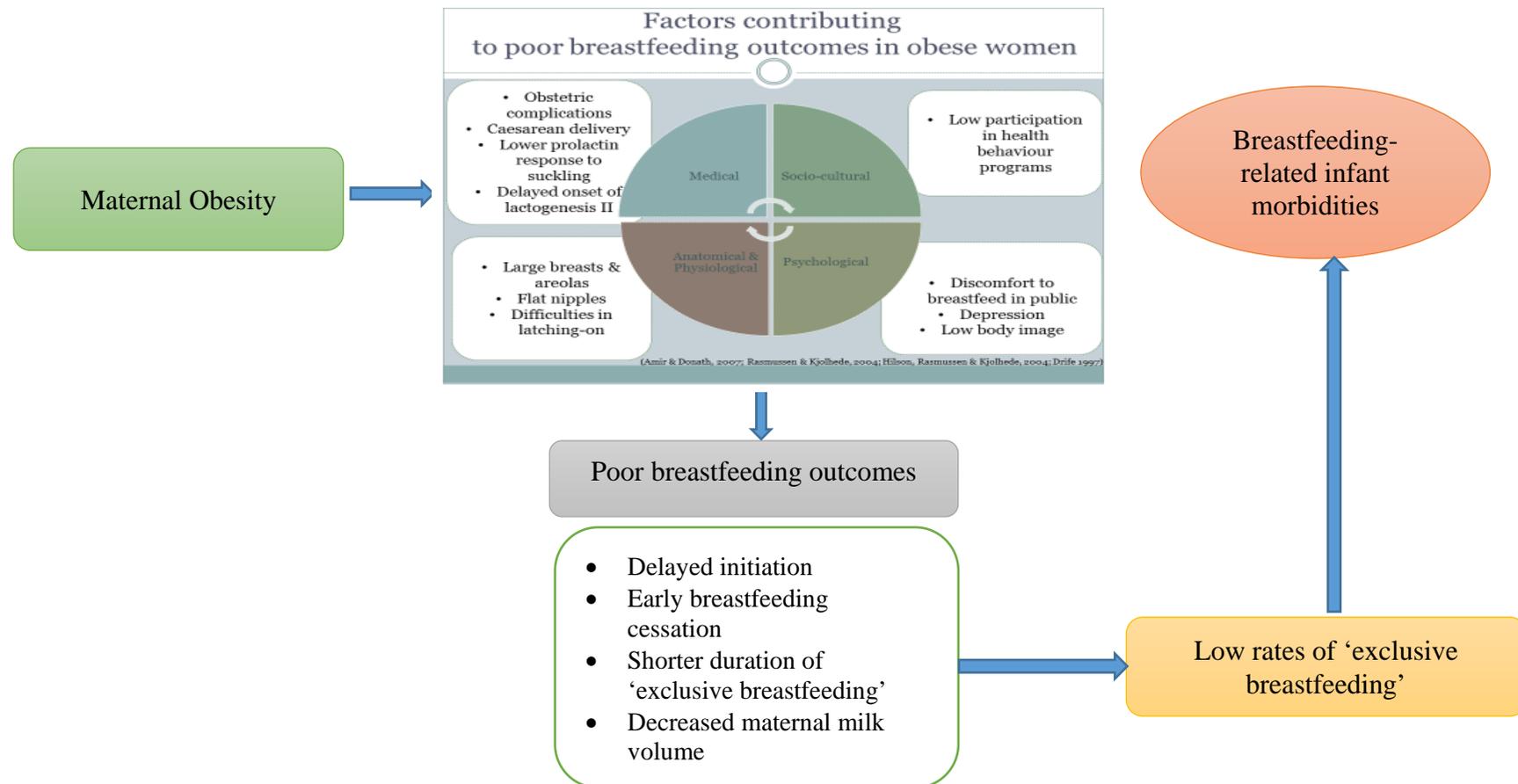


Figure 1.1 : Research framework of Maternal Obesity and Breastfeeding Outcomes in Selangor, Malaysia

CHAPTER 2

LITERATURE REVIEW

This chapter provides an extensive literature review related to the topic of this study. The prevalence of obesity mainly in Asian countries as compared to the world's prevalence, as well as the health consequences of obesity were reviewed.

2.1 OBESITY AND OVERWEIGHT

Obesity is a complex condition that results from an excess of energy intake over energy expenditure due to dietary excess and sedentary lifestyle. It is a major public health problem in developed countries, as well as globally and has been linked closely with the increased incidence of cardiovascular diseases (CVD) and type 2 diabetes,1 and some type of cancers (Ng et al., 2014).

Number of overweight and obese individuals around the world has increased from 921 million in 1980 to 2.1 billion in 2014 (Ng et al., 2014). About 13 % of the world's adult population were obese while women (15 %) had a higher prevalence of obesity compared to men (11 %) (World Health Organization, 2014).

2.1.1 Definition

Overweight and obesity are defined as abnormal or excessive body fat accumulation that will impair one's health. Body mass index (BMI) is a simple index of weight-for-height (kg/m^2) that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of the height in meters. According to World Health Organization (WHO), obesity can be defined as BMI more than $30 \text{ kg}/\text{m}^2$ and overweight as BMI more than $25.1 \text{ kg}/\text{m}^2$ (World Health Organization, 2016).

BMI is a simple index which reflects body fat and is used to categorise levels of obesity particularly in adults. More recently its use has become more common in children, but cut-off levels must be adjusted for age (World Health Organization, 2014). BMI has been commonly used in epidemiological studies to predict morbidity and

mortality related to obesity among adults. BMI provides the most expedient method in population and is gender independent and applicable to all ages of adults.

2.1.2 Classification of Body Mass Index (BMI)

Classification of BMI was done according to the WHO guideline (Table 2.1).

Table 2.1 :

BMI classifications according to World Health Organization (WHO)

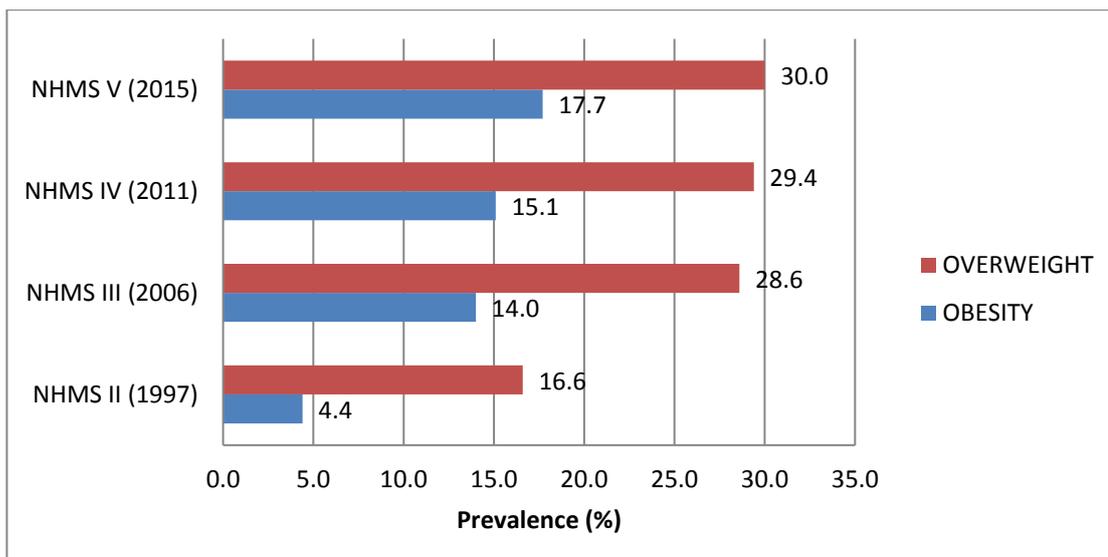
Classification	BMI (kg/m ²)
Underweight	<18.50
Severe thinness	<16.00
Moderate thinness	16.00 - 16.99
Mild thinness	17.00 - 18.49
Normal range	18.50 - 24.99
Overweight	≥25.00
Pre-obese	25.00 - 29.99
Obese	≥30.00
Obese class I	30.00 - 34.99
Obese class II	35.00 - 39.99
Obese class III	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

2.1.3 Prevalence of Overweight and Obesity in Malaysia

Due to globalisation and urbanisation growths, Malaysians are facing an increase in the incidences of non-communicable diseases (NCD) which are now the main causes of death in Malaysia, for example heart disease, diabetes, stroke, cancer and respiratory disease (Institute for Public Health (IPH), 2015).

The common risk factors of NCD include unhealthy diet and physical inactivity as well as two non-modifiable factors which are age and heredity. The intermediate risk factors to NCD include being overweight/obese, high blood sugar, high blood pressure and abnormal blood lipids (Hazreen et al., 2014).



Source: (IKU, 2015)

Figure 2.1 : Prevalence of Overweight and Obesity in Malaysia, ≥ 18 years old

Ministry of Health Malaysia has conducted a few series of population-based surveys using multistage random sampling (28 strata) the National Health and Morbidity Survey (NHMS), the first in 1986, followed by NHMS II (1996), NHMS III (2006) and the latest in 2015.

Overweight levels measured in the Second and Fifth National Health and Morbidity Surveys (NHMS) done in 1996 and 2015 respectively reported a four-fold increase in overweight prevalence among adults, surging from 16.6 % to 30.0 % over almost 20 years-period (Figure 2.1). The prevalence of obesity also increased by four times from 4.4 % (NHMS II) to 15.1 % (NHMS IV). The prevalence of obesity continues to surge as seen in the Fifth national survey by 17.7 % (Institute for Public Health (IPH), 2015). Thus, Malaysia had higher prevalence of obesity more than world's prevalence of 13.0 % in 2014 (World Health Organization, 2014)

During the Fifth survey, BMI was measured on 33,055 eligible adults. The result showed the proportion with a normal BMI (20-24.9) was 45.6% (95% CI: 44.5, 46.7), overweight was 30.0% (95% CI: 29.1, 31.0) and obesity 17.7% (95% CI: 16.9, 18.5). Females had significantly higher of the prevalence of obesity [20.6% (95% CI: 19.5, 21.8)] compared to males [15.0% (95% CI: 13.9, 16.1)]. Ethnicity is often identified as one of the risk factors for a higher BMI in Malaysia. The latest survey shows that

Indians and Malays have the highest incidence of overweight and obesity compared to Chinese and other ethnic groups (IKU, 2015).

Figure 2.2 below shows the prevalence of obesity by gender. Females had a higher prevalence of obesity in all of the surveys, and both genders significantly increased their rates of obesity over the past 20 years.

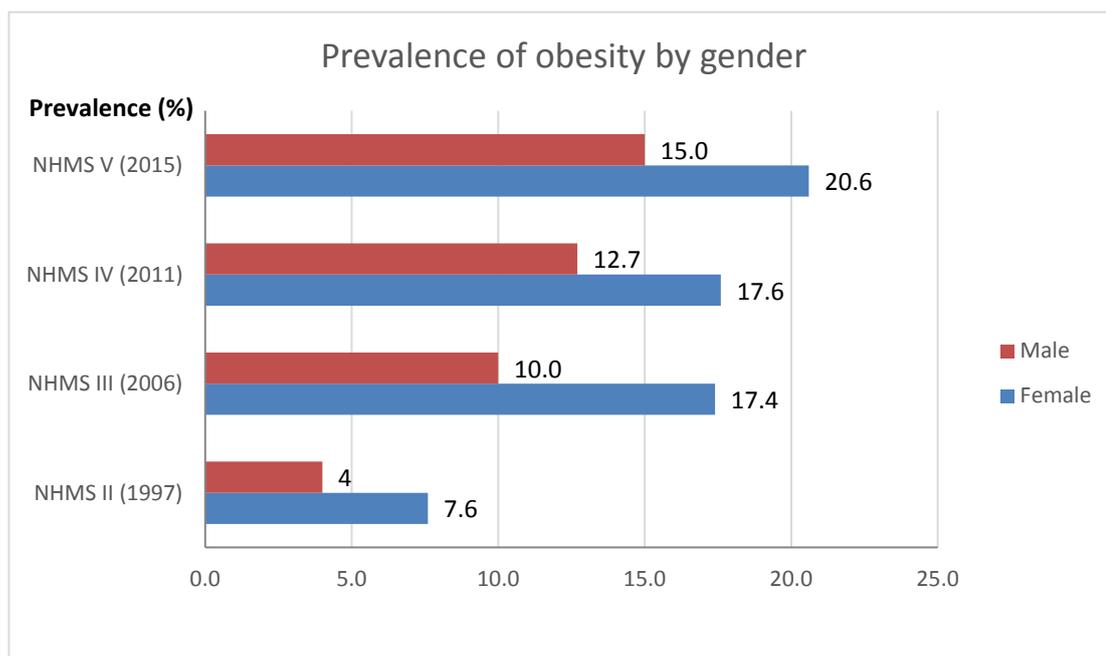


Figure 2.2 : Prevalence of Obesity By Genders Source: (IKU, 2015)

Hence, these have ranked Malaysia as the highest prevalence of overweight and obesity in ASEAN region while Vietnam was listed as the lowest (WHO, 2010).

In another cross-sectional study undertaken in 2007 and 2008 conducted by 6 institutions in five different selected regions in Peninsular Malaysia and East Malaysia, the level of obesity and overweight was measured in a total of 4341 subjects. The prevalence of overweight and obesity were 33.6 % and 29.5 %, respectively, with more women (22.5 %) obese than men (14.1 %) (Wan Mohamud et al., 2011).

By ethnicity, Indians (39.5 % and 24.6 %, respectively) have the highest incidence of overweight and obesity, followed by Malays with 34.0 % and 23.2 %, (Wan Mohamud et al., 2011).

2.1.4 Risk Factors of Overweight and Obesity

In Malaysia, risks of obesity are greatly influenced by ethnicity, gender, age, family history, educational level, health conditions as well as smoking status (Azmi et al., 2009; Rampal et al., 2007; A. K. G. Tan, Yen, & Feisul, 2012).

A cross-sectional study was done between year 2007 to 2008 in five different regions in Peninsular Malaysia and East Malaysia to determine the national prevalence of overweight and obesity. Wan Nazaimoon WM and colleagues (Mohamud et al., 2011) discovered that being females, Indians, have lower education level and aged between 40 – 49.9 years are the risk factors of obesity in Malaysia.

In another population based survey that covered 13 states in Malaysia, the data that was obtained from the Malaysia Non-Communicable Disease Surveillance-1 (MyNCDS-1) discovered family history of illnesses including diabetes mellitus, hypertension, coronary heart disease (CHD) and stroke are more likely to contribute to overweight or obesity, as well as ethnicity. Malays who were aged more than 30 years old, primary-educated, high-income earners, had family history of serious illnesses and living in metropolitan areas were more likely to develop overweight and obesity. Furthermore, high income earners are 3.1 % (SE: 0.99) and 6.3 % (SE: 3.11) higher probability to be overweight for Malays and Chinese, respectively than their low-middle income counterparts. Ethnic Malays and Indians lived in metropolitan areas like Selangor, Kuala Lumpur and Penang are more likely to be overweight by 2.0 % and 3.7 %, respectively and obese by 4.2 % and 8.4 %, respectively than those lived in non-metropolitan areas. In terms of educational backgrounds, tertiary-educated Malays however are 6.0 % and 7.9 % less likely to become overweight and obese, whilst, Chinese with primary school education are higher probability to be overweight by 6.6 % and obese by 6.5 % than those with junior high school education. Moreover, individuals with family history of serious illnesses have a higher likelihood of becoming overweight and obesity for all ethnics. Lastly, ethnic Malay smokers are less likely to be overweight or obese, but more likely to be in the normal and underweight category (A. K. G. Tan et al., 2012).

The Malaysian Adults Nutrition Survey (MANS) that was carried out between October 2002 and July 2003, including 3334 men and 3441 women aged 18 – 59 years old from six zones of Malaysia also support these facts (Azmi et al., 2009). It was reported that more women (14.7 %) were obese, while men shown too significantly

more overweight (28.6 %). Malays (24.9 kg/m²) had the highest mean BMI, followed by Indians (24.5 kg/m²), and that remarked Malays to have the highest prevalence of obesity (15.3 %) while overweight was highest for the Indians (31.0 %). The prevalence of overweight was reported as the highest for households with monthly income of more than RM 3500 (28.7 %).

2.1.5 Health Consequences of Overweight and Obesity

Overweight and obesity aggravate a number of health problems either by independently or in relationship other diseases as shows in Table 2.2.

Table 2.2 :

Summary of health consequences of overweight and obesity

Metabolic syndrome	30% of middle-aged people in developed countries have features of metabolic syndrome
Type 2 diabetes	90% of type 2 diabetics have a body mass index (BMI) of >23 kg m ⁻²
Hypertension	5× risk in obesity 66% of hypertension is linked to excess weight 85% of hypertension is associated with a BMI >25 kg m ⁻²
Coronary artery disease (CAD) and stroke	3.6× risk of CAD for each unit change in BMI Dyslipidaemia progressively develops as BMI increases from 21 kg m ⁻² with rise in small particle low-density lipoprotein 70% of obese women with hypertension have left ventricular hypertrophy Obesity is a contributing factor to cardiac failure in >10% of patients Overweight/obesity plus hypertension is associated with increased risk of ischaemic stroke
Respiratory effects	Neck circumference of >43 cm in men and >40.5 cm in women is associated with obstructive sleep apnoea, daytime somnolence and development of pulmonary hypertension

Table 2.2

Summary of health consequences of overweight and obesity-continue

Cancers	10% of all cancer deaths among non-smokers are related to obesity (30% of endometrial cancers)
Reproductive function	6% of primary infertility in women is attributable to obesity Impotency and infertility are frequently associated with obesity in men
Osteoarthritis (OA)	Frequent association in the elderly with increasing body weight – risk of disability attributable to OA equal to heart disease and greater to any other medical disorder of the elderly
Liver and gall bladder disease	Overweight and obesity associated with non-alcoholic fatty liver disease and non-alcoholic steatohepatitis (NASH). 40% of NASH patients are obese; 20% have dyslipidaemia 3× risk of gall bladder disease in women with a BMI of >32 kg m ⁻² ; 7× risk if BMI of >45 kg m ⁻²

Source: (Kopelman, 2007)

2.1.5.1 Obstetrics Outcomes

According to National Morbidity and Health Survey in 2015, prevalence of obesity among women at child-bearing age in Malaysia was 20.6 %. The rate is higher compared to worldwide prevalence of obesity in women which was 15.0 % in 2014 (World Health Organisation, 2016). This has exposed the obese women to a number of serious diseases as mentioned above as well as infertility (Gussler & Arensberg, 2011).

Obesity during pregnancy has been connected to many complications during and after pregnancy. Mothers who are obese are at increased risk for a number of complications during pregnancy; pre-eclampsia (Cedergren, 2004a; O'Brien, Ray, & Chan, 2003), diabetes mellitus (Chu et al., 2007; Scott-Pillai, Spence, Cardwell, Hunter, & Holmes, 2013), premature rupture of membrane (PROM) (Iyoke, Ugwu, Ezugwu, Lawani, & Onyebuchi, 2013) and increased rate of both emergency and elective caesarean (Chu et al., 2007; Minsart et al., 2014).

Because of their dimensions, the obstetric anaesthetists might have difficulties with venous access due to the increased penetration of tissue to the intervertebral space, thus the obese women are at higher risk of requiring general anaesthesia and higher rate of episodes of severe hypertension during surgery (Hodgkinson, 1981).

Following labour and delivery, they were also more likely to experience complications including postpartum haemorrhage (Blomberg, 2011), blood clots, wound infection and antepartum venous thromboembolism (Robinson, O'Connell, Joseph, & McLeod, 2005; Sebire et al., 2001), therefore requiring longer duration of hospitalization (Heslehurst et al., 2008).

2.1.5.2 Infant Health Outcomes

Higher prepregnancy weight is also linked to a number of adverse health outcomes for the neonates as well (Iyoke et al., 2013; Ruager-Martin, Hyde, & Modi, 2010; Scott-Pillai et al., 2013). The complications include stillbirth (Salihu, 2011), neonatal mortality (Nohr et al., 2007; Vasudevan, Renfrew, & McGuire, 2011), macrosomia (Baeten, Bukusi, & Lambe, 2001; Gaudet, Ferraro, Wen, & Walker, 2014; Iyoke et al., 2013), preterm delivery (Baeten et al., 2001; Cedergren, 2004b) and congenital anomalies particularly in heart and central nervous system (Mills, Troendle, Conley, Carter, & Druschel, 2010; A.-M. Siega-Riz & Laraia, 2006; Watkins, Rasmussen, Honein, Botto, & Moore, 2003).

Furthermore, infants born by obese mothers were at risk of having abnormal Apgar scores and need admission to special care baby or intensive care unit (Iyoke et al., 2013; Onubi, Marais, Aucott, Okonofua, & Poobalan, 2015).

2.2 BREASTFEEDING

Breastmilk is recognized as providing the most complete nutrition for infants for their optimal growth and development, as well as for the prevention of childhood illnesses. It is also beneficial for pre-term babies as it is suitable for their immature digestive system and reduces morbidity (e.g: necrotising enterocolitis) and mortality. It contains higher quality protein and immunological components, living cells, vitamins and minerals (Ballard and Morrow, 2013).

In the Malaysian National Breastfeeding Policy formulated by Ministry of Health in 1993 and revised in 2005, there are 12 key messages guiding mothers on breastfeeding and its benefits. . The Policy recommends breastmilk as the optimal food for infants, and advises mothers to breastfeed exclusively from birth until six months and to continue to breastfeed until two years of age. This is aligned with recommendations by World Health Organization (WHO), who also recommends the introduction of complementary foods to infants at six months of age while breastfeeding continues.

2.2.1 Definition

Breastfeeding refers to the act of feeding infants with breast milk, either direct from the breast or expressed. Table 2.3 provides the definitions for infant feeding according to World Health Organization (World Health Organization, 2008).

Table 2.3 :
WHO Definitions For Infant Feeding (WHO, 2008)

Feeding category	Infant receives	May include	Does not include
Exclusive breastfeeding	Breast milk (including milk expressed or from a wet nurse) breastfeeding	Oral Rehydration Salts (ORS), drops, syrups (vitamins, minerals, medicines)	Anything else
Predominant breastfeeding	Breast milk (including milk expressed or from a wet nurse) as the predominant source of nourishment	Certain liquids (water and water-based drinks, (fruit juice), ritual fluids and ORS, drops or syrups (vitamins, minerals, medicines)	Anything else (in particular, non-human milk food based fluids)
Complementary feeding	Breast milk (including milk expressed or from a wet nurse) and solid or semi-solid foods	Anything else: any food or liquid including non-human milk and formula	Not available

Table 2.3
WHO Definitions For Infant Feeding (WHO, 2008)-continue

Breastfeeding	Breast (including expressed or from a wet nurse)	milk milk	Anything else: any food or liquid including non- human milk and formula	Not available
Bottle-feeding	Any (including milk) or semi-solid food from a bottle with nipple/teat	liquid breast	Anything else: any food or liquid including non- human milk and formula	Not available

Source: (World Health Organization, 2008).

2.2.2 Trends in Breastfeeding

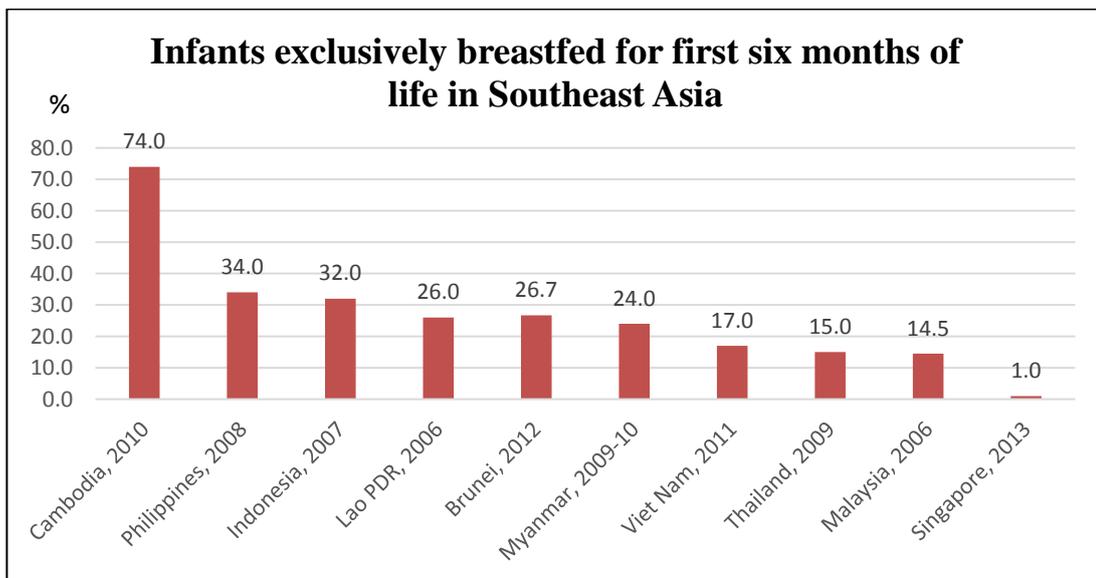
Despite the benefits of breastfeeding that were well documented, the rate of breastfeeding in many countries is still far behind from WHO recommendations to exclusively breastfeed babies for the first six months of life and continue until age of 24 months or more (World Health Organization, 2007).

For instance, the rates of ever breastfeeding and ‘exclusive breastfeeding’ through six months of life in the United States were 81.1 % and 22.3 %, respectively (Centers for Disease Control and Prevention (CDC), 2016). Meanwhile, in Australia, the prevalence of infants receiving ‘any breastfeeding’ was 60.1 % and ‘exclusive breastfeeding’ for less than six months was 15.4 % (AIHW, 2011).

Breastfeeding rates in Asian countries were also reported to be low. As depicted in Figure 2.3, ‘exclusive breastfeeding’ is more common among the less developed countries including Cambodia, Philippines, Indonesia and Laos. However, for high income country like Singapore, the mothers preferred formula milk over breastfeeding with only 1.0 % of them practicing ‘exclusive breastfeeding’ up to six months.

As seen in Figure 2.3 below, in Malaysia, ‘exclusive breastfeeding’ is still not commonly practised. In 2006, the Third National Health and Morbidity Survey reported that 19.3 % and 14.5 % of infants were exclusively breastfed up to four six months,

respectively. These figures were actually decreased from the Second National Health and Morbidity Survey that was done ten years ago. Prevalence of ‘exclusive breastfeeding’ at four months was 29.0 % (Fatimah S, Jackie H, Tahir A, Yusof MI & Sa’adiah HN, 1999). However, this suggests that the prevalence of ‘ever breastfeeding’ in the last ten years remained high.



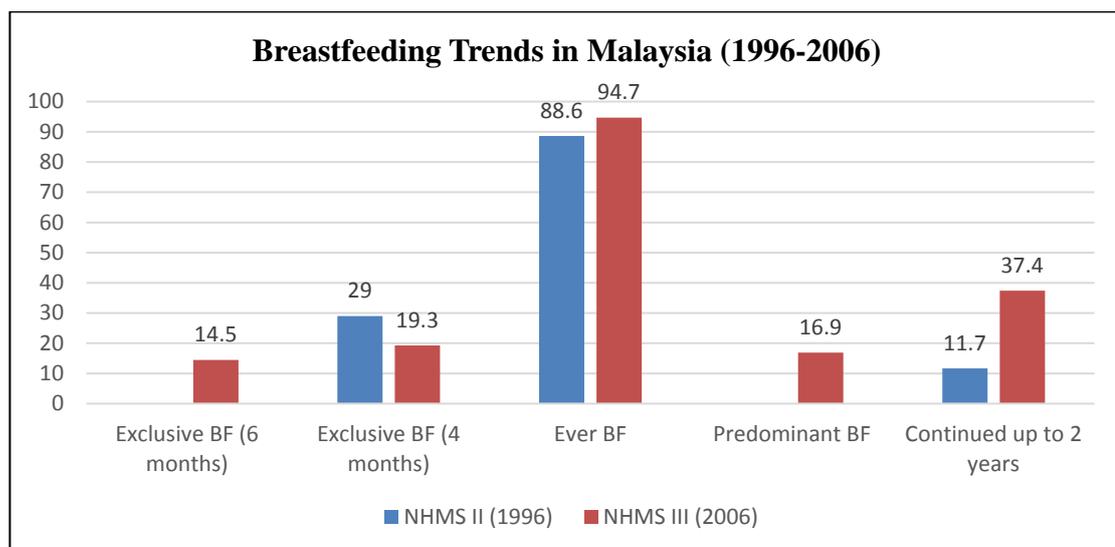
Source: (Institute of Public Health National Institute for Health and Ministry of Health, 2006; Lily Chua and Aye Mya Win, 2013; Ministry of Health Brunei Darussalam, 2012; OECD/WHO, 2012).

Figure 2.3 : Trends Of ‘Exclusive Breastfeeding’ Rates In Southeast Asia Countries

The dropping rates in breastfeeding in Malaysia are seen to be associated with many variables especially the socio-demographic factors as seen in Figure 2.4 below. Factors such as age of mothers, their background of education, household income, parity and employment status may determine the prevalence of successful breastfeeding among them (Awang & Salleh, 2000; Fatimah, Siti Saadiah, Tahir, Hussain Imam, & Ahmad Faudzi, 2010a; Kok Leong Tan, 2011b). The National Health and Morbidity Survey (Fatimah et al., 2010a) showed that prevalence of mothers who lived in rural areas tend to breastfeed their babies are higher compared in the urban residential areas. This is in agreement with another study done by Tan (Kok Leong Tan, 2011a) who suggested that mother’s residential area has role in determining the exclusiveness of breastfeeding giving by mothers. Previous studies reported working factors strongly influence the duration and discontinuation of breastfeeding by mothers in Malaysia (R. Amin et al., 2011; K. L. Tan, 2009). A cross sectional study that was done in a district

of Klang, Selangor also proved that exclusive breastfeeding were commonly practiced if the mothers were Malays, not working, living in rural area, multiparous, non-smoking, share bed with infants, have supportive spouse and giving birth to full term infants (Kok Leong Tan, 2011b).

Similarly, another study done in a neighbouring district to Klang (Petaling) among 290 mothers who were Malaysian working women with children between the ages of six to twelve months reported that the prevalence of breastfeeding discontinuation by mothers was 51% and majority of them only continue to breastfeed their babies three months up to three months postpartum (R. Amin et al., 2011). Working mothers who work at private sector were most likely to breastfeed for shorter duration compared to mothers who work in government sector. They also noted that the implementation breastfeeding policy at the workplace may determine the time of breastfeeding discontinuation by working mothers (Amin et al., 2011; Ms, T, & Sutan, 2014).



Source: (Fatimah S, Jackie H, Tahir A, Yusof MI & Sa'adiah HN, 1999; Institute of Public Health National Institute for Health and Ministry of Health, 2006)

Figure 2.4 : Breastfeeding trends in Malaysia (1996-2006)

2.2.3 Benefits of Breastfeeding to Infants

There have been many studies reporting the benefits of breastfeeding to infants. The immunological properties of breastmilk also have been reported to be protective against respiratory symptoms and necrotising enterocolitis in preterm and very-low-

birth-weight infants. (Blaymore Bier, Oliver, Ferguson, and Vohr, 2002; Rodriguez, Miracle, and Meier, 2005). Breastfeeding has also been associated with lower rates of asthma and allergy. A cohort study from a large randomized trial study by Kramer and colleagues in Belarus, found that infants have a lower risk of gastrointestinal infection if they were exclusively breastfed for six months (Kramer et al., 2003). Acute otitis media (AOM) is common in children below age six and a meta-analysis showed that breastfeeding was associated with significantly lower risks of getting AOM (Ip et al., 2007). This is probably related to the fact that because breastmilk contains immunoglobulins to protect against common bacteria such as *Haemophilus influenzae* and *Streptococcus pneumonia* (Aniansson et al., 1990).

A series of meta-analyses by the World Health Organization on studies that were published between 1996 and 2006 assessed the effects of breastfeeding on obesity/overweight, blood pressure, total cholesterol, type-2 diabetes, and intellectual performance (Bernardo L. Horta, 2007). This review found that breastfeeding is associated with decreased risk of blood cholesterol, lower systolic and diastolic blood pressure and reduced risk of developing type-2 diabetes.

The relationship between breastfeeding and childhood obesity has been a major focus of interest in the past few years. Since 2005, there have been six systematic reviews concluded that breastfeeding had an inverse association with childhood obesity (Arenz, Ruckerl, Koletzko, and von Kries, 2004; Bernardo L. Horta, 2007; Harder, Bergmann, Kallischnigg, and Plagemann, 2005; Ip et al., 2007; Owen et al., 2005; Plagemann and Harder, 2005).

2.2.4 Benefits of Breastfeeding to Mothers

Breastfeeding are also beneficial to the health status of the mothers. The benefits include decreased risk of postpartum haemorrhage (PPH), contraceptive effect, decreased risk of breast and ovarian cancer, earlier return to pre-pregnancy weight, as well as possibly decreased risk of hip fractures and osteoporosis in the postmenopausal period (Collaborative Group on Hormonal Factors in Breast, Möller, Olsson, Ranstam, and Bergkvist, 2002; Danforth et al., 2007; Dewey, Heinig, and Nommsen, 1993; Fatimah S, 2010; Ip et al., 2007). Breastfeeding may have beneficial effects in lowering the incidence of diabetes among women by providing a protective effect on glucose metabolism and subsequent risk of diabetes by lower oestrogen levels during lactation

and women who never breastfed were more likely to develop myocardial infarction compared to those who had breastfed (Stuebe et al., 2009; Stuebe, Rich-Edwards, Willett, Manson, and Michels, 2005; Taylor, Kacmar, Nothnagle, and Lawrence, 2005).

2.3 RELATIONSHIP OF MATERNAL OBESITY AND BREASTFEEDING OUTCOMES

Obesity increases risk of chronic diseases and these contribute to deleterious effects on female reproduction in general and a major impact on maternal health. Thus, overweight and obese women tend to experience medical problems that may increase the possibilities to obstetric complications and caesarean birth when compared with their normal weight counterparts (Sebire et al., 2001).

In recent years, many studies have found maternal obesity also has a significant independent effect on breastfeeding outcomes, which breastfeeding intention, initiation and duration. Overweight and obese women had less intention to breastfeed and were less likely to initiate breastfeeding. They also tended to breastfeed for shorter period, had inadequate milk supply and delayed onset of lactogenesis II (L. H. Amir and S. Donath, 2007; J. L. Baker, Michaelsen, Rasmussen, and Sorensen, 2004; Donath and Amir, 2000, 2008; Hilson, Rasmussen, and Kjolhede, 1997; P. Kitsantas and L. R. Pawloski, 2010; Lepe, Bacardi Gascon, Castaneda-Gonzalez, Perez Morales, and Jimenez Cruz, 2011; R. Turcksin, S. Bel, S. Galjaard, and R. Devlieger, 2012; Rivka Turcksin et al., 2012)

2.3.1 Determinant Factors of Adverse Breastfeeding Outcomes in Obese

Mothers

Women who have a caesarean section delivery may have less mother-infant contact after birth thus delaying first-latching on for the infant. This can lead to delayed lactogenesis II and contribute to poor breastfeeding outcomes (Rasmussen, Hilson, and Kjolhede, 2001). Below are the factors that are associated with poor breastfeeding outcomes in obese mothers.

2.3.1.1 Medical Factors

Obstetric complications that are common among mothers with higher BMI were gestational diabetes mellitus, pregnancy-induced hypertension, presence of polycystic ovary syndrome, prolonged gestation and had an induction ending in caesarean section (L. Amir and S. Donath, 2007; Arrowsmith, Wray, and Quenby, 2011; Caughey, Stotland, Washington, and Escobar, 2009; Rasmussen and Kjolhede, 2004; Denny, Avalos, O'Reilly, O'Sullivan, & Dunne, 2012)

In a prospective population-based cohort study done in Sweden on 3,480 women with a BMI of more than 40 kg/m² and 12,698 women with a BMI between 35.1 kg/m² and 40 kg/m² were compared with normal-weight women (Cedergren, 2004). They found that morbid obese (BMI of more than 40 kg/m²) women have a greater risk of preeclampsia (adjusted OR: 4.82, 95 % CI of adjusted OR: 4.04 - 5.74), antepartum stillbirth (adjusted OR: 2.79, 95 % CI of adjusted OR: 1.94 - 4.02), caesarean delivery (adjusted OR: 2.69, 95 % CI of adjusted OR: 2.49 - 2.90), instrumental delivery (adjusted OR: 1.34, 95 % CI of adjusted OR: 1.16 - 1.56), shoulder dystocia (adjusted OR: 3.14, 95 % CI of adjusted OR: 1.86 - 5.31), meconium aspiration (adjusted OR: 2.85, adjusted OR: 1.60 - 5.07), fetal distress (adjusted OR: 2.52, 95 % CI of adjusted OR: 2.12 - 2.99), early neonatal death (adjusted OR: 3.41, 95 % CI of adjusted OR: 2.07 - 5.63), and large-for-gestational age (adjusted OR: 3.82, 95 % CI of adjusted OR: 3.50 - 4.16).

Using data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) done in United States, Kitsantas and Pawloski found that obese women with medical problems or had obstetric complications were almost 1.4 times more likely to not to initiate breastfeeding and to cease breastfeeding earlier compared to non-obese women (Panagiota Kitsantas and Lisa R. Pawloski, 2010). These findings have also been supported by various studies (Li, Jewell, and Grummer-Strawn, 2003).

There are many factors associated with reduced intention and initiation or early cessation of breastfeeding among obese mothers. One possibility is these women usually experienced delayed onset of lactogenesis II that resulted to cessation of breastfeeding. Lactogenesis is defined as the onset of milk secretion, it can be divided into two phase. Lactogenesis I occurs during pregnancy when the gland becomes sufficiently differentiated to secrete small quantities of specific milk components such as casein and lactose. In addition, lactogenesis II is the onset of copious milk secretion,

stimulated by prolactin. This process usually begins approximately 2 days after birth. Progesterone inhibits lactogenesis II, therefore it is important for the placenta, which is the main source of prenatal progesterone to be expelled during the delivery (Jevitt, Hernandez, & Groër, 2007). However, progesterone hormones are also stored in the adipose tissues, leading to a higher progesterone level in obese women (Rasmussen, Kathleen M.Kjohlhede, 2004).

Meanwhile, prolactin and cortisol are the cofactors in the formulation and production of breastmilk. Overweight or obese women have also been associated with lower prolactin response to suckling, the reduced prolactin in the first two days after delivery predict the lower production of colostrum (Rasmussen and Kjohlhede, 2004). As a result, many obese women tend to give up on breastfeeding due to low milk supply.

Maternal obesity is associated with higher rate of caesarean deliveries (Cedergren, 2004b; Kumari, 2001). In a study done by Nissen and friends in Sweden, they collected maternal blood samples from 37 mothers to investigate the difference in oxytocin, prolactin and cortisol levels between mothers delivered vaginally and by caesarean. They found that mothers who had caesarean delivery has deficit rise of prolactin at 20 to 30 minutes after the onset of breastfeeding and mothers who had vaginal delivery had more oxytocin pulses. They concluded delivery method and the first time the infant breastfed play important role in influencing oxytocin level (Nissen et al., 1996)

Maternal obesity and large babies were also found to be risk factors for postpartum haemorrhage (Drife, 1997) which could contribute to the high rate of maternal deaths in developing countries (Chamberlain, 1992).

2.3.1.2 Anatomical and Physiological

Larger breasts also make the latching difficulty which suggests one of anatomical factors that contribute to adverse breastfeeding outcomes (L. Amir and S. Donath, 2007). Extensive studies has proved that maternal obesity is associated with breastfeeding difficulties (Hilson, Rasmussen, & Kjohlhede, 1997) and also associated with delayed onset of lactogenesis II (Chapman & Pérez-Escamilla, 1999). The possible explanation of the delay among obese women could be due steroid hormone levels, latching difficulties by the infants to the bigger breasts and less ability to perceive breast fullness (Chapman & Pérez-Escamilla, 1999).

Obese women also felt embarrassed and discomfort to breastfeed in public as well as have low body image are the psychological factors which decrease the likeliness of initiating breastfeeding (L. Amir and S. Donath, 2007; Mok et al., 2008).

Mastitis is a significant and common problem for lactating women, especially in primiparous breastfeeding mothers, often due to attachment difficulties. Nipple pain during feeding, blocked ducts and stress were significant predictors of mastitis. Development of mastitis commonly results in early cessation of breastfeeding (Catherine, 1998, Carmichael 2001 and Mary Paton 2001).

2.3.1.3 Socio-Cultural Factors

Obese women were less likely had intention to breastfeed (Turcksin, Bel, Galjaard, & Devlieger, 2014) and if they did, they intended to breastfeed for a shorter period compared to other women (Hilson, Rasmussen, & Kjolhede, 2004).

Obese women also were less likely to participate in any health screening for example pap smears and mammography (Cohen et al., 2008). This may link to their own health beliefs or to feelings of embarrassment of exposing their body parts (Sarwer, David B.; Wadden, Thomas A.; Foster, 1998), thus they were less likely to want to breastfeed (Barnes, Stein, Pollock, & Team, 1997). Furthermore, women who are obese are more likely belong to a social group that were less likely to breastfeed in public (Mok et al., 2008a). Difficulty to breastfeed discreetly while doing it in modesty were the main problems of women with larger breasts (Amir & Donath, 2007).

2.3.1.4 Psychological factors

Obese women were more likely to have negative body image perception compared to non-obese women (Zanardo et al., 2014). Women with extra concern on their body shape and weight had less intention to breastfeed (Barnes et al., 1997) and shorter duration of breastfeeding (Hauff & Demerath, 2012).

Obesity has been associated with depression and is mediated by body image dissatisfaction (Gavin, Simon, & Ludman, 2010). Obese women were more likely to develop postpartum depression compared to normal weight women (Lacoursiere, Barrett-Connor, O'Hara, Hutton, & Varner, 2010). Which in turn, postpartum depression may decrease the rate of breastfeeding (Hamdan & Tamim, 2012).

2.3.2 Time of Initiation of Breastfeeding

According to World Health Organization, early initiation of breastfeeding is defined as infants who were put to the breast within one hour of birth (WHO, 2008b). Meanwhile, late initiation indicated breastfeeding that began after the first day of life. Delayed timing of breastfeeding initiation is related to the increasing risk of neonatal mortality (Edmond et al., 2006).

Using data from Prevention's Pregnancy Risk Assessment Monitoring System (PRAMS) that was collected during the year of 2004 until 2008 in Illinois, Maine, and Vermont USA showed that obese mothers was less likely to initiate breastfeeding compared to the normal weight mothers. They are also had higher probabilities of introducing pacifiers in the hospital [OR: 1.31 (1.17-1.48) 95 % CI, $p < 0.0001$] and lower chances to initiate breastfeeding as early as one hour after delivery [OR 0.55, (0.49-0.62) 95 % CI, $p < 0.0001$] (Kair and Colaizy, 2016). Meanwhile, early introduction of pacifier to the infants should be discouraged as it is negatively linked to the duration of 'exclusive breastfeeding' (Riva et al., 1999).

A total of 688 pregnant women were recruited from the University of North Carolina hospitals between January 2001 and June 2005 in a prospective cohort study. They were then followed up till three months after delivery. The objective of this study is to investigate associations of pre-pregnancy obesity, psychological factors during pregnancy, and breastfeeding initiation. This study found that mothers who were overweight or obese prenatally (BMI more than 26 kg/m²) had almost four times higher odds of not initiating breastfeeding compared with underweight or normal weight women (risk ratio, RR = 3.94 [95% CI 2.17, 7.18]) after adjusting for race, poverty level, education level, and marital status. However they did not find any association between psychological factors during pregnancy and breastfeeding initiation among overweight/obese women (Mehta, Siega-Riz, Herring, Adair, and Bentley, 2011).

This is also been supported by another population-based cohort study done in Florida between year 2004 to 2009. Although the rates of breastfeeding initiation is increased from 77.1 % in 2004 to 80.1 %, obese women had significantly lower odds of initiating breastfeeding [aOR 0.84 (95 % CI 0.83–0.85, $p < 0.0001$)], after adjusting for confounders such as maternal age, race/ethnicity, education, maternal health, prenatal care, and infant characteristics such as birth weight. Moreover, they also found

that both maternal race/ethnicity and education were the strong predictors of the decision to initiate breastfeeding among the population (Thompson et al., 2013).

There are also few socio-demographic factors exert positive influence towards breastfeeding initiation. The mothers having been breastfed herself, higher social class, had social supports from the nurses (Riva et al., 1999), higher education background and delivered in health facilities (Adhikari, Khanal, Karkee, and Gavidia, 2014) were positively associated with initiation of breastfeeding.

A prospective cross-sectional study on 491 pregnant mothers from antenatal clinic of Coombe Women and Infants University Hospital, Dublin was conducted from 2004 until 2006. The objective was to assess factors associated with breast-feeding initiation. This study exerts a positive relationship between socio-demographic factors and breastfeeding initiation. Mothers who were aged more than 35 years old, had tertiary education background, reported to receive positive postnatal encouragement to breastfeed from their partners and had a positive antenatal intention to breastfeed had significant positive association with breastfeeding initiation (Tarrant, Younger, Sheridan-Pereira, White, and Kearney, 2010).

Time of initiation of breastfeeding also will have a significant influence to the duration of breastfeeding. A prospective cohort study was conducted in two districts in Kelantan, Malaysia between year 2011 and 2012 that was aimed to investigate factors predicting cessation of 'exclusive breastfeeding'. The study concluded that mothers whom delayed initiation of breastfeeding and had breastfeeding difficulties were more likely to discontinue 'exclusive breastfeeding' (Tengku Alina, Wan Abdul Manan, and Mohd Isa, 2013).

A study in Mauritius among 500 mothers in 2011 stated that there are few reasons on why mothers fail to initiate breastfeeding as early as one hour after delivery. In Mauritius, the prevalence of caesarean deliveries is on the rise and this study has found the timing of breastfeeding initiation was significantly associated with mode of delivery ($\chi^2 = .212$, $p < 0.001$). This delayed breastfeeding initiation could be due to difficulties experienced by mothers who had caesarean delivery such as pain, tiredness, effect of anaesthetic procedure as well as mostly the infants were kept in the baby nursery. This will lead to delay onset of lactation (Motee, Ramasawmy, Pugo-gunsam, and Jeewon, 2013). In addition, maternal obesity was associated with an increased risk of caesarean delivery (Zhou et al., 2015).

Another cohort study was conducted to investigate association between sociodemographic factors and breastfeeding initiation in Latina women from two hospitals located in San Francisco Bay Area. Initiation rate was 95.7 %, 177 from 185 mothers participated. They found that mothers who had being breastfed were more likely to initiate breastfeeding compared to who were breastfed previously. However, having more than one child was not associated significantly increase the odds of early initiation. Furthermore, mothers who initiated breastfeeding had a significant higher score of Iowa Infant Feeding Attitude Scale (IIFAS) compared to who did not. Higher IIFAS score means higher maternal attitudes towards breastfeeding (Holbrook, White, Heyman, and Wojcicki, 2013).

Thus, it can be concluded that maternal age, type of delivery, parity, breastfeeding supports received from close family members and healthcare professionals, education and employment status as well as breastfeeding difficulties such as colostrum/breastmilk insufficient were the main barriers to initiation of breastfeeding (Motee et al., 2013). Socio-demographic factors such as maternal age, maternal education background, maternal education level, household income, parity and residential areas significantly affect breastfeeding initiation. This will later have correlation with duration of breastfeeding.

2.3.3 Intention to Breastfeed

Intention is an immediate precursor of behaviour and is defined as the perception of an individual towards performance of a particular behaviour (Ajzen & Fishbein, 1980). In this study breastfeeding intention was defined as the degree of confidence about practising optimal breastfeeding behaviour. Intention to breastfeed is closely related to early initiation to breastfeed and could also be a predictor of longer duration of breastfeeding (Tarrant et al., 2010).

In the Avon Longitudinal Study of Parents and Childhood (ALSPAC) from Bristol (United Kingdom), studied the relationship between prenatal infant feeding intention and initiation and duration of breastfeeding (Donath, Amir, & The, 2003). The study confirmed that maternal intention during the prenatal period predicts both initiation and duration of breastfeeding.

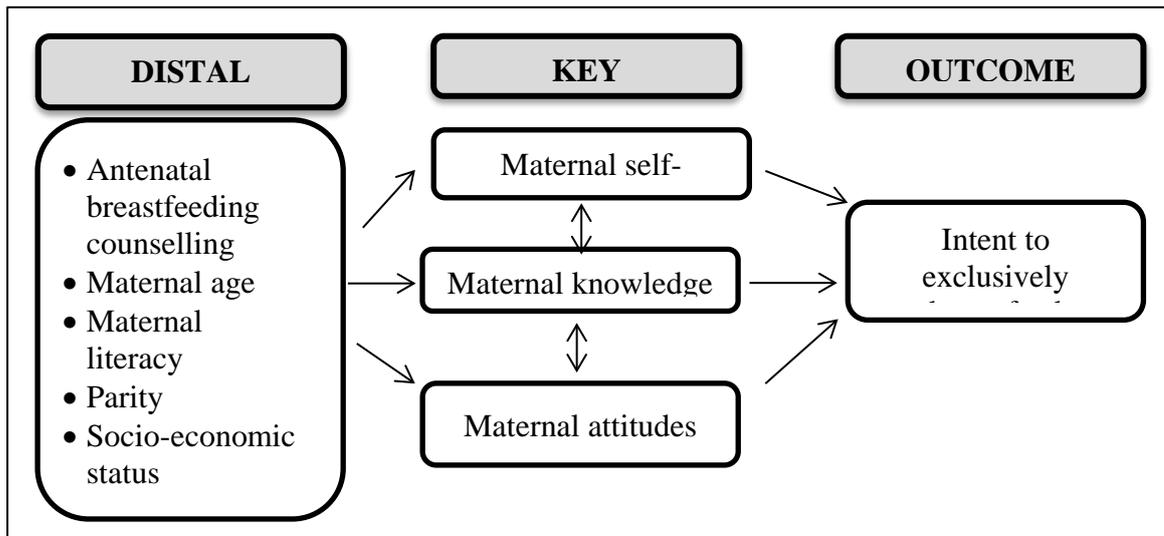
In a prospective cohort study from Melbourne, a total of 889 women were randomly selected and were followed from delivery until sixsix months postpartum.

Factors that were positively associated with ‘any breastfeeding’ at six months postpartum were ‘having strong desire to breastfeed’ (aOR 2.18, 95% CI 1.45, 3.29), having been breastfed before as a baby (aOR 1.73, 95% CI 1.19, 2.54), being born in an Asian country (aOR 1.57, 95% CI 1.57, 5.36) and older maternal age (aOR per five year increase in age 1.58, 95% CI 1.35, 1.86). However, factors that are negatively associated are women ‘having no intention to breastfeed for six months’ or more (aOR 0.41, 95% CI 0.25, 0.67), (Forster, McLachlan, & Lumley, 2006).

In a comparative cross sectional study done among 1200 Syrian and Jordanian mothers in 2008 that investigates the factors affecting ones’ intention to breastfeed. They found that mothers with positive attitudes towards breastfeeding, breastfeeding experience and breastfeeding supports from partners had higher odds to intend to breastfeed (Al-Akour, Khassawneh, Khader, Ababneh, & Haddad, 2010).

Few studies had reported that having positive attitudes toward breastfeeding were linked to had more intention to breastfeed (Kong & Lee, 2004; Persad & Mensinger, 2008).

Meanwhile, in a cross-sectional study done in a remote area of Bangladesh, a total of 2400 mothers were recruited from districts of Karimganj and Katiadi. They conducted a study based on Theory of Planned Behaviour (TPB), to seek better understanding on the role of breastfeeding knowledge, attitude and self-efficacy in the prediction of maternal breastfeeding intention. This study found the rate of breastfeeding intention was higher among literate mothers and those who received counselling or information regarding nutrition or breastfeeding. They also reported knowledge was associated with ‘exclusive breastfeeding’ (EBF) intention (OR 2.47; 95 % CI 1.74, 3.51), attitudes towards EBF (OR 1.68; 95 % CI 1.31, 2.16) and self-efficacy (OR 1.72; 95 % CI 1.23, 2.40) were independently associated with intention to breastfeed. They concluded distal socio-demographic factors and programmatic factors contribute to proximal factors given that the mothers received appropriate breastfeeding knowledge, had positive attitudes and higher level of self-efficacy may influence EBF intention (Figure 2.5) (Thomas et al., 2014).



Source: (Thomas et al., 2014)

Figure 2.5 : Conceptual framework for intention to exclusively breastfeed

Meanwhile in the Infant Feeding Practices Study II (IFPS II) done in United States, a longitudinal cohort study of women followed since their late pregnancy until their infant’s first year of life investigates the associations of maternal obesity and psychosocial factors with breastfeeding intention. All psychosocial factors include social knowledge, social influence, attitudes and behavioural beliefs and maternal confidence were associated with breastfeeding intention. However, they reported BMI category was not significantly associated with breastfeeding intention, but, obese women had lower tendencies of ever breastfeeding and were at higher risk of an earlier exclusive and ‘any breastfeeding’ cessation (Hauff, Leonard, & Rasmussen, 2014a).

2.3.3.1 Breastfeeding Self-Efficacy

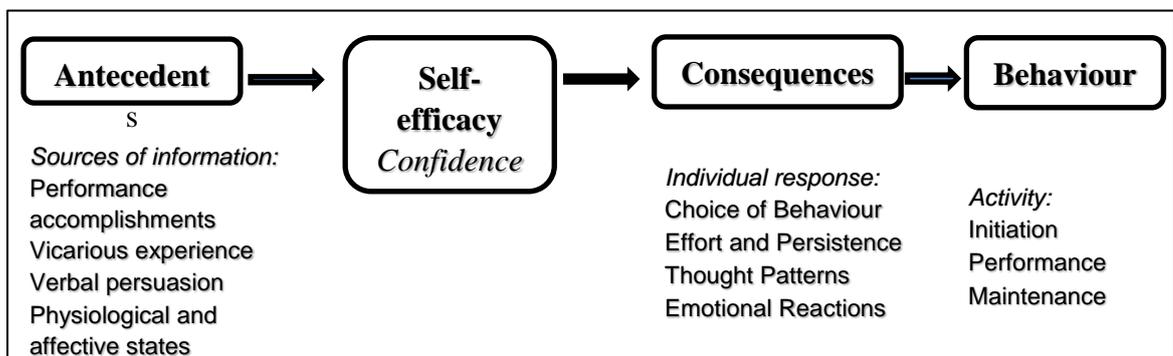
Breastfeeding self-efficacy is defined as a mother’s confidence in her capability to breastfeed her infant (Dennis & Faux, 1999). Higher level of maternal self-efficacy has been associated with positive breastfeeding outcomes in terms of duration and exclusivity (Chezem, Friesen, & Boettcher, 2003; Henshaw, Fried, Siskind, Newhouse, & Cooper, 2015; Loke & Chan, 2013; Wu, Hu, McCoy, & Efirid, 2014).

Theoretically, breastfeeding self-efficacy is predisposed to these four sources of information: (a) performance accomplishments (e.g., previous breastfeeding experiences), (b) vicarious experiences through observational learning (e.g., peer counselling, witnessing other mother breastfeed, peer counselling), (c) verbal persuasion (e.g., appraisals from lactation consultants, family members or close friends)

and (d) physiological and/or affective states (e.g., own experience of either positive interpretations like excitement/satisfaction or negative interpretations like pain, fatigue, anxiety and stress) (Bandura, 1978; Dennis & Faux, 1999).

Refer to the Figure 2.6 below, self-efficacy of one's may influence thoughts and actions through these four broad processes: ((a) choice of behaviour (e.g.: setting goals or confused by her ability to breastfeed), (b) the amount of effort and being persistence (e.g.: putting an effort, withstand the difficulties that may arise, seek for motivation and support to maintain breastfeeding), (c) thought patterns (e.g.: predict success by analyse the problems and defeat the negative thoughts of quitting breastfeeding) and (d) emotional reactions (e.g.: either to perceived themselves as successful and satisfied with breastfeeding experiences even when having difficulties during breastfeeding or being doubtful, had negative thoughts about breastfeeding and more likely to terminate breastfeeding when having difficulties).

As a result of a higher self-efficacy, the mothers shall initiate breastfeeding earlier, maintain exclusivity up to six months and increase the duration of breastfeeding (Dennis & Faux, 1999).



Source: (Dennis & Faux, 1999)

Figure 2.6 : Self-Efficacy Framework

In an experimental study on 74 mothers in a city of the central of China, Wuhan, they investigate the effects of self-efficacy intervention on breastfeeding self-efficacy, duration and exclusivity at four and eight weeks postpartum. The subjects were assigned equally to two groups i.e. intervention (n=37) and control (n=37) group. The result showed intervention group had higher mean of breastfeeding self-efficacy scores at four weeks ($F=56.67$, $p < 0.001$, $R^2=0.74$) and eight weeks ($F=53.79$, $p < 0.001$, $R^2=0.74$) compared to the control group. They also found that women with higher breastfeeding

self-efficacy scores were more likely to exclusively breastfeed at four weeks (OR=1.83, $p < 0.01$) and at eight weeks (OR=1.61, $p < 0.01$) (Wu et al., 2014).

2.3.3.2 Breastfeeding attitude

Intention to breastfeed is associated with positive breastfeeding attitudes (Persad & Mensinger, 2008). Duration of breastfeeding showed a positive association with maternal attitude towards breastfeeding (Cheah & Poh, 2014; S. Chen et al., 2013; Kronborg & Vaeth, 2004; Mossman, Heaman, Dennis, & Morris, 2008a). Meanwhile, breastfeeding attitudes also predicted early initiation of breastfeeding (S. Chen et al., 2013; Kohlhuber, Rebhan, Schwegler, Koletzko, & Fromme, 2008a; Mossman, Heaman, Dennis, & Morris, 2008b). Maternal attitudes plays an important role in choosing infant feeding method (Kong & Lee, 2004).

De la Mora et al. developed Iowa Infant Feeding Attitude Scale (IIFAS) to measure attitudes toward infant feeding (A la Mora, Russell, Dungy, Losch, & Dusdieker, 1999). The scale provides a reliable and valid assessment in predicting choice of infant feeding method. Total score could range from as low as 17 which indicates high favourable towards artificial feeding and higher score of more than 85 indicates high favourable towards breastfeeding. While a score of 51 indicated neutral attitude.

2.3.3.3 Breastfeeding Knowledge

Breastfeeding knowledge is defined as understanding or information acquired by a mother through experience or education in breastfeedin. There are nine elements of breastfeeding knowledge as stated by Handayani and Kosnin, they were (1) Knowledge about breastfeeding advantages to baby, (2) Knowledge about breastfeeding advantages to mother, (3) Knowledge about colostrums, (4) Knowledge about effective feeding, (5) Knowledge about duration of feeding, (6) Knowledge about complementary feeding, (7) Knowledge about problem with breastfeeding, (8) Knowledge about practical aspect of breastfeeding, and (9) Knowledge about breastfeeding skill. (Handayani, Kosnin, & Jiar, 2012).

There is a high significant correlation between maternal knowledge and their attitude towards breastfeeding (Saied, Mohamed, Suliman, & Anazi, 2013). Mother's

knowledge and positive attitudes are important predictor in influencing infant feeding choice followed by husband's support (Kong & Lee, 2004). Higher knowledge in breastfeeding would influence mother's intention to breastfeed (Wang, Lau, Chow, & Chan, 2014) as well as longer duration of breastfeeding (Kang, Choi, Hyun, & Lee, 2015; Kronborg & Vaeth, 2004).

2.3.4 Duration of Breastfeeding and Maternal Obesity

Breastfeeding duration is the length of time for 'any breastfeeding' since initiation of breastfeeding to the introduction of solid/semi solid food together with breastfeeding until the child is weaned off from breastfeeding. Factors that were associated with breastfeeding duration are categorised and discussed below.

2.3.4.1 Socio-Demographic Factors

The major socio-demographic factors that affect breastfeeding duration were maternal age, education background, income and employment status and parity (Thulier & Mercer, 2009a).

There were strong evidence that increased maternal age (J A Scott, Aitkin, Binns, & Aroni, 1999) (Blyth et al., 2004), mothers with higher education (Tarrant, Younger, Sheridan-Pereira, & Kearney, 2011) (J A Scott et al., 1999) (Awang & Salleh, 2000) and multiparous mothers (Kok Leong Tan, 2011b; Wang et al., 2014) were more likely to breastfeed longer. In addition, mothers who were working part-time or being housewives and had lower family income also had higher odds to breastfeed longer (Wang et al., 2014).

However, mothers who had returned earlier to work after confinement had lower possibility to breastfeed longer (Jane A Scott, Binns, Oddy, & Graham, 2006a), (Wang et al., 2014) (Tarrant et al., 2011). Similarly, to the mothers who smoked during pregnancy (Chaves, Lamounier, & César, 2007; Jane A Scott et al., 2006a;) (Bosnjak, Grguric, Stanojevic, & Sonicki, 2009) (Cox, Binns, & Giglia, 2015) and who were younger than 30 years old were less likely to breastfeed longer (Chaves et al., 2007; Jane A Scott et al., 2006a).

In the meantime, in the context of Malaysia, maternal ethnicity and living area are also the predictors of breastfeeding duration (Awang & Salleh, 2000; Kok Leong

Tan, 2011b). Rural women are more likely to breastfeed longer than urban women, whereas, Chinese were more prone to cease 'exclusive breastfeeding' earlier than Malay and Indian mothers (Awang & Salleh, 2000; Kok Leong Tan, 2011b).

In a recent study aimed to determine factors associated with 'exclusive breastfeeding' in Peninsular Malaysia, this cross-sectional study involved 682 pairs of mother-infant with infants up to six months from selected government health clinics in Klang, Selangor (Kok Leong Tan, 2011b). This study found the determinants of 'exclusive breastfeeding' were maternal ethnicity, living area, maternal employment status, maternal smoking status and parity. Mothers from rural area were more likely to exclusively breastfed their babies longer than mothers lived in urban area (OR 1.16; 95% CI: 1.03, 1.89). Chinese mothers were less likely to exclusively breastfed compared to Malay mothers (OR 0.20; 95% CI: 0.11, 0.35). Non-working (OR 3.66, 95 % CI; 2.45, 5.46) and non-smoking (OR 5.18, 95 % CI: 1.59, 45.05) mothers were 3.5 times and five times, respectively to exclusively breastfed their babies. In addition, multiparous mothers were almost two times more chance to exclusively breastfeed their babies compared to primiparous mothers (OR = 1.68; 95% CI: 1.17, 2.42). It is possibly due to the mothers had previous breastfeeding experience which made them more likely to breastfeed their babies (Blyth et al., 2004).

In another cross-sectional study that investigated the association between non-'exclusive breastfeeding' at four weeks and maternal, paternal, obstetric and infant factors in Klang, Selangor, Malaysia. Tan (K. L. Tan, 2009) found Indian ethnic mothers were four times more likely to not exclusively breastfeed their babies compared to other ethnics (aOR 4.06, 95 % CI 2.41, 6.84). Equally to working mothers (aOR 3.55, 95 % CI: 2.25, 5.60), mothers from higher household income of more than RM 3000 (aOR 1.90, 95% CI: 1.04, 3.45), mothers who smoke (aOR=7.27, 95% CI: 1.26 , 55.53) and mothers with more than one child (aOR=1.97, 95% CI: 1.28, 3.05).

2.3.4.2 Biophysical Factors

Biological factors include insufficient milk supply, infant health problems, maternal obesity, breastfeeding difficulties and types of delivery.

Extensive studies have proved that early introduction to pacifier (Chaves et al., 2007; Jane A Scott, Binns, Oddy, & Graham, 2006b), mothers experienced breastfeeding difficulties (Jane A Scott et al., 2006a) (Tengku Alina et al., 2013a),

delayed initiation of breastfeeding (Chaves et al., 2007) (Tengku Alina et al., 2013a), had caesarean delivery (Semenic, Loiselle, & Gottlieb, 2008), infants being fed with in-hospital formula supplement (Semenic et al., 2008) and were born prematurely (K. L. Tan, 2009) were less likely to fully breastfed or any breastfed their infants at the different time points.

Main reasons to wean were maternal perception of insufficient breast milk (Tarrant et al., 2011; Wang et al., 2014) (32.7 %), tiredness and fatigue (Wang et al., 2014) and return to work (Tarrant et al., 2011) (Wang et al., 2014) were the main reasons of weaning breastfeeding .

In the meantime, factors related to the longer duration of breastfeeding were mothers who delivered vaginally (Ishak et al., 2014), early initiation of breastfeeding (Wang et al., 2014), mothers resume to work after six months postpartum (Cox et al., 2015) and mothers with BMI lower than 30 kg/m² (Cox et al., 2015).

In the meantime, maternal obesity is defined as a BMI of more than 30 kg/m² and maternal overweight as a BMI between 25 and 29.9 kg/m² (World Health Organisation, 2012). Wide extensive literature had suggest maternal obesity is related to delay initiation, shorter duration and early cessation of breastfeeding (Amir & Donath, 2007; Turcksin et al., 2014b; Wojcicki, 2011).

In the Infant Feeding Practices Study II (IFPS II), a prospective cohort study conducted in United States between 2005 and 2007, they reported women with higher pre-pregnancy BMI had psychosocial characteristics that lead to poor breastfeeding outcomes. Even though intention to breastfeed did not differ between BMI classification, but prepregnancy BMI was significantly associated with breastfeeding confidence ($p < 0.0001$), social influence toward breastfeeding ($p = 0.02$) and breastfeeding knowledge ($p < 0.0001$). Obese women showed to have shorter duration of 'exclusive breastfeeding' by six weeks than other BMI category. Similarly to overweight women, who had a median duration of 'any breastfeeding' shorter by 9 weeks. Maternal obesity pose a greater risk of early cessation of both exclusive and 'any breastfeeding' (Hauff et al., 2014a).

Correspondingly to a study done among 37,459 women lived in Denmark in Danish National Birth Cohort, they were followed since pregnancy until 18 months postpartum. This study found as the prepregnancy BMI increased, the risk of termination of 'any breastfeeding' also steadily rose. Relative risk of termination increased from 1.12 for overweight women (RR 95 % CI; 1.09, 1.16) to 1.39 times in

the morbid obese (BMI \geq 40 kg/m²) (95 % CI; 1.19, 1.63) compared to normal BMI women (Baker, Michaelsen, Sørensen, & Rasmussen, 2007).

Lastly, a prospective cohort study done in Athens, Greece in 2004 on 312 mothers they discovered BMI was negatively associated with the maintenance of breastfeeding. At 40 days postpartum, overweight (OR: 0.57, 95 % CI: 0.34, 0.91, $p < 0.05$) and obese (OR: 0.76, 95 % CI: 0.54, 0.99, $p < 0.05$) women were 43 % and 24%, respectively less likely to breastfeed. Furthermore, both overweight and obese women were 50% lower odds to breastfeed at six months postpartum (OR: 0.50, 95 % CI: 0.28, 0.90, $p < 0.01$). Mothers who delivered via caesarean section were less likely to initiate breastfeeding within one hour after delivery (OR: 0.24, 95% CI: 0.11, 0.49) and maintenance of breastfeeding (OR: 0.42, 95% CI: 0.20, 0.89) (Theofilogiannakou, Skouroliakou, Gounaris, Panagiotakos, & Markantonis, 2006).

2.3.4.3 Psychosocial Factors

Psychosocial factors include family and professional support, maternal intention, maternal interest/self-efficacy and confidence in breastfeeding (Thulier & Mercer, 2009a).

Longer duration of 'exclusive breastfeeding' was associated with mothers who had positive breastfeeding intention during pregnancy (Wang et al., 2014), higher maternal breastfeeding self-efficacy, (Semenic et al., 2008) (Leahy-Warren, Mulcahy, Phelan, & Corcoran, 2014), attended prenatal class (Semenic et al., 2008), positive infant feeding attitude (Leahy-Warren et al., 2014) (Semenic et al., 2008), intended to breastfeed longer (Blyth et al., 2004) (Bosnjak et al., 2009), had higher breastfeeding confidence (Blyth et al., 2004) and intended to breastfeed during pregnancy (Bosnjak et al., 2009).

However, since the partners are the closest person with the mothers, their positive attitude towards breastfeeding and their active engagement during breastfeeding also were linked to longer duration of breastfeeding (Semenic et al., 2008; Şencan, Tekin, & Tatli, 2013). In addition, paternal preference towards breastfeeding influence the mothers decision to breastfeed (J A Scott, Binns, & Aroni, 1997). Active supports from the partners made the mothers feel more capable and confident about breastfeeding and therefore lead to the maintenance of breastfeeding (Mannion, Hobbs, McDonald, & Tough, 2013). Besides, by teaching the partners on the management of

‘any breastfeeding’ difficulties could increase the rates of full breastfeeding (Pisacane, Continisio, Aldinucci, D’Amora, & Continisio, 2005).

Intention is the precursor of breastfeeding practice and could predict the duration of breastfeeding, it is important to study the role of psychosocial factors which were breastfeeding knowledge, attitudes and self-efficacy (Thomas et al., 2014). In another perspectives, women’s breastfeeding intention, her breastfeeding self-efficacy and her social support are the modifiable factors that positively influenced breastfeeding duration (Meedya, Fahy, & Kable, 2010).

In the Infant Feeding Practices Study II (IFPS II) that was discussed earlier, they found that women who were more knowledgeable, had higher social influence, had positive attitude/behavioural beliefs about breastfeeding and increased level of confidence in breastfeeding predicted their longer duration of both exclusive and ‘any breastfeeding’ than they planned to (Hauff, Leonard, & Rasmussen, 2014).

As seen in a cross sectional study done among 682 mother-infant pairs in Malaysia, Tan found that supportive husband had positive relationship with ‘exclusive breastfeeding’. Mothers with supportive husbands on breastfeeding were four times higher odds to exclusively breastfeed their babies compared to mothers who had non-supportive husbands (OR 4.20 95% CI: 1.12, 15.75) (Kok Leong Tan, 2011b).

This is supported by a qualitative study done in a group of professionals women in Kuala Lumpur, Malaysia. The aim of this study is to seek for breastfeeding difficulties and social supports and motivation they might receive. Deficit knowledge in breastfeeding as well as lack of moral supports from the close families and healthcare providers and had breastfeeding problems such as engorged breast, cracked nipple and inverted nipple are the main causes of poor breastfeeding outcomes as reported by the mothers. Furthermore, a non-friendly and lack of breastfeeding facilities at workplace also contribute to these. However, husband supports and maternal positive attitudes are the main motivation of successful breastfeeding outcomes among majority of the mothers (Nazatul, 2009).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 STUDY DESIGN AND SETTING

Selangor is the most populous state in Malaysia with 5.46 million persons in 2011. This study centres on four major cities in Selangor which were Shah Alam, Klang, Sungai Buloh and Gombak. Shah Alam was the most greatly populated city with 1,812,633 people, followed by big cities such as Sungai Buloh (1,765,49), Klang (861,189) and Gombak (682,226) as tabulated by the Department Statistics of Malaysia (Department of Statistics, 2011).

A prospective cohort design is used to study mothers selected from three large districts involved four major cities include Sungai Buloh (Paya Jaras, Merbau Sempak and Sungai Buloh Mother and Child health clinics), Klang (Meru, Kapar and Bandar Botanik Mother and Child health clinics), Shah Alam (Seksyen 7 and Seksyen 19 Mother and Child Health clinics) and Gombak (Gombak Setia and Selayang Baru Mother and Child health clinics).

Meanwhile, in Malaysia, there are few ethnicities. Malay ethnic group was the majority population with 19.5 million (68.6 %) followed by Chinese (23.4 %: 6.6 millions), Indians (7.0 %: 2.0 million) and other Indigenous minority groups that made up the remaining one percent. This study was only conducted among Malay women because no studies were done on the relationship between maternal obesity and breastfeeding outcomes among Malay mothers. On top of that, the prevalence of overweight and obesity is high among the Malays (Institute for Public Health (IPH), 2015).

The inclusion criteria were Malay mothers aged between 20 to 40 years old with a singleton pregnancy. They were excluded if they were unable to answer the questionnaires due to limited understanding, illness or if health professionals advised that participation could be detrimental to the participant.

3.2 SAMPLE SIZE CALCULATION

Sample size calculations were made using Statcalc V6 from Epi Info 2000 (<http://wwwn.cdc.gov/epiinfo/7/>). Based on previous studies in other parts of Malaysia it is assumed that the prevalence of “any breastfeeding” at six months in Malay mothers will be 80%. The proportion of Malay mothers who are overweight (BMI>25) is estimated at 50% (Noor Safiza MN, 2006). With a 5 % significance level and power of 80% a sample of 600 mothers will allow the detection of a 12% difference in breastfeeding rates at six months between the two groups.

3.3 RECRUITMENT AND DATA COLLECTION PROCESS

Figure 3.1 shows the flow of the data collection process of this study.

Expectant mothers were first recruited during their antenatal examination at the selected government Mother & Child Health Clinics. Upon agreement to participate in this study, set of questionnaires on socio-demographics as well as infant feeding intention were asked. Periodically follow up was performed at one month, three months and six months after delivery to acquire information on breastfeeding practice and infant feeding. During the one month follow-up, the exclusion criteria were expanded to mothers and infants who were seriously ill or if the infant passed away.

At 36 weeks gestation and six months after delivery, anthropometric measurements such as weight and height were taken from the motherst. The follow-up interviews were conducted during the children’s routine examination at clinics for vaccination. A follow-up through telephones or home-visit were carried out if they were unable to attend on the appointment dates.

Both research assistants were trained by the candidate for the interview. A standardized protocol were developed for the interview to ensure consistency of the data collection between research team members.

Information on the mothers’ weight during pregnancy, at one and three months after delivery were acquired from their medical records. The research team had access to this information from the mothers’ records as part of the local approval process.

All the validated questionnaires were translated into Malay and back translated into English. The translation were assessed using a focus group of mothers, except for

the Iowa Feeding Attitude Scale (IIFAS) and food frequency questionnaire which have been previously translated and validated.

3.3.1 Pilot study

A pilot study was undertaken prior to the major study in order to test that the methods to be used in the actual study are reliable under field conditions. In this pilot study, a small sample of 15 subjects were recruited from selected Government Health Clinic in Selangor. These women were not included in the main study. The data were not included in the final analysis.

3.3.2 Phase 1: Recruitment

The research team (candidate and two part time research assistants) approached the mothers who attended the clinics for their routine antenatal examinations monthly until 35 weeks of gestation and then weekly from 36 weeks gestation until delivery. The inclusion criteria were mothers aged between 20 to 40 years old with a singleton pregnancy between second and third trimester. They were excluded if they were unable to answer the questionnaires given due to limited understanding, illness or if health professionals advised the research team that participation could be detrimental to the participant. The participants were informed of the background and objectives of this study. Participation is warranted when the participants signed off the consent form provided.

3.3.3 Phase 2: One month postpartum

The mothers were later contacted for their first follow-up at one month after delivery. The mothers were excluded if either the mother or infants were seriously ill or if an infant death occurred.

Detailed information on infant feeding practice was obtained particularly on the obstetric histories, initiation of breastfeeding and current practice and problems during postnatal period as well as newborn care.

3.3.4 Phase 3: Three months postpartum

The mothers were followed-up during their visit to the health clinics. Further infant feeding information were obtained including breastfeeding practices, introduction of complementary foods, social support received from partner and family, problems in breastfeeding and information on the health of the mothers and infants

3.3.5 Phase 4: Six months postpartum

The mothers were followed-up during their visit to the health clinics. Further infant feeding information were obtained including breastfeeding practices, introduction of complementary foods, social support received from partner and family, problems in breastfeeding and information on the health of the mothers and infants.

Flow chart of research activities

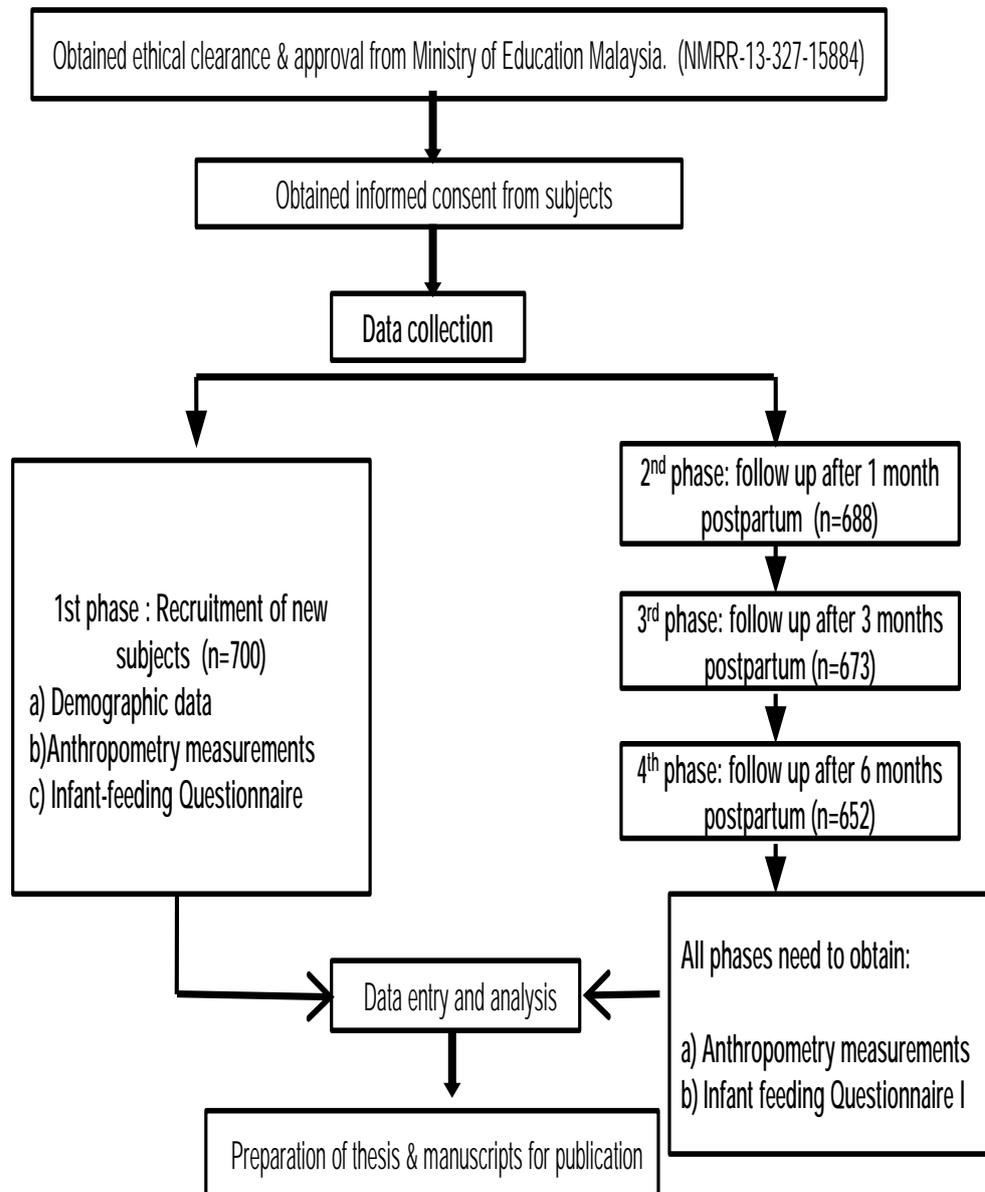


Figure 3.1 : Flowchart of Data Collection Process

3.4 RESEARCH INSTRUMENTS

3.4.1 Socio-Demographic Profile

A set of questions on socio-demographic data included socioeconomic status, education background, medical history and family medical history were asked to the mothers. The presence of any complications that occurred during the pregnancy as well as blood glucose and haemoglobin variables, urine analysis and blood pressure also were recorded.

3.4.2 Infant Feeding Profile

Another set of questionnaires regarding breastfeeding intention, initiation and duration as well the associated factors including psychosocial and biomedical were asked to the mothers. A follow-up questionnaire which consisted of information on current feeding practices and the types of problems experienced during the period of breastfeeding (J. A. Scott, Aitkin, Binns, and Aroni, 1999) were obtained during the follow-ups. This questionnaire has been used extensively and validated in any breastfeeding studies in Kuwait, Vietnam, China and Australia (Dashti, Scott, Edwards, and Al-Sughayer, 2010; Duong, Binns, and Lee, 2004; Qiu, Zhao, Binns, Lee, and Xie, 2008; J. A. Scott et al., 1999).

3.4.3 Iowa Infant Feeding Attitude Scale (IIFAS)

The IIFAS consists of 17-item questions to measure attitudes and knowledge of mothers (Mora, Russell, Dungy, Losch, and Dusdieker, 1999) were used during their 36 weeks antenatal check-ups. It has been translated in Malay and validated to be used within Malay population. Mothers were asked to indicate the extent they agreed with each statement on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Approximately half of the items were worded favourably towards breastfeeding and the remaining favoured formula feeding. Items that favoured over formula feeding were reverse-scored and a total score was computed by summing all items. Total attitude scores range from 17 to 85 with higher score reflecting attitudes more positive to breastfeeding. Total scores were grouped into the following three

categories: (1) positive to breastfeeding (70–85), (2) neutral (49–69), and (3) positive to formula feeding (17–48).

3.4.4 Anthropometric Measurement

3.4.4.1 Weight Measurement

Weight measurements were taken using the SECA 813 Digital Flat Scale Body Meters as shown in Figure 3.2. The scale was placed on a level and uncarpeted surface. The scale was checked to be ‘zero’ before any measurements taken. Participants were advised to wear light clothing, remove shoes, purses/handbags, mobile phones, keys and any accessories (such as watch, bangle/bracelets, and heavy buckle belts) and to stand still in on the scale in the middle of the scale’s platform without touching anything. Weight on the scale was read and recorded instantly. This equipment was calibrated at periodic intervals to ensure acceptable accuracy and reliability.

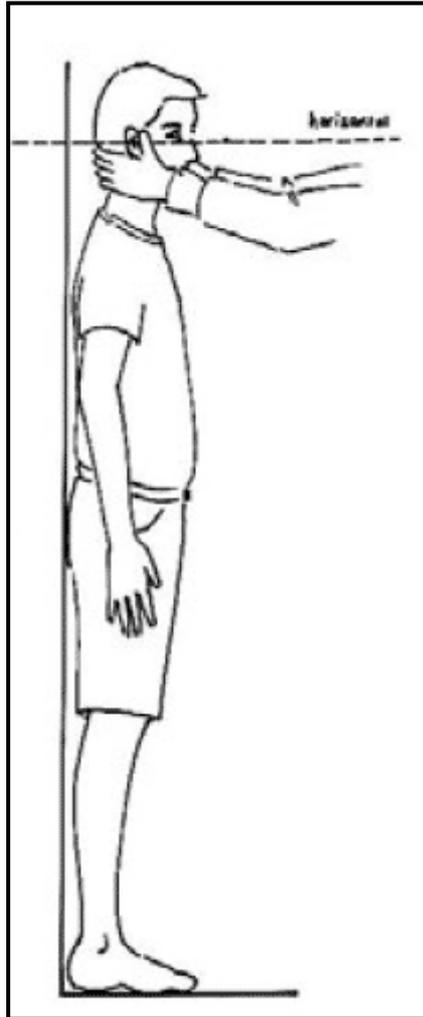


Figure 3.2 : SECA 813 Digital Flat Scale Body Meters

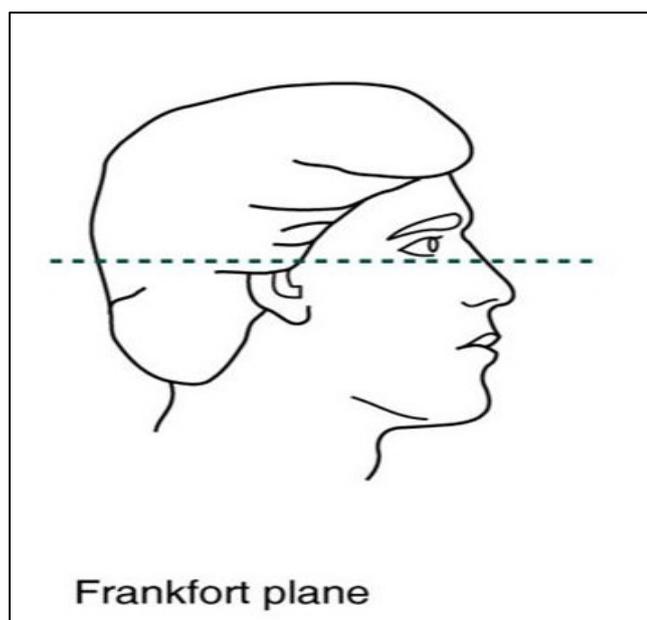
3.4.4.2 Height Measurement

The standing height of the subjects were measured by a stadiometer (Figure 3.3). Subjects were asked to be barefooted and wear minimal clothing to enable the measurement at a correct upright position. The subjects were asked to stand with heels together, arms hanging loose to the side, legs straight, shoulders relaxed and the head in the Frankfort horizontal’s plane position. The Frankfort Plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye (Figure 3.4). Before the measurement was taken,

subjects were asked to inhale a deep breath and maintain the erect posture while the headboard is positioned on the highest point of the head with enough pressure to compress the hair/head scarves. The measurement was taken by looking at the bottom edge of the headboard with eye level to avoid parallel errors. Height was recorded in centimetres and millimetres, e.g. 176.5 cms. This equipment was calibrated at periodic intervals to ensure acceptable accuracy and reliability.



Source: (Robert D. Lee & David C. Nieman, 2010)
Figure 3.3 : Measuring Height With Stadiometer



Source: (Robert D. Lee & David C. Nieman, 2010)

Figure 3.4 : The Frankfort Plane

3.5 STATISTICAL ANALYSES

Data were coded and entered into Statistical Package for the Social Sciences (version 20.0) by the principal researcher to avoid between-coder variation (SPSS Inc. 2010). Data cleaning was performed prior to data analyses. Frequencies were examined for all variables to identify coding and data entry errors. All data were analysed using SPSS 20.0 (Statistical Package for Social Sciences) (SPSS Inc., Chicago, IL, USA) by the principal researcher. A two-sided level of significance of 0.05 was used.

Descriptive statistics were used to describe the rate of ‘exclusive breastfeeding’ and the prevalence of overweight and obesity in percentage. Chi-square test was used to determine the association between categorical variables (e.g: age group, breastfeeding intention or breastfeeding initiation). Student’s t-test and one-way analysis of variance were used to assess the continuous outcomes that were normally distributed across groups. Chi-square test was carried out to investigate association between maternal weight retention and breastfeeding practices as well as the association between infant growth and infant feeding practices.

Multivariate logistic regression models were employed to ascertain the association between breastfeeding outcomes and exposure variables of interest based on the literature. The multivariable models were constructed using a stepwise algorithm

which assesses potential interactions and multicollinearities at each step. The level of significance for a variable to be entered or to be removed from the model was $p < 0.05$.

3.6 ETHICAL ISSUES

This study was approved by Curtin University Human Research Ethics Committee on 21st June 2013 (HR 134/2013). Ethics approval were also obtained from Medical Research and Ethics Committee, Ministry of Health Malaysia on 18th July 2013 (NMRR-13-327-15884) . The participants were informed of the aims and nature of the research by an information sheet and were assured of the confidentiality of all information that was collected. They were then asked to complete a written consent form. The participants were advised that participation in the survey is voluntary and nonparticipation or withdrawal would not prejudice future treatment in any way. Contact details of the researcher were provided for participants to obtain further information. A copy of the Ethics Approval letter, Information Sheet and Consent Form are included in the Appendix.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter presents findings of the descriptive, univariate and multivariate analyses of this cohort study that was carried out in Selangor, Malaysia. The initial sections present the characteristics of the subjects and the results in each subsequent section correspond to the specific research objectives.

4.2 RESPONSE RATE OF THE SUBJECTS

Table 4.1 :
Response rates of the subjects throughout study

Visit	Number of respondents (n)	Response rate (%)
Baseline	700	100
One month	688	98.3
Three months	673	96.1
Six months	652	93.1

A total of 700 expectant mothers were recruited during their second and third antenatal medical examinations at government health clinics in Selangor as shown in Table 4.1.

At the first follow-up at one month after delivery, 12 subjects could not be contacted, 96.1 % were traced in second follow-up and 93.1 % remained until the end of the study.

4.3 CHARACTERISTICS OF THE SUBJECTS

Table 4.2 :
Characteristics Of The Subjects

Variables	Categories	N	%
Age (years)	18 – 20 years old	12	1.8
	21 – 30 years old	410	32.9
	31 – 40 years old	230	35.3
Marital status	Married	649	99.5
	Never married	2	0.3
	Divorced/Separated	1	0.2
Household income	< RM 1000	8	4.0
	RM 1001 – 3000	323	49.5
	RM 3001 – 5000	137	21.0
	> RM 5000	166	25.5
Maternal educational background	Primary school	8	1.2
	Secondary	231	35.4
	Tertiary	413	63.3
Paternal educational background	Primary	10	1.5
	Secondary	268	41.2
	Tertiary	372	57.2
Maternal Employment status	Housewife	202	31.0
	Fulltime	393	60.3
	Part-time	24	3.7
	Self-employed	30	4.6
Paternal employment status:	Not working	5	0.8
	Fulltime	538	82.5
	Part-time	18	2.8
	Self-employed	89	13.7
Paternal smoking status:	Non-smoker	324	49.7
	Less than 1 pack	252	38.7
	1 pack or more	59	9.0
	Unsure how many	16	2.5
Parity	1 st child	260	39.9
	2 children	206	31.6
	3 or more children	178	27.3

A total of 700 mothers were recruited during their pregnancy health examinations in their second and third trimester pregnancy, but only 652 subjects were available until end of follow-up.

Table 4.2 presents maternal, paternal and infant socio-demographic profiles of the subjects. The majority of the mothers were aged between 21 and 30 years old (n=410) with a mean age of 29.03 years. Almost all of the mothers were married (99.5

%), and majority were working fulltime (60.6 %), had tertiary education (57.2 %), had household incomes between RM 1001 and RM 3000 (49.5 %) and these were their first pregnancy (39.9 %). At the same time as, majority of the spouses were fulltime workers (82.5 %), had tertiary education (57.2 %) and 50.3 % of them smoked.

4.4 OBJECTIVE 1: TO DETERMINE THE PREVALENCE OF MATERNAL OVERWEIGHT AND OBESITY IN MALAY WOMEN.

4.4.1 Prevalence of Overweight and Obesity Before Pregnancy and Six months Postpartum

The prevalence of obesity in this population based on their pre-pregnancy weight was 12.0 % and overweight was 24.5 % (see Figure 4.1). More than half of the total subjects were classified as normal BMI and only 11.8 % were underweight.

Six months after delivery, half of the total subjects had normal BMI (50.9 %). However, the rate of both overweight and obesity had increased by 2.0 % and 3.3 %, respectively at six months postpartum.

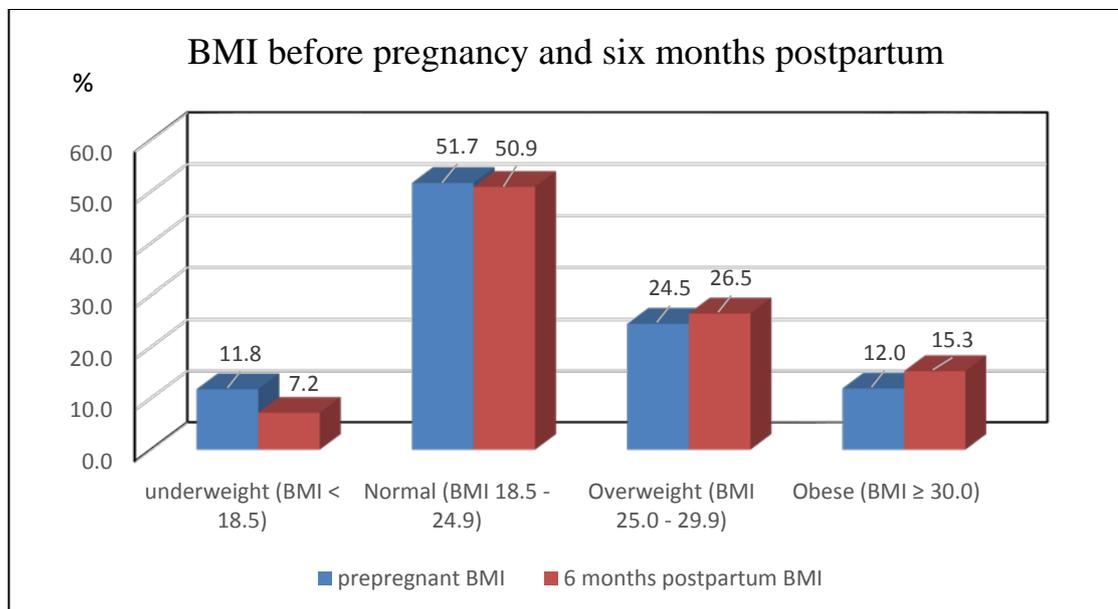


Figure 4.1 : Trends In BMI Categories Before Pregnancy And six months Postpartum (N=652)

4.4.2 Demographics of Mothers by Pre-Pregnancy Body Mass Index (N=652)

4.4.2.1 Mean Pre-Pregnancy BMI by Demographic Factors

Table 4.3 :
Mean Body Mass Index (BMI) By Demographic Factors Based On Weight Before Pregnancy (N=637)

Demographic	n	Mean (kg/m²) (95% CI)
<i>Age</i>		
18 – 30 years old	414	23.62 (23.08, 24.12)
31 – 40 years old	223	24.91 (24.29, 25.57)
<i>Maternal educational level</i>		
Primary	7	23.42 (19.78, 26.92)
Secondary	224	24.03 (23.39, 24.77)
Tertiary	406	24.11 (23.58, 24.61)
<i>Maternal employment status</i>		
Housewife	195	23.60 (22.97, 24.21)
Working mothers	442	24.28 (23.79, 24.80)
<i>Paternal employment</i>		
Working	5	25.11 (21.37, 29.92)
Not working	632	24.06 (23.68, 24.46)
<i>Paternal educational level</i>		
Primary	10	24.65 (21.45, 28.15)
Secondary	262	23.95 (23.30, 24.63)
Tertiary	365	24.15 (23.62, 24.67)
<i>Total household income</i>		
Low (<RM1000 – 3000)	339	24.43 (23.82, 25.01)
Middle (RM3001 – RM5000)	135	23.41 (22.42, 24.30)
High (>RM5000)	163	23.89 (23.21, 24.59)
<i>Parity</i>		
Primiparous	256	23.55 (22.88, 24.17)
Multiparous	381	24.42 (23.92, 24.96)

Table 4.3 shows the mean BMI (kg/m²) by demographic factors based on weight before pregnancy.

Mean BMI was higher in mothers aged between 31 to 40 years old (24.9 kg/m²) compared to only 23.6 kg/m² in mothers aged between 18 to 40 years old.

On top of that, mothers who had tertiary educational background had the highest mean BMI (24.1 kg/m²), followed by secondary level (24.0 kg/m²) and primary level (23.4 kg/m²).

Housewives had a lower mean BMI (23.6 kg/m²) compared to career mothers which was 24.3 kg/m². However, the opposite result was seen in fathers, where employed fathers had a higher mean BMI (25.1 kg/m²) and classified as overweight.

Mothers who came from low household income had the highest mean BMI (24.4 kg/m²), followed by high income (23.9 kg/m²) and middle income (23.4 kg/m²).

Finally, as expected, mothers with more than 1 child had higher mean BMI (24.4 kg/m²) compared to primiparous mothers which was 23.6 kg/m².

Table 4.4 :
Prevalence Of Obesity By Demographic Profiles Based On Weight Before Pregnancy (N=78)

Demographic	n	Prevalence % (95% CI)
<i>Age</i>		
18 – 30 years old	44	56.4 (45.6, 68.0)
31 – 40 years old	34	43.6 (32.0, 54.4)
<i>Maternal educational level</i>		
Secondary	27	34.6 (25.0, 45.6)
Tertiary	51	65.4 (54.4, 75.0)
<i>Maternal employment status</i>		
Housewife	17	21.8 (13.3, 31.9)
Working mothers	61	78.2 (68.1, 86.7)
<i>Paternal employment</i>		
Working	77	98.7 (95.6, 100.0)
Not working	1	1.3 (0, 4.4)
<i>Paternal educational level</i>		
Primary	2	2.6 (0, 6.4)
Secondary	31	39.7 (29.4, 50.0)
Tertiary	45	57.7 (47.7, 68.6)
<i>*Total household income</i>		
Low (<RM1000 – 3000)	45	57.7 (47.1, 69.1)
Middle (RM3001 – RM5000)	16	20.5 (11.5, 30.3)
High (>RM5000)	17	21.8 (12.2, 31.0)
<i>Parity</i>		
Primiparous	27	34.6 (23.6, 44.9)
Multiparous	51	65.4 (55.1, 76.4)

*Ringgit Malaysia (RM)

Table 4.4 above shows the prevalence of obesity based on pre-pregnancy weight by demographic factors. The overall prevalence of obesity for this whole population was 12.0 % (95% CI = 1.86, 1.91) and overweight was 24.5 % (95% CI = 0.21, 0.28).

Prevalence of obesity was higher as age increased, 56.4 % of obese mothers aged between 18 to 30 years old. The prevalence of obesity increased with multiple pregnancies, higher education for both maternal and paternal and was common among working mothers.

Obesity increased with a higher educational level for both mothers and fathers. Mothers with tertiary education had an obesity level of 65.4 % and 57.7 % among fathers.

Housewives had a lower prevalence of obesity, only 21.8 % compared to working mothers which was 78.2 %. Mothers who have a lower household income were more obese (57.7 %) compared to middle (20.5 %) and high (21.8 %) income.

As expected, the prevalence of obesity was higher in mothers with more than 1 child (65.4 %), compared to mothers with one child (34.6 %).

4.4.3 Demographics of Mothers by Weight at Six months Postpartum (N=652)

4.4.3.1 Mean Pre-Pregnancy BMI by Demographic Factors at Six months Postpartum

Table 4.5 :
Mean Body Mass Index (BMI) By Demographic Factors Based On Weight At Six months After Delivery (N=638)

Demographic	n	Mean (kg/m ²) (95% CI)
<i>Age</i>		
18 – 30 years old	415	25.02 (24.50, 25.58)
31 – 40 years old	223	25.56 (24.11, 28.00)
<i>Maternal educational level</i>		
Primary	7	24.35 (22.12, 26.42)
Secondary	225	26.01 (24.50, 28.46)
Tertiary	406	24.77 (24.29, 25.28)
<i>Maternal employment status</i>		
Housewife	195	25.77 (24.14, 28.44)
Working mothers	443	24.96 (24.45, 25.48)
<i>Paternal employment</i>		
Not working	5	23.40 (19.44, 26.88)
Working	633	25.22 (24.56, 26.13)
<i>Paternal educational level</i>		
Primary	10	25.15 (24.09, 26.25)
Secondary	263	25.78 (24.49, 27.86)
Tertiary	365	24.80 (24.31, 25.36)
<i>Total household income</i>		
Low (<RM1000 – 3000)	340	25.79 (24.72, 27.39)
Middle (RM3001 – RM5000)	135	24.53 (23.70, 25.45)
High (>RM5000)	163	24.56 (23.77, 25.38)
<i>Parity</i>		
Primiparous	256	25.13 (24.45, 25.83)
Multiparous	382	25.26 (24.32, 26.70)

Table 4.5 shows mean BMI (kg/m^2) of the mothers by demographic factors six months after delivery.

Mothers aged between 31 to 40 years old had higher mean BMI ($25.6 \text{ kg}/\text{m}^2$) than mothers aged between 18 to 30 years old ($25.0 \text{ kg}/\text{m}^2$).

Meanwhile, mothers who had secondary education background had the highest mean BMI which was $26.01 \text{ kg}/\text{m}^2$, followed by mothers with tertiary education level ($24.77 \text{ kg}/\text{m}^2$) and primary education level ($24.35 \text{ kg}/\text{m}^2$).

Housewives had a higher mean BMI of $25.77 \text{ kg}/\text{m}^2$ compared to working mothers which was $24.96 \text{ kg}/\text{m}^2$. In the meantime, mothers whose their husbands are working ($25.22 \text{ kg}/\text{m}^2$) had higher mean BMI compared to those not working ($23.40 \text{ kg}/\text{m}^2$).

Mothers who came from low household income had the highest mean BMI which was $25.79 \text{ kg}/\text{m}^2$, followed by high ($24.56 \text{ kg}/\text{m}^2$) and middle-class household income ($24.53 \text{ kg}/\text{m}^2$).

The mean BMI, mothers who were primiparous and multiparous were classified as overweight six months after delivery, which were $25.13 \text{ kg}/\text{m}^2$ and $25.26 \text{ kg}/\text{m}^2$, respectively.

4.4.3.2 Prevalence of Obesity by Demographic Profile at Six months Postpartum

Table 4.6 :
Demographic Profiles Of Mothers Classified As Obese By Based On Weight At Six months After Delivery (N=99)

Demographic	n	Prevalence % (95% CI)
<i>Age</i>		
18 – 30 years old	57	57.6 (47.3, 67.8)
31 – 40 years old	42	42.4 (32.2, 52.7)
<i>Maternal educational level</i>		
Secondary	38	38.4 (28.8, 47.7)
Tertiary	61	61.6 (52.3, 71.2)
<i>Maternal employment status</i>		
Housewife	22	22.2 (14.6, 30.6)
Working mothers	77	77.8 (69.4, 85.4)
<i>Paternal employment</i>		
Not working	2	2 (0, 5.2)
Working	97	98.0 (94.8, 100.0)
<i>Paternal educational level</i>		
Primary	2	2.0 (0, 5.2)
Secondary	41	41.4 (31.6, 50.5)
Tertiary	56	56.6 (47.5, 66.5)
<i>Total household income</i>		
Low (<RM1000 – 3000)	57	57.6 (47.0, 67.0)
Middle (RM3001 – RM5000)	23	23.2 (15.3, 31.6)
High (>RM5000)	19	19.2 (12.2, 27.3)
<i>Parity</i>		
Primiparous	32	32.3 (23.2, 42.4)
Multiparous	67	67.7 (57.6, 76.8)

Table 4.6 shows details of the profile of mothers with obesity based on weight after six months delivery by demographic factors. The overall prevalence of obesity for this whole population was 15.3 % and overweight was 26.5 %.

Obesity was more prevalent among mothers aged between 18 to 30 years old (57.6 %), than mothers aged 31 to 40 years old (42.4 %). There was also an obvious higher prevalence of obesity among mothers with more than 1 child compared to primiparous mothers by 67.7 % and 32.3 %, respectively.

Tertiary educated mothers had the highest prevalence of obesity (61.6 %) compared to secondary educated mothers 38.4 %. Meanwhile, obesity seems more prevalent among working mothers by 77.8 % compared to housewives (22.2 %).

However, obesity was less prevalent among mothers with high household income which was only 19.2 %, followed by middle class by 23.2 %. Mothers from low class family had the highest prevalent of obesity, 57.6 %.

4.4.4 Discussion of Objective 1

The World Health Organization (WHO) defines overweight as BMI equal to or greater than 25 kg/m² and obesity is a BMI greater than or equal to 30 kg/m² in adult.

The prevalence of obesity worldwide has risen at an alarming rate since 2000. WHO reported more than 1.9 billion adults aged more than 18 years old were overweight and over 600 million of them were obese in 2014. Globally it is reported that about 13 % of the adult population were obese, 11 % of men and 15 % of women (World Health Organization, 2016).

As reported in the National Health and Nutrition Examination Survey, between 2011 and 2014, there were 36 % of adults in United States were obese. The prevalence of obesity was higher in women by 38.3 % than in men (34.3 %) (Ogden, Carroll, Fryar, and Flegal, 2015).

In Australia, the prevalence of obesity has increased steadily for the past 30 years. As reported in Australian Health Survey between 2011 and 2012, 62.8 % of Australian adults aged 18 years and over were overweight and obese. 35.3 % of them were overweight and 27.5 % were obese (Australian Bureau of Statistics, 2012). More men were overweight or obese than women (69.7% compared with 55.7%). Nonetheless, rates of obese for both genders are the same, 27.5 %.

In Malaysia, according to the latest National Health and Morbidity Survey from 2015, the national prevalence of overweight was 30.0% (95% CI: 29.1, 31.0) while the prevalence of obesity was 17.7% (95% CI: 16.9, 18.5). The prevalence of obesity also was seen higher among females [20.6% (95% CI: 19.5, 21.8)] compared to males [15.0% (95% CI: 13.9, 16.1)].

The prevalence of obesity and overweight in this cohort of 652 mothers were 15.3 % and 26.5 %, respectively, close to the national and world prevalence for adult women.

With respect of demographic profiles, the prevalence of obesity was higher as the maternal age increased, in mothers with lower household income, who had completed higher educational background and mothers with more than 1 child.

This is in agreement with numerous other studies which showed, there is a strong association between higher BMI values and age (Mohamud et al., 2011; Rampal et al., 2007), education and socioeconomic status (Azmi et al., 2009).

In a national study (2007-2008) in five different selected regions in Peninsular Malaysia and East Malaysia with 4428 subjects the overall prevalence of overweight and obesity was 33.6 % and 19.5 %, respectively (Mohamud et al., 2011). More women were obese than men (22.5 % compared to 14.1 %). Meanwhile, by ethnicity, the highest prevalence of overweight and obesity was among Indians, followed by Malays. Chinese had the lowest prevalence of obesity (8.2 %). Though overweight was found to be significantly associated with increasing age, the odds ratios of being obese were higher among those with lower education status, 1.63 (1.15, 2.31). In addition a history of co-morbidities (hypertension, diabetes and dyslipidemia) was associated with a higher possibility of being overweight and obese.

4.5 OBJECTIVE 2: TO COMPARE THE BREASTFEEDING OUTCOMES (INTENTION, INITIATION, INTENSITY AND DURATION) BETWEEN WOMEN WITH DIFFERENT BMI CLASSIFICATIONS

The intention to breastfeed their infant was compared across BMI classifications in the following tables. The results of the univariate analysis are presented in the following tables.

4.5.1 Comparison of Breastfeeding Initiation, Intensity and Duration Between Mothers With Different BMI Classification

Table 4.7 :

Breastfeeding initiation, intensity and duration between mothers with different BMI classification (N=652)

Characteristics	Underweight n=76	Normal n=337	Overweight n=160	Obese n=78	Total
<i>Initiation of breastfeeding</i>					
Less than one hour	54 (71.1 %)	238 (70.6 %)	109 (68.1 %)	41 (52.6 %)	442 (67.8 %)
One to four hours	20 (26.3 %)	75 (22.2 %)	38 (23.8 %)	22 (28.2 %)	155 (23.8 %)
More than four hours, less than 2four hours	2 (2.6 %)	21 (6.2 %)	8 (5.0 %)	10 (12.8 %)	41 (6.3 %)
More than one day after birth	1 (1.3 %)	3 (0.9 %)	5 (3.1 %)	5 (6.7 %)	14 (2.1 %)
<i>Feeding during the entire first month</i>					
‘exclusive breastfeeding’	65 (84.4 %)	289 (85.8 %)	124 (77.5 %)	34 (43.6 %)	512 (78.5 %)
‘any breastfeeding’	11 (14.3 %)	43 (12.8 %)	32 (20.0 %)	33 (42.3 %)	119 (18.3 %)
Formula feeding	1 (1.3 %)	5 (1.5 %)	4 (2.5 %)	11 (14.1 %)	21 (3.2 %)
<i>Feeding during three months</i>					
‘exclusive breastfeeding’	48 (62.3 %)	240 (71.2 %)	87 (54.4 %)	24 (30.8 %)	399 (61.2 %)
‘any breastfeeding’	21 (27.3 %)	73 (21.7 %)	54 (33.8 %)	28 (35.9 %)	176 (27.0 %)
Formula feeding	8 (10.4 %)	24 (7.1 %)	19 (11.9 %)	26 (33.3 %)	77 (11.8 %)
<i>Feeding during six months</i>					
‘exclusive breastfeeding’	41 (53.2 %)	200 (59.3 %)	67 (41.9 %)	18 (23.1 %)	326 (50.0 %)
‘any breastfeeding’	22 (28.6 %)	73 (21.7 %)	55 (35.0 %)	18 (23.1 %)	169 (25.9 %)
Formula feeding	14 (18.2 %)	64 (19.0 %)	37 (23.1 %)	42 (53.8 %)	157 (24.1 %)

Table 4.8 :

Association of breastfeeding initiation, intensity and duration between women with different BMI groups

Characteristics	Underweight (BMI < 18.5 kg/m ²) n=76		Normal (BMI 18.5 – 24.9 kg/m ²) n=337		Overweight (BMI 25.0 – 29.9 kg/m ²) n=160		Obese (BMI > 30.0 kg/m ²) n=78		Total		χ^2	df	P value
	n	%	n	%	n	%	n	%	n	%			
<i>Initiation of breastfeeding</i>											9.722	3	0.021
Early (within one hour)	54	70.1	238	70.6	109	68.1	41	52.6	442	67.8			
Delayed (more than one hour)	23	29.9	99	29.4	51	31.9	37	47.4	210	32.2			
<i>Feeding during the entire first four weeks</i>											68.594	3	< 0.001
'exclusive breastfeeding'	65	84.4	289	85.8	124	77.5	34	43.6	512	78.5			
Non-'exclusive breastfeeding'	12	15.6	48	14.2	36	22.5	44	56.4	140	21.5			
<i>Feeding through three months</i>											47.837	3	< 0.001
'exclusive breastfeeding'	48	62.3	240	71.2	87	54.4	24	30.8	399	61.2			
Non-'exclusive breastfeeding'	29	37.7	97	28.8	73	45.6	54	69.2	253	38.8			
<i>Feeding during six months</i>											38.943	3	< 0.001
'exclusive breastfeeding'	41	53.2	200	59.3	67	41.9	18	23.1	326	50.0			
Non-'exclusive breastfeeding'	36	46.8	137	40.7	93	58.1	60	76.9	326	50.0			

4.5.1.1 Initiation of breastfeeding

While 67.8 % (442/652) mothers initiated breastfeeding less than one hour after birth (Table 4.8), early initiation of breastfeeding (within one hour) was less common if the mothers were obese (9%, i.e. 41/442) compared to mothers who have a normal BMI (54%, 238/442).

In Table 4.8, initiation of breastfeeding was grouped into early (within one hour) and delayed (more than one hour) initiation. There was a significant association between breastfeeding initiation and BMI among mothers, $\chi^2 = 9.722$, df 3, $p=0.021$.

4.5.1.2 Infant Feeding During the Entire four weeks

Majority of the mothers who formula fed their babies were obese (52.4 %; 11/21) (see Table 4.7), and only 6.6 % (34/512) of obese mothers exclusively breastfed their babies during the entire first four weeks (Table 4.8). A total of 78.5 % (512/652) of mothers exclusively breastfed their babies for the first four weeks of their life. Women with a normal BMI (18.5 – 24.9 kg/m²) had the highest percentage of exclusive breastfeeding. There was indeed a significant association between mothers who exclusively breastfed their babies during the first four weeks and BMI status, $\chi^2 = 68.594$, df 3, $p < 0.001$). (Table 4.8).

4.5.1.3 Infant Feeding Through three months

There was a significant association between mothers who exclusively breastfed their babies through three months and BMI status, $\chi^2 = 47.837$, df 3, $p < 0.001$) (Table 4.8).

Prevalence of ‘exclusive breastfeeding’ at three months was 61.2 % (399/652) in this study. More mothers chose to supplement their babies with formula milk as they resumed to work three months after delivery (Table 4.7), resulting in the prevalence of ‘‘any breastfeeding’’ increased from 18.3 % (119/652) to 27.0 % (176/652). ‘Exclusive breastfeeding’ at three months (see Table 4.8) was most common in the mothers who had a BMI in the normal range (56.4 %; 289/512).

4.5.1.4 Infant Feeding Through Six months

The prevalence of ‘exclusive’ and ‘‘any breastfeeding’’ at six months was 50.0 % and 25.9 %, respectively (Table 4.7). Most normal BMI mothers were still practicing ‘‘exclusive breastfeeding’’ at six months (59.3 % (200/337)), followed by underweight mothers (53.2 % 41/76) and overweight mothers (41.9 % 67/160). About 53.8% of the obese mothers chose ‘formula milk’ for their babies at six months, compared to 18.2% of the underweight mothers, 19.0% of the normal weight mothers and 23.1% of the overweight mothers (Table 4.7). . There was a significant association between mothers who practised ‘‘exclusive breastfeeding’’ and BMI categories at six months of age, $\chi^2 = 38.943$, df 3, $p < 0.001$) (Table 4.8).

Table 4.9 :

Unadjusted and adjusted odd ratios (ORs) of breastfeeding outcomes and maternal obesity (N=652)

Breastfeeding outcomes	Normal (BMI 18.5 – 24.9)	Overweight and obese (BMI ≥ 25)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Infant feeding intention						
<i>Intention to exclusively breastfeed</i>						
With intention	216 (52.4 %)	106 (44.7 %)	0.734 (0.533 – 1.012)	0.059	0.801 (0.565 – 1.138) ¹	0.215
Without intention	196 (47.6 %)	131 (55.3 %)	1 (reference)		1 (reference)	
<i>Father's preference</i>						
Breastfeeding	292 (70.5 %)	153 (64.3 %)	0.752 (0.536 – 1.056)	0.752	0.785 (0.551 – 1.118) ²	0.180
Formula feeding or ambivalent	122 (29.5 %)	85 (35.7 %)	1 (reference)		1 (reference)	
<i>Grandmother's preference</i>						
Breastfeeding	269 (65.0 %)	120 (50.4 %)	0.548 (0.396 – 0.758)	< 0.001	0.559 (0.403 – 0.775)³	< 0.001
Formula feeding or ambivalent	145 (35.0 %)	118 (49.6 %)	1 (reference)		1 (reference)	
<i>Intended breastfeeding duration</i>						
< six months	35 (8.6 %)	18 (7.7 %)	0.847 (0.461 – 1.556)	0.806	0.959 (0.512 – 1.796) ⁴	0.960
≥ six months	156 (38.5 %)	87 (37.0 %)	0.918 (0.653 – 1.291)		0.952 (0.673 – 1.347)	
> 12 months	214 (52.8 %)	130 (55.3 %)	1 (reference)		1 (reference)	
<i>Time intended to breastfeed</i>						
Before pregnant	203 (49.5 %)	118 (49.6 %)	1.003 (0.729 – 1.380)	0.987	0.967 (0.697 – 1.343) ⁵	0.843
During pregnancy	207 (50.5 %)	120 (50.4 %)	1 (reference)		1 (reference)	

¹adjusted for parity, maternal education and spouse preference, ²adjusted for parity, paternal education, attending antenatal class and household monthly income, ³adjusted for maternal age, ⁴adjusted for maternal age, maternal education and parity, ⁵adjusted for parity, IIFAs score, maternal education and household monthly income

Table 4.9 :

Unadjusted and adjusted odd ratios (ORs) of breastfeeding outcomes and maternal obesity (N=652)- continue

Breastfeeding outcomes	Normal (BMI 18.5 – 24.9)	Overweight and obese (BMI ≥ 25)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
<i>Initiation of breastfeeding</i>						
Early	292 (70.5 %)	150 (63.0 %)	1.362 (0.988 – 1.877)	0.059	1.221 (0.854 – 1.745) ¹	0.274
Delayed	122 (29.5 %)	88 (37.0 %)	1 (reference)		1 (reference)	
<i>Nutrition during the entire first four weeks</i>						
‘exclusive breastfeeding’	354 (85.5 %)	158 (66.4 %)	0.335 (0.228 – 0.491)	< 0.001	0.398 (0.261 – 0.606)²	< 0.001
Non-‘exclusive breastfeeding’	60 (14.5 %)	80 (33.6 %)	1 (reference)		1 (reference)	
<i>Nutrition through three months</i>						
‘exclusive breastfeeding’	288 (69.6 %)	111 (46.6 %)	0.382 (0.275 – 0.532)	< 0.001	0.474 (0.333 – 0.676)²	< 0.001
Non-‘exclusive breastfeeding’	126 (30.4 %)	127 (53.4 %)	1 (reference)		1 (reference)	
<i>Nutrition through six months</i>						
‘exclusive breastfeeding’	241 (58.2 %)	85 (35.7 %)	0.399 (0.287 – 0.554)	< 0.001	0.468 (0.328 – 0.666)²	< 0.001
Non-‘exclusive breastfeeding’	173 (41.8 %)	153 (64.3 %)	1 (reference)		1 (reference)	

¹adjusted for parity, maternal education, maternal employment, IIFAs score, received ‘any breastfeeding’ interventions and maternal age, ²adjusted for maternal age, maternal education, parity, spouse preference, grandmother’s preference, grandmother’s breastfeeding experience, IIFAS score and attending antenatal class

Table 4.9 presents crude (unadjusted) and adjusted odd ratios for breastfeeding outcomes and maternal obesity.

Obese mothers were less likely to have biological mothers who preferred breastfeeding for their infants compared to lower BMI mothers (crude OR: 0.548, 95% CI of crude OR: 0.396 – 0.758), even after adjusted for maternal age, maternal education and parity (adjusted OR: 0.559, 95% CI of adjusted OR: 0.403 – 0.775).

Obese mothers also were less likely to ‘exclusive breastfeed’ their babies at four weeks postpartum than mothers with lower BMI (crude OR: 0.335, 95% CI of crude OR: 0.228 – 0.491), through three months BMI (crude OR: 0.382, 95% CI of crude OR: 0.275 – 0.532) and six months (crude OR: 0.399, 95% CI of crude OR: 0.287 – 0.554).

Even after adjusting for maternal age, maternal education, parity, spouse preference, grandmother’s preference, grandmother’s breastfeeding experience, IIFAS score and attending antenatal class, they were still less likely to ‘exclusive breastfeed’ their babies four weeks postpartum than mothers with lower BMI (adjusted OR: 0.398, 95% CI of adjusted OR: 0.261 – 0.606), through three months BMI (adjusted OR: 0.474, 95% CI of adjusted OR: 0.333 – 0.676) and six months (adjusted OR: 0.468, 95% CI of adjusted OR: 0.328 – 0.666).

4.5.2 Comparison of Infant Feeding Intention Between Women With Different BMI Classification

Table 4.10 :

Infant feeding intention of the mothers with different BMI categories (N=652)

Characteristics	Underweight n=76	Normal n=337	Overweight n=160	Obese n=78	Total
<i>Intention to breastfeed</i>					
Breastfeeding only	35 (46.1 %)	181 (53.9 %)	67 (41.9 %)	39 (50.6 %)	322 (49.6 %)
Formula feeding	4 (5.3 %)	14 (4.2 %)	8 (5.0 %)	-	26 (4.0 %)
Formula feeding more than breastfeeding	5 (6.6 %)	28 (8.3 %)	19 (11.9 %)	8 (10.4 %)	60 (9.2 %)
Breastfeeding more than formula feeding	32 (42.1 %)	113 (33.6 %)	66 (41.3 %)	30 (39.0 %)	241 (37.1 %)
<i>Intended breastfeeding duration</i>					
≤ six months	7 (9.3 %)	28 (8.5 %)	14 (8.8 %)	4 (5.3 %)	53 (8.3 %)
6 – 12 months	32 (42.7 %)	124 (37.6 %)	61 (38.4 %)	26 (34.2 %)	243 (38.0 %)
More than 12 months	36 (48.0 %)	178 (53.9 %)	84 (52.8 %)	46 (60.5 %)	344 (53.8 %)
<i>Spouse's preference</i>					
Bottle-feeding	1 (1.3 %)	3 (0.9 %)	2 (1.3 %)	-	6 (0.9 %)
Breastfeeding	56 (72.7 %)	236 (70.0 %)	99 (61.9 %)	54 (69.2 %)	445 (68.3 %)
Doesn't mind	20 (26.0 %)	98 (29.1 %)	59 (36.9 %)	24 (30.8 %)	201 (30.8 %)
<i>Mother's preference</i>					
Bottle-feeding	1 (1.3 %)	5 (1.5 %)	-	-	6 (0.9 %)
Breastfeeding	48 (62.3 %)	221 (65.6 %)	94 (58.8 %)	26 (33.3 %)	389 (59.7 %)
Doesn't mind	10 (13.0 %)	56 (16.6 %)	26 (16.3 %)	24 (30.8 %)	116 (17.8 %)
Never discussed	18 (23.4 %)	55 (16.3 %)	40 (25.0 %)	28 (35.9 %)	141 (21.6 %)

Table 4.10 :

Infant feeding intention of the mothers with different BMI categories (N=652)-continue

Characteristics	Underweight n=76	Normal n=337	Overweight n=160	Obese n=78	Total
<i>Time decision to feed baby</i>					
Before pregnant	36 (46.8 %)	167 (49.9 %)	78 (48.8 %)	40 (51.3 %)	321 (49.2 %)
Early pregnancy	38 (49.4 %)	155 (46.3 %)	76 (47.5 %)	31 (39.7 %)	300 (46.0 %)
Late pregnancy	3 (3.9 %)	13 (3.9 %)	6 (3.8 %)	7 (9.0 %)	29 (4.4 %)
<i>Plan to introduce solid food</i>					
< six months	5 (6.5 %)	8 (2.4 %)	6 (3.8 %)	-	19 (2.9 %)
≥ six months	66 (85.7 %)	292 (86.6 %)	142 (88.8 %)	71 (91.0 %)	571 (87.6 %)
> 12 months	-	8 (2.4 %)	3 (1.9 %)	4 (5.1 %)	15 (2.3 %)
When baby is ready	6 (7.8 %)	26 (7.7 %)	8 (5.0 %)	1 (1.3 %)	41 (6.3 %)
I don't know	-	3 (0.9 %)	1 (0.6 %)	2 (2.6 %)	6 (0.9 %)

Table 4.11 :
Association of infant feeding intention of mothers with different BMI categories (N=652)

Characteristics	Underweight (BMI < 18.5 kg/m ²) n=76		Normal (BMI 18.5 – 24.9 kg/m ²) n=337		Overweight (BMI 25.0 – 29.9 kg/m ²) n=160		Obese (BMI > 30.0 kg/m ²) n=78		Total		χ^2	df	P value
	n	%	n	%	n	%	n	%	n	%			
<i>Intention to breastfeed</i>											6.685	3	0.083
With intention to EBF	35	46.1	181	53.9	67	41.9	39	50.6	322	49.6			
Without intention to EBF	41	53.9	155	46.1	93	58.1	38	49.4	327	50.4			
<i>Intended breastfeeding duration</i>											2.882	6	0.824
< six months	7	9.3	28	8.5	14	8.8	4	5.3	53	8.3			
≥ six months	32	42.7	124	37.6	61	38.4	26	34.2	243	38.0			
> 12 months	36	48.0	178	53.9	84	52.8	46	60.5	344	53.8			
<i>Husband's preference</i>											4.240	3	0.237
Breastfeeding	56	72.7	236	70.0	99	61.9	54	69.2	445	68.3			
Formula feeding or ambivalent	21	27.3	101	30.0	61	38.1	24	30.8	207	31.7			
<i>Mother's preference</i>											27.653	3	< 0.001
Breastfeeding	48	62.3	221	65.6	94	58.8	26	33.3	389	59.7			
Bottle-feeding or ambivalent	29	37.7	116	34.4	66	41.3	52	66.7	263	40.3			
<i>Time intended to breastfeed baby</i>											0.306	3	0.959
Before pregnant	36	47.4	167	50.0	78	48.8	40	51.3	321	49.5			
During pregnancy	40	52.6	167	50.0	82	51.2	38	48.7	327	50.5			
<i>Plan to introduce solid food</i>											5.214	3	0.157
< six months/ Undecided	11	14.3	37	11.0	15	9.4	3	3.8	66	10.0			
≥ six months	66	85.7	300	89.0	145	90.6	75	96.2	586	89.9			

*Analyses were done using Chi square test

4.5.2.1 Mother's Intention to Breastfeed

Mothers with normal BMI (18.5-24.9 kg/m²) are more inclined to “exclusive breastfeeding” (181/322 = 56.2%) followed by overweight mothers (67/322 = 20.8%) and the underweight and obese mothers (35/322 = 10.9% and 39/322 = 12.1%, respectively). However there were no significant association between intention to breastfeed and BMI categories ($\chi^2=6.685$, df 3, p = 0.083).

4.5.2.2 Duration Intended to Breastfeed

A total of 8.3 % (53/652) of the mothers' intended to breastfeed their babies shorter than six months, which is the recommended breastfeeding duration for exclusive breastfeeding in the Malaysian National Breastfeeding Policy that was formulated in 1993 and revised in 2005. The policy advises mothers to exclusively breastfeed for six months and continues until two years. (<http://www.moh.gov.my/images/gallery/GarisPanduan/diet/km12.pdf>). However, majority of the mothers intended to breastfeed their babies for more than 12 months (52.8 %: 344/652) and more than half of them were normal BMI (51.7 %). There was no significant association seen in intention of breastfeeding duration across the four BMI classifications as shown in Table 4.11.

4.5.2.3 Father's Preference on Infant Feeding

Most mothers (68.3 %, 445/652) reported their husbands offer encouragement by showing their preference to breastfeed their babies (Table 4.11). Only 31.7 % (207/652) prefers to formula feed or ambivalent about feeding practices of their babies.

4.5.2.4 Grandmother's preference

Majority mothers had supportive biological mothers whom preferred “exclusive breastfeeding” (59.7 %: 389/652) and only 40.3 % (263/652) preferred formula milk or ambivalent about feeding method for the newborns.

Only a third of obese women (33.3%) had mothers who preferred breastfeeding their grandchildren compared to about 59% of overweight women and 62% of underweight women (See Table 4.11). The percentage is the highest amongst women

with normal BMI with about 66% of them had grandmothers preferred to breastfeed. This number is double that of the obese mothers.

4.5.2.5 When Decision Was Made On Breastfeeding

A total of 321 (49.5 %) mothers made decision to breastfeed before they were expecting with majority of them were normal BMI (52 %; 167/321), followed by overweight (24.3 %; 78/321), obese (12.5 %; 40/321) and underweight (11.2 %; 36/321). Meanwhile, 50.5 % (327/652) of the mothers decided to breastfeed their newborns during pregnancy with highest number were subjects with normal BMI (51.7 %).

4.5.2.6 Time Intended To Introduce Solid Food

Almost 90 % of the mothers intended to introduce solid food as recommended by WHO and Ministry of Health Malaysia which was at six months or more and there was no significant association between time intended to introduce solid food between BMI categories ($p = 0.157$).

4.5.3 To Evaluate Factors Associated With Breastfeeding Intention

4.5.3.1 Maternal and Paternal Factors

Table 4.12 presents descriptive analysis and Table 4.13 presents association between maternal and paternal variables and breastfeeding intention for 652 mothers.

Table 4.12 :

Distribution of Maternal And Paternal Variables by Breastfeeding Intention (N=652)

Variables	Percent (no.) women's intention to exclusive breastfeed (EBF)		Total
	With intention (n=322)	Without intention (n=327)	
Maternal factors			
<i>Mother's age at pregnancy</i>	28.1 ± 4.2	29.9 ± 4.2	
18-20 years old	10 (3.1 %)	2 (0.6 %)	12 (1.8 %)
21-30 years old	238 (73.9 %)	170 (52.0 %)	408 (62.6 %)
31-40 years old	74 (23.0 %)	155 (47.4 %)	229 (35.1 %)
<i>Maternal education</i>			
Primary	2 (0.6 %)	6 (1.8 %)	8 (1.2 %)
Secondary	95 (29.5 %)	135 (41.3 %)	230 (35.3 %)
Tertiary	225 (69.9 %)	186 (56.9 %)	411 (63.0 %)
<i>Maternal occupation</i>			
Housewife	114 (35.5 %)	88 (27.1 %)	202 (30.9 %)
Fulltime	180 (56.1 %)	212 (65.2 %)	392 (60.1 %)
Part-time	8 (2.5 %)	14 (4.3 %)	22 (3.4 %)
Self-employed	19 (5.9 %)	11 (3.4 %)	30 (4.6 %)
<i>Mother's pre-pregnancy BMI</i>			
Underweight	35 (10.9 %)	41 (12.5 %)	76 (11.7 %)
Normal	181 (56.2 %)	155 (47.4 %)	336 (51.5 %)
Overweight	67 (20.8 %)	93 (28.4 %)	160 (24.5 %)
Obese	39 (12.1 %)	38 (11.6 %)	77 (11.8 %)
Paternal factors			
<i>Paternal education</i>			
Primary	4 (1.2 %)	6 (1.8 %)	10 (1.5 %)
Secondary	111 (34.6 %)	156 (47.9 %)	267 (41.0 %)
Tertiary	206 (64.2 %)	164 (50.3 %)	370 (56.7 %)
<i>Paternal employment</i>			
Not working	3 (0.9 %)	2 (0.8 %)	5 (0.8 %)
Fulltime	265 (82.6 %)	270 (82.8 %)	535 (82.1 %)
Part-time	10 (3.1 %)	8 (2.5 %)	18 (2.8 %)
Self-employed	43 (13.4 %)	46 (14.1 %)	89 (13.7 %)

Table 4.13 :

Association between maternal and paternal variables and breastfeeding intention (N=652)

Characteristics	With intention to EBF n=322		Without intention to EBF n=327		Total		χ^2	df	P value
	n	%	n	%	n	%			
Maternal factors									
<i>Age during pregnancy</i>							42.367	1	< 0.001
18 – 30 years old	248	77.0	172	52.6	420	64.7			
31 – 40 years old	74	23.0	155	47.4	229	35.3			
<i>Years of education</i>							11.797	1	< 0.001
≤ 12 years	97	30.1	141	43.1	238	36.7			
> 12 years	225	69.9	186	56.9	411	63.3			
<i>Employment</i>							5.349	1	0.013
Housewife	114	35.5	88	27.1	202	31.3			
Employed	207	64.5	237	72.9	444	68.7			
<i>Pre-pregnancy BMI</i>							3.570	1	0.035
Normal (BMI 18.5 – 24.9 kg/m ²)	216	67.1	196	59.9	412	63.5			
Overweight and obese (BMI > 25)	106	32.9	131	40.1	237	36.5			
Paternal factors									
<i>Years of education</i>							12.704	1	< 0.001
≤ 12 years	115	35.8	162	49.7	277	42.8			
> 12 years	206	64.2	164	50.3	370	57.2			
<i>Employment</i>							0.217	1	0.493
Unemployed	3	0.9	2	0.6	5	0.8			
Employed	318	99.1	324	99.4	642	99.2			

*Analyses were done using Chi-square test

a) Age during pregnancy

There was a significant association between maternal age and intention 'exclusive breastfeed', χ^2 (1, N = 42.367, $p < 0.001$). "Exclusive breastfeeding" intention was more common among younger mothers aged between 21 to 30 years old (73.9 %: 238/322), followed by middle-aged mothers aged 31 to 40 years old (23.0 %: 74/322) and only 3.1 % were mothers aged 18 to 20 years old.

b) Maternal education

A total of 411 mothers came from tertiary education and 69.9 % (225/322) had higher intention to 'exclusive breastfeed' their babies, followed by 29.5 % (95/322) from secondary and 0.6 % (2/322) from primary school. Then, it was grouped into less than 12 years and more than 12 years of total education they received. The finding showed that there was a significant association between maternal education and breastfeeding intention, $\chi^2 = 11.797$, df 1 $p < 0.001$. Higher educated mothers had intention to 'exclusive breastfeed' their babies than mothers from lower education.

c) Maternal employment

A total of 60.1 % (392/652) of the mothers work fulltime and more than 50 % of them had no intention to 'exclusive breastfeed' their babies (54.1 %: 212/392). It was found that there was a significant association between employment status of the mothers and "exclusive breastfeeding" intention, $\chi^2 = 5.349$, df 1, $p = 0.013$.

d) Maternal pre-pregnancy BMI status

Majority of the mothers had normal pre-pregnancy BMI (51.5 %, 336/652), followed by overweight (24.5 %: 160/652), obese (11.8 %: 77/652) and underweight (11.7 %: 76/652). The mothers then were grouped into normal ($BMI \leq 25.0 \text{ kg/m}^2$) and overweight and obese ($BMI > 25 \text{ kg/m}^2$). Majority of mothers who had intention to 'exclusive breastfeed' were mothers with normal BMI (67.1 %: 216/322), therefore there was a significant association between maternal BMI status and intention to breastfeed, $\chi^2 = 3.570$, df 1, $p = 0.035$.

e) Paternal education

56.7 % (370/652) of the mothers had husbands with tertiary education, followed by 41.0 % (267/652) secondary and 1.5 % (10/652) from primary education. The finding showed that there was a significant association between paternal education and maternal breastfeeding intention, $\chi^2 = 12.704$, df 1, $p < 0.001$. Mothers who had an intention to 'exclusive breastfeed' had higher educated husbands.

4.5.3.2 Demographic and maternal knowledge

Table 4.14 presents descriptive analysis and Table 4.15 presents association between demographic and maternal knowledge variables and breastfeeding intention for 652 mothers. Demographic includes marital status, household monthly income and parity. Meanwhile maternal knowledge is presented as scores in knowledge of breastfeeding and formula feeding through Iowa Infant Feeding Scale (IIFAS) and whether the mothers received other knowledge through breastfeeding interventions from health clinic or by attending antenatal classes.

Table 4.14 :

Demographic and maternal knowledge variables associated with breastfeeding intention (N=652)

Variables	Percent (no.) women's intention to exclusive breastfeed (EBF)		Total
	With intention	Without intention	
Demographic factors			
<i>Marital status</i>			
Married	321 (99.7 %)	325 (99.4 %)	649 (99.1 %)
Never married	1 (0.3 %)	1 (0.3 %)	2 (0.3 %)
Divorced/separated	-	1 (0.3 %)	1 (0.1 %)
<i>Household income monthly</i>			
< RM 1000	10 (3.1 %)	16 (4.9 %)	26 (4.0 %)
RM 1001- RM 3000	156 (48.4 %)	165 (50.5 %)	321 (49.2 %)
RM 3001 – RM 5000	70 (21.7 %)	67 (20.5 %)	137 (21.0 %)
> RM 5000	86 (26.7 %)	79 (24.2 %)	165 (25.3 %)
<i>Parity</i>			
First	180 (56.8 %)	79 (24.4 %)	259 (39.7 %)
Second	71 (22.4 %)	134 (41.4 %)	205 (31.4 %)
Third or more	66 (20.8 %)	111 (34.3 %)	177 (27.1 %)
<i>Maternal knowledge</i>			
<i>IIFAS score</i>			
Positive to formula feeding	64.5 ± 7.8	62.4 ± 7.9	
Neutral	8 (2.5 %)	16 (4.9 %)	24 (3.7 %)
Positive to breastfeeding	231 (71.7 %)	250 (76.5 %)	481 (73.8 %)
<i>Attending breastfeeding interventions</i>			
Notes/pamphlets on BF	83 (25.8 %)	61 (18.7 %)	144 (22.1 %)
Class/seminar/lecture on BF	196 (48.8 %)	206 (51.2 %)	402 (61.7 %)
Demonstration of BF	159 (52.5 %)	144 (47.5 %)	303 (46.5 %)
Video/tv/slide show on BF	147 (46.2 %)	171 (53.8 %)	318 (48.8 %)
Counseling/discussion on BF	48 (47.5 %)	53 (52.5 %)	101 (15.5 %)
<i>Attending antenatal class</i>			
Yes	90 (50.6 %)	88 (49.4 %)	178 (27.3 %)
No	236 (73.3 %)	232 (70.9 %)	468 (71.8 %)
	86 (26.7 %)	95 (29.1 %)	181 (27.8 %)

Table 4.15 :

Association between demographic and maternal knowledge variables and breastfeeding intention (N=652)

Characteristics	With intention n=322		Without intention n=327		χ^2	df	P value
	n	%	n	%			
Demographic factors							
<i>*Marital status</i>							
Married	321	99.7	325	99.4	1.163	2	0.675
Unmarried	1	0.3	1	0.3			
Divorced/widow	-	-	1	0.3			
<i>Household monthly income</i>							
Low (<RM3000)	166	51.6	181	55.4	0.973	2	0.615
Middle (RM3001 - 5000)	70	21.7	67	20.5			
High (\geq RM5000)	86	26.7	79	24.2			
<i>Parity</i>							
Primiparous	180	56.8	79	24.4	69.852	1	< 0.001
Multiparous	137	43.2	245	75.6			
Maternal knowledge							
<i>IIFAS score</i>							
High (\geq 65)	159	49.4	135	41.3	4.290	1	0.023
Low (<65)	163	50.6	192	58.7			
<i>Attending breastfeeding interventions</i>							
Yes	257	80.6	269	82.5	0.408	1	0.296
No	62	19.4	57	17.5			
<i>Attending antenatal class</i>							
Yes	236	73.3	232	70.9	0.443	1	0.282
No	86	26.7	95	29.1			

*Analyses were done using Fisher Exact test, the rest of the analyses were done using Chi-square test

a) Marital status

A total of 99.1 % (649/652) of the mothers were married, only 0.3 % (2/652) and 0.1 % (1/652) were never married and had divorced/separated, respectively. Most mothers who had intention to 'exclusive breastfeed' were married. However, there is no significant association between breastfeeding intention and marital status, $p = 0.675$ using Fisher Exact test.

b) Household monthly income

Majority of the mothers with intention to exclusive breastfeed had household monthly income of RM 1001 – RM 3000 (48.4 %: 156/322). However, almost the same percentage that was 50.5 % of the mothers with no intention was in the same category of household income.

The mothers then were grouped into low, middle and high household monthly income and there was no significant association between them and breastfeeding intention. There was no significant association between household monthly income and the decision to exclusive breastfeed, $\chi^2 = 0.973$, df 2, $p = 0.615$).

c) Parity

39.7 % (259/652) mothers were in first pregnancy, 31.4 % (205/652) was in their second pregnancy and 27.1 % (144/652) had more than 2 children at the time this study was carried out. Mothers who were in their first pregnancy had more intention to 'exclusive breastfeed' their babies compared to mothers with more than 1 children, $\chi^2 = 69.852$, df 1, $p < 0.001$).

d) Mothers Attitudes towards Infant Feeding

The mothers' attitudes towards infant feeding were measured using the validated Iowa Infant Feeding Scale (IIFAS). The majority of the mothers had neutral attitude (73.8 %: 481/652), followed by 22.1 % (144/652) with a positive attitude towards breastfeeding and 3.7 % (24/652) were positive towards formula feeding.

Having a higher score (≥ 65) was significantly associated with higher intention to exclusive breastfeed, $\chi^2 = 4.290$, df 1, $p = 0.023$).

e) Breastfeeding interventions

Government health clinics in Malaysia provide several breastfeeding programs for expectant mothers. In this study, 61.7 % (402/652) reported that they had read notes or pamphlets on breastfeeding, 46.5 % (303/652) had attended classes/seminars/lectures on breastfeeding, 48.8 % (318/652) had watched demonstrations on breastfeeding, 15.5 % (101/652) had watched video/television on breastfeeding and 27.3 % (178/652) had personal counselling or discussion with any medical staff about breastfeeding.

However, there were no associations between those who received breastfeeding interventions concerning breastfeeding intention, $\chi^2 = 0.443$, df 1, p = 0.296).

f) Antenatal class

A total of 468 (71.8 %) of the mothers had attended at least one antenatal class during their pregnancies, but there was no significant association between attending antenatal class and intention to breastfeed among them, $\chi^2 = 0.443$, df 1, p = 0.282).

Table 4.16 :
Psychosocial variables and breastfeeding intention (N=652)

Variables	Number (%) of women's intend to breastfeed		Total
	With intention	Without intention	
Psychosocial			
<i>Father's preference</i>			
Formula feeding	2 (0.6 %)	4 (1.2 %)	6 (0.9 %)
Breastfeeding	248 (77.0 %)	195 (59.6 %)	443 (67.9 %)
Doesn't mind	72 (22.4 %)	128 (39.1 %)	200 (30.7 %)
<i>*Grandmother's preference</i>			
Formula feeding	4 (1.2 %)	2 (0.6 %)	6 (0.9 %)
Breastfeeding	214 (66.5 %)	173 (52.9 %)	387 (59.4 %)
Doesn't mind	46 (14.3 %)	69 (21.1 %)	115 (17.6 %)
Never discussed	58 (18.0 %)	83 (25.4 %)	141 (21.6 %)
<i>*Grandmother's breastfed for more than one month</i>			
Yes	237 (73.6 %)	208 (63.6 %)	445 (68.3 %)
No	27 (8.4 %)	38 (11.6 %)	65 (10.0 %)
I don't know	58 (18.0 %)	81 (24.8 %)	139 (21.3 %)

*Grandmother is mother's maternal mother

Table 4.17 :
Association between psychosocial variables and breastfeeding intention (N=652)

Characteristics	With intention n=322		Without intention n=327		χ^2	df	P value
	n	%	n	%			
Psychosocial factors							
<i>Father's preference</i>					22.634	1	< 0.001*
Breastfeeding	248	77.0	195	59.6			
Formula feeding or ambivalent	74	23.0	132	40.4			
<i>Grandmother's preference</i>					12.382	1	< 0.001*
Breastfeeding	214	66.5	173	52.9			
Formula feeding or ambivalent	108	33.5	154	47.1			
<i>Grandmother's breastfeeding experience</i>					7.518	1	0.004*
Yes	237	73.6	208	63.6			
No	85	26.4	119	36.4			

*Analyses were done using Chi-square test

4.5.3.3 Psychosocial Factors

Table 4.16 presents descriptive analysis and Table 4.17 presents association between psychosocial variables and breastfeeding intention for 652 mothers.

a) Father's preference on infant feeding method

Majority of the mothers perceived their husband preferred breastfeeding (67.9 %: 443/652), formula feeding (0.9 %: 6/652) and were ambivalent about the feeding method (30.7 %: 200/652).

77.0 % (248/322) of those mothers who had intention to ‘exclusive breastfeeding’ perceived their husbands too preferred them to breastfeed their babies. Nonetheless, 22.4 % (72/322) had husbands who were ambivalent about the feeding method, but they were still having an intention to ‘exclusive breastfeed’ their babies. However, there was an association between father's preference on infant feeding method and breastfeeding intention of the mothers, $\chi^2 = 22.634$, df 1, $p < 0.001$).

b) Grandmother's preference on infant feeding method

In Malay culture, most of the mothers will spend their confinement period with their own biological mothers. Therefore, their biological mothers might influence the mothers' decision as well.

As seen in the Table 4.17, majority mothers who had intention towards breastfeeding perceived that their mothers had preference towards breastfeeding (66.5 %: 214/322). There was a significant association between grandmother's preference about infant feeding method and breastfeeding intention of the mothers, $\chi^2 (1, N = 12.382, p < 0.001)$.

c) Grandmother's breastfeeding experience

There was a significant association between grandmother's breastfeeding experience and mother's intention to breastfeed, $\chi^2 = 7.518$, df 1, $p = 0.004$).

Being a child who has been breastfed before or had watched their mothers had breastfed their siblings may influence one's decision to breastfeed their babies in the

future. Hence, 73.6 % (237/322) of the mothers who had intention to 'exclusive breastfeed' their babies perceived that their mothers had experience in breastfeeding for more than one month.

Table 4.18 :

Unadjusted And Adjusted Odd Ratios (Ors) Of Variables Associated With Breastfeeding Intention (N=652).

Factor	With intention n=322	Without intention n=327	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value*
Maternal factors						
<i>Maternal age</i>						
18 – 30 years old	248 (77.0 %)	172 (52.6 %)	3.020 (2.153 – 4.236)	< 0.001*	2.096 (1.428 – 3.078)¹	< 0.001*
31 to 40 years old	74 (23.0 %)	155 (47.4 %)	1 (reference group)		1 (reference group)	
<i>Maternal years of education</i>						
≤ 12 years	97 (30.1 %)	141 (43.1 %)	1 (reference group)	0.001*	1 (reference group)	0.005*
> 12 years	225 (69.9 %)	186 (56.9 %)	1.758 (1.273 – 2.430)		1.648 (1.164 – 2.333) ²	
<i>Maternal employment</i>						
Housewives	114 (35.5 %)	88 (27.1 %)	1.483 (1.061 – 2.073)	0.021*	2.105 (1.372 – 3.230)³	0.001*
Employed	207 (64.5 %)	237 (72.9 %)	1 (reference group)		1 (reference group)	
Paternal factors						
<i>Years of education</i>						
≤ 12 years	115 (35.8 %)	162 (49.7 %)	1.769 (1.291 – 2.424)	< 0.001*	1.666 (1.172 – 2.368)³	0.004*
> 12 years	206 (64.2 %)	164 (50.3 %)	1 (reference group)		1	
Demographic factor						
<i>Household monthly income</i>						
Low (< RM 5000)	236 (73.3 %)	248 (75.8 %)	0.874 (0.614 – 1.245)	0.857	0.948 (0.612 – 1.470) ⁴	0.813
High (≥ RM5000) (ref)	86 (26.7 %)	79 (24.2 %)	1 (reference group)		1 (reference group)	

*significant p value (p < 0.05)

¹Adjusted for parity, maternal education, IIFAs score, receiving ‘any breastfeeding’ interventions, attending antenatal class, spouse’s preference and grandmother’s preference,

²adjusted for parity and maternal occupation, maternal age, IIFAs score, receiving ‘any breastfeeding’ interventions, attending antenatal class, spouse and grandmother’s preference, ³adjusted for parity and household monthly income, ⁴adjusted for maternal education, age, IIFAS score, receiving ‘any breastfeeding’ interventions, attending antenatal class, spouse and grandmother’s preference, parity and household monthly income,

Table 4.18

Unadjusted And Adjusted Odd Ratios (Ors) Of Variables Associated With Breastfeeding Intention (N=652) - continue

Factor	With intention n=322	Without intention n=327	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value*
Maternal knowledge						
<i>IIFAS score</i>						
High (≥ 65)	159 (49.4 %)	135 (41.3 %)	1.387 (1.017 – 1.892)	0.039*	1.444(1.030 – 2.025)¹	0.033*
Low (<65)	163 (50.6 %)	192 (58.7 %)	1 (reference group)		1 (reference group)	
<i>Attending breastfeeding interventions</i>						
Yes	257 (80.6 %)	269 (82.5 %)	0.878 (0.590 – 1.308)	0.523	1.053 (0.675 – 1.643) ²	0.905
No	62 (19.4 %)	57 (17.5 %)	1 (reference group)		1 (reference group)	
<i>Attending antenatal class</i>						
Yes	236 (73.3 %)	232 (70.9 %)	1.124 (0.797 – 1.584)	0.506	1.281 (0.875– 1.877) ³	0.203
No	86 (26.7 %)	95 (29.1 %)	1 (reference group)		1 (reference group)	
Psychosocial factors						
<i>Father's preference</i>						
Breastfeeding	248 (77.0 %)	195 (59.6 %)	2.269 (1.613 – 3.190)	< 0.001*	2.381 (1.639 – 3.458)⁴	< 0.001*
Formula feeding or ambivalent	74 (23.0 %)	132 (40.4 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's preference</i>						
Breastfeeding	214 (66.5 %)	173 (52.9 %)	1.764 (1.284 – 2.422)	< 0.001*	1.700 (1.212 – 2.384)⁵	0.002*
Formula feeding or ambivalent	108 (33.5 %)	154 (47.1 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	237 (73.6 %)	208 (63.6 %)	1.595 (1.141 – 2.230)	0.006*	1.657 (1.157 – 2.371)⁵	0.006*
No	85 (26.4 %)	119 (36.4 %)	1 (reference group)		1 (reference group)	

*significant p value (p < 0.05)

¹adjusted for parity, maternal education, received 'any breastfeeding' interventions and attending antenatal class, ² adjusted for maternal education, parity, IIFAS score and attending antenatal class, ³adjusted for maternal education, parity, IIFAS score and received 'any breastfeeding' interventions, ⁴adjusted for paternal education, paternal employment, household monthly income and parity, ⁵adjusted for parity and household monthly income

Table 4.18 presents unadjusted (crude) and adjusted odd ratios (ORs) of variables associated with breastfeeding intention.

Mothers aged between 18 to 30 years old were three times more likely to intend to “exclusive breastfeeding” than mothers aged between 31 to 40 years old (crude OR: 3.020, 95% CI of crude OR: 2.153 – 4.236). After adjustment for confounding variables, they are about twice more likely to exclusively breastfeed their babies (adjusted OR: 2.096, 95% CI of adjusted OR: 1.428 – 3.0780).

Mothers with a higher level of education of more and equal to 12 years were 1.7 times more likely to intend to ‘exclusively breastfeed’ than mothers with education of less than 12 years (crude OR: 1.758, 95% CI 1.273 – 2.430, adjusted OR: 1.648, 95% CI of adjusted OR: 1.164 – 2.333).

Housewives were almost 1.5 times more likely to intend to exclusively breastfeed than working mothers (crude OR: 1.483, 95% CI of crude OR: 1.061 – 2.073) and the adjusted odds ratio was 2.105 (95% CI of adjusted OR: 1.372 – 3.230).

Mothers with higher educated spouses of more and equal to 12 years were almost 1.8 times more likely to intend to ‘exclusively breastfeed’ than mothers of lower educated spouses (crude OR: 1.769, 95% CI of crude OR: 1.291 – 2.424, adjusted OR: 1.666, 95% CI of adjusted OR: 1.172 – 2.368).

Mothers with higher score of Iowa Infant Feeding Attitude (IIFAS) were more likely to intend to ‘exclusively breastfeed’ than mothers with lower score (crude OR: 1.387, 95% CI of crude OR: 1.017 – 1.892), and the adjusted odd ratios was 1.444 (95% CI of crude OR: 1.030 – 2.025).

Mothers who perceived their spouses prefers “exclusive breastfeeding” were 2.26 more likely to intend to ‘exclusively breastfeed’ their babies than mothers who perceived their spouses to have a preference for formula feeding or were ambivalent about the feeding method spouses (crude OR: 2.269, 95% CI of crude OR: 1.613 – 3.190, adjusted OR: 2.381, 95% CI of adjusted OR: 1.639 – 3.458).

Mothers who perceived their biological mothers had preference towards breastfeeding were more likely to intend to ‘exclusively breastfeed’ their babies than mothers who perceived their biological mothers were favoured towards formula feeding or were ambivalent about the feeding method mothers (crude OR: 1.764, 95% CI of crude OR: 1.284 – 2.422), adjusted OR: 1.700 (95% CI of adjusted OR: 1.212 – 2.384).

Mothers who informed that their biological mothers had experience of breastfeeding for more than one month were more likely to intend to ‘exclusively

breasted' their babies than mothers who did not (crude OR: 1.595, 95% CI of crude OR: 1.141 – 2.230 and the adjusted odd ratios was 1.657 (95% CI of adjusted OR: 1.157 – 2.371).

4.5.4 To Evaluate Factors Associated With Early Initiation of Breastfeeding Within One Hour

Table 4.19 :

Initiation of breastfeeding within one hour of childbirth by demographic and socioeconomic characteristics (N=652)

Factor	Less than one hour (n=442)	One to four hours (n=155)	Four to 2four hours (n=41)	More than 2four hours after birth (n=14)	Total, N (%)
Maternal factors					
<i>Mother's age at pregnancy</i>					
18-20 years old	7 (1.6 %)	3 (1.9 %)	2 (4.9 %)	-	12 (1.8 %)
21-30 years old	274 (62.0 %)	102 (65.8 %)	21 (51.2 %)	13 (92.9 %)	410 (62.9 %)
31-40 years old	161 (36.4 %)	50 (32.3 %)	18 (43.9 %)	1 (7.1 %)	230 (35.3 %)
<i>Maternal education</i>					
Primary	5 (1.1 %)	3 (1.9 %)	-	-	8 (1.2 %)
Secondary	158 (35.7 %)	57 (36.8 %)	14 (34.1 %)	2 (14.3 %)	231 (35.4 %)
Tertiary	279 (63.1 %)	95 (61.3 %)	27 (65.9 %)	12 (85.7 %)	413 (63.3 %)
<i>Maternal occupation</i>					
Housewife	138 (31.4 %)	50 (32.3 %)	12 (29.3 %)	2 (14.3 %)	202 (31.1 %)
Fulltime	260 (59.2 %)	94 (60.6 %)	28 (68.3 %)	11 (78.6 %)	393 (60.6 %)
Part-time	19 (4.3 %)	5 (3.2 %)	-	-	24 (3.7 %)
Self-employed	22 (5.0 %)	6 (3.9 %)	1 (2.4 %)	1 (7.1 %)	30 (4.6 %)
Paternal factors					
<i>Paternal education</i>					
Primary	7 (1.6 %)	3 (1.9 %)	-	-	10 (1.5 %)
Secondary	180 (40.7 %)	69 (44.8 %)	15 (37.5 %)	4 (28.6 %)	268 (41.2 %)
Tertiary	255 (57.7 %)	82 (53.2 %)	25 (62.5 %)	10 (71.4 %)	372 (57.2 %)
<i>Paternal occupation</i>					
Not working	5 (1.1 %)	-	-	-	5 (0.8 %)
Fulltime	361 (81.9 %)	130 (84.4 %)	37 (90.2 %)	10 (71.4 %)	538 (82.8 %)
Part-time	17 (3.9 %)	1 (0.6 %)	-	-	18 (2.8 %)
Self-employed	58 (13.2 %)	23 (14.9 %)	4 (9.8 %)	4 (28.6 %)	89 (13.7 %)

Table 4.19 :

Initiation of breastfeeding within one hour of childbirth by demographic and socioeconomic characteristics (N=652)- continue

Factor	Less than one hour (n=442)	One to four hours (n=155)	Four to 2four hours (n=41)	More than 2four hours after birth (n=14)	Total, N (%)
Demographic factors					
<i>Marital status</i>					
Married	440 (99.5 %)	154 (99.4 %)	41 (100.0 %)	14 (2.1 %)	649 (99.5 %)
Never married	1 (0.2 %)	1 (0.6 %)	-	-	2 (0.3 %)
Divorced/separated	1 (0.2 %)	-	-	-	1 (0.2 %)
<i>Household income</i>					
< RM 1000	15 (3.4 %)	7 (4.5 %)	4 (9.8 %)	-	26 (4.0 %)
RM 1001- RM 3000	225 (50.9 %)	75 (48.4 %)	17 (41.5 %)	6 (42.9 %)	323 (49.5 %)
RM 3001 – RM 5000	85 (19.2 %)	36 (23.2 %)	12 (29.3 %)	4 (28.6 %)	137 (21.0 %)
> RM 5000	117 (26.5 %)	37 (23.9 %)	8 (19.5 %)	4 (28.6 %)	166 (25.5 %)

Table 4.20 :

Association between demographic and socioeconomic characteristics and initiation of breastfeeding within one hour of childbirth (N=652)

Variables	Early initiation		Delayed initiation		Total		χ^2	df	p value
	n	%	n	%	n	%			
Maternal factors									
<i>Age at pregnancy</i>							0.794	1	0.211
18-30 years old	281	63.6	141	67.1	422	64.7			
31-40 years old	161	36.4	69	32.9	230	35.3			
<i>Years of education</i>							0.029	1	0.468
≤ 12 years	163	36.9	76	36.2	239	36.7			
> 12 years	279	63.1	134	63.8	413	63.3			
<i>Employment</i>							0.061	1	0.439
Housewife	138	31.4	64	30.5	202	31.0			
Employed	301	68.6	146	69.5	447	68.6			
Paternal factors									
<i>Years of education</i>							0.120	1	0.396
≤ 12 years	187	42.3	91	43.8	278	42.6			
> 12 years	255	57.7	117	56.3	372	57.1			
Demographic factors									
<i>*Marital status</i>									
Married	440	99.5	209	99.4	649	99.5	1.109	2	0.770
Unmarried	1	0.2	1	0.6	2	0.3			
Divorced/widow	1	0.2	-	-	1	0.2			
<i>Household monthly income</i>							2.776	2	0.250
Low (<RM3000)	240	54.3	109	51.9	349	53.5			
Middle (RM3000 - 5000)	85	19.2	52	24.8	137	21.0			
High (> RM5000)	117	26.5	49	23.3	166	25.5			

* Fisher exact test has been used and the rest of the analyses were done using Chi square test

4.5.4.1 Maternal and Paternal Factor

Table 4.19 presents descriptive data and Table 4.20 presents the association between sociodemographic variables and initiation of breastfeeding within one hour of childbirth.

Majority of the mothers initiated breastfeeding within one hour of childbirth (67.8 %: 442/652), followed by 23.8 % (155/652) within one to four hours, 6.3 % (41/652) within four to 2four hours and 2.1 % (14/652) started 2four hours after childbirth.

a) Maternal age at pregnancy

Mothers aged 21 to 30 years old commonly initiated breastfeeding within one hour (62.0 %: 274/442), followed by older age mothers of 31 to 40 years old (36.4 %: 161/652) and 1.6 % (7/652) from young mothers aged 18 to 20 years old. However, there was no significant relationship between maternal age and time of breastfeeding initiation, $\chi^2 = 0.794$, df 1, p = 0.211.

b) Maternal education

Tertiary educated mothers tended to early initiate breastfeeding their babies (63.1 %: 279/442), followed by secondary educated mothers (35.7 %: 15/442) and primary educated (1.1 %: 442), but the association between maternal education and early initiation of breastfeeding by the mothers was not significant, $\chi^2 = 0.029$, df 1, p = 0.468.

c) Maternal employment

Fulltime working mothers had highest percentage of early initiation (59.2 %, 260/442), followed by housewives (31.4 %: 138/442), self-employed (5.0 %: 22/442) and part-time working mothers (4.3 %: 19/442).

Nevertheless, there was no significant association between maternal employment and initiation of breastfeeding among the mothers, $\chi^2 = 0.061$, df 1, p = 0.439.

d) Paternal education

Early initiation of breastfeeding were common among mothers who had husbands with tertiary education (57.7 %: 255/442), followed by secondary (40.7 %: 180/442) and primary (1.6 %: 7/442).

However, there was no significant association between paternal education and breastfeeding initiation among the mothers, $\chi^2 = 0.120$, df 1, p = 0.396.

e) Paternal employment

A total of 81.9 % of mothers who early initiated breastfeeding had husbands who worked fulltime (81.9 %: 361/442), followed by self-employed (13.2 %: 58/442), part-time (3.9 %: 17/442) and not working (1.1 %: 5/442).

4.5.4.2 Demographic Factors

a) Marital status

A total of 99.5 % of the mothers who initiated within one hour were married, 0.2 % (1/442) was never married and 0.2 % (1/442) was divorced.

There was no significant association between marital status and breastfeeding initiation among the mothers, p = 0.770.

b) Household monthly income

Early initiation of breastfeeding were common among mothers from low household monthly income (< RM 3000) which was 54.3 % (240/442), followed by high (26.5 %: 117/442) and middle household monthly income (19.2 %: 85/442).

Nonetheless, there was no significant association between household monthly income and breastfeeding initiation by the mothers, $\chi^2 = 2.776$, df 2, p = 0.250.

Table 4.21 :

Initiation of breastfeeding within one hour of childbirth by biological variables (N=652)

Factor	Less than one hour (n=442)	1 to four hours (n=155)	Four to 24 hours (n=41)	More than 24 hours after birth (n=14)	Total N (%)
Child related factors					
<i>Sex of child</i>					
Male	188 (42.5 %)	65 (41.9 %)	21 (51.2 %)	5 (35.7 %)	279 (42.8 %)
Female	253 (57.2 %)	90 (58.1 %)	20 (48.8 %)	9 (64.3 %)	372 (57.1 %)
<i>Parity</i>					
First	169 (38.5 %)	64 (42.7 %)	17 (41.5 %)	10 (71.4 %)	260 (40.4 %)
Second	134 (30.5 %)	51 (34.0 %)	18 (43.9 %)	3 (21.4 %)	206 (32.0 %)
Third or more	136 (31.0 %)	35 (23.3 %)	6 (14.6 %)	1 (7.1 %)	178 (27.6 %)
<i>Size of baby</i>					
< 2.50 kg	10 (2.3 %)	5 (3.2 %)	-	1 (7.1 %)	16 (2.5 %)
≥ 2.50 – 3.99 kg	430 (97.3 %)	148 (95.5 %)	40 (97.6 %)	13 (92.9 %)	631 (96.8 %)
≥ 4.00 kg	2 (0.5 %)	2 (1.3 %)	1 (2.4 %)	-	5 (0.8 %)
Birth factors					
<i>Delivery method</i>					
Vaginal	331 (74.9 %)	110 (71.0 %)	10 (24.4 %)	8 (57.1 %)	459 (70.4 %)
Assisted vaginal	62 (14.0 %)	14 (9.0 %)	2 (4.9 %)	1 (7.1 %)	79 (12.1 %)
Caesarean	49 (11.1 %)	31 (20.0 %)	29 (70.7 %)	5 (35.7 %)	114 (17.5 %)
<i>Birth problems</i>					
Yes	21 (4.8 %)	7 (4.5 %)	4 (10.3 %)	2 (15.4 %)	34 (5.3 %)
No	419 (95.2 %)	147 (95.5 %)	35 (89.7 %)	11 (84.6 %)	612 (94.7 %)

*Biological variables consisted of insufficient milk supply, infant health problems, maternal obesity, and the physical challenges of breastfeeding, maternal smoking, parity, and method of delivery (Thulier and Mercer, 2009a)

Table 4.21 :

Initiation of breastfeeding within one hour of childbirth by biological variables (N=652)-continue

Factor	Less than one hour (n=442)	1 to four hours (n=155)	4 to 2four hours (n=41)	More than 2four hours after birth (n=14)	Total N (%)
Breastfeeding difficulties					
Swollen breasts	313 (70.8 %)	85 (54.8 %)	23 (56.1 %)	6 (42.9 %)	427 (65.5 %)
Sore breasts with fever	157 (35.5 %)	39 (25.2 %)	12 (29.3 %)	1 (7.1 %)	209 (32.1 %)
Cracked or sore nipples	186 (42.1 %)	71 (45.8 %)	27 (65.9 %)	3 (21.4 %)	287 (44.0 %)
Poor milk flowing	175 (39.6 %)	89 (57.4 %)	33 (80.5 %)	10 (71.4 %)	307 (47.1 %)
Insufficient milk	52 (11.8 % %)	59 (38.3 %)	21 (51.2 %)	9 (64.3 %)	141 (21.7 %)
Inverted nipples	4 (0.9 %)	7 (4.5 %)	4 (9.8 %)	-	15 (2.3 %)
Baby has suckling problems	20 (4.5 %)	14 (9.0 %)	9 (22.0 %)	6 (42.9 %)	49 (7.5 %)
Baby doesn't wake up for feeds	11 (2.5 %)	6 (3.9 %)	1 (2.4 %)	3 (21.4 %)	21 (3.2 %)
Maternal factors					
<i>Pre-pregnancy BMI status</i>					
Underweight	54 (12.2 %)	20 (12.9 %)	2 (4.9 %)	1 (7.1 %)	77 (11.8 %)
Normal	238 (53.8 %)	75 (48.4 %)	21 (51.2 %)	3 (21.4 %)	337 (51.7 %)
Overweight	109 (24.7 %)	38 (24.5 %)	8 (19.5 %)	5 (35.7 %)	160 (24.5 %)
Obese	41 (9.3 %)	22 (14.2 %)	10 (24.4 %)	5 (35.7 %)	78 (12.0 %)

Table 4.22 :

Association between biological variables and initiation of breastfeeding within one hour of childbirth (N=644)

Variables	Early initiation		Delayed initiation		Total		χ^2	df	p value*
	n	%	n	%	n	%			
Maternal factors									
<i>Pre-pregnancy BMI status</i>							3.900	1	0.048
Normal (BMI \leq 24.9)	292	66.1	122	58.1	414	63.5			
Overweight and obese (BMI > 25)	150	33.9	88	41.9	238	36.5			
<i>Parity</i>							2.016	1	0.156
Primiparous	169	38.5	91	44.4	260	40.4			
Multiparous	270	61.5	114	55.6	384	59.6			
<i>Birth weight</i>							1.127	1	0.288
Normal	430	97.3	201	95.7	631	96.8			
Under/overweight	12	2.7	9	4.3	21	3.2			
<i>Sex of child</i>									
Boy	188	42.5	91	43.3	279	42.8	0.505	1	0.777
Girl	253	57.2	119	56.7	372	57.1			
Birth factors									
<i>Delivery method</i>							38.944	1	< 0.001
Vaginal	393	88.9	145	69.0	538	82.5			
Cesarean section	49	11.1	65	31.0	114	17.5			
<i>Birth problems</i>							0.666	1	0.415
Yes	21	4.8	13	6.3	34	5.3			
No	419	95.2	193	93.7	612	94.7			
<i>Breastfeeding difficulties at or before four weeks</i>									
Yes	401	90.7	199	94.8	600	92.0	3.163	1	0.075
No	41	9.3	11	5.2	52	8.0			

*Analyses were done using Chi square test

4.5.4.3 *Biological factors*

Table 4.21 presents descriptive statistics while Table 4.22 presents the association between biological variables and early initiation among 652 mothers.

a) Sex of child

There were 57.1 % (372/652) girls and 42.8 % (279/652) boys, but, mothers who had baby girls (57.2 %: 253/442) were more common to early initiate breastfeeding compared to boys (42.5 %: 188/442).

However, there was no significant association between baby's gender and breastfeeding initiation, $\chi^2 = 0.505$, df 1, p = 0.777.

b) Size of baby

Most of the babies (96.8 %: 631/652) were born with normal body weight (≥ 2.5 to 3.99 kg). About 2.5% (16/652) were born with low birth weight (<2.5kg) 0.8% (5/652) macrosomia (>4.0 kg).

After categorized into normal and under/overweight, there was no significant association between birth weight and breastfeeding initiation by the mothers, $\chi^2 = 1.127$, df 1, p = 0.288.

c) Parity

Early initiation of breastfeeding were common among first child mothers (38.5 %: 169/442), closely followed by second child mothers (30.5 %: 134/442) and mothers with more than 3 children (31.0 %: 136/442).

After categorized into primiparous and multiparous, there was no significant association between parity and breastfeeding initiation among the mothers, $\chi^2 = 2.016$, df 1, p = 0.156).). However, more multiparous mothers (61.5 %: 270/442) seems to initiate within one hour compared to primiparous mothers (38.5 %: 169/442).

d) Maternal pre-pregnancy BMI status

Mothers with normal BMI were more likely to initiate breastfeeding within one hour of childbirth (53.8 %: 238/442), followed by overweight (24.7 %: 109/442), underweight (12.2 %: 54/442) and obese (9.3 %: 41/442) mothers.

When they were grouped into normal (BMI \leq 24.9 kg/m²) and overweight and obese (BMI $>$ 25 kg/m²), there was a significant association between maternal pre-pregnancy BMI status and breastfeeding initiation, $\chi^2 = 3.900$, df 1, p = 0.048. Early initiation of breastfeeding was more common among mothers with normal BMI (66.1 %: 292/442).

e) Birth delivery method

There were higher percentage of mothers who had vaginal delivery (70.4 %: 459/652), than those by caesarean delivery (17.5 %: 114/652) and assisted vaginal delivery (12.1 %: 79/652).

There was a significant association between birth delivery and breastfeeding initiation, $\chi^2 = 38.944$, df 1, p < 0.001. Mothers who had caesarean delivery were tend to have delayed breastfeeding initiation (31.0 %: 65/114), compared to mothers who delivered vaginally had higher percentage to early initiation of breastfeeding (88.9 %: 393/538).

f) Birth problems

There were 24 mothers who reported to experience health problems after delivery which were postpartum haemorrhage (29.2 %: 7/24), 12.5 % had high blood sugar (3/24), 29.2 % had high blood pressure (7/24) and 29.2 % (7/24) had various health problems like retained placenta, lack of oxygen level and surgical problems.

However, there was no significant association between birth problems and breastfeeding initiation, $\chi^2 = 0.666$, df 1, p = 0.415.

g) Breastfeeding difficulties at or before four weeks

The most common breastfeeding difficulties experienced by the mothers at or before four weeks were listed in descending order; painful swollen breasts (65.5 %: 427/652), sore breasts with high fever (32.1 %: 209/652), cracked or sore nipples (44.0 %: 287/652), milk takes longer time to flow at first feed (47.1 %: 307/652) and insufficient colostrum/milk (21.7 %: 141/652), inverted nipples (2.3 %: 15/652). The mothers also reported that 7.5 % (49/652) of their babies had problems in sucking and 3.2 % (21/652) of the babies does not wake up for feeds.

However, there was no significant association between difficulties in breastfeeding and breastfeeding initiation, $\chi^2 = 3.163$, df 1, p = 0.075.

Table 4.23 :

Initiation of breastfeeding within one hour of childbirth by psycho-social variables (N=652)

Factor	Less than one hour (n=442)	1 to four hours (n=155)	4 to 24r hours (n=41)	More than 24 hours after birth (n=14)	Total N (%)
Psycho-social					
<i>Prenatal intention to breastfeed</i>					
Breastfeeding	234 (53.3 %)	65 (41.9 %)	14 (34.1 %)	9 (64.3 %)	322 (49.6 %)
Formula feeding	10 (2.3 %)	11 (7.1 %)	4 (9.8 %)	1 (7.1 %)	26 (4.0 %)
Formula more than breastfeeding	40 (9.1 %)	12 (7.7 %)	6 (14.6 %)	2 (14.3 %)	60 (9.2 %)
Breastfeed more than formula feeding	155 (35.3 %)	67 (43.2 %)	17 (41.5 %)	2 (14.3 %)	241 (37.1 %)
<i>Paternal preference</i>					
Formula feeding	4 (0.9 %)	2 (1.3 %)	-	-	6 (0.9 %)
Breastfeeding	309 (69.9 %)	101 (65.2 %)	27 (65.9 %)	8 (57.1 %)	445 (68.3 %)
Doesn't mind	129 (29.2 %)	52 (33.5 %)	14 (34.1 %)	6 (42.9 %)	201 (30.8 %)
<i>Grandmother's preference</i>					
Formula feeding	3 (0.7 %)	3 (1.9 %)	-	-	6 (0.9 %)
Breastfeeding	297 (67.2 %)	74 (47.7 %)	14 (34.1 %)	4 (28.6 %)	389 (59.7 %)
Doesn't mind	67 (15.2 %)	31 (20.0 %)	12 (29.3 %)	6 (42.9 %)	116 (17.8 %)
Never discussed	75 (17.0 %)	47 (30.3 %)	15 (36.6 %)	4 (28.6 %)	141 (21.6 %)
<i>Grandmother's breastfeeding experience</i>					
Yes	330 (74.7 %)	93 (60.0 %)	19 (46.3 %)	5 (35.7 %)	447 (68.6 %)
No	36 (8.1 %)	22 (14.2 %)	4 (9.8 %)	4 (28.6 %)	66 (10.1 %)
I don't know	76 (17.2 %)	40 (25.8 %)	18 (43.9 %)	5 (35.7 %)	139 (21.3 %)
Maternal knowledge					
<i>IIFAS score</i>					
Positive to formula feeding	18 (4.1 %)	4 (2.6 %)	2 (4.9 %)	1 (7.1 %)	25 (3.8 %)
Neutral	327 (74.0 %)	115 (74.2 %)	31 (75.6 %)	10 (71.4 %)	483 (74.1 %)
Positive to breastfeeding	97 (21.9 %)	36 (23.2 %)	8 (19.5 %)	3 (21.4 %)	144 (22.1 %)

Table 4.23 :

Initiation of breastfeeding within one hour of childbirth by psycho-social variables (N=652)-continue

Maternal education interventions					
<i>BF interventions</i>					
Notes/pamphlets on BF	273 (62.0 %)	95 (62.1 %)	24 (58.5 %)	12 (85.7 %)	404 (62.3 %)
Class/seminar/lecture on BF	208 (47.3 %)	71 (46.4 %)	18 (43.9 %)	9 (64.3 %)	306 (47.2 %)
Demonstration of BF	212 (48.2 %)	78 (51.0 %)	20 (48.8 %)	10 (71.4 %)	320 (49.4 %)
Video/tv/slide show on BF	70 (15.9 %)	22 (14.4 %)	5 (12.2 %)	5 (35.7 %)	102 (15.7 %)
Counseling/discussion on BF	115 (26.1 %)	43 (28.1 %)	11 (26.8 %)	9 (64.3 %)	178 (27.5 %)
<i>Attending antenatal classes</i>					
Yes, for this pregnancy	202 (45.7 %)	65 (41.9 %)	11 (26.8 %)	6 (42.9 %)	284 (43.6 %)
Yes, for previous pregnancy	135 (30.5 %)	41 (26.5 %)	10 (24.4 %)	1 (7.1 %)	187 (28.7 %)
No	105 (23.8 %)	49 (31.6 %)	20 (48.8 %)	7 (50.0 %)	181 (27.8 %)

*Social variables included maternal work outside the home, number of working hours per week, breastfeeding support from the significant other, maternal grandmother and close friends, and inconsistent and appropriate support from health care professionals. (Thulier and Mercer, 2009b)

Table 4.24

Association between psycho-social variables and initiation of breastfeeding within one hour of childbirth (N=652)

Variables	Early initiation (n=442)		Delayed initiation (n=210)		Total		χ^2	df	p value
	n	%	n	%	n	%			
Breastfeeding support									
<i>Prenatal maternal intention to exclusive breastfeed</i>							7.382	1	0.007
With intention	234	53.3	88	41.9	322	49.6			
Without intention	205	46.7	122	58.1	327	50.4			
<i>Father's preference</i>							1.741	1	0.187
Breastfeeding	309	69.9	136	64.8	445	68.3			
Formula feeding or ambivalent	133	30.1	74	35.2	207	31.7			
<i>Grandmother's preference</i>							32.349	1	< 0.001
Breastfeeding	297	67.2	92	43.8	389	59.7			
Formula feeding or ambivalent	145	32.8	118	56.2	263	40.3			
<i>Grandmother's breastfed for more than one month</i>							23.707	1	< 0.001
Yes	330	74.7	117	55.7	447	68.6			
No	112	25.3	93	44.3	205	31.4			
Maternal knowledge									
<i>IIFAS score</i>							0.310	1	0.578
High (≥ 65)	196	44.3	98	46.7	294	45.1			
Low (< 65)	246	55.7	112	53.3	358	54.9			
<i>Received breastfeeding interventions</i>							0.228	1	0.633
Yes	357	81.1	172	82.7	529	81.6			
No	83	18.9	36	17.3	119	18.4			
<i>Attending antenatal class</i>							10.977	1	0.001
Yes	337	76.2	134	63.8	471	72.2			
No	105	23.8	76	36.2	181	27.8			

*Analyses were done using Chi square test

4.5.4.4 *Psycho-Social Factors*

Table 4.23 presents descriptive data and Table 4.24 presents the association between psychosocial variables and initiation of breastfeeding within one hour of childbirth.

a) Prenatal maternal intention to 'exclusive breastfeed'

As noted in Table 4.23, 53.3 % of the mothers who had intention towards 'exclusive breastfeeding' initiated breastfeeding within one hour of childbirth (234/442), followed by mothers who preferred breastfeeding to formula (35.3 %: 155/442), those who preferred formula to breastfeeding (9.1 %: 40/442) and those who preferred formula feed (2.3 %: 10/442).

As presented in Table 4.24, mothers who had intention to 'exclusive breastfeed' had more tendency to initiate breastfeeding early (53.3 %: 234/442) than mothers who did not had any intention to exclusive breastfeed, who actually had delayed initiation (58.1 %: 122/210). There is a significant association between intention to breastfeed and initiation, $\chi^2 = 7.382$, df 1, p = 0.007 (Table 4.24).

b) Father's preference

There was no significant association between father's preference and breastfeeding initiation of the mothers, $\chi^2 = 1.741$, df 1, p = 0.187.

It was a fair comparison between 69.4 % (309/445) of mothers who perceived their husbands prefer breastfeeding and 64.3 % of mothers who perceived their husband prefer formula feeding or were ambivalent had early initiation of breastfeeding.

c) Infant Feeding Attitude

Higher score of Iowa Infant Feeding Attitude (IIFAS) was associated with positive attitude towards breastfeeding.

Nevertheless, there was no significant association between scores of IIFAS and breastfeeding initiation among the mothers, $\chi^2 (1, N = 0.310, p = 0.578)$.

d) Grandmother's preferences

There was a significant association between grandmother's preference and breastfeeding initiation, $\chi^2 (1, N = 32.349, p < 0.001)$.

67.2 % (297/442) of mothers who perceived their biological mothers had preference towards breastfeeding were early initiated breastfed their babies. However, 56.2 % (118/210) mothers who perceived their mothers had preference toward formula feeding or were ambivalent about the feeding method had delayed initiation of breastfeeding.

e) Grandmother's breastfeeding experience for more than one month

There was a significant association between mothers whose their biological mothers had breastfeeding experience for more than one month and breastfeeding initiation, $\chi^2 = 23.707, df 1, p < 0.001$.

A total of 74.7 % (330/442) of the mothers who initiated breastfeeding within one hour had mothers with breastfeeding experience of more than one month.

f) Breastfeeding interventions

Government health clinics in Malaysia had provided various breastfeeding interventions for expectant mothers. In this study, 61.7 % (402/652) reported they had read notes or pamphlets on breastfeeding, 46.5 % (303/652) had attended class/seminar/lecture on breastfeeding, 48.8 % (318/652) had watched demonstrations on breastfeeding, 15.5 % (101/652) had watched video/television on breastfeeding and 27.3 % (178/652) had personal counselling or discussion with any medical staff about breastfeeding.

Nonetheless, there was no significant association between mothers receiving breastfeeding interventions and breastfeeding initiation, $\chi^2 = 0.228, df 1, p = 0.633$.

g) Antenatal class

Mothers who had attended antenatal class had higher percentage to initiate breastfeeding within one hour (71.5 %: 335/471), 42.0 % of mothers who were never attend antenatal class had delayed breastfeeding initiation (76/181).

There was a significant association between mothers attending antenatal class and breastfeeding initiation, $\chi^2 = 10.977$, df 1, $p < 0.001$).

Table 4.25 :

Crude (unadjusted) and adjusted odd ratios (ORs) of variables associated with breastfeeding initiation (N=652)

Factor	Early initiation n=442	Delayed initiation n=210	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value*
Maternal factors						
<i>Maternal age</i>						
18 – 30 years old	281 (63.6%)	141 (67.1 %)	1.171 (0.827 – 1.657)	0.373	1.054 (0.716 – 1.549) ¹	0.791
31 to 40 years old	161 (36.4 %)	69 (32.9 %)	1 (reference group)		1 (reference group)	
<i>Maternal years of education</i>						
≤ 12 years	163 (36.9 %)	76 (36.2 %)	1 (reference group)	0.865	1 (reference group)	0.784
> 12 years	279 (63.1 %)	134 (63.8 %)	0.971 (0.690 – 1.366)		0.948 (0.648 – 1.387) ²	
<i>Maternal employment</i>						
Housewives	138 (31.4 %)	64 (30.5 %)	1.046 (0.732 – 1.494)	0.805	1.085 (0.727 – 1.620) ³	0.689
Employed	301 (68.6 %)	146 (69.5 %)	1 (reference group)		1 (reference group)	
Demographic factor						
<i>Household monthly income</i>						
Low (< RM 5000)	325 (73.5 %)	161 (76.7 %)	0.845 (0.576 – 1.240)	0.390	0.823 (0.529 – 1.279) ⁴	0.386
High (≥ RM5000) (ref)	117 (26.5 %)	49 (23.3 %)	1 (reference group)		1 (reference group)	
Maternal knowledge						
<i>IIFAS score</i>						
High (≥65)	196 (44.3 %)	98 (46.7 %)	0.911 (0.655 – 1.266)	0.578	0.845 (0.598 – 1.193) ⁵	0.338
Low (<65)	246 (55.7 %)	112 (53.3 %)	1 (reference group)		1 (reference group)	
<i>Attending breastfeeding interventions</i>						
Yes	357 (81.1 %)	172 (82.7 %)	0.900 (0.585 – 1.368)	0.633	0.742 (0.468 – 1.175) ⁶	0.203
No	83 (18.9 %)	36 (17.3 %)	1 (reference group)		1 (reference group)	
<i>Attending antenatal class</i>						
Yes	337 (76.2 %)	134 (63.8 %)	1.820 (1.274 – 2.600)	0.001*	1.842 (1.272 – 2.666)⁷	0.001
No	105 (23.8 %)	76 (36.2 %)	1 (reference group)		1 (reference group)	

Table 4.25 :

Crude (unadjusted) and adjusted odd ratios (ORs) of variables associated with breastfeeding initiation (N=652)- continue

Factor	Early initiation n=442	Delayed initiation n=210	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P Value*
Psychosocial factors						
<i>Father's preference</i>						
Breastfeeding	309 (69.9 %)	136 (64.8 %)	1.264 (0.892 – 1.791)	0.187	1.315 (0.918 – 1.883) ¹	0.135
Formula feeding or ambivalent	133 (30.1 %)	74 (35.2 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's preference</i>						
Breastfeeding	297 (67.2 %)	92 (43.8 %)	2.627 (1.875 – 3.681)	< 0.001*	2.873 (2.031 – 4.065)²	< 0.001
Formula feeding or ambivalent	145 (32.8 %)	118 (56.2 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	330 (74.7 %)	117 (55.7 %)	2.342 (1.656 – 3.312)	< 0.0018*	2.387 (1.678 – 3.396)²	< 0.001*
No	112 (25.3 %)	93 (44.3 %)	1 (reference group)		1 (reference group)	
Biological factors						
<i>Pre-pregnancy BMI</i>						
Normal (BMI 18.5 – 24.9)	292 (66.1 %)	122 (58.1 %)	1 (reference group)	0.0498*	1 (reference group) ³	0.091
Overweight and obese (BMI > 25)	150 (33.9 %)	88 (41.9 %)	0.712 (0.508 – 0.998)		0.736 (0.517 – 1.049)	
<i>Parity</i>						
Primiparous	169 (38.5 %)	91 (44.4 %)	1 (reference group)	0.156	1 (reference group) ⁴	0.058
Multiparous	270 (61.5 %)	114 (55.6 %)	1.275 (0.911 – 1.785)		1.502 (0.987 – 2.285)	
<i>Birth weight</i>						
Normal	430 (97.3 %)	201 (95.7 %)	1.604 (0.665 – 3.870)	0.293	1.868 (0.715 – 4.882) ⁴	0.203
Under/overweight	12 (2.7 %)	9 (4.3 %)	1 (reference group)		1 (reference group)	
<i>Delivery method</i>						
Vaginal	393 (88.9 %)	145 (69.0 %)	3.595 (2.370 – 5.455)	< 0.0018	3.472 (2.216 – 5.440)⁴	< 0.001
Cesarean section	49 (11.1 %)	65 (31.0 %)	1 (reference group)		1 (reference group)	

*significantly different from reference (p< 0.05), ¹adjusted for maternal age, paternal education, paternal employment, household monthly income and parity, ²adjusted for maternal age, parity and household monthly income, ³adjusted for maternal age, maternal education, maternal employment, parity, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, ⁴adjusted for maternal age, maternal education, maternal employment, intention to breastfeed, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, grandmother's preference and breastfeeding experience

Table 4.25 presents unadjusted (crude) and adjusted odd ratios (ORs) of variables associated with breastfeeding initiation.

Mothers who attended antenatal class were 1.8 times more likely to initiate breastfeeding within one hour than mothers who never attend antenatal class (crude OR: 1.820, 95% CI of crude OR: 1.274 – 2.600), even after adjusted for maternal age, maternal education, spouse's preference, received 'any breastfeeding' interventions, household monthly income (adjusted OR: 1.842, 95% CI of adjusted OR: 1.272 – 2.666).

Mothers who perceived their biological mothers had preference towards breastfeeding were 2.6 times more likely to initiate breastfeeding within one hour than mothers who perceived their biological mothers were favoured towards formula feeding or were ambivalent about the feeding method mothers (crude OR: 2.627, 95% CI of crude OR: 1.875 – 3.681). After adjusted for maternal age, parity and household monthly income, the probability has increased to 2.8 times more likely to initiate breastfeeding within one hour (adjusted OR: 2.873, 95% CI of adjusted OR: 1.678 – 3.396).

Mothers who informed that their biological mothers had experience of breastfeeding for more than one month were 2.3 times more likely to initiate breastfeeding within one hour than mothers who did not (crude OR: 2.342, 95% CI of crude OR: 1.656 – 3.312), even after adjusted for maternal age, parity and household monthly income (adjusted OR: 2.387, 95% CI of adjusted OR: 1.678 – 3.396).

Overweight and obese mothers were less likely to initiate breastfeeding within one hour than mothers with lower BMI values were (crude OR: 0.712, 95% CI of crude OR: 0.508 – 0.998). However, after adjusted for maternal age, maternal education, maternal employment, parity, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, the association was not significant (adjusted OR: 0.736, 95% CI of adjusted OR: 0.517 – 1.049).

Mothers who had vaginal delivery were nearly 3.6 times more likely to initiate breastfeeding within one hour than mothers who had undergone C-section (crude OR: 3.595, 95% CI of crude OR: 2.370 – 5.455). Nonetheless, after adjusted for maternal age, maternal education, maternal employment, intention to breastfeed, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, grandmother's preference and breastfeeding

experience, the likelihood has decreased to 3.47 times (adjusted OR: 3.472, 95% CI of adjusted OR: 2.216 – 5.440).

Table 4.25 :

Crude (unadjusted) and adjusted odd ratios (ORs) of variables associated with breastfeeding initiation (N=652)- continue

Factor	Early initiation n=442	Delayed initiation n=210	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P Value*
Psychosocial factors						
<i>Father's preference</i>						
Breastfeeding	309 (69.9 %)	136 (64.8 %)	1.264 (0.892 – 1.791)	0.187	1.315 (0.918 – 1.883) ¹	0.135
Formula feeding or ambivalent	133 (30.1 %)	74 (35.2 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's preference</i>						
Breastfeeding	297 (67.2 %)	92 (43.8 %)	2.627 (1.875 – 3.681)	< 0.001*	2.873 (2.031 – 4.065)²	< 0.001
Formula feeding or ambivalent	145 (32.8 %)	118 (56.2 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	330 (74.7 %)	117 (55.7 %)	2.342 (1.656 – 3.312)	< 0.0018	2.387 (1.678 – 3.396)²	< 0.001
No	112 (25.3 %)	93 (44.3 %)	1 (reference group)		1 (reference group)	
Biological factors						
<i>Pre-pregnancy BMI</i>						
Normal (BMI 18.5 – 24.9)	292 (66.1 %)	122 (58.1 %)	1 (reference group)	0.0498*	1 (reference group) ³	0.091
Overweight and obese (BMI > 25)	150 (33.9 %)	88 (41.9 %)	0.712 (0.508 – 0.998)		0.736 (0.517 – 1.049)	
<i>Parity</i>						
Primiparous	169 (38.5 %)	91 (44.4 %)	1 (reference group)	0.156	1 (reference group) ⁴	0.058
Multiparous	270 (61.5 %)	114 (55.6 %)	1.275 (0.911 – 1.785)		1.502 (0.987 – 2.285)	
<i>Birth weight</i>						
Normal	430 (97.3 %)	201 (95.7 %)	1.604 (0.665 – 3.870)	0.293	1.868 (0.715 – 4.882) ⁴	0.203
Under/overweight	12 (2.7 %)	9 (4.3 %)	1 (reference group)		1 (reference group)	
<i>Delivery method</i>						
Vaginal	393 (88.9 %)	145 (69.0 %)	3.595 (2.370 – 5.455)	< 0.0018	3.472 (2.216 – 5.440)⁴	< 0.001
Cesarean section	49 (11.1 %)	65 (31.0 %)	1 (reference group)		1 (reference group)	

*significantly different from reference (p< 0.05), ¹adjusted for maternal age, paternal education, paternal employment, household monthly income and parity, ²adjusted for maternal age, parity and household monthly income, ³adjusted for maternal age, paternal education, maternal employment, parity, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, ⁴adjusted for maternal age, maternal education, maternal employment, intention to breastfeed, spouse's preference, attending antenatal class, received 'any breastfeeding' interventions, IIFAS score and household monthly income, grandmother's preference and breastfeeding experience

4.5.5 To Investigate Factors Associated With Intensity of Breastfeeding at Four Weeks Postpartum

Table 4.26 :

Maternal, paternal and demographic factors with intensity of breastfeeding at four weeks postpartum (N=652)

Variables	'exclusive breastfeeding' (n=512)	Non-'exclusive breastfeeding' (n=140)	Total N (%)
Maternal factors			
<i>Maternal age</i>			
18 – 20 years old	10 (2.0 %)	2 (1.4 %)	12 (1.8 %)
21 – 30 years old	323 (63.1 %)	87 (62.1 %)	410 (62.9 %)
31 to 40 years old	179 (35.0 %)	51 (36.4 %)	230 (35.3 %)
<i>Maternal occupation</i>			
Housewife	170 (33.4 %)	32 (22.9 %)	202 (31.1 %)
Fulltime	296 (58.2 %)	97 (69.3 %)	393 (60.6 %)
Part-time	19 (3.7 %)	5 (3.6 %)	24 (3.7 %)
Self-employed	24 (4.7 %)	6 (4.3 %)	30 (4.6 %)
<i>Educational background</i>			
Primary	7 (1.4 %)	1 (0.7 %)	8 (1.2 %)
Secondary	170 (33.2 %)	61(43.6 %)	231 (35.4 %)
Tertiary	335 (65.4 %)	78 (55.7 %)	413 (63.3 %)
Paternal factors			
<i>Paternal occupation</i>			
Not working	5 (1.0 %)	-	5 (0.8 %)
Fulltime	419 (82.0 %)	119 (85.6 %)	538 (82.8 %)
Part-time	17 (3.3 %)	1 (0.7 %)	18 (2.8 %)
Self-employed	70 (13.7 %)	19 (13.7 %)	89 (13.7 %)
<i>Educational background</i>			
Primary	8 (1.6 %)	2 (1.4 %)	10 (1.5 %)
Secondary	207 (40.5 %)	61 (43.9 %)	268 (41.2 %)
Tertiary	296 (57.9 %)	76 (54.7 %)	372 (57.2 %)

Table 4.26 :

Maternal, paternal and demographic factors with intensity of breastfeeding at four weeks postpartum (N=652)
-continue

Demographic factors			
<i>Household monthly income</i>			
< RM 1000	17 (3.3 %)	9 (6.4 %)	26 (4.0 %)
RM 1001- RM 3000	253 (49.4 %)	70 (50.0 %)	323 (49.5 %)
RM 3001 – RM 5000	105 (20.5 %)	32 (22.9 %)	137 (21.0 %)
> RM 5000	137 (26.8 %)	29 (20.7 %)	166 (25.5 %)
<i>Marital status</i>			
Married	510 (99.6 %)	139 (99.3 %)	649 (99.5 %)
Never married	1 (0.2 %)	1 (0.7 %)	2 (0.3 %)
Divorced/separated	1 (0.2 %)	-	1 (0.2 %)

Table 4.27 :

Association between maternal, paternal and demographic factors and intensity of breastfeeding at four weeks postpartum (N=652)

Characteristics	'exclusive breastfeeding' n=512		Non-'exclusive breastfeeding' n=140		Total		χ^2	df	P value
	n	%	n	%	n	%			
Maternal factors									
<i>Age during pregnancy</i>							0.104	1	0.747
18 – 30 years old	333	65.0	89	63.6	422	64.7			
31 – 40 years old	179	35.0	51	36.4	230	35.3			
<i>Years of education</i>							4.469	1	0.035
≤ 12 years	177	34.6	62	44.3	239	36.7			
> 12 years	335	65.4	78	55.7	413	63.3			
<i>Employment</i>							5.692	1	0.017
Housewife	170	33.4	32	22.9	202	31.1			
Employed	339	66.6	108	77.1	447	68.9			
Paternal factors									
<i>Years of education</i>							0.471	1	0.492
≤ 12 years	215	42.1	63	45.3	278	42.8			
> 12 years	296	57.9	76	54.7	372	57.2			
<i>Employment</i>							1.371	1	0.242
Employed	5	1.0	-	-	5	0.8			
Unemployed	506	99.0	139	100.0	645	99.2			
Demographic factors									
<i>Household monthly income</i>							2.146	2	0.342
Low (<RM3000)	270	52.7	79	56.4	349	53.5			
Middle (RM3000 - 5000)	105	20.5	32	22.9	137	21.0			
High (> RM5000)	137	26.8	29	20.7	166	25.5			

*Analyses were done using Chi square test

There are various factors associated with intensity of breastfeeding; they can be divided into maternal, paternal, demographic, social, knowledge, psychological and social factors. Table 4.26 and Table 4.27 present maternal, paternal and demographic factors associated with intensity of breastfeeding at four weeks postpartum.

4.5.5.1 Maternal Factors

a) Maternal age

There was no significant difference between age categories and breastfeeding practices among 652 subjects, $\chi^2 = 0.104$, df 1, $p = 0.747$).

Majority of the mothers at age 21 to 30 years old chose to 'exclusively breastfed' (63.1 %: 323/410) and 62.1 % (87/140) were either 'any breastfed' or 'formula fed' their babies during the first four weeks after delivery.

Meanwhile, only 2.0 % of the 'exclusively breastfed' and 1.4 % of 'any breastfed' and/or 'formula fed' mothers were aged between 18 to 20 years old, this could be due to poor experience and too young in motherhood.

b) Employment status

There was a significant association between employment status and breastfeeding intensity among mothers at four weeks after delivery, $\chi^2 = 5.692$, df 1 $p = 0.017$.

Majority of the mothers who 'exclusively' (58.2 %: 296/512) and 'non-exclusively breastfed' (69.3 %: 97/140) their babies were fulltime workers, followed by housewives (33.4 % and 24.4 %, respectively), self-employed mothers (4.7 % and 4.2 %, respectively) and lastly, part-time mothers (3.7 % and 2.5 %, respectively).

c) Educational background

There was a significant association between maternal education and breastfeeding intensity at four weeks, $\chi^2 = 4.469$, df 1, $p = 0.035$.

Majority of 'exclusively breastfed' mothers (65.4 %), 'non-exclusive breastfed' mothers (54.7 %) were from tertiary education level, followed by secondary education

level (33.2 % and 43.6 %, respectively), and lastly, primary education level (1.4 % and 0.7 %, respectively).

Higher educated mothers had more percentage to ‘exclusively breastfeed’ their babies (57.9 %, 296/512)

4.5.5.2 Paternal Factors

a) Employment status

Among 511 mothers who practising ‘exclusive breastfeeding’, 82.0 % of the husbands were fulltime workers, 13.7 % were self-employed, 3.3 % were part-time and 1.0 % was not working.

These results also did not show significant association between the spouse’s employment status and practising ‘any breastfeeding’ to their four week old infants.

b) Educational background

There is no significant association between education level of the spouses between ‘exclusive’ and ‘any breastfeeding’ mothers, $p = 0.492$.

However, majority of the spouses with their wives practising ‘exclusive breastfeeding’, 57.9 % of them had tertiary education, followed by secondary education background (40.5 %) and the lowest were from primary education (1.6 %). These are not much different with spouses of mothers practising ‘any breastfeeding’, 54.2 % tertiary, 44.1 % secondary and 1.7 % primary education level.

4.5.5.3 Demographic Factors

a) Household income

There were no significant association between total monthly household incomes and infant feeding at four weeks, $p = 0.342$.

However, there were clearly that majority of the mothers practising either 'exclusive' (49.4 %) or "any breastfeeding" (48.7 %) were mothers from RM 1001 – RM 3000 total monthly household income.

b) Marital status

There is no significant association between marital status and infant feeding at four weeks. However, 99.6 % of 'exclusively' and 99.2 % of 'any breastfed' mothers were married. While, 0.2 % of both never married and widowed mothers were 'exclusively breastfed' their babies, respectively. Only 0.8 % of 'any breastfed' mothers were never married.

4.5.5.4 Social Factors

Table 4.28 presents social and psychological factors associated with intensity of breastfeeding.

According to a review done by Thulier and Mercer in 2009, who concluded that social factors that might associated with breastfeeding duration were breastfeeding support from the significant other, maternal grandmother and close friends and appropriate support from health care professionals, while psychological factors were prenatal maternal intention and maternal interest which include early initiation of breastfeeding, time intended to breastfeed and intention to breastfeed duration (Thulier and Mercer, 2009b).

Table 4.28 :

Social and psychological factors with intensity of breastfeeding (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=512)	Non-'exclusive breastfeeding' (n=140)
Social factors			
<i>Father's preference</i>			
Formula feeding	6 (0.9 %)	5 (1.0 %)	1 (0.7 %)
Breastfeeding	445 (68.3 %)	358 (69.9 %)	87 (62.1 %)
Doesn't mind	201 (30.8 %)	149 (29.1 %)	52 (37.1 %)
<i>Grandmother's preference</i>			
Formula feeding	6 (0.9 %)	5 (1.0 %)	1 (0.7 %)
Breastfeeding	389 (59.7 %)	345 (67.4 %)	44 (31.4 %)
Doesn't mind	116 (17.8 %)	72 (14.1 %)	44 (31.4 %)
Never discussed	141 (21.6 %)	90 (17.6 %)	51 (36.4 %)
<i>Grandmother's breastfed for more than one month</i>			
Yes	447 (68.6 %)	388 (75.8 %)	59 (42.1 %)
No	66 (10.1 %)	42 (8.2 %)	24 (17.1 %)
Don't know	139 (21.3 %)	82 (16.0 %)	57 (40.7 %)
Psychological factors			
<i>Early initiation of breastfeeding</i>			
Less than one hour	442 (67.8 %)	396 (89.6 %)	46 (32.9 %)
1 to four hours	155 (23.8 %)	96 (18.8 %)	59 (42.1 %)
More than four hours, less than one day	41 (6.3 %)	16 (3.1 %)	25 (17.9 %)
More than one day	14 (2.1 %)	4 (0.8 %)	10 (7.1 %)
<i>Intention to breastfeed</i>			
With intention	322 (49.6 %)	278 (86.3 %)	44 (31.4 %)
Without intention	327 (50.4 %)	231 (45.4 %)	96 (68.6 %)
<i>Time intended to breastfeed</i>			
Before pregnancy	321 (49.4 %)	257 (50.4 %)	64 (45.7 %)
Early pregnancy	300 (46.2 %)	237 (46.5 %)	63 (45.0 %)

Late pregnancy	27 (4.2 %)	14 (2.7 %)	13 (9.3 %)
Table 4.28 :			
<i>Social and psychological factors with intensity of breastfeeding (N=652)-continue</i>			
<i>Intention to breastfeed duration</i>			
< six months	53 (8.3 %)	35 (6.9 %)	18 (13.2 %)
6 to 12 months	243 (38.0 %)	190 (37.7 %)	53 (39.0 %)
More than 12 months	344 (53.8 %)	279 (55.4 %)	65 (47.8 %)

Table 4.29 :

Association between social and psychological factors and intensity of breastfeeding at one month (N=652) *significant p value ($p < 0.05$)

Characteristics	'exclusive breastfeeding' n=512		Non-'exclusive breastfeeding' n=140		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Social factors									
<i>Father's preference</i>							3.070	1	0.080
Breastfeeding	358	69.9	87	62.1	445	68.3			
Formula feeding or ambivalent	154	30.1	53	37.9	207	31.7			
<i>Grandmother's preference</i>							59.053	1	< 0.001
Breastfeeding	345	67.4	44	31.4	389	59.7			
Formula feeding or ambivalent	167	32.6	96	68.6	263	40.3			
<i>Grandmother's breastfed for more than one month</i>							57.710	1	< 0.001
Yes	388	75.8	59	42.1	447	68.6			
No	124	24.2	81	57.9	205	31.4			
Psychological factors									
<i>Breastfeeding initiation</i>							99.647	1	< 0.001
Early	396	77.3	46	32.9	442	67.8			
Delayed	116	22.7	94	67.1	210	32.2			
<i>Intention to breastfeed</i>							23.617	1	< 0.001
With intention	278	54.6	44	31.4	322	49.6			
Without intention	231	45.4	96	68.6	327	50.4			
<i>Time intended to breastfeed</i>							1.044	1	0.307
Before pregnancy	257	50.6	64	45.7	321	49.5			
Early pregnancy	251	49.4	76	54.3	327	50.5			
<i>Intention to breastfeed duration</i>							6.304	2	0.043
≤ six months	35	6.9	18	13.2	53	8.3			
> 6 to 12 months	190	37.7	53	39.0	243	38.0			
More than 12 months	279	55.4	65	47.8	344	53.8			

*Analyses were done using Chi square test

a) Father's preference

As seen in Table 4.29, father's preference did not significantly affect infant feeding practices among the mothers and there were no significant association between these two variables.

However, majority of the mothers practising 'exclusive' (69.9 %) and "any breastfeeding" (63.0 %) at four weeks postpartum had been influenced by their spouses' preferences to breastfeed their newborns. While, 29.1 % of the 'exclusively' and 36.1 % of 'any breastfed' mothers had spouses whom did not mind either breastfeeding or formula feeding for their babies.

b) Grandmother's preference

There is a significant association between 'exclusive' and "any breastfeeding" mothers whom their mothers had their own preferences on what to feed to their grandchildren ($p < 0.001$).

Among 512 'exclusively breastfed' mothers, majority of them (67.4 %) reported that their mothers preferred them to breastfeed their babies, followed by mothers whom never had any discussions regarding infant feeding with their mothers (17.6 %), whom their mothers did not mind which feedings should be given to the infants (14.1 %) and only 1.0 % had mothers whom preferred formula feeding over breastfeeding.

In the meantime, majority of the 'any breastfed' mothers had never discussed with their mothers regarding infant feeding (37.0 %), 31.9 % of them reported that their mothers did not mind whether it is formula or breastfeeding should be fed to their grandchildren, 30.3 % had mothers whom preferred breastfeeding and only 0.8 % preferred formula feeding.

c) Grandmother's breastfeeding experience

There is a strong association between grandmother's breastfeeding experience and infant feeding practices ($p < 0.001$).

Subjects whom their mothers had breastfeeding experience tend to exclusively breastfeed their babies in the first four weeks of life (75.8 %), and 42.0 % were 'any breastfed' their babies.

Meanwhile, 16.0 % of 'exclusively breastfed' mothers did not know whether their mothers had 'ever breastfed' any children before or not and 8.2 % of them reported that their mothers did not have breastfeeding experience.

Finally, 42.0 % of 'any breastfed' mothers also did not know their mothers' breastfeeding experience and 16.0 % reported that their mothers had no experience in breastfeeding.

4.5.5.5 Psychological Factors

a) Early initiation of breastfeeding

There was a significant association between 'exclusively breastfed' and 'any breastfed' mothers in initiating breastfeeding their babies ($p < 0.001$).

A total of 442 mothers initiated breastfeeding as early as less than one hour. 77.3 % of 'exclusively breastfed' mothers initiated breastfeeding in less than one hour, while only 35.3 % of 'any breastfed' mothers initiated within less than one hour. Majority (42.0 %) of 'any breastfed' mothers initiated breastfeeding after more than four hours but less than one day after delivery.

b) Intention to breastfeed

'Exclusively breastfed' mothers (54.6 %) tend to had intention to breastfeed their babies prenatally, while 'any breastfed' mothers (35.3 %) had lower intention to exclusively their babies prenatally, $\chi^2 = 23.653$, $df = 1$, $p < 0.001$.

c) Time intended to breastfeed

There was a significant association between 'exclusively breastfed' and 'any breastfed' mothers in terms of time intended to breastfeed their babies, $p = 0.0433$.

Among 510 mothers who 'exclusively breastfed' their babies in the first four weeks after delivery, 50.4 % of them had made the decision as early as before getting

pregnant, followed by during early pregnancy (46.5 %) and later in their pregnancy by 2.7 %.

d) Intention to breastfeed duration

There is no significant association between infant feeding practices and duration intended to breastfeed, $p = 0.307$.

However, 55.4 % of total 'exclusively breastfed' mothers intended to breastfeed their babies for more than 12 months.

4.5.5.6 Knowledge in Breastfeeding

Table 4.30 :

Breastfeeding knowledge and breastfeeding intensity at four weeks (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=512)	Non-'exclusive breastfeeding' (n=140)
Knowledge in breastfeeding			
<i>IIFAS Scoring category</i>			
Positive to formula feeding	25 (3.8 %)	22 (4.3 %)	3 (2.1 %)
Neutral	483 (74.1 %)	370 (72.3 %)	113 (80.7 %)
Positive to breastfeeding	144 (22.1 %)	120 (23.4 %)	24 (17.1 %)
<i>Antenatal classes</i>			
Yes, for this pregnancy	284 (43.6 %)	246 (48.0 %)	38 (27.1 %)
Yes, for previous pregnancy	187 (28.7 %)	149 (29.1 %)	38 (27.1 %)
No	181 (27.8 %)	117 (22.9 %)	64 (45.7 %)
<i>Notes/pamphlets on BF</i>			
Yes	404 (62.3 %)	322 (63.3 %)	82 (59.0 %)
No	244 (37.7 %)	187 (36.7 %)	57 (41.0 %)
<i>Class/seminar/lecture on BF</i>			
Yes	306 (47.2 %)	245 (48.1 %)	61 (43.9 %)
No	342 (52.8 %)	264 (51.9 %)	78 (56.1 %)
<i>Demonstration of BF</i>			
Yes	320 (49.4 %)	254 (49.9 %)	66 (47.5 %)
No	328 (50.6 %)	255 (50.1 %)	73 (52.5 %)
<i>Video/tv/slide show on BF</i>			
Yes	102 (15.7 %)	78 (15.3 %)	24 (17.3 %)
No	546 (84.3 %)	431 (84.7 %)	115 (82.7 %)
<i>Counselling/discussion on BF</i>			
Yes	178 (27.5 %)	138 (27.1 %)	40 (28.8 %)
No	470 (72.5 %)	371 (72.9 %)	99 (71.2 %)

Table 4.31 :

Association between breastfeeding knowledge and breastfeeding intensity at four weeks (N=652)

Characteristics	'exclusive breastfeeding' n=512		Non-'exclusive breastfeeding' n=140		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>IIFAS score</i>							0.966	1	0.326
High (≥ 65)	236	46.1	58	41.4	294	45.1			
Low (< 65)	276	53.9	82	58.6	358	54.9			
<i>Attended breastfeeding interventions</i>							0.017	1	0.897
Yes	415	81.5	114	82.0	529	81.6			
No	94	18.5	25	18.0	119	18.4			
<i>Attended antenatal class</i>							28.655	1	< 0.001
Yes	395	77.1	76	54.3	471	72.2			
No	117	22.9	64	45.7	181	27.8			

*Analyses were done using Chi square test

Table 4.30 presents variables in knowledge of breastfeeding and Table 4.31 presents the association with infant feeding practices.

a) Infant feeding attitude

Iowa Infant Feeding Attitude Scale (IIFAS) is a 17-item instrument used in this study to measure attitudes and knowledge of mothers during their 36 weeks antenatal check-ups. Total attitude scores were then will be grouped to the following three categories: (1) positive to breastfeeding (70–85), (2) neutral (49–69), and (3) positive to formula feeding (17–48). Higher score reflecting attitudes more positive to breastfeeding.

Majority subjects had neutral (74.1 %) attitude towards breastfeeding and formula feeding, 22.1 % had more favourable towards breastfeeding and 3.8 % towards formula feeding.

72.3 % of ‘exclusively breastfed’ mothers had neutral attitude, followed by 23.4 % had positive attitude towards breastfeeding and only 4.3 % were positive towards formula feeding. Meanwhile, majority of ‘any breastfed’ mothers also were neutral (79.8 %), 17.6 % positive towards breastfeeding and 2.5 % positive towards formula feeding.

b) Birthing and breastfeeding education interventions

There was a significant association between attending antenatal class and infant feeding practices, $p < 0.001$.

A total of 471 of the mothers reported that they had attended antenatal class before and, 83.9 % were ‘exclusively breastfed’, while only 14.4 % ‘any breastfed’ their babies.

However, there were no significant association between having notes or pamphlets on breastfeeding, attending classes or lectures, demonstration, video or slide show and counselling or discussion on breastfeeding with infant feeding practices.

Nonetheless, mothers of who perceived had read pamphlets or booklets (63.3 %), attended breastfeeding lectures or classes (48.1 %) and watched breastfeeding demonstrations (49.9 %) opted to ‘exclusively breastfeed’ their babies. Compared to ‘any breastfed’ mothers, majority of them reported to have watched video or slide show

regarding breastfeeding (16.9 %) and received individual consultation or discussion with any of the health staff about breastfeeding (29.7 %).

4.5.5.7 Biological Factors

Table 4.32 :

Biological factors with infant feeding practices at four weeks (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=512)	Non-'exclusive breastfeeding' (n=140)
Biological factors			
<i>Maternal obesity</i>			
Underweight	77 (11.8 %)	65 (12.7 %)	12 (8.6 %)
Normal	337 (51.7 %)	289 (56.4 %)	48 (34.3 %)
Overweight	160 (24.5 %)	124 (24.2 %)	36 (25.7 %)
Obese	78 (12.0 %)	34 (6.6 %)	44 (31.4 %)
<i>Parity</i>			
First	260 (40.4 %)	204 (40.4 %)	56 (40.3 %)
Second	206 (32.0 %)	154 (30.5 %)	52 (37.4 %)
Third or more	178 (27.6 %)	147 (29.1 %)	31 (22.3 %)
<i>Health problems during pregnancy</i>			
Hypertension	72 (11.0 %)	41 (8.0 %)	31 (22.1 %)
Gestational Diabetes	102 (15.6 %)	53 (10.4 %)	49 (35.0 %)
Anemia	22 (3.4 %)	17 (3.3 %)	5 (3.6 %)
Low blood pressure	4 (0.6 %)	3 (0.6 %)	1 (0.7 %)
Others	12 (1.8 %)	7 (1.4 %)	5 (3.6 %)
<i>Baby birth weight</i>			
≤ 2.5kg	16 (2.5 %)	10 (2.0 %)	6 (4.3 %)
2.5 – 3.99 kg	631 (96.8 %)	499 (97.5 %)	132 (94.3 %)
≥ 4.0 kg	5 (0.8 %)	3 (0.6 %)	2 (1.4 %)
<i>Birth delivery method</i>			
Vaginal	459 (70.4 %)	387 (75.6 %)	72 (51.4 %)
Assisted vaginal	79 (12.1 %)	59 (11.5 %)	20 (14.3 %)
Caesarean	114 (17.5 %)	66 (12.9 %)	48 (34.3 %)
<i>Birth problems</i>			
Yes	34 (5.3 %)	12 (3.7 %)	12 (8.8 %)
No	610 (94.4 %)	311 (96.0 %)	123 (90.4 %)
<i>Breastfeeding difficulties at or before four weeks</i>			
Painful swollen breasts	427 (65.5 %)	369 (72.1 %)	58 (41.4 %)
Sore breasts with high fever	209 (32.1 %)	184 (35.9 %)	25 (17.9 %)
Cracked or sore nipples	287 (44.0 %)	214 (41.8 %)	73 (52.1 %)
Poor milk flowing	307 (47.1 %)	193 (37.7 %)	114 (81.4 %)
Insufficient milk	141 (21.7 %)	34 (6.7 %)	107 (77.0 %)
Inverted nipples	15 (2.3 %)	3 (0.6 %)	12 (8.6 %)
Baby has suckling problems	49 (7.5 %)	11 (2.1 %)	38 (27.1 %)

Table 4.33 :

Association between biological factors and infant feeding practices at four weeks (N=652)

Characteristics	'exclusive breastfeeding' n=512		Non-'exclusive breastfeeding' n=140		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Child-related factors									
<i>Parity</i>							0.001	1	0.982
Primiparous	204	40.4	56	40.3	260	40.4			
Multiparous	301	59.6	83	59.7	384	59.6			
<i>Birth weight</i>							3.556	1	0.059
Normal	499	97.5	132	94.3	631	96.8			
Under/overweight	13	2.5	8	5.7	21	3.2			
Birth factors									
<i>Delivery method</i>							34.881	1	< 0.001
Vaginal	446	87.1	92	65.7	538	82.5			
Cesarean section	66	12.9	48	34.3	114	17.5			
<i>Birth problems</i>							4.380	1	0.036
Yes	22	4.3	12	8.8	34	5.3			
No	488	95.7	124	91.2	612	94.7			
Maternal factors									
<i>Maternal pre-pregnancy BMI status</i>									
Normal (BMI 18.5 – 24.9)	354	69.1	60	42.9	414	63.5	32.767	1	< 0.001
Overweight and obese (BMI > 25)	158	30.9	80	57.1	238	36.5			
<i>Pregnancy health problems</i>							5.447	2	0.066
Yes	22	4.3	12	8.8	34	5.3			
No	487	95.5	123	90.4	610	94.4			

*Analyses were done using Chi square test

Table 4.33 :

Association between biological factors and infant feeding practices at four weeks (N=652)-continue

Characteristics	'exclusive breastfeeding' n=512		Non-'exclusive breastfeeding' n=140		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Breastfeeding difficulties at or before four weeks									
Yes	465	90.8	135	96.4	600	92.0	4.711	1	0.017
No	47	9.2	5	3.6	52	8.0			
<i>Painful swollen breasts</i>							45.673	1	< 0.001
Yes	369	72.1	58	41.4	427	65.5			
No	143	27.9	82	58.6	225	34.5			
<i>Sore breasts with high fever</i>							16.501	1	< 0.001
Yes	184	35.9	25	17.9	209	32.1			
No	328	64.1	115	82.1	443	67.9			
<i>Cracked or sore nipples</i>							4.775	1	0.029
Yes	214	41.8	73	52.1	287	44.0			
No	298	58.2	67	47.9	365	56.0			
<i>Milk takes longer time to flow</i>							84.394	1	< 0.001
Yes	193	37.7	114	81.4	307	47.1			
No	319	62.3	26	18.6	345	52.9			
<i>Insufficient colostrum/milk</i>							318.148	1	< 0.001
Yes	34	6.7	107	77.0	141	21.7			
No	477	93.3	32	23.0	509	78.3			
<i>Baby has sucking problems</i>							98.814	1	< 0.001
Yes	11	2.1	38	27.1	49	7.5			
No	501	97.9	102	72.9	603	92.5			

*Analysis were done using Chi square test

Table 4.33 shows biological factors that were associated with infant feeding practices. Biological variables consisted of insufficient milk supply, infant health problems, maternal obesity, and the physical challenges of breastfeeding, maternal smoking, parity, and method of delivery (Thulier and Mercer, 2009a).

a) Maternal obesity

A total of 11.8 % of the mothers were underweight, 51.7 % with normal BMI, 24.5 % were overweight and 12.0 % were obese among the 652 mothers enrolled in this study.

Among 512 mothers who ‘exclusively breastfed’ their babies, majority of them were normal BMI (56.4 %), followed by overweight (24.2 %) and underweight (12.7 %). Obese mothers had the lowest prevalence of “exclusive breastfeeding” at four weeks (6.6 %).

Meanwhile, 36.1 % of ‘any breastfed’ mothers were normal BMI, followed by 27.7 % were obese, overweight (26.9 %) and 9.2 % underweight.

These findings showed that mothers with normal BMI before pregnancy tend to ‘exclusively breastfeed’ their babies compared to those with higher BMI.

b) Parity

There were no significant association between total numbers of children and infant feeding practices at first four weeks after delivery, $p = 0.982$.

However, among mothers whom ‘exclusively breastfed’ their babies, 29.1 % of them having three or more children, and only 21.2 % were ‘any breastfed’ their babies.

c) Health problems during pregnancy

There were no significant association between mothers who had hypertension and gestational diabetes and breastfeeding intensity, $p = 0.066$.

Only 8.0 % and 10.4 % of ‘exclusively breastfed’ mothers experienced hypertension and gestational diabetes mellitus during pregnancy, respectively. Meanwhile, 21.0 % and 34.5 % of ‘any breastfed’ mothers experienced hypertension and gestational diabetes mellitus during pregnancy, respectively.

On top of that, a total of 3.4 % and 0.6 % of the mothers reported to have anaemia and hypotension during pregnancy. There were no significant associations between 'exclusively' and 'any breastfed' mothers for both health problems.

d) Birth delivery methods

There were significant association between three types of delivery methods and intensity of breastfeeding, $p < 0.001$.

As shown in Table 4.32, majority of 'exclusively breastfed' (75.6 %) mothers were vaginally delivered their babies, compared to only 52.1 % were 'any breastfed' their babies.

Furthermore, 33.6 % mothers whom 'any breastfed' their babies were mothers who had caesarean birth and only 12.9 % of 'exclusively breastfed' mothers had caesarean birth.

e) Birth problems

There were 29.2 %, 12.5 % and 29.2 % of total mothers enrolled reported to experience postpartum haemorrhage, high blood sugar and high blood pressure during their stay at hospital after delivery.

There was a significant association between those who had problems during birthing with breastfeeding intensity at one month, $p = 0.036$.

f) Breastfeeding difficulties

There was a significant association between 'exclusively' and 'any breastfed' mothers who experienced breastfeeding difficulties, $p = 0.017$.

Of all 512 mothers who were 'exclusively breastfed' their babies, 72.1 % of them experienced painful swelling breasts, while mothers who 'any breastfed' their babies do not show a significant association between experiencing swollen breasts or not.

Only 35.9 % of mothers experienced symptoms of mastitis (swollen breasts, fever) 'exclusively breastfed' their babies and 18.5 % of them 'any breastfed' their babies.

287 (44.0 %) mothers reported to experience cracked or sore nipples during the first months after delivery. However, despite of having such difficulty, 74.6 % of them able to 'exclusively breastfed' and only 23.0 % were 'any breastfed' their babies during the first four weeks after delivery.

Among 512 mothers who 'exclusively breastfed' their babies, only 37.7 % of them admit that it took a long time before milk starts flowing at their start of feed. While, 80.7 % of 'any breastfed' mothers reported to experience the same thing and that could possibly explained why they decided to supplement the feedings with formula milk.

On top of that, 141 (21.7 %) of the mothers claimed they do not had enough milk or colostrum at the beginning of the breastfeeding journey. Only 24.1 % of the mothers 'exclusively breastfed' their babies and majority of them (63.8 %) decided to supplement breastmilk with formula milk.

0.6 % of a total of 512 'exclusively' and 6.7 % of 'any breastfed' mothers had inverted nipples that make breastfeeding harder for the babies. Although, the milk can still come out of the nipples, but it is harder for the baby to latch on the nipples and that could result to breastfeeding cessation. Hence, majority (53.3 %) mothers with this constraint chose to supplement the infants with formula milk, compared to only 20.0 % of them successfully 'exclusive breastfed' their babies.

Lastly, 49 of the babies had problems in sucking and therefore only 22.4 % of them were 'exclusively breastfed', majority were 'any breastfed' for their first four weeks of life (61.2 %).

4.5.6 To Investigate Factors Associated With Intensity of Breastfeeding at three months Postpartum

Table 1 (Refer to Appendix) presents maternal, paternal and demographic factors and Table 2 (Refer to Appendix) presents the association with intensity of breastfeeding at three months postpartum.

When comparing with total number of mothers who still ‘exclusively breastfeeding’ their babies during four weeks postpartum (n=512), there was a significant drop seen by 22.0 % at three months postpartum (n=399).

Nonetheless, the total number of mothers practising ‘‘any breastfeeding’’ has increased by 47.9 % from 119 mothers during four weeks postpartum to 176 mothers at three months postpartum. This could be due to more working mothers had resumed to work which normally government workers were given three months maternity leave and private workers were given between 2 to three months maternity leave in Malaysia.

4.5.6.1 Maternal Factors

a) Age

There was no significant association between age categories of the mothers and breastfeeding intensity during three months postpartum ($p = 0.071$).

Among 399 mothers who still ‘exclusively breastfed’ their babies at three months postpartum, 65.7 % of them were mothers aged between 21 to 30 years old, followed by 32.6 % aged 31 to 40 years old and only 1.8 % were young mothers aged 18-20 years old.

However, among 176 mothers who ‘any breastfed’ their babies, majority of them were mothers aged 31 to 40 years old (55.1 %), followed by aged 21 to 30 years old (55.1 %) and only 1.7 % were young mothers.

b) Employment status

There was a significant association in breastfeeding intensity among fulltime mothers; ‘‘any breastfeeding’’ (78.3 %) was more common than ‘‘exclusive

breastfeeding’’ (51.4 %). However, among housewives, ‘‘exclusive breastfeeding’’ was higher compared to ‘‘any breastfeeding’’ (17.1 %).

c) Educational background

There was no significant association between intensity of breastfeeding and 3 levels of educational background ($p = 0.706$).

Yet, more ‘any breastfed’ mothers (65.9 %) came from tertiary education level compared to 63.9 % that ‘exclusively breastfed’ their babies.

4.5.6.2 Paternal Factors

a) Employment status

No significant association was seen between types of employment status of the fathers and breastfeeding intensity of the infants at three months, $p = 0.718$. Majority of fulltime working fathers had higher rates of ‘‘any breastfeeding’’ (88.6 %) and ‘exclusively breastfeeding’ (81.2 %).

b) Educational background

There were fair comparisons between 3 levels of educational background of the fathers and breastfeeding intensity of the infants at three months. Majority of fathers with tertiary education were either ‘exclusively breastfed’ (57.8 %) or ‘any breastfed’ (58.0 %) their babies.

4.5.6.3 Demographic Factors

a) Total monthly household income (RM)

There was no significant association between different ranges of household income monthly and breastfeeding intensity, $p = 0.851$.

However, majority of mothers who still ‘exclusively breastfed’ (50.1 %) their three months babies had total household income within RM 1001 – RM 3000.

4.5.6.4 Social Factors

Table 3 (Refer to Appendix) presents descriptive data on social and psychological factors and Table 4 (Refer to Appendix) presents the association with intensity of breastfeeding at three months postpartum

a) Father's preference

Majority of 'exclusive breastfed' mothers (72.2 %) had husbands who preferred them to breastfeed their babies, compared to only 62.5 % of them were any breastfed. However, for mothers whom their husbands did not have any preferences towards infant feeding, more of them any breastfed (35.8 %) their babies compared to 'exclusively breastfed' (27.1 %).

b) Grandmother's preference

Grandmother's preference towards breastfeeding had a great influence in their daughter's practise to 'exclusively breastfed' their babies (72.2 %) as well as 'any breastfed' (62.5 %) ($p < 0.001$).

c) Grandmother's breastfeeding experience

Grandmother's breastfeeding experience had a significant association with breastfeeding intensity at three months postpartum ($p < 0.001$).

Majority subjects who had mothers with breastfeeding experience tend to 'exclusively breastfed' their babies until three months by 70.2 % and 44.9 % still 'any breastfed' their babies.

4.5.6.5 Psychological Factors

a) Early initiation of breastfeeding

Early initiation in breastfeeding had a significant association with breastfeeding intensity at three months postpartum ($p < 0.001$).

While 66.7 % (399/652) mothers ‘exclusively breastfed’ their babies up to three months, 76.7 % of them initiated breastfeeding in less than one hour and 58.5 % were ‘any breastfed’ their babies.

b) Intention to breastfeed

Mothers who had intention to ‘exclusively breastfeed’ their babies prenatally were more common to ‘exclusively breastfeed’ (63.4 %) their babies up to three months compared to who did not (36.6 %) ($p < 0.001$).

In contrast, majority mothers without intention to ‘exclusively breastfeed’ their babies were ‘any breastfed’ (75.3 %) their babies.

c) Time intended to breastfeed

There was no significant association between the times mothers intended to breastfeed with breastfeeding intensity at three months ($p = 0.648$). Nevertheless, mothers who decided earlier before pregnancy tend to practise breastfeeding up to three months; ‘exclusive’ (50.1 %) and ‘any breastfeeding’ (48.3 %).

d) Intended to breastfeed duration

Duration intended to breastfeed prenatally did not influence breastfeeding intensity at three months postpartum ($p = 0.150$). Nonetheless, 56.1 % of ‘exclusive’ and 51.2 % of ‘any breastfeeding’ mothers were those who intended to breastfeed for more than 12 months.

4.5.6.6 Knowledge in Breastfeeding

Table 5 (Refer to Appendix) presents descriptive data on maternal knowledge factors and Table 6 (Refer to Appendix) presents the association with intensity of breastfeeding at three months postpartum.

a) Infant feeding attitude

Iowa Infant Feeding Attitude Scale (IIFAS) was used to measure knowledge and attitude of breastfeeding of the mothers during their pregnancy.

There was no significant association in scores of IIFAS between exclusive and any breastfed mothers at three months postpartum, $p = 0.861$.

However, majority of ‘exclusively’ (72.9 %) and ‘any breastfed’ (74.4 %) mothers had scores between 49 – 69 which means neutral attitude towards either breastfeeding or formula feeding.

b) Birthing and breastfeeding education interventions

By attending antenatal classes and demonstration on breastfeeding prenatally, there were a significant association with breastfeeding intensity at three months. More mothers practiced “exclusive breastfeeding” until three months when they had attended antenatal classes and demonstration on breastfeeding.

4.5.6.7 Biological Factors

Table 7 (Refer to Appendix) presents descriptive data on biological factors and Table 8 (Refer to Appendix) presents the association with intensity of breastfeeding at three months postpartum.

a) Maternal obesity

There were 11.8 % underweight, 51.7 % normal BMI, 24.5 % overweight and 12.0 % were obese among 652 mothers enrolled in this study.

Among 512 mothers who ‘exclusively breastfed’ their babies, majority of them were normal BMI (56.4 %), followed by overweight (24.2 %) and underweight (12.7 %). Obese mothers had the lowest prevalence of ‘‘exclusive breastfeeding’’ at four weeks (6.6 %).

Meanwhile, 36.1 % of ‘any breastfed’ mothers were normal BMI, followed by 27.7 % were obese, overweight (26.9 %) and 9.2 % underweight.

These findings showed that mothers with normal BMI before pregnancy tend to ‘exclusively breastfeed’ their babies compared to those with higher BMI.

b) Parity

There was a significant association between total numbers of children and infant feeding practices at three months after delivery, $p = 0.039$.

However, among mothers who ‘exclusively breastfed’ their babies, 29.1 % of them having three or more children, and only 21.2 % were ‘any breastfed’ their babies.

c) Health problems during pregnancy

There was a significant association between mothers who had hypertension and gestational diabetes and breastfeeding intensity at three months after delivery ($p < 0.001$).

Only 8.0 % and 10.4 % of ‘exclusively breastfed’ mothers experienced hypertension and gestational diabetes mellitus during pregnancy, respectively. Meanwhile, 21.0 % and 34.5 % of ‘any breastfed’ mothers experienced hypertension and gestational diabetes mellitus during pregnancy, respectively.

On top of that, a total of 3.4 % and 0.6 % of the mothers reported to have anaemia and hypotension during pregnancy. There was no significant association between ‘exclusively’ and ‘any breastfed’ mothers for both health problems ($p > 0.05$).

d) Birth delivery methods

There was a weak significant association between three types of delivery methods and intensity of breastfeeding at three months after delivery, $p < 0.001$.

As shown in Table 8 (Refer to Appendix), majority of 'exclusively breastfed' (75.6 %) mothers were vaginally delivered their babies, compared to only 52.1 % were 'any breastfed' their babies.

Furthermore, 33.6 % mothers who 'any breastfed' their babies were mothers who had caesarean birth and only 12.9 % of 'exclusively breastfed' mothers had caesarean birth.

e) Birth problems

There were 29.2 %, 12.5 % and 29.2 % of total mothers enrolled reported to experience postpartum haemorrhage, high blood sugar and high blood pressure during their stay at hospital after delivery.

There were significant association between those who had health problems during pregnancy with breastfeeding intensity at one month ($p < 0.001$).

f) Breastfeeding difficulties

There were significant associations between those experienced insufficient milk, breasts engorgement and sore breasts with high fever and breastfeeding intensity at three months ($p < 0.001$).

A total of 271 mothers reported to have insufficient milk at within 1 to three months postpartum. More than half of them chose to supplement breastfeeding with formula milk while 17.7 % (48/271) still 'exclusively breastfeeding' their babies at three months.

Breasts engorgement is quite common among breastfeeding mothers due to few reasons like unable to empty the breasts frequently either by nursing baby or expressing and milk ducts blockage. A total of 97 mothers described to experience breasts engorgement, majority of them still 'exclusively breastfed' (96.6 %) their babies at three months whilst, only 0.3 % (7/97) 'any breastfed' their babies.

Mastitis is likely to happen within three months after birth and is common among first time mothers. Mastitis is an inflammation of the breast tissues and factors that associated with mastitis include milk stasis (obstruction of milk flow), nipple damage and maternal fatigue (WHO, 2000). Since there is no standard definition of mastitis, mastitis was defined as having at least two out of three breast symptoms (breast tenderness/pain, redness and breast lump) and at least one of fever or flu-like symptoms (shivering, hot sweats or aches). By definition, 2.5 % of exclusively breastfed mothers experienced sore breasts with high fever (Amir, Forster, Lumley, and McLachlan, 2007).

Meanwhile, 3.1 % and 7.1 % of mothers stated that their babies had suckling problems and refused to breastfeed, respectively. There was significant association between mothers who claimed their babies had these difficulties and breastfeeding intensity at three months ($p < 0.05$).

4.5.7 To Investigate Factors Associated With Intensity of Breastfeeding at Six months Postpartum

There are various factors associated with intensity of breastfeeding; they can be divided into maternal, paternal, demographic, social, knowledge, psychological and social factors.

When comparing with total number of mothers who still ‘exclusively breastfeeding’ their babies during six months postpartum ($n=326$), there was a dramatic decrement by 18.2 % from the total mothers who ‘exclusively breastfed’ their babies at three months ($n=399$). Meanwhile, the total number of mothers practising “any breastfeeding” has also dropped by 3.4 % ($6/176$) from 176 mothers who ‘any breastfed’ their babies at three months. This is because more mothers had switched to formula feeding at six months after delivery ($n=157$) by one fold compared to only 77 ‘formula fed’ mothers at three months.

4.5.7.1 Maternal, Paternal and Demographic Factors

Table 4.34 :

Maternal, paternal and demographic factors with intensity of breastfeeding at six months postpartum (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=326)	Non-'exclusive breastfeeding' (n=326)
Maternal factors			
<i>Maternal age</i>			
18 – 20 years old	12 (1.8 %)	5 (1.5 %)	7 (2.1 %)
21 – 30 years old	410 (62.9 %)	220 (67.5 %)	190 (58.3 %)
31 to 40 years old	230 (35.3 %)	101 (31.0 %)	129 (39.6 %)
<i>Maternal occupation</i>			
Housewife	202 (31.1 %)	136 (42.0 %)	66 (20.3 %)
Fulltime	393 (60.6 %)	155 (47.8 %)	238 (73.2 %)
Part-time	24 (3.7 %)	10 (3.1 %)	14 (4.3 %)
Self-employed	30 (4.6 %)	23 (7.1 %)	7 (2.2 %)
<i>Maternal educational background</i>			
Primary	8 (1.2 %)	3 (0.9 %)	5 (0.9 %)
Secondary	231 (35.4 %)	113 (34.7 %)	118 (36.2 %)
Tertiary	413 (63.3 %)	210 (64.4 %)	203 (62.3 %)
Paternal factors			
<i>Paternal occupation</i>			
Not working	5 (0.8 %)	2 (0.6 %)	3 (0.9 %)
Fulltime	538 (82.8 %)	267 (82.2 %)	271 (83.4 %)
Part-time	18 (2.8 %)	10 (3.1 %)	8 (2.5 %)
Self-employed	89 (13.7 %)	46 (14.2 %)	43 (13.2 %)
<i>Paternal educational background</i>			
Primary	10 (1.5 %)	4 (1.2 %)	6 (1.8 %)
Secondary	268 (41.2 %)	133 (40.9 %)	135 (41.5 %)
Tertiary	372 (57.2 %)	188 (57.8 %)	184 (56.6 %)
Demographic factors			
<i>Household monthly income</i>			
< RM 1000	26 (4.0 %)	13 (4.0 %)	13 (4.0 %)
RM 1001- RM 3000	323 (49.5 %)	167 (51.2 %)	156 (47.9 %)
RM 3001 – RM 5000	137 (21.0 %)	64 (19.6 %)	73 (22.4 %)
> RM 5000	166 (25.5 %)	82 (25.2 %)	84 (25.8 %)
<i>Marital status</i>			
Married	649 (99.5 %)	325 (99.7 %)	324 (99.4 %)
Never married	2 (0.3 %)	1 (0.3 %)	1 (0.3 %)
Divorced/separated	1 (0.2 %)	-	1 (0.3 %)

Table 4.35 :

Association between maternal, paternal and demographic factors and intensity of breastfeeding at six months postpartum

Characteristics	'exclusive breastfeeding' n=326		Non-'exclusive breastfeeding' n=326		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal factors									
<i>Age during pregnancy</i>							5.267	1	0.022
18 – 30 years old	225	69.0	197	60.4	422	64.7			
31 – 40 years old	101	31.0	129	39.6	230	35.3			
<i>Years of education</i>							0.324	1	0.569
≤ 12 years	116	35.6	123	37.7	239	36.7			
> 12 years	210	64.4	203	62.3	413	63.3			
<i>Employment</i>							35.533	1	< 0.001
Housewife	136	42.0	66	20.3	202	31.1			
Employed	188	58.0	259	79.7	447	68.9			
Paternal factors									
<i>Years of education</i>							0.101	1	0.751
≤ 12 years	137	42.2	141	43.4	278	42.8			
> 12 years	188	57.8	184	56.6	372	57.2			
<i>Employment</i>							0.202	1	0.653
Employed	2	0.6	3	0.9	5	0.8			
Unemployed	323	99.4	322	99.1	645	99.2			
Demographic factors									
<i>Household monthly income</i>							0.962	2	0.618
Low (<RM3000)	180	55.2	169	51.8	349	53.5			
Middle (RM3000 - 5000)	64	19.6	73	22.4	137	21.0			
High (> RM5000)	82	25.2	84	25.8	166	25.5			

*Analyses were done using Chi square test

Table 4.34 shows descriptive results of demographic factors and Table 4.35 shows the association with breastfeeding intensity at six months among 652 mothers.

a) Maternal age

There was a significant association between age categories and breastfeeding practices among 652 subjects, $\chi^2 = 5.267$, df 1, p = 0.022.

Majority of the mothers at age 21 to 30 years old chose to 'exclusively breastfed' (67.5%: 220/326) and 58.3 % (190/326) were either 'any breastfed' or 'formula fed' their babies at six months after delivery.

b) Employment status

There was a significant association between employment status and breastfeeding intensity among mothers at four weeks after delivery, $\chi^2 = 35.533$, df 1 p < 0.001.

More than half of mothers who 'exclusively breastfed' (58.0 %: 188/326) were working mothers, while 42.0 % of them were housewives. However, more than three quarter of those mothers who were 'non-exclusively breastfed' (79.7 %; 259/326) their babies also were employed followed by housewives (20.3 %; 66/326).

c) Educational background

There was no significant association between maternal education and breastfeeding intensity at six months, $\chi^2 = 0.324$, df 1, p = 0.569.

Majority of 'exclusively breastfed' mothers (64.4 %; 210/326) were from tertiary education level, followed by secondary education level (34.7 %; 113/326) and lastly, primary education level (0.9 %; 3/326). Same trend also was seen among 'non-exclusively breastfed' mothers; tertiary (62.3 %; 203/326), secondary (36.2 %; 118/326) and primary (0.9 %; 5/326).

d) Employment status

Among 326 mothers who practising “exclusive breastfeeding”, 82.2 % (267/326) of the husbands were fulltime workers, 14.2 % were self-employed (46/326), 3.1 % (10/326) were part-time and 0.6 % (2/326) was not working.

These results also did not differ significantly with husbands whom the wives practising ‘any breastfeeding’. Majority of them were fulltime workers (83.4 %; 271/326), 13.2 % (43/326) self-employed and 0.9 % (3/326) were part-time workers.

e) Educational background

There is no significant association between education level of the spouses between ‘exclusive’ and ‘any breastfeeding’ mothers, $\chi^2 = 0.101$, df 1, p = 0.751.

However, majority of the spouses with their wives practising “exclusive breastfeeding”, 57.8 % (188/326) of them were tertiary education, followed by secondary education background (40.9 %) and the lowest were from primary education (1.2 %). These are not much different with spouses of mothers practising “any breastfeeding”, 56.6 % (184/326) tertiary, 41.5 % secondary and 1.8 % primary education level.

4.5.7.2 Social Factors

Table 4.36 :
Social and psychological factors with intensity of breastfeeding at six months postpartum
(N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=326)	Non-'exclusive breastfeeding' (n=326)
Social factors			
<i>Father's preference</i>			
Formula feeding	6 (0.9 %)	2 (0.6 %)	4 (1.2 %)
Breastfeeding	445 (68.3 %)	235 (72.1 %)	210 (64.4 %)
Doesn't mind	201 (30.8 %)	89 (27.3 %)	112 (34.4 %)
<i>Grandmother's preference</i>			
Formula feeding	6 (0.9 %)	3 (0.9 %)	3 (0.9 %)
Breastfeeding	389 (59.7 %)	239 (73.3 %)	150 (46.0 %)
Doesn't mind	116 (17.8 %)	43 (13.2 %)	73 (22.4 %)
Never discussed	141 (21.6 %)	41 (12.6 %)	100 (30.7 %)
<i>Grandmother's breastfed for more than one month</i>			
Yes	447 (68.6 %)	261 (80.1 %)	186 (57.1 %)
No	66 (10.1 %)	19 (5.8 %)	47 (14.4 %)
Don't know	139 (21.3 %)	46 (14.1 %)	93 (28.5 %)
Psychological factors			
<i>Initiation of breastfeeding</i>			
Less than one hour	442 (67.8 %)	251 (77.0 %)	191 (58.6 %)
1 to four hours	155 (23.8 %)	62 (19.0 %)	93 (28.5 %)
More than four hours, less than 1 day	41 (6.3 %)	9 (2.8 %)	32 (9.8 %)
More than 1 day	14 (2.1 %)	4 (1.2 %)	10 (3.1 %)
<i>Intention to breastfeed</i>			
With intention	322 (49.6 %)	218 (67.5 %)	104 (31.9 %)
Without intention	327 (49.4 %)	105 (32.5 %)	222 (68.1 %)
<i>Time intended to breastfeed</i>			
Before pregnancy	321 (49.4 %)	168 (51.7 %)	153 (47.1 %)
Early pregnancy	300 (46.2 %)	143 (44.0 %)	157 (48.3 %)
Late pregnancy	27 (4.2 %)	13 (4.0 %)	14 (4.3 %)
<i>Intended breastfeeding duration</i>			
< six months	53 (8.3 %)	21 (6.5 %)	32 (10.0 %)
6 to 12 months	243 (38.0 %)	113 (35.2 %)	130 (40.8 %)
More than 12 months	344 (53.8 %)	187 (58.3 %)	157 (49.2 %)

Table 4.37 :

Association between social and psychological factors and intensity of breastfeeding at six months postpartum (N=652)

Characteristics	'exclusive breastfeeding' n=326		Non-'exclusive breastfeeding' n=326		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Social factors									
<i>Father's preference</i>							4.424	1	0.035
Breastfeeding	235	72.1	210	64.4	445	65.3			
Formula feeding or ambivalent	91	27.9	116	35.6	207	31.7			
<i>Grandmother's preference</i>							50.480	1	< 0.001
Breastfeeding	239	73.3	150	46.0	389	59.7			
Formula feeding or ambivalent	87	26.7	176	54.0	263	40.3			
<i>Grandmother's breastfed for more than one month</i>							40.023	1	< 0.001
Yes	261	80.1	186	57.1	447	68.6			
No	65	19.9	140	42.9	205	31.4			
Psychological factors									
<i>Breastfeeding initiation</i>							25.288	1	< 0.001
Early	251	77.0	191	58.6	442	67.8			
Delayed	75	23.0	135	41.4	210	32.2			
<i>Intention to breastfeed</i>							82.211	1	< 0.001
With intention	218	67.5	104	31.9	322	49.6			
Without intention	105	32.5	222	68.1	327	50.4			
<i>Time intended to breastfeed</i>							1.389	1	0.239
Before pregnancy	168	51.9	153	47.2	321	49.5			
Early pregnancy	156	48.1	171	52.8	327	50.5			

*Analyses were done using Chi square test

Table 4.37 :

Association between social and psychological factors and intensity of breastfeeding at six months postpartum (N=652)-continue

<i>Intention to breastfeed duration</i>							6.082	2	0.048
< six months	21	6.5	32	10.0	53	8.3			
≥ 6 to 12 months	113	35.2	130	40.8	243	38.0			
More than 12 months	187	58.3	157	49.2	344	53.8			

*Analysis were done using Chi square test

Table 4.36 shows descriptive results of psychological factors and Table 4.37 shows the association with breastfeeding intensity at six months among 652 mothers.

a) Father's preference

There was a significant association between father's preference towards infant feeding and breastfeeding intensity at six months ($p = 0.035$). However, 52.8 % (235/445) mothers who chose to 'exclusively breastfed' their babies at six months had spouses with the same preference.

b) Grandmother's preference

Traditionally, Malay mothers will have their confinement period with their mothers. Hence, their mother's preference towards infant feeding plays an important role in the decision of breastfeeding or not.

As seen in the Table 4.37, there was a strong significant association between grandmother's preference towards infant feeding and breastfeeding intensity at six months, $p < 0.001$.

59.7 % of the subjects reported that their mothers had preferences towards breastfeeding for their newborns. 73.3 % of the 'exclusively breastfed' mothers came from this group compared to only 50.9 % were 'any breastfed' mothers.

Whilst, 28.4 % and 19.5 % 'any breastfed' mothers never discuss and their mothers did not have any preferences at all, respectively.

c) Grandmother's breastfeeding experience

There was a strong significant association between grandmother's breastfeeding experience and breastfeeding intensity at six months ($p < 0.001$).

Majority of 'exclusively breastfed' (80.1 %) subjects stated their mothers had breastfed any children before, therefore that influenced them to breastfeed their babies compared to whom reported that their mothers didn't have any experience in breastfeeding or didn't know if their mothers had or not.

Since most Malay mothers prefer to spend their confinement leaves with their mothers, therefore, their mothers normally had their preferences towards infant feeding and would share their experiences in raising and caring of a newborn with their daughters.

4.5.7.3 Psychological Factors

a) Early initiation of breastfeeding

There was a significant association between early initiation of breastfeeding and breastfeeding intensity at six months ($p < 0.001$)

442 mothers reported to initiate breastfeeding their newborns as early as less than one hour. More than half of them still 'exclusively breastfed' (56.8 %, 251/442) their babies at six months compared to only 26.0 % 'any breastfed' their babies.

b) Intention to breastfeed

Having an intention to 'exclusively breastfeed' had a great influence towards breastfeeding intensity at six months ($p < 0.001$).

49.6 % mothers had intention to 'exclusively breastfed' their babies. 67.5 % of 'exclusively breastfed' mothers had an intention to exclusively breastfed their babies, compared to only 32.5 % whom never had.

Meanwhile, majority of 'any breastfed' mothers (69.8 %) never had an intention to exclusively breastfed their babies and only 30.2 % of them exclusively breastfed their babies at six months.

c) Time intended to breastfeed

Time intended to breastfeed did not influence breastfeeding intensity at six months, $p = 0.239$.

However as seen in the Table 4.36 mothers who decided to breastfeed their babies before conception tend to 'exclusively' and 'any breastfeed' their babies by 51.7 % and 50.3 %, respectively.

d) Intended breastfeeding duration

There was a significant association between duration of intended breastfeeding and breastfeeding intensity of 652 mothers in this study, $p = 0.048$.

Nonetheless, longer duration of intended breastfeeding were possibly influenced majority of the mothers to practice 'exclusive' and 'any breastfeeding' at six months by 58.3 % and 50.9 %, individually.

4.5.7.4 Knowledge in Breastfeeding

Table 4.38 :

Breastfeeding knowledge and breastfeeding intensity at six months postpartum (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=326)	Non-'exclusive breastfeeding' (n=326)
Knowledge in breastfeeding			
<i>IIFAS score</i>		63.9 ± 8.3	63.0 ± 7.4
<i>IIFAS Scoring category</i>			
Positive to formula feeding	25 (3.8 %)	13 (4.0 %)	12 (3.7 %)
Neutral	483 (74.1 %)	229 (70.2 %)	254 (77.9 %)
Positive to breastfeeding	144 (22.1 %)	84 (25.8 %)	60 (18.4 %)
<i>Antenatal classes</i>			
Yes, for this pregnancy	284 (43.6 %)	182 (55.8 %)	102 (31.3 %)
Yes, for previous pregnancy	187 (28.7 %)	76 (23.3 %)	111 (34.0 %)
No	181 (27.8 %)	68 (20.9 %)	113 (34.7 %)
<i>Notes/pamphlets on BF</i>			
Yes	404 (62.3 %)	205 (63.5 %)	199 (61.2 %)
No	244 (37.7 %)	118 (36.5 %)	126 (38.8 %)
<i>Class/seminar/lecture on BF</i>			
Yes	306 (47.2 %)	165 (51.1 %)	141 (43.4 %)
No	342 (52.8 %)	158 (48.9 %)	184 (56.6 %)
<i>Demonstration of BF</i>			
Yes	320 (49.4 %)	166 (51.4 %)	154 (47.4 %)
No	328 (50.6 %)	157 (48.6 %)	171 (52.6 %)
<i>Video/tv/slide show on BF</i>			
Yes	102 (15.7 %)	52 (16.1 %)	50 (15.4 %)
No	546 (84.3 %)	271 (83.9 %)	275 (84.6 %)
<i>Counselling/discussion on BF</i>			
Yes	178 (27.5 %)	88 (27.2 %)	90 (27.7 %)
No	470 (72.5 %)	235 (72.8 %)	235 (72.3 %)

Table 4.39 :

Association between breastfeeding knowledge and breastfeeding intensity at six months postpartum (N=652)

Characteristics	'exclusive breastfeeding' n=326		Non-'exclusive breastfeeding' n=326		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>IIFAS score</i>							1.586	1	0.208
High (≥ 65)	155	47.5	139	42.6	294	45.1			
Low (< 65)	171	52.5	187	57.4	358	54.9			
<i>Attended breastfeeding interventions</i>							1.164	1	0.281
Yes	269	83.3	260	80.0	529	81.6			
No	54	16.7	65	20.0	119	18.4			
<i>Attended antenatal class</i>							15.487	1	< 0.001
Yes	258	79.1	213	65.3	471	72.2			
No	68	20.9	113	34.7	181	27.8			

*Analyses were done using Chi square test

Table 4.38 shows descriptive data of maternal knowledge and Table 4.39 shows the association with breastfeeding intensity at six months among 652 mothers.

a) Infant Feeding Attitude

There was no significant difference in the Iowa Infant Feeding Attitude scores between exclusive and ‘any breastfeeding’ mothers, $p = 0.208$.

Majority of the mothers had neutral attitudes towards infant feeding; 70.2 % ‘exclusive’ and 77.5 % ‘any breastfeeding’. However, among 144 subjects who had positive attitudes towards breastfeeding, half of them favoured ‘exclusive breastfeeding’ at six months (58.3 %; 84/144) and only 22.9 % (33/144) practising ‘any breastfeeding’ to their babies.

b) Birthing and breastfeeding education interventions

Having knowledge in breastfeeding may be the triggering factor of breastfeeding practice among mothers.

72.2 %, 62.3 %, 47.2 %, 49.4 %, 15.7 % and 27.5 % of mothers reported that they had attending antenatal class, received notes or pamphlets on breastfeeding, attending classes or lectures or seminars on breastfeeding, demonstration on breastfeeding, watched video or television or slide show on breastfeeding and having personal counselling or discussion of breastfeeding from any healthcare professionals during antenatal check-up, respectively.

However, mothers who had attended antenatal class significantly influenced them to breastfeed their babies at six months, with 79.1 % and 70.4 % of them ‘exclusively’ and ‘any breastfed’ their babies, correspondingly.

4.5.7.5 Biological Factors

Table 4.40 :

Biological factors associated with infant feeding practices at six months (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=326)	Non-'exclusive breastfeeding' (n=326)
Biological factors			
<i>Maternal pre-pregnancy body mass index (BMI) status</i>			
Underweight	77 (11.8 %)	41 (12.6 %)	36 (11.00 %)
Normal	337 (51.7 %)	200 (61.3 %)	137 (42.0 %)
Overweight	160 (24.5 %)	67 (20.6 %)	93 (28.5 %)
Obese	78 (12.0 %)	18 (5.5 %)	60 (18.4 %)
<i>Parity</i>			
First	260 (40.4 %)	148 (46.0 %)	112 (34.8 %)
Second	206 (32.0 %)	90 (28.0 %)	116 (36.0 %)
Third or more	178 (27.6 %)	84 (26.1 %)	94 (29.2 %)
<i>Health problems during pregnancy</i>			
Hypertension	72 (11.0 %)	26 (8.0 %)	46 (14.1 %)
Gestational Diabetes	102 (15.6 %)	21 (6.4 %)	81 (24.8 %)
Anemia	22 (3.4 %)	12 (3.7 %)	10 (3.1 %)
Low blood pressure	4 (0.6 %)	2 (0.6 %)	2 (0.6 %)
Others	12 (1.8 %)	1 (0.3 %)	11 (3.4 %)
<i>Birth delivery method</i>			
Vaginal	459 (70.4 %)	259 (79.4 %)	200 (61.3 %)
Assisted vaginal	79 (12.1 %)	29 (8.9 %)	50 (15.3 %)
Caesarean	114 (17.5 %)	38 (11.7 %)	76 (23.3 %)
<i>Birth problems</i>			
Postpartum hemorrhage	7 (29.2 %)	2 (28.6 %)	5 (29.4 %)
High blood sugar	3 (12.5 %)	1 (14.3 %)	2 (11.8 %)
High blood pressure	7 (29.2 %)	1 (14.3 %)	6 (35.3 %)
Others	7 (29.2 %)	3 (42.9 %)	4 (23.5 %)
<i>Baby birth weight</i>			
< 2.5 kg	16 (2.5 %)	7 (2.1 %)	9 (2.8 %)
≥ 2.5 – 3.99 kg	631 (96.8 %)	317 (97.2 %)	314 (96.3 %)
≥ 4.0 kg	5 (0.8 %)	2 (0.6 %)	3 (0.9 %)
Biological factors			
<i>Breastfeeding difficulties at or before four weeks</i>			
Swollen breasts	427 (65.5 %)	249 (76.4 %)	178 (54.6 %)
Sore breasts with fever	209 (32.1 %)	134 (41.1 %)	75 (23.0 %)
Sore breasts with body pain	38 (5.8 %)	18 (5.5 %)	20 (6.1 %)
Cracked nipples	287 (44.0 %)	147 (45.1 %)	140 (42.9 %)
Longer time to flow	307 (47.1 %)	125 (38.3 %)	182 (55.8 %)
Baby has suckling problems	49 (7.5 %)	7 (2.1 %)	42 (12.9 %)
Baby doesn't wake up for feeds	21 (3.2 %)	10 (3.1 %)	11 (3.4 %)
Insufficient milk/colostrum	141 (21.7 %)	15 (4.6 %)	126 (38.8 %)
Inverted nipples	15 (2.3 %)	-	15 (4.6 %)

Table 4.40 :

Biological factors associated with infant feeding practices at six months (N=652)-continue

Variables	Total N (%)	'exclusive breastfeeding' (n=326)	Non-'exclusive breastfeeding' (n=326)
Biological factors			
<i>Breastfeeding difficulties between 3-six months</i>			
Insufficient milk	281 (43.2 %)	14 (4.3 %)	267 (81.9 %)
Cracked/sore nipples	17 (2.6 %)	6 (1.8 %)	11 (3.4 %)
Mastitis	3 (0.5 %)	-	3 (0.9 %)
Breasts engorgement	90 (13.8 %)	81 (24.9 %)	9 (2.8 %)
Breastfeeding is painful	1 (0.2 %)	-	1 (0.3 %)
Swollen breasts	16 (2.5 %)	7 (2.2 %)	3 (1.8 %)
Sore breasts with high fever	8 (1.2 %)	4 (1.2 %)	4 (1.2 %)
Sore breasts with body pains	6 (0.9 %)	-	6 (1.8 %)
<i>Difficulties in baby</i>			
Baby not gaining enough weight	18 (2.8 %)	10 (3.1 %)	8 (2.5 %)
Baby has suckling problems	20 (3.1 %)	-	20 (6.1 %)
Baby refuses to breastfeed	47 (7.2 %)	3 (0.9 %)	44 (13.5 %)
Baby too tired to feed	7 (1.1 %)	2 (0.6 %)	5 (1.5 %)

Table 4.41 :
Association between biological factors and breastfeeding intensity at six months (N=652)

Characteristics	'exclusive breastfeeding' n=326		Non-'exclusive breastfeeding' n=326		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Child-related factors									
<i>Parity</i>							8.360	1	0.004
Primiparous	148	46.0	112	34.8	260	40.4			
Multiparous	174	54.0	210	65.2	384	59.6			
<i>Birth weight</i>							0.443	1	0.506
Normal	317	97.2	314	96.3	631	96.8			
Under/overweight	9	2.8	12	3.7	21	3.2			
Birth factors									
<i>Delivery method</i>							15.351	1	< 0.001
Vaginal	288	88.3	250	76.7	538	82.5			
Cesarean section	38	11.7	76	23.3	114	17.5			
<i>Birth problems</i>							3.170	1	0.075
Yes	12	3.7	22	6.8	34	5.3			
No	312	96.3	300	93.2	612	94.7			
Maternal factors									
<i>Pre-pregnancy BMI</i>							30.598	1	< 0.001
Normal (BMI 18.5 – 24.9)	241	73.9	173	53.1	414	63.5			
Overweight and obese (BMI > 25)	85	26.1	153	46.9	238	36.5			
<i>Pregnancy health problems</i>							40.183	1	< 0.001
Yes	60	18.4	134	41.1	194	29.8			
No	266	81.6	192	58.9	458	70.2			
<i>Breastfeeding difficulties at or before four weeks</i>							0.334	1	0.563
Yes	302	92.6	298	91.4	600	92.0			
No	24	7.4	28	8.6	52	8.0			
<i>Breastfeeding difficulties within 4 – six months</i>							197.461	1	< 0.001
Yes	97	29.8	275	84.4	372	57.1			
No	228	70.2	51	15.6	279	42.9			

Table 4.40 shows descriptive data of biological factors and Table 4.41 shows the association with breastfeeding intensity at six months among 652 mothers.

a) Child-related factors

There is a significant association between parity and breastfeeding practice at six months, $p = 0.004$. Mothers who had more than 1 child had higher prevalence of 'exclusive breastfeeding' at six months (54.0 %; 174/326).

There is no significant association between infants' birth weight and breastfeeding practices at six months, $p = 0.506$.

b) Birth factors

There is a weak significant association between birth delivery and breastfeeding practices at six months, $p < 0.001$. Mothers who had vaginal delivery (88.3 %: 288/326) were more likely to continue "exclusive breastfeeding" until six months compared to mothers who had caesarean section (11.7 %: 38/326).

Meanwhile, there is no significant association between mothers who experience problems during birth and breastfeeding practices at six months, $p = 0.075$. However, mothers who did not have any difficulties during birth were more likely to 'exclusively breastfeed' their babies until six months (96.3 %: 312/326).

c) Maternal factors

There was a weak significant association between pre-pregnancy BMI and breastfeeding practices at six months, $p < 0.001$. Out of 326 mothers practising "exclusive breastfeeding" at six months, 73.9 % of them were normal weight mothers. Instead, overweight and obese mothers were 'non-exclusive breastfed' their babies at six months (46.9 %: 153/326).

Besides that, there is also a significant association between mothers who experienced health problems during pregnancy and breastfeeding practices at six months, $p < 0.001$. 81.6 % (266/326) of the mothers whom 'exclusively breastfed' their babies did not experience any health problems such as gestational diabetes mellitus and hypertension during pregnancy.

d) Breastfeeding difficulties

There is no significant association between mothers who experienced breastfeeding difficulties at four weeks and breastfeeding practices at six months, $p = 0.563$.

However, there is a significant difference between mothers who experienced breastfeeding difficulties between four to six months and breastfeeding practices, $p < 0.001$. 70.2 % (228/326) of the mothers who did not experience ‘any breastfeeding’ difficulties between four to six months were more likely to continue breastfeeding exclusively until six months compared to those who had the difficulties in breastfeeding for example inadequate milk supply.

4.5.8 To Examine Duration of Breastfeeding and the Associated Factors

Table 4.42 :

Proportion of women breastfeeding from hospital discharge to six months (N = 652)

Interview interval	Proportion of women breastfeeding (%)		
	Exclusive	Any	Total
At discharge	91.7	7.7	96.8
One month	78.5	18.3	99.4
Three months	61.2	27.0	88.2
Six months	50.0	25.9	75.9

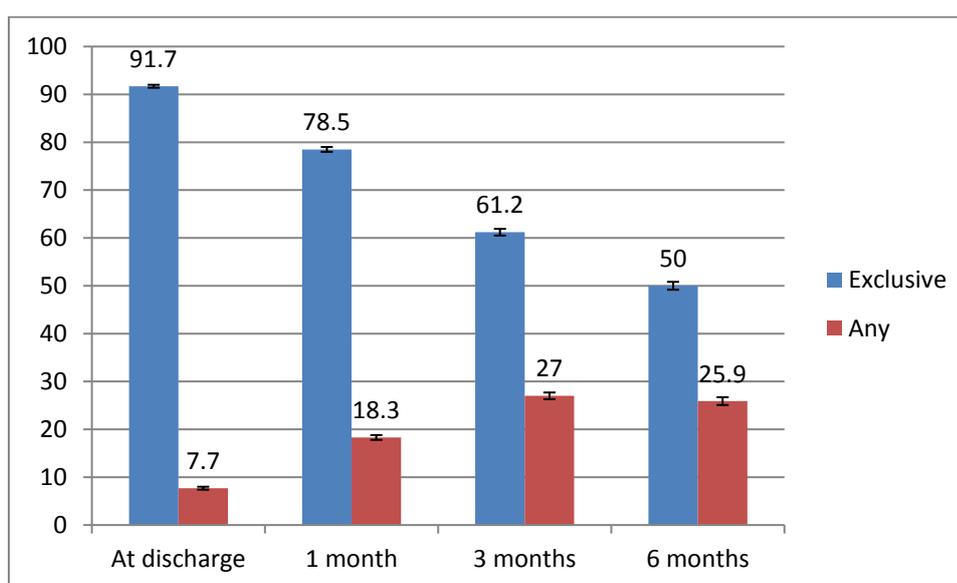


Figure 4.2 : Prevalence rates for exclusive and ‘any breastfeeding’ in Selangor

Table 4.42 shows the proportion of women breastfeeding from discharge until six months after delivery and Figure 4.1 shows the rates of ‘exclusive’ and ‘any breastfeeding’ in Selangor, Malaysia.

In total, 67.8 % of the mothers initiated breastfeeding within one hour while in hospital. At discharge, 96.8 % of them were breastfeeding their newborns including 7.7 % were ‘any breastfeeding’. By three months, 61.2 % of the mothers continued ‘exclusive breastfeeding’ and 18.3 % were ‘any breastfeeding’. Nonetheless, at six months, the rates of breastfeeding had fallen to 75.9 %, 50.0 % were ‘exclusive breastfeeding’ and 25.9 % were ‘any breastfeeding’.

4.5.8.1 Factors Predicting 'Exclusive Breastfeeding' At one month

Table 4.43 :

Crude (unadjusted) and adjusted odd ratios (ORs) for demographic and knowledge predictors of 'exclusive breastfeeding' at four weeks

Factor	EBF (n=512)	Non-EBF (n=140)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Demographic factors						
<i>Maternal years of education</i>						
≤ 12 years	177 (34.6 %)	62 (44.3 %)	1 (reference)	0.007*	1 (reference)	0.001*
> 12 years	335 (65.4 %)	78 (55.7 %)	1.824 (1.177 – 2.825)		2.185 (1.354 – 3.528)¹	
<i>Maternal employment</i>						
Housewives	170 (33.4 %)	32 (22.9 %)	2.338 (1.452 – 3.767)	< 0.001*	2.179 (1.282 – 3.706)²	0.004*
Employed	339 (66.6 %)	108 (77.1 %)	1 (reference)		1 (reference)	
<i>Household monthly income</i>						
Low (< RM 5000)	375 (73.2 %)	111 (79.3 %)	0.715 (0.455 – 1.125)	0.147	0.881 (0.506 – 1.533) ²	0.653
High (≥ RM5000)	137 (26.8 %)	29 (20.7 %)	1 (reference)		1 (reference)	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
Yes	395 (77.1 %)	76 (54.3 %)	2.843 (1.922 – 4.205)	< 0.001*	2.029 (1.286 – 3.200)³	0.004*
No	117 (22.9 %)	64 (45.7 %)	1 (reference)		1 (reference)	
<i>Attending breastfeeding interventions</i>						
Yes	415 (81.5 %)	114 (82.0 %)	0.968 (0.595 – 1.576)	0.897	0.667 (0.375 – 1.186) ¹	0.168
No	94 (18.5 %)	25 (18.0 %)	1 (reference)		1 (reference)	

*significantly different from reference (p< 0.05)

¹Adjusted for maternal employment, maternal pre-pregnancy BMI, parity, attending antenatal class, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, ²adjusted for maternal education, maternal pre-pregnancy BMI, parity, attending antenatal class, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, ³adjusted for maternal education, maternal pre-pregnancy BMI, parity, received breastfeeding interventions, spouse's preference, grandmother's preference, grandmother's breastfeeding experience

Table 4.43 presents crude (unadjusted) and adjusted odd ratios for demographic and knowledge predictors of “exclusive breastfeeding” at four weeks for socio-demographic factors using logistic regression analysis.

Mothers with higher education were almost twice more likely to ‘exclusively breastfeed’ their babies at four weeks compared to mothers with lower education (crude OR 1.824, 95% CI of crude OR: 1.177 – 2.825) and the adjusted odd ratios was 2.185 (95% CI of adjusted OR: 1.354 – 3.528).

However, housewives were more likely to ‘exclusive breastfeed’ their babies at four weeks compared to working mothers (crude OR 2.338, 95% CI of crude OR: 1.452 – 3.767, adjusted OR 2.179, 95% CI of adjusted OR: 1.282 – 3.706).

Mothers who attending antenatal class were nearly three times more likely to ‘exclusively breastfeed’ their babies at four weeks compared to who did not attend antenatal class (OR 2.843 95% CI 1.922 – 4.205, adjusted OR 2.029, 95% CI of adjusted OR: 1.286 – 3.200).

Table 4.44 :

Crude (unadjusted) and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at four weeks (N=652)

Factor	EBF (%)	Non-EBF (%)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Parity</i>						
Primiparous (ref)	204 (40.4 %)	56 (40.3 %)	1 (reference)	0.982	1 (reference)	0.270
Multiparous	301 (59.6 %)	83 (59.7 %)	0.996 (0.679 – 1.460)		1.291 (0.820 - 2.034) ¹	
<i>Maternal obesity</i>						
Obese (BMI ≥ 30)	34 (6.6 %)	44 (31.4 %)	0.155 (0.094 – 0.255)	< 0.001*	0.220 (0.126 – 0.385)²	< 0.001*
Non-obese (BMI < 30)	478 (93.4 %)	96 (68.6 %)	1 (reference)		1 (reference)	
<i>Health problems during pregnancy</i>						
Yes	116 (22.7 %)	78 (55.7 %)	0.233 (0.157 – 0.345)	< 0.001*	0.308 (0.193 – 0.492)³	< 0.001*
No (ref)	396 (77.3 %)	62 (44.3 %)	1 (reference)		1 (reference)	
<i>Birth problems</i>						
Yes	22 (4.3 %)	12 (8.8 %)	0.466 (0.224 – 0.967)	0.040*	0.663 (0.286 – 1.538) ¹	0.339
No (ref)	488 (95.7 %)	124 (91.2 %)	1 (reference)		1 (reference)	
<i>Birth delivery method</i>						
Vaginal (ref)	446 (87.1 %)	92 (65.7 %)	1 (reference)	< 0.001*	1 (reference)	< 0.001*
Caesarean	66 (12.9 %)	48 (34.3 %)	0.284 (0.184 – 0.438)		0.406 (0.246 – 0.669)¹	
<i>Breastfeeding difficulties at or before four weeks</i>						
Yes	465 (90.8 %)	135 (96.4 %)	0.366 (0.143 – 0.940)	0.037*	0.239 (0.080 – 0.712)⁴	0.010*
No (ref)	47 (9.2 %)	5 (3.6 %)	1 (reference)		1 (reference)	
<i>Painful swollen breasts</i>						
Yes	369 (72.1 %)	58 (41.4 %)	3.648 (2.476 – 5.376)	< 0.001*	2.637 (1.698 – 4.094)⁴	< 0.001*
No (ref)	143 (27.9 %)	82 (58.6 %)	1 (reference)		1 (reference)	
<i>Sore breasts with high fever</i>						
Yes	184 (35.9 %)	25 (17.9 %)	3.108 (1.421 – 6.799)	0.005*	2.344 (1.382 – 3.975)⁴	0.002*
No (ref)	328 (64.1 %)	115 (82.1 %)	1 (reference)		1 (reference)	
<i>Cracked or sore nipples</i>						
Yes	214 (41.8 %)	73 (52.1 %)	0.659 (0.453 – 0.959)	0.029	0.721 (0.466 – 1.115) ⁴	0.141
No (ref)	298 (58.2 %)	67 (47.9 %)	1 (reference)		1 (reference)	

Table 4.44 :

Crude (unadjusted) and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at four weeks (N=652)- continue

<i>Poor milk flowing</i>						
Yes	193 (37.7 %)	114 (81.4 %)	0.617 (0.272 – 1.403)	0.250	0.149 (0.089 – 0.250)⁴	< 0.001*
No (ref)	319 (62.3 %)	26 (18.6 %)	1 (reference)		1 (reference)	
<i>Insufficient milk</i>						
Yes	34 (6.7 %)	107 (77.0 %)	0.028 (0.013 – 0.058)	< 0.001	0.020 (0.011 – 0.038)⁴	< 0.001*
No (ref)	477 (93.3 %)	32 (23.0 %)	1 (reference)		1 (reference)	
<i>Inverted nipples</i>						
Yes	3 (0.6 %)	12 (8.6 %)	0.189 (0.037 – 0.955)	0.044	0.073 (0.016 – 0.333)⁴	0.001*
No (ref)	509 (99.4 %)	128 (91.4 %)	1 (reference)		1 (reference)	
<i>Baby has suckling problems</i>						
Yes	11 (2.1 %)	38 (27.1 %)	0.078 (0.029 – 0.213)	< 0.001	0.072 (0.032 – 0.163)⁴	< 0.001*
No (ref)	501 (97.9 %)	102 (72.9 %)	1 (reference)		1 (reference)	

*significantly different from reference level with $p < 0.05$

¹Adjusted for maternal education, maternal pre-pregnancy BMI, attending antenatal class, received breastfeeding interventions, husband's preference, grandmother's preference, grandmother's breastfeeding experience,

²Adjusted for maternal education, parity, attending antenatal class, received breastfeeding interventions, husband's preference, grandmother's preference, grandmother's breastfeeding experience,

³adjusted for maternal education, maternal pre-pregnancy BMI, parity, attending antenatal class, received breastfeeding interventions, husband's preference, grandmother's preference, grandmother's breastfeeding experience,

⁴adjusted for maternal education, maternal pre-pregnancy BMI, attending antenatal class, received breastfeeding interventions, husband's preference, grandmother's preference, grandmother's breastfeeding experience, birth delivery method

Table 4.44 shows crude (unadjusted) and adjusted odd ratios of biological predictors of “exclusive breastfeeding” at four weeks.

Obese mothers were less likely to ‘exclusive breastfeed’ their babies at four weeks compared to mothers with lower BMI (crude OR 0.155, 95% CI of crude OR: 0.094 – 0.255 and the adjusted odd ratios was 0.220 (95% CI of adjusted OR: 0.126 – 0.385).

Mothers who had health problems related to pregnancy such as gestational diabetes and hypertension were less likely to ‘exclusive breastfeed’ their babies at four weeks compared to those who did not have any health problems during pregnancy (crude OR 0.233, 95% CI of crude OR: 0.157 – 0.345, adjusted OR 0.308, 95% CI of adjusted OR: 0.193 – 0.492).

In addition, mothers who had health problems related to delivery such as postpartum haemorrhage were less likely to ‘exclusive breastfeed’ their babies at four weeks compared to who did not have (crude OR 0.466, 95% CI of crude OR: 0.224 – 0.967, adjusted OR 0.663, 95% CI of adjusted OR: 0.286 – 1.538).

Mothers who had birth delivery via C-section were less likely to ‘exclusive breastfeed’ their babies at four weeks compared to mothers who had vaginal delivery (crude OR 0.284, 95% CI of crude OR: 0.184 – 0.438) and the adjusted odd ratios was 0.406 (95% CI of adjusted OR: 0.246 – 0.669).

Mothers who reported to experience any breastfeeding difficulties like inverted nipples (crude OR 0.189, 95% CI of crude OR: 0.037 – 0.955, adjusted OR 0.073, 95% CI of adjusted OR: 0.016 – 0.333), insufficient colostrum/milk (crude OR 0.028, 95% CI of crude OR: 0.013 – 0.058, adjusted OR 0.020, 95% CI of adjusted OR: 0.011 – 0.038) , cracked or sore nipples (crude OR 0.659, 95% CI of crude OR: 0.453 – 0.959, adjusted OR 0.721, 95% CI of adjusted OR: 0.466 – 1.115) and baby with suckling problems (crude OR 0.078, 95% CI of crude OR: 0.029 – 0.213, adjusted OR 0.072, 95% CI of adjusted OR: 0.032 – 0.163) were less likely to ‘exclusive breastfeed’ their babies at four weeks compared to those who did not experience (OR 0.366 95% CI 0.143 – 0.940, adjusted OR: 0.239, 95% CI of adjusted OR: 0.080 – 0.712).

However, mothers who experienced symptoms of mastitis which were sore breasts with high fever were more likely to “exclusive breastfeeding” at four weeks

compared to who did not (OR 3.108 95% CI 1.421 – 6.799) and the adjusted odd ratios was 2.344, 95% CI of adjusted OR: 1.382 – 3.975) and painful swollen breasts (OR 3.648, 95% CI: 2.476 – 5.376, adjusted OR 2.637, 95% CI of adjusted OR: 1.698 – 4.094).

Table 4.45 :

Unadjusted and adjusted odd ratios (ORs) for psychosocial predictors of 'exclusive breastfeeding' at four weeks

Factor	EBF (%)	Non-EBF (%)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	358 (69.9 %)	87 (62.1 %)	1.416 (0.959 – 2.092)	0.081	1.344 (0.881 – 2.050) ¹	0.170
Formula feeding or ambivalent (ref)	154 (30.1 %)	53 (37.9 %)	1		1	
<i>Grandmother's preference</i>						
Breastfeeding	345 (67.4 %)	44 (31.4 %)	4.507 (3.016 – 6.736)	< 0.001	2.589 (1.557 – 4.305)²	<0.001*
Formula feeding or ambivalent (ref)	167 (32.6 %)	96 (68.6 %)	1		1	
<i>Grandmother's breastfeeding experience</i>						
Yes	388 (75.8 %)	59 (42.1 %)	4.296 (2.904 – 6.355)	< 0.001	2.125 (1.286 – 3.512)³	0.03*
Noor ambivalent (ref)	124 (24.2 %)	81 (57.9 %)	1		1	
Psychological factors						
<i>Initiation of breastfeeding</i>						
Early	396 (77.3 %)	46 (32.9 %)	6.976 (4.635 – 10.50)	< 0.001	7.393 (4.869 – 11.225)⁴	< 0.001*
Delayed (ref)	116 (22.7 %)	94 (67.1 %)	1		1	
<i>Intention to breastfeed</i>						
With intention	278 (54.6 %)	44 (31.4 %)	2.626 (1.765 – 3.906)	< 0.001	2.782 (1.809 – 4.279)⁴	< 0.001*
Without intention (ref)	231 (45.4 %)	96 (68.6 %)	1		1	
<i>Time intended to breastfeed</i>						
Before pregnancy	257 (50.6 %)	64 (45.7 %)	1.216 (0.835 – 1.770)	0.307	1.125 (0.767 – 1.651) ⁵	0.546
During pregnancy (ref)	251 (49.4 %)	76 (54.3 %)	1		1	
<i>Intended breastfeeding duration</i>						
< six months (ref)	35 (6.9 %)	18 (13.2 %)	1		1	
≥ six months	190 (37.7 %)	53 (39.0 %)	1.844 (0.967 – 3.514)	0.063	1.793 (0.926 – 3.472) ⁶	0.083
> 12 months	279 (55.4 %)	65 (47.8 %)	2.207 (1.176 – 4.142)	0.014	2.049 (1.068 – 3.933)	0.031*

*significantly different from reference level with p< 0.05

¹Adjusted for maternal education, maternal employment, attending antenatal class, received 'any breastfeeding' interventions and parity, ²adjusted for maternal education, maternal employment, attending antenatal class, biological mother's breastfeeding experience, ³adjusted for maternal education, maternal employment, attending antenatal class and biological's mother feeding preference, ⁴adjusted for parity, IIFAs score and maternal education, ⁵adjusted for parity, IIFAs score, maternal education and household monthly income, ⁶adjusted for parity, IIFAs score, maternal education, age and household monthly income

Table 4.45 presents psychosocial predictors of “exclusive breastfeeding” at four weeks. Mothers whom the husbands preferred breastfeeding were 1.4 times more likely to ‘exclusively breastfeed’ their babies until six months than mothers whom the husbands preferred formula feeding or were ambivalent on the type of infant feeding (OR 1.416, 95% CI 0.959 – 2.092, adjusted OR 1.344, 95% CI 0.881 – 2.050).

Subjects whom their biological mothers prefer breastfeeding were four times more likely to ‘exclusive breastfeed’ at four weeks postpartum compared to mothers whom their biological mothers prefer formula feeding or ambivalent (OR 4.507 95% CI 3.016 – 6.736, adjusted OR 2.589, 95% CI 1.557 – 4.305).

Furthermore, subjects whom their biological mothers had breastfed for more than one month were four times more likely to ‘exclusive breastfeed’ at four weeks postpartum compared to subjects whose their biological mothers did not had ‘any breastfeeding’ experience (OR 4.296 95% CI 2.904 – 6.355) and the adjusted odd ratios was OR 2.125 (95% CI 1.286 – 3.512).

Mothers who initiated breastfeeding within less than one hour were almost 7 time more likely to ‘exclusive breastfeed’ four weeks postpartum compared to mothers who delayed the initiation (OR 6.976 95% CI 4.635 – 10.50) and the adjusted odd ratios was 7.393 (95% CI 4.869 – 11.225).

Mothers with intention to ‘exclusive breastfeed’ prenatally were 2.6 times more likely to ‘exclusive breastfeed’ their babies at four weeks (OR 2.626 95% CI 1.765 – 3.906, adjusted OR 2.782, 95% CI 1.809 – 4.279).

Mothers who intended to breastfeed before conceived were more likely to “exclusive breastfeeding” at four weeks compared to those intended during pregnancy (OR 1.216 95% CI 0.835 – 1.770, adjusted OR 1.125, 95 % CI 0.767 – 1.651).

Finally, mothers who intends to breastfeed for more than 12 months were more likely to ‘exclusive breastfeed’ at four weeks postpartum compared to mothers who intend to ‘exclusive breastfeed’ for less than six months (OR 2.207 95% CI 1.176 – 4.142, adjusted OR 2.049, 95% CI 1.068 – 3.933).

4.5.8.2 Factors Predicting 'Exclusive Breastfeeding' At Three months

Table 4.46:

Unadjusted and adjusted odd ratios (ORs) for demographic and knowledge predictors of 'exclusive breastfeeding' at three months

Factor	EBF (n=399)	Non-EBF (n=253)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Maternal factors						
<i>Maternal age</i>						
18 – 30 years old	269 (67.4 %)	153 (60.5 %)	1.352 (0.975 – 1.877)	0.071	1.186 (0.798 – 1.763) ¹	0.399
31 to 40 years old(ref)	130 (32.6 %)	100 (39.5 %)	1 (reference)		1 (reference)	
<i>Maternal occupation</i>						
Housewife	156 (39.3 %)	46 (18.3 %)	2.899 (1.987 – 4.229)	< 0.001*	3.161 (2.086 – 4.790)²	< 0.001*
Employed (ref)	241 (60.7 %)	206 (81.7 %)	1 (reference)		1 (reference)	
<i>Maternal years of education</i>						
≤ 12 years (ref)	144 (36.1 %)	95 (37.5 %)	1 (reference)	0.706	1 (reference)	0.029*
> 12 years	255 (63.9 %)	158 (62.5 %)	1.065 (0.768 – 1.476)		1.581 (1.049 – 2.383)³	
<i>Household monthly income</i>						
Low (< RM 5000)	296 (74.2 %)	190 (75.1 %)	0.953 (0.663 – 1.369)	0.794	0.864 (0.555 – 1.345) ⁴	0.518
High (≥ RM5000) (ref)	103 (25.8 %)	63 (24.9 %)	1 (reference)		1 (reference)	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
Yes	315 (78.9 %)	156 (61.7 %)	2.332 (1.644 – 3.307)	< 0.001*	1.844 (1.231 – 2.763)⁵	0.003*
No (ref)	84 (21.1 %)	97 (38.3 %)	1 (reference)		1 (reference)	
<i>Attending breastfeeding interventions</i>						
Yes	327 (82.6 %)	202 (80.2 %)	1.173 (0.783 – 1.757)	0.439	1.032 (0.646 – 1.649) ⁶	0.895
No (ref)	69 (17.4 %)	50 (19.8 %)	1 (reference)		1 (reference)	

*significantly different from reference level with p< 0.05

¹Adjusted for maternal employment, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class,

²Adjusted for maternal age, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class, ³Adjusted for

maternal age, maternal employment, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class,

⁴Adjusted for maternal age, maternal employment, maternal education, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding

experience, attending antenatal class, ⁵Adjusted for maternal age, maternal employment, maternal education, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference,

grandmother's breastfeeding experience

⁶Adjusted for maternal age, maternal employment, maternal education, maternal pre-pregnancy BMI, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding

experience, attending antenatal class

Table 4.46 presents socio-demographic predictors of ‘exclusive breastfeeding’ at three months using logistic regression analysis.

Housewives were 2.9 times more likely to ‘exclusive breastfeeding’ at three months than working mothers (crude OR 2.899, 95% CI of crude OR: 1.987 – 4.229, adjusted OR 3.161, 95% CI of adjusted OR: 2.086 – 4.790).

After adjusted for maternal age, maternal employment, maternal pre-pregnancy BMI, parity, spouse’s preference, grandmother’s preference, grandmother’s breastfeeding experience, attending antenatal class, higher educated mothers were more likely to ‘exclusive breastfeed’ through three months than lower educated mothers (adjusted OR 1.581, 95% CI of adjusted OR: 1.049 – 2.383).

Mothers who had attended antenatal class were 2.3 times more likely to ‘exclusive breastfeeding’ at three months compared to who did not (crude OR 2.013, 95% CI of crude OR: 1.417 – 2.860, adjusted OR 1.844, 95% CI of adjusted OR: 1.231 – 2.763).

Table 4.47 :

Unadjusted and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at three months

Factor	EBF (%)	Non-EBF (%)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Parity</i>						
Primiparous (ref)	172 (43.5 %)	88 (35.3 %)	1 (reference)	0.039*	1 (reference)	0.074
Multiparous	223 (56.5 %)	161 (64.7 %)	0.709 (0.511 – 0.983)		0.711 (0.490 – 1.033) ¹	
<i>Maternal obesity</i>						
Obese (BMI ≥ 30)	24 (6.0 %)	54 (21.3 %)	0.382 (0.275 – 0.532)	< 0.001*	0.367 (0.209 – 0.645)²	< 0.001*
Non-obese (BMI < 25)	375 (94.0 %)	199 (78.7 %)	1 (reference)		1 (reference)	
<i>Health problems during pregnancy</i>						
Yes	79 (19.8 %)	115 (45.5 %)	0.296 (0.209 – 0.420)	< 0.001*	0.319 (0.212 – 0.480)³	< 0.001*
No (ref)	320 (80.2 %)	138 (54.5 %)	1 (reference)		1 (reference)	
<i>Birth delivery method</i>						
Vaginal (ref)	348 (87.2 %)	190 (75.1 %)	1 (reference)	< 0.001*	1 (reference)	0.05*
Caesarean	51 (12.8 %)	63 (24.9 %)	0.442 (0.294 – 0.666)		0.625 (0.390 – 1.001)⁴	
<i>Breastfeeding difficulties at or before four weeks</i>						
Painful swollen breasts						
Yes	296 (74.2 %)	131 (51.8 %)	2.676 (1.918 – 3.735)	< 0.001	2.270 (1.563 – 3.295)⁵	< 0.001*
No (ref)	103 (25.8 %)	122 (48.2 %)	1 (reference)		1 (reference)	
Sore breasts with high fever						
Yes	156 (39.1 %)	53 (20.9 %)	2.423 (1.684 – 3.484)	< 0.001	2.475 (1.637 – 3.741)⁵	< 0.001*
No (ref)	243 (60.9 %)	200 (79.1 %)	1 (reference)		1 (reference)	
Insufficient colostrum/milk						
Yes	19 (4.8 %)	122 (48.6 %)	0.053 (0.031 – 0.089)	< 0.001	0.056 (0.032 – 0.100)⁵	< 0.001*
No (ref)	380 (95.2 %)	129 (51.4 %)	1 (reference)		1 (reference)	

*significantly different from reference level with p< 0.05

¹Adjusted for maternal employment, maternal education, maternal pre-pregnancy BMI, attending antenatal class spouse's preference, grandmother's preference and grandmother's breastfeeding experience, ²Adjusted for maternal employment, maternal education, parity, attending antenatal class spouse's preference, grandmother's preference and grandmother's breastfeeding experience, ³Adjusted for maternal age, maternal employment, maternal education, maternal pre-pregnancy BMI, parity, attending antenatal class, spouse's preference, grandmother's preference and grandmother's breastfeeding experience

Table 4.47 :

Unadjusted and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at three months - continue

Factor	EBF (%)	Non-EBF (%)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
Longer time to flow						
Yes	148 (37.1 %)	159 (62.8 %)	0.349 (0.252 – 0.483)	< 0.001*	0.302 (0.204 – 0.449)⁵	< 0.001*
No (ref)	251 (62.9 %)	94 (37.2 %)	1 (reference)		1 (reference)	
Baby has suckling problems						
Yes	7 (1.8 %)	42 (16.6 %)	0.090 (0.040 – 0.203)	< 0.001*	0.103 (0.043 – 0.244)⁵	< 0.001*
No (ref)	392 (98.2 %)	211 (83.4 %)	1 (reference)		1 (reference)	
Breastfeeding difficulties within 1 to three months						
Yes	145 (36.3 %)	227 (89.7 %)	0.065 (0.042 – 0.103)	< 0.001*	0.075 (0.046 – 0.123)⁵	< 0.001*
No (ref)	254 (63.7 %)	26 (10.3 %)	1 (reference)		1 (reference)	
Insufficient milk						
Yes	48 (12.0 %)	223 (88.1 %)	0.018 (0.011 – 0.030)	< 0.001*	0.022 (0.013 – 0.037)⁵	< 0.001*
No (ref)	351 (88.0 %)	30 (11.9 %)	1 (reference)		1 (reference)	
Cracked or sore nipples						
Yes	9 (2.3 %)	15 (5.9 %)	0.366 (0.158 – 0.850)	0.019*	0.376 (0.147 – 0.966)⁵	< 0.001*
No (ref)	390 (97.7 %)	238 (94.1 %)	1 (reference)		1 (reference)	
Baby refuses to breastfeed						
Yes	9 (2.3 %)	37 (14.6 %)	0.135 (0.064 – 0.284)	< 0.001*	0.166 (0.074 – 0.370)⁵	< 0.001*
No (ref)	390 (97.7 %)	216 (85.4 %)	1 (reference)		1 (reference)	

*significantly different from reference level with $p < 0.05$ ⁴Adjusted for maternal employment, maternal education, maternal pre-pregnancy BMI, parity, attending antenatal class, spouse's preference, grandmother's preference and grandmother's breastfeeding experience, ⁵Adjusted for maternal employment, maternal education, maternal pre-pregnancy BMI, parity, attending antenatal class, received breastfeeding interventions, spouse's preference, grandmother's preference and grandmother's breastfeeding experience

Table 4.47 shows biological predictors of ‘exclusive breastfeeding’ at three months using logistic regression analysis.

Mothers with more than 1 child were less likely ‘exclusive breastfeed’ their babies at three months compared to mothers with only single child (crude OR 0.709, 95% CI of crude OR: 0.511 – 0.983, adjusted OR 0.711, 95% CI of adjusted OR: 0.490 – 1.033).

Obese mothers were less likely to “‘exclusive breastfeeding” at three months than mothers with lower BMI (crude OR 0.382, 95% CI of crude OR: 0.275 – 0.532, adjusted OR 0.367, 95% CI of adjusted OR: 0.209 – 0.645).

Mothers who had any health problems during pregnancy like gestational diabetes and hypertension were less likely to “‘exclusive breastfeeding” at three months compared to mothers who did not have any pregnancy health related problems (crude OR 0.296, 95% CI of crude OR: 0.209 – 0.420, adjusted OR 0.319, 95% CI of adjusted OR: 0.212 – 0.480).

Mothers who had C-section delivery were less likely to “‘exclusive breastfeeding” at three months compared to mothers who had vaginal delivery (OR 0.442 95% CI 0.294 – 0.666) and the adjusted odd ratios was 0.625 (95% CI of adjusted OR: 0.390 – 1.001).

Mothers who reported to experience breastfeeding difficulties such as insufficient colostrum/milk (crude OR 0.053, 95% CI of crude OR: 0.031 – 0.089, (adjusted OR 0.056, 95% CI of adjusted OR: 0.032 – 0.100), milk takes longer time to flow at first feed (crude OR 0.349, 95% CI of crude OR: 0.252 – 0.483, adjusted OR 0.302, 95% CI of adjusted OR: 0.204 – 0.449) and their babies had difficulties in sucking (crude OR 0.090, 95% CI of crude OR: 0.040 – 0.203, adjusted OR 0.103, 95% CI of adjusted OR: 0.043 – 0.244) at or before four weeks postpartum were less likely to exclusive breastfeed at three months.

However, they were more likely to ‘exclusive breastfeed’ at three months even they experience symptoms of mastitis (breast infection) like painful swollen breasts (crude OR 2.676, 95% CI of crude OR: 1.918 – 3.735, adjusted OR 2.270, 95% CI of adjusted OR: 1.563 – 3.295) and sore breasts presented with high fever (crude OR 2.423, 95% CI of crude OR: 1.684 – 3.484, adjusted OR 2.475, 95% CI of adjusted OR: 1.637 – 3.741).

Furthermore, mothers who had experienced breastfeeding difficulties within 1 to three months such as insufficient breast milk (crude OR 0.018, 95% CI of crude OR:

0.011 – 0.030, adjusted OR 0.022, 95% CI of adjusted OR: 0.013 – 0.037), cracked or sore nipples (crude OR 0.366, 95% CI of crude OR: 0.158 – 0.850, adjusted OR 0.376, 95% CI of adjusted OR: 0.147 – 0.966) and baby refused to breastfeed (crude OR 0.135, 95% CI of crude OR: 0.064 – 0.284, adjusted OR 0.166, 95% CI of adjusted OR: 0.074 – 0.370) were more likely to discontinue ‘‘exclusive breastfeeding’’ at three months (OR 0.065 95% CI 0.042 – 0.103, adjusted OR 0.075, 95% CI of adjusted OR: 0.046 – 0.123).

Table 4.48 :

Unadjusted and adjusted odd ratios (ORs) for psychosocial predictors of 'exclusive breastfeeding' at three months

Factor	EBF (%)	Non-EBF (%)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	288 (72.2 %)	157 (62.1 %)	1.587 (1.135 – 2.219)	0.007*	1.462 (1.038 – 2.060)¹	0.030*
Formula feeding or ambivalent (ref)	111 (27.8 %)	96 (37.9 %)	1		1	
<i>Grandmother's preference</i>						
Breastfeeding	280 (70.2 %)	109 (43.1 %)	3.108 (2.238 – 4.317)	< 0.001*	3.152 (2.260 – 4.395)²	< 0.001*
Formula feeding or ambivalent (ref)	119 (29.8 %)	144 (56.9 %)	1		1	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	314 (78.7 %)	133 (52.6 %)	3.333 (2.363 – 4.701)	< 0.001*	1.974 (1.274 – 3.058)³	0.002*
No or ambivalent (ref)	85 (21.3 %)	120 (47.4 %)	1		1	
Psychological factors						
<i>Time of initiation of breastfeeding</i>						
Early	306 (76.7 %)	136 (53.8 %)	2.831 (2.017 – 3.973)	< 0.001*	2.589 (1.825 – 3.674)⁴	< 0.001*
Delayed (ref)	93 (23.3 %)	117 (46.2 %)	1		1	
<i>Intention to breastfeed</i>						
With intention	251 (63.4 %)	71 (28.1 %)	4.437 (3.152 – 6.247)	< 0.001*	4.491 (3.138 – 6.428)⁴	< 0.001*
Without intention (ref)	145 (36.6 %)	182 (71.9 %)	1		1	
<i>Time intended to breastfeed</i>						
Before pregnancy	199 (50.3 %)	122 (48.4 %)	1.076 (0.785 – 1.476)	0.648	1.157 (0.842 – 1.589) ⁵	0.368
During pregnancy (ref)	197 (49.7 %)	130 (51.6 %)	1		1	
<i>Intended breastfeeding duration</i>						
< six months (ref)	27 (6.9 %)	26 (10.6 %)	1		1	
≥ six months	146 (37.1 %)	97 (39.4 %)	1.449 (0.798 – 2.632)	0.223	1.450 (0.774 – 2.715) ⁵	0.246
> 12 months	221 (56.1 %)	123 (50.0 %)	1.730 (0.967 – 3.096)	0.065	2.037 (1.094 – 3.794)	0.025*

*significantly different from reference level with $p < 0.05$

¹adjusted for parity, paternal education, paternal employment and household monthly income, ²adjusted for household monthly income and parity, ³adjusted for household monthly income, parity and grandmother's breastfeeding experience, ⁴adjusted for parity, IIFAS score and maternal education, ⁵adjusted for parity, IIFAS score, maternal education, maternal age and household monthly income

Table 4.48 shows unadjusted and adjusted odd ratios of psycho-social factors that could be determinants of ‘exclusive breastfeeding’ at three months.

Women who perceived that their spouses and biological mothers had preference towards ‘‘exclusive breastfeeding’’ were 1.5 times (crude OR 1.587, 95% CI of crude OR: 1.135 – 2.219, adjusted OR 1.462, 95% CI of adjusted OR: 1.038 – 2.060) and 3.1 times (crude OR 3.108, 95% CI of crude OR: 2.238 – 4.317, adjusted OR 3.152, 95% CI of adjusted OR: 2.260 – 4.395) more likely to ‘exclusive breastfeed’ their babies at three months than women who perceived their spouses and biological mothers to have a preference for formula feeding or were ambivalent about the feeding method.

Furthermore, women whom their biological mothers had experience of breastfeeding for more than one month were 3.3 times more likely to ‘exclusive breastfeed’ their babies at three months than women whom their biological mothers did not have breastfeeding experience (crude OR 3.333, 95% CI of crude OR: 2.363 – 4.701, adjusted OR 1.974, 95% CI of adjusted OR: 1.274 – 3.058)

Mothers who initiated breastfeeding within less than one hour were more likely to ‘exclusive breastfeed’ at three months than mothers who delayed the initiation for more than one hour (OR 2.831 95% CI 2.017 – 3.973) and the adjusted odd ratios was 2.589 (95% CI of adjusted OR: 1.825 – 3.674).

Lastly, mothers who had intention prenatally to ‘exclusive breastfeed’ their babies were 4.4 times more likely to ‘exclusive breastfeed’ at three months than mothers who had no intention to ‘exclusive breastfeed’ their babies (crude OR 4.437, 95% CI of crude OR: 3.152 – 6.247, adjusted OR 4.491, 95% CI of adjusted OR: 3.138 – 6.428).

4.5.8.3 Factors Predicting 'Exclusive Breastfeeding' At Six months

Table 4.49 : Crude (unadjusted) and adjusted odd ratios (ORs) for demographic and knowledge predictors of 'exclusive breastfeeding' at six months

Factor	EBF (n=326)	Non-EBF (n=326)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Demographic factors						
<i>Maternal age</i>						
18 – 30 years old	225 (69.0 %)	197 (60.4 %)	1.459 (1.056 – 2.015)	0.022*	1.230 (0.833 – 1.815) ¹	0.297
31 to 40 years old	101 (31.0 %)	129 (39.6 %)	1 (reference group)		1	
<i>Maternal years of education</i>						
≤ 12 years	116 (35.6 %)	123 (37.7 %)	1 (reference group)	0.569	1	0.025*
> 12 years	210 (64.4 %)	203 (62.3 %)	1.097 (0.798 – 1.509)		1.774 (1.076 – 2.927)²	
<i>Maternal employment</i>						
Housewives	136 (42.0 %)	66 (20.3 %)	2.839 (2.003 – 4.024)	< 0.001*	4.149 (2.687 – 6.406)³	< 0.001*
Employed	188 (58.0 %)	259 (79.7 %)	1 (reference group)		1	
<i>Household monthly income</i>						
Low (< RM 5000)	244 (74.8 %)	242 (74.2 %)	1 (reference group)	0.857	1 (reference group)	0.843
High (≥ RM5000)	82 (25.2 %)	84 (25.8 %)	1.033 (0.726 – 1.469)		1.045 (0.678 – 1.611) ⁴	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
Yes	258 (79.1 %)	213 (65.3 %)	2.013 (1.417 – 2.860)	< 0.001*	1.622 (1.075 – 2.446)⁵	0.021*
No	68 (20.9 %)	113 (34.7 %)	1 (reference group)		1	
<i>Attending breastfeeding interventions</i>						
Yes	269 (83.3 %)	260 (80.0 %)	1.245 (0.836 – 1.856)	0.281	1.303 (0.823 – 2.061) ⁶	0.259
No	54 (16.7 %)	65 (20.0 %)	1 (reference group)		1	

*significantly different from reference level with $p < 0.05$; ¹Adjusted for parity, maternal education, maternal employment, IIFAS score, received 'any breastfeeding' and attending antenatal class, grandmother's preference, grandmother's breastfeeding experience, paternal education, paternal employment; ²adjusted for parity, maternal employment, IIFAS score, attending antenatal class, received breastfeeding interventions, father's preference, grandmother's preference, grandmother's breastfeeding experience, paternal employment and paternal education; ³adjusted for parity, maternal education, IIFASs score, attending antenatal class, received breastfeeding interventions, father's preference, grandmother's preference, grandmother's breastfeeding experience, paternal employment and paternal education, household monthly income; ⁴adjusted for parity, maternal age, maternal education, IIFASs score, attending antenatal class, received breastfeeding interventions, father's preference, grandmother's preference, grandmother's breastfeeding experience, paternal employment and paternal education; ⁵adjusted for parity, maternal age, maternal education, IIFASs score, received breastfeeding interventions, father's preference, grandmother's preference, grandmother's breastfeeding experience, paternal employment and paternal education, delivery method; ⁶adjusted for parity, maternal age, maternal education, IIFASs score, attending antenatal class, father's preference, grandmother's preference, grandmother's breastfeeding experience, paternal employment and paternal education, delivery method

Table 4.49 presents crude (unadjusted) and adjusted odd ratios for demographic and knowledge predictors of “exclusive breastfeeding” at six months.

Younger mothers aged between 18 to 30 years old were nearly 1.5 times more likely to ‘exclusive breastfeed’ at six months than older mothers aged between 31 to 40 years old (crude OR 1.459, 95% CI of crude OR: 1.056 – 2.015, adjusted OR: 1.230, 95% CI of adjusted OR: 0.833 – 1.815).

When adjusted for parity, maternal employment, IIFAS score, attending antenatal class, received breastfeeding interventions, father’s preference, grandmother’s preference, grandmother’s breastfeeding experience, paternal employment and paternal education, mothers with higher education were 1.7 times more likely to continue “exclusive breastfeeding” at six months than mothers with lower education (adjusted OR: 1.774, 95% of adjusted CI: 1.076 – 2.927).

Housewives were 2.8 times more likely to ‘exclusive breastfeed’ their babies at six months compared to working mothers (crude OR: 2.839, 95% CI of crude OR: 2.003 – 4.024 and the adjusted odd ratios was 4.149 (95% CI of adjusted OR: 2.687 – 6.406).

Mothers who attended antenatal class were twice more likely to ‘exclusive breastfeed’ at six months (crude OR 2.013, 95% CI of crude OR: 1.417 – 2.860, adjusted OR: 1.622, 95% CI of adjusted OR: 1.075 – 2.446).

Table 4.50 :

Crude (unadjusted and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at six months (N=652)

Factor	EBF n=326	Non-EBF n=326	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Parity</i>						
Primiparous	148 (46.0 %)	112 (34.8 %)	1 (reference group)	0.004*	1 (reference group)	0.008*
Multiparous	174 (54.0 %)	210 (65.2 %)	0.627 (0.457 – 0.861)		0.591 (0.395 – 0.882)¹	
<i>Maternal obesity</i>						
Obese (BMI ≥ 30)	18 (5.5 %)	60 (18.4 %)	0.259 (0.149 – 0.450)	< 0.001*	0.464 (0.251 – 0.857)²	0.014*
Non-obese (BMI < 30)	308 (94.5 %)	266 (81.6 %)	1 (reference group)		1 (reference group)	
<i>Health problems during pregnancy</i>						
Yes	60 (18.4 %)	134 (41.1 %)	0.323 (0.226 – 0.462)	< 0.001*	0.372 (0.244 – 0.565)³	< 0.001*
No (ref)	266 (81.6 %)	192 (58.9 %)	1 (reference group)		1 (reference group)	
<i>Birth delivery method</i>						
Vaginal (ref)	288 (88.3 %)	250 (76.7 %)	1 (reference group)	< 0.001*	1 (reference group)	0.001*
Caesarean	38 (11.7 %)	76 (23.3 %)	0.434 (0.284 – 0.664)		0.557 (0.345 – 0.897)⁴	
<i>Breastfeeding difficulties at or before four weeks</i>						
<i>Painful swollen breasts</i>						
Yes	249 (76.4 %)	178 (54.6 %)	2.689 (1.922 – 3.762)	< 0.001*	2.083 (1.448 – 2.998)⁵	< 0.001*
No (ref)	77 (23.6 %)	148 (45.4 %)	1 (reference group)		1 (reference group)	
<i>Sore breasts with high fever</i>						
Yes	134 (41.1 %)	75 (23.0 %)	2.336 (1.663 – 3.280)	< 0.001*	2.078 (1.429 – 3.021)⁵	< 0.001*
No (ref)	192 (58.9 %)	251 (77.0 %)	1 (reference group)		1 (reference group)	
<i>Insufficient colostrum/milk</i>						
Yes	15 (4.6 %)	126 (38.8 %)	0.076 (0.043 – 0.134)	< 0.001*	0.086 (0.048 – 0.155)⁵	< 0.001*
No (ref)	310 (95.4 %)	199 (61.2 %)	1 (reference group)		1 (reference group)	
<i>Longer time to flow</i>						
Yes	125 (38.3 %)	182 (55.8 %)	0.492 (0.360 – 0.673)	< 0.001*	0.429 (0.297 – 0.620)⁵	< 0.001*
No (ref)	201 (61.7 %)	144 (44.2 %)	1 (reference group)		1 (reference group)	

Table 4.50 :

Crude (unadjusted and adjusted odd ratios (ORs) for biological predictors of 'exclusive breastfeeding' at six months (N=652)- continue

Factor	EBF n=326	Non-EBF n=326	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Baby has suckling problems</i>						
Yes	7 (2.1 %)	42 (12.9 %)	0.148 (0.066 – 0.336)	< 0.001*	0.195 (0.082 – 0.459)⁵	< 0.001*
No (ref)	319 (97.9 %)	284 (87.1 %)	1 (reference group)		1 (reference group)	
<i>Breastfeeding difficulties within 4 to six months</i>						
Yes	97 (29.8 %)	275 (84.4 %)	0.079 (0.054 – 0.116)	< 0.001*	0.080 (0.053 – 0.121)⁵	< 0.001*
No (ref)	228 (70.2 %)	51 (15.6 %)	1 (reference group)		1	
<i>Insufficient milk</i>						
Yes	14 (4.3 %)	267 (81.9 %)	0.010 (0.005 – 0.018)	< 0.001*	0.011 (0.005 – 0.19)⁵	< 0.001*
No (ref)	311 (95.7 %)	59 (18.1 %)	1 (reference group)		1 (reference group)	
<i>Breasts engorged (too full)</i>						
Yes	81 (24.9 %)	9 (2.8 %)	11.693 (5.757 – 23.749)	< 0.001*	11.575 (5.540 – 24.186)⁵	< 0.001*
No (ref)	244 (75.1 %)	317 (97.2 %)	1 (reference group)		1 (reference group)	

*significantly different from reference level with p < 0.05

¹adjusted for maternal age, maternal education, maternal employment, house monthly income, IIFAS score, attending antenatal class, received breastfeeding interventions, father's preference, grandmother's preference, maternal pre-pregnancy BMI, delivery method²adjusted for maternal age, maternal education, maternal employment, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class, pregnancy health problems, birth problems and delivery method³adjusted for maternal age, maternal education, maternal employment, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class, birth problems and delivery method⁴adjusted for maternal employment, parity, spouse's preference, grandmother's breastfeeding experience, grandmother's preference, attending antenatal class, received breastfeeding interventions and maternal pre-pregnancy BMI⁵adjusted for maternal age, maternal education, parity, spouse's preference, grandmother's preference, grandmother's breastfeeding experience, attending antenatal class, received breastfeeding interventions and maternal pre-pregnancy BMI

Table 4.50 presents crude (unadjusted) and adjusted odd ratios for biological predictors of ‘exclusive breastfeeding’ at six months.

Mothers with more than one child were less likely ‘exclusive breastfeed’ their babies through six months than mothers with a single child (crude OR: 0.627, 95% CI of crude OR: 0.457 – 0.861, adjusted OR: 0.620, 95% CI of adjusted OR: 0.437 – 0.880).

Higher pre-pregnancy BMI values mothers were less likely to “exclusive breastfeeding” through six months compared to mothers with lower BMI values (crude OR: 0.399, 95% CI of crude OR: 0.287 – 0.554, adjusted OR: 0.464, 95% CI of crude OR: 0.251 – 0.857)

Mothers who experienced pregnancy health related problems such as gestational diabetes and hypertension were less likely to “exclusive breastfeeding” through six months than mothers without pregnancy health related problems (crude OR: 0.323, 95% CI of crude OR: 0.226 – 0.462, adjusted OR: 0.372, 95% CI of crude OR: 0.244 – 0.565).

Mothers who had C-section delivery were less likely to ‘exclusive breastfeed’ through six months than mothers who had vaginal delivery (crude OR: 0.434, 95% CI of crude OR: 0.284 – 0.664, adjusted OR: 0.557, 95% CI of crude OR: 0.345 – 0.897).

Mothers who faced breastfeeding difficulties like insufficient colostrum/milk (crude OR: 0.076, 95% CI of crude OR: 0.043 – 0.134, adjusted OR: 0.086, 95% CI of adjusted OR: 0.048 – 0.155), milk takes longer time to flow at a start feed (crude OR: 0.492, 95% CI of crude OR: 0.360 – 0.673, adjusted OR: 0.429, 95% CI of adjusted OR: 0.297 – 0.620) and their babies had problems in sucking (crude OR: 0.148, 95% CI of crude OR: 0.066 – 0.336, adjusted OR: 0.195, 95% CI of adjusted OR: 0.082 – 0.459) at or before four weeks after delivery were less likely to ‘exclusive breastfeed’ through six months than mothers who did not experience these.

Nonetheless, mothers who experienced symptoms of mastitis (breast infection) which were painful swollen breasts (crude OR: 2.689, 95% CI of crude OR: 1.922 – 3.762, adjusted OR: 2.083, 95% CI of adjusted OR: 1.448 – 2.998) and sore breasts presented with high fever (crude OR: 2.336, 95% CI of crude OR: 1.663 – 3.280, adjusted OR: 2.078, 95% CI of adjusted OR: 1.429 – 3.021) were more than 2 times likely to ‘exclusive breastfeed’ through six months than mothers who did not experience these symptoms. In Malay culture, mothers who experienced mastitis were related to the breasts were full of milk, hence, Malay mothers tend to seek for traditional advice like massaging the breasts by masseur and natural remedies to promote the production

of the milk. Therefore, mothers have a tendency to continue and keep on breastfeeding their babies to avoid mastitis happen again.

Finally, mothers who reported to experience breastfeeding difficulties within 3 to six months such as insufficient milk (crude OR: 0.010, 95% CI of crude OR: 0.005 – 0.018, adjusted OR: 0.011, 95% CI of adjusted OR: 0.005 – 0.19) and engorged breasts (crude OR: 11.693, 95% CI of crude OR: 5.757 – 23.749, adjusted OR: 11.575, 95% CI of adjusted OR: 5.540 – 24.186) were less likely to continue “exclusive breastfeeding” through six months than mothers who did not experience these.

Table 4.51 :

Crude (unadjusted) and adjusted odd ratios (ORs) for psychosocial predictors of 'exclusive breastfeeding' at six months

Factor	EBF n=326	Non-EBF n=326	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	235 (72.1 %)	210 (64.4 %)	1.426 (1.024 – 1.987)	0.036*	1.462 (1.038 – 2.060)¹	0.030*
Formula feeding or ambivalent	91 (27.9 %)	116 (35.6 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's preference</i>						
Breastfeeding	239 (73.3 %)	150 (46.0 %)	3.223 (2.322 – 4.475)	< 0.001*	2.162 (1.437 – 3.252)²	< 0.001*
Formula feeding or ambivalent	87 (26.7 %)	176 (54.0 %)	1 (reference group)		1 (reference group)	
<i>Grandmother's breastfeeding experience for more than onemonth</i>						
Yes	261 (80.1 %)	186 (57.1 %)	3.022 (2.132 – 4.285)	< 0.001*	1.974 (1.274 – 3.058)³	0.002*
No or ambivalent	65 (19.9 %)	140 (42.9 %)	1 (reference group)		1 (reference group)	
Psychological factors						
<i>Time of initiation of breastfeeding</i>						
Early	251 (77.0 %)	191 (58.6 %)	2.365 (1.685 – 3.321)	< 0.001*	2.589 (1.825 – 3.674)⁴	< 0.001*
Delayed	75 (23.0 %)	135 (41.4 %)	1 (reference group)		1 (reference group)	
<i>Intention to breastfeed</i>						
With intention	218 (67.5 %)	104 (31.9 %)	4.432 (3.188 – 6.160)	< 0.001*	4.491 (3.138 – 6.428)⁴	< 0.001*
Without intention	105 (32.5 %)	222 (68.1 %)	1 (reference group)		1 (reference group)	
<i>Time intended to breastfeed</i>						
Before pregnancy	168 (51.9 %)	153 (47.2 %)	1.204 (0.884 – 1.638)	0.239	1.157 (0.842 – 1.589) ⁵	0.368
During pregnancy	156 (48.1 %)	171 (52.8 %)	1 (reference group)		1 (reference group)	
<i>Intended breastfeeding duration</i>						
< six months	21 (6.5 %)	32 (10.0 %)	1 (reference group)		1 (reference group)	
≥ six months	113 (35.2 %)	130 (40.8 %)	1.325 (0.723 – 2.427)	0.363	1.450 (0.774 – 2.715) ⁶	0.246
> 12 months	187 (58.3 %)	157 (49.2 %)	1.815 (1.006 – 3.274)	0.048*	2.037 (1.094 – 3.794)	0.025*

¹adjusted for parity, paternal education, paternal employment, household monthly income, ²adjusted for parity, household monthly income and grandmother's breastfeeding experience, ³ adjusted for grandmother's preference, household monthly income and parity, ⁴adjusted for parity, IIFAs score and maternal education, ⁵adjusted for parity, IIFAs score, maternal education and household monthly income, ⁶adjusted for parity, IIFAs score, maternal education, age and household monthly income

Table 4.51 presents crude (unadjusted) and adjusted odd ratios for psychosocial predictors of ‘exclusive breastfeeding’ at six months.

Women who perceived that their spouses and biological mothers had preference towards “‘exclusive breastfeeding’” were 1.4 times (crude OR: 1.426, 95% CI of crude OR: 1.024 – 1.987, adjusted OR: 1.462, 95% CI of adjusted OR: 1.038 – 2.060) and 3.2 times (crude OR: 3.223, 95% CI of crude OR: 2.322 – 4.475, adjusted OR: 2.162, 95% CI of adjusted OR: 1.437 – 3.252) more likely to continue “‘exclusive breastfeeding’” their babies at six months than women who perceived their spouses and biological mothers to have a preference for formula feeding or were ambivalent about the feeding method.

Furthermore, women whom their biological mothers had breastfed their children for more than one month were three times more likely to continue ‘exclusive breastfeeding’ their babies at six months than women whom their biological mothers did not have breastfeeding experience (crude OR: 3.022, 95% CI of crude OR: 2.132 – 4.285) and the adjusted odd ratios was 1.974 (95% CI of adjusted OR: 1.274 – 3.058).

Mothers who initiated breastfeeding within less than one hour were more likely to continue “‘exclusive breastfeeding’” at six months than mothers who delayed the initiation for more than one hour (crude OR: 2.365, 95% CI of crude OR: 1.685 – 3.321, adjusted OR: 2.589, 95% CI of adjusted OR: 1.825 – 3.674).

On top of that, mothers who had intention to ‘exclusive breastfeed’ their babies were 4.4 times more likely to ‘exclusive breastfeed’ through six months than mothers who had no intention to ‘exclusive breastfeed’ their babies (crude OR: 4.432, 95% CI of crude OR: 3.188 – 6.160) and the adjusted odd ratios was 4.491 (95% CI of adjusted OR: 3.138 – 6.428).

Finally, mothers who intended to breastfeed for more than 12 months were more likely to continue “‘exclusive breastfeeding’” at six months than who intended to breastfeed less than six months (crude OR: 1.815, 95% CI of crude OR: 1.006 – 3.274, adjusted OR: 2.037, 95% CI of adjusted OR: 1.094 – 3.794).

4.5.9 Discussion on the Relationships Between Breastfeeding Outcomes And BMI Classifications

4.5.9.1 Breastfeeding Intention

A total of 96.0 % mothers have intention to breastfeed their babies. Although there was no association in intention to breastfeed by BMI categories ($p = 0.226$), more than half of the mothers who had intention to breastfeed were normal BMI (51.6 %), followed by overweight (24.4 %), obese (12.4 %) and underweight (11.6 %). On top of that, 53.2 % and 49.4 % of overweight and obese subjects respectively intended to ever breastfeed their babies. Majority of the mothers decided to breastfeed their newborns during pregnancy with highest number were mothers with normal BMI (51.7 %).

The findings are supported by a prospective cohort study done in the Infant Feeding Practices Study II on 2824 mothers in the United States. They also found that there was no association in intended duration of breastfeeding (in women who intended to breastfeed) by BMI category albeit intention to breastfeed for a longer period had significantly lengthier median duration of ‘exclusive breastfeeding’ as well as ‘any breastfeeding’ ($P < 0.0001$). Obese women also were found to have lower chances of ‘ever breastfeeding’ and pose a greater risk of an earlier cessation of ‘exclusive’ and ‘any breastfeeding’ (Hauff et al., 2014b)

The findings are also aligned with a study done in Illinois to examine the factors affecting their choice of infant-feeding method and attitudes toward breastfeeding done by Dix in 1991 among 81 women, a total of 46 % of them made their decision during pregnancy whereas, 41 % of them decided before conception (Dix, 1991). There was no difference in intended duration of breastfeeding (in women who intended to breastfeed) by BMI category, however, intended to breastfeed for a longer period had significantly lengthier median duration of “exclusive breastfeeding” as well as “any breastfeeding” (Hauff et al., 2014b). Prenatal intention appears to be significant predictors of breastfeeding initiation and duration (Donath and Amir, 2003).

Meanwhile, having an intention to breastfeed during prenatal has significantly contribute to positive attitudes towards breastfeeding among mothers as well as providing an influence on both initiation and duration of breastfeeding (Al-Akour, Khassawneh, Khader, Ababneh, and Haddad, 2010; Amir and Donath, 2007; Donath and Amir, 2003). Mothers who had positive breastfeeding intention prenatally was

linked to longer duration of breastfeeding (Wang, Lau, Chow, and Chan, 2014) and prenatal intention appears to be significant predictors of breastfeeding initiation and duration (Donath and Amir, 2003).

On top of that, according to a cohort study done under York Region's Infant Feeding Survey, a Cox proportional hazards regression analysis revealed that having an intention to supplement with infant formula has found to be associated with shorter breastfeeding duration (HR=2.64, 95% CI 1.83-3.81) (Kim, Hoetmer, Li, and Vandenberg, 2013).

There was a significant relationship between infant feeding intention and each psychosocial variables between BMI categories. Women who had more than 5 friends or relatives who breastfed, had high social influence to breastfeed and had positive attitudes and beliefs toward breastfeeding intended to breastfeed in greater magnitudes and majority of them was underweight/normal weight mothers (Hauff et al., 2014a).

Our study revealed 68.3 % (445/652) mothers reported their husbands offer encouragement by showing their preference to breastfeed their babies. Almost 60 % of the mothers too had supportive biological mothers whom preferred “exclusive breastfeeding” and 40.3 % preferred formula milk or ambivalent about feeding method for the newborns.

Various studies suggest that presence of supportive spouses are important in playing a critical role on the mothers decision on how to feed the infant (Al-Akour et al., 2010; Kong and Lee, 2004; J A Scott et al., 1997) by encouraging them to breastfeed their newborn infants (Wolfberg et al., 2004). Fathers can play their roles as breastfeeding advocates which in turn will promote initiation and increase the duration of breastfeeding (Wolfberg et al., 2004) as well as boosting higher confidence in breastfeeding along the journey (Mannion et al., 2013). Women's intention to breastfeed is also strongly affected by the mother's significant other's infant feeding preferences which in turn may result to successful breastfeeding initiation (Kessler, Gielen, Diener-West, & Paige, 1995a).

Since breastfeeding journey will have their ups and downs experienced by of the mothers especially for the new mothers, it is also important that fathers should be exposed on how to prevent and manage the most common lactation difficulties might face by the mothers, for example breasts engorgement and latching problems.

In a controlled trial study done in Italy, 280 fathers were divided into two; there will be a training session on management of breastfeeding in the intervention group and

control group where they received nothing. As a result, the intervention group had higher rates of 'full breastfeeding' at six months (25 %) compared to only 15 % in control group. Furthermore, majority mothers of intervention groups (91 %) reported to receive an adequate amount of support and relevant assistance in infant feeding management from their partners compared to control group (34 %) (Pisacane et al., 2005).

In summary, having an intention to breastfeed during prenatal has significantly contribute to positive attitudes towards breastfeeding among mothers as well as providing an influence on both initiation and duration of breastfeeding (Al-Akour et al., 2010; Amir and Donath, 2007; Donath and Amir, 2003).

4.5.9.2 Early Initiation of Breastfeeding

This study found a higher rate of early initiation of breastfeeding which were 67.8 % (442/652) compared to previous national study done in Malaysia in the Third National Health and Morbidity Survey which was 63.7 % (Fatimah, Siti Saadiah, Tahir, Hussain Imam, & Ahmad Faudzi, 2010b) and the latest was done in Kelantan state which was only 46.1 % (Tengku Alina, Wan Abdul Manan, & Mohd Isa, 2013b).

Equally, the rate is higher when compared with previous studies from nearby Asia countries Singapore, Indonesia, Thailand and Brunei which have comparable socioeconomic status and cultural practices (Institute of Public Health National Institute for Health and Ministry of Health, 2006; Lily Chua and Aye Mya Win, 2013; Ministry of Health Brunei Darussalam, 2012; OECD/WHO, 2012).

The increased rate of breastfeeding initiation reported in this study can be attributed by a number of successful health programs promoting breastfeeding (Fatimah et al., 2010b). Ministry of Health Malaysia has been extensively providing various interventions to the public, for example by introducing Baby-Friendly Hospital programs to a few number of government hospitals to encourage early initiation of breastfeeding and to assist the mothers in breastfeeding difficulties.

There was a negative association between maternal prepregnancy BMI and early initiation of breastfeeding. Overweight and obese mothers were less likely to initiate breastfeeding within one hour than mothers with lower BMI values were. This result is similar to other findings from North Carolina (Mehta et al., 2011) and Florida

(Thompson et al., 2013). Maternal obesity has been associated with delayed lactogenesis II and less adequate of milk supply (Turcksin et al., 2014b).

Furthermore, mothers who had caesarean delivery tend to delay breastfeeding initiation and higher percentage of mothers who had vaginal delivery initiate early breastfeeding. In a multivariable logistic regression model, mothers who had vaginal delivery were nearly 3.6 times more likely to initiate breastfeeding within one hour than mothers who had undergone Caesarean-section (crude OR: 3.595, 95% CI of crude OR: 2.370 – 5.455). This is similar to findings by various studies. Caesarean section was negatively associated with breastfeeding initiation (Pérez-Ríos, Ramos-Valencia, & Ortiz, 2008a). Women with caesarean delivery were less likely to breastfeed longer (Chien & Tai, 2007). Caesarean delivery was common among obese mothers due to various obstetric challenges that they might face during labour, for example failure to progress and fetal macrosomia (Sheiner et al., 2004).

There was also a significant positive association between breastfeeding intention and early initiation of breastfeeding in this cohort study. Mothers who had intention to ‘exclusive breastfeed’ had more tendency to early initiate breastfeeding (53.3 %: 234/442) than mothers who did not had any intention to exclusive breastfeed were actually had delayed initiation (58.1 %: 122/210), χ^2 (1, N = 7.382, $p < 0.05$). Having had an intention to exclusive breastfeed is significantly associated with early breastfeeding initiation and prolonged ‘exclusive breastfeeding’ (S M Donath & Amir, 2003).

In addition, there was a significant association between grandmother’s preference and breastfeeding initiation, χ^2 (1, N = 32.349, $p < 0.05$). The likelihood to initiate breastfeeding within one hour increased to 2.8 times if the mothers who perceived their biological mothers had preference towards breastfeeding. A significant other’s preference towards infant feeding also plays an important role in predisposing a woman’s intention to breastfeed. Moreover, breastfeeding initiation is mediated through intention to breastfeed and is reliant on the woman’s self-efficacy to breastfeed (Kessler, Gielen, Diener-West, & Paige, 1995b).

Meanwhile, mothers who had biological mothers with breastfeeding experience of more than one month were 2.3 times more likely initiate breastfeeding within one hour. Having been breastfed herself also was positively associated with breastfeeding initiation (Riva et al., 1999). It may be explained as an indicator of either sociocultural or physical factors influencing mothers to breastfeeding. Few studies also had

discovered social support is important and positively associated with breastfeeding intention as well as breastfeeding initiation mainly from their partners (L. Li, Zhang, Scott, & Binns, 2004; Tarrant et al., 2010).

There was a significant association between mothers attending antenatal class and breastfeeding initiation. Mothers who had attended antenatal class were 1.8 times more likely to initiate breastfeeding within one hour than who were never attending antenatal.

4.5.9.3 Duration of 'Exclusive Breastfeeding'

In this cohort study, the prevalence of 'exclusive breastfeeding' at the first, third and sixth months of life were 78.5 %, 61.2 % and 50.0 %, respectively. 'Any breastfeeding' rates for the same periods were 18.3 %, 27.0 % and 25.9 %.

In the national survey done in Malaysia in 2006, the Third National Health and Morbidity Survey reported only 14.5 % of infants were exclusively breastfed at six months (Fatimah et al., 2010b). Meanwhile, in the latest cross-sectional study that was done within same area of this cohort study took place which was in Klang, Selangor, the prevalence of 'exclusive breastfeeding' at six months was comparable which was 43.1 % (Kok Leong Tan, 2011a).

This study took place in the districts of Klang, Petaling and Gombak. These similarities were due to similar population studies in terms of geographically and demographically. Furthermore, the higher rates of both breastfeeding initiation and exclusivity reported in this study can be attributed to increased access to knowledge in breastfeeding through effective interventions for child and mother well beings by the Ministry of Health Malaysia. For example, by promoting breastfeeding and its benefits in the televisions, by providing mothers especially the new and inexperienced mothers, antenatal classes includes demonstration on breastfeeding.

Additionally, at the hospital level, more government and private hospitals were accredited as Baby Friendly Hospital Initiative (BFHI) in the aim of promoting breastfeeding. They also have lines of skilful and certified midwives and nurses to assist the mothers on breastfeeding during admission and confinement period. Furthermore, beginning the year of 2007 where more social networks such as Facebook were easily accessed by many, there were more support groups particularly in breastfeeding assisted

by certified lactation counsellors exist. Therefore, breastfeeding has been popularised in the recent few years in Malaysia.

Meanwhile, normal weight mothers had the highest prevalence of practising 'exclusive breastfeeding' at four weeks (85.8 %), three months (71.2 %) and six months (59.3 %). However, as expected, obese mothers had the lowest prevalence of 'exclusive breastfeeding' for all three phases: at four weeks (43.6 %), three months (30.8 %) and six months (23.1 %). These findings were comparable with other studies done on maternal obesity and breastfeeding duration. Majority of the large studies reported that obese women breastfed for a shorter duration (Baker, Michaelsen, Rasmussen, & Sørensen, 2004; Donath & Amir, 2000; Forster, McLachlan, & Lumley, 2006; Jane A Scott et al., 2006b). Obese women have higher risk of discontinuing 'exclusive breastfeeding' and had shorter period of 'exclusive breastfeeding' than their normal weight counterparts (Hilson et al., 2004; Mok et al., 2008a).

Additionally, maternal obesity also has been associated with a shortened duration of 'any breastfeeding' (Baker et al., 2007; S. M. Donath & Amir, 2000; Susan M Donath & Amir, 2008; Hilson et al., 1997, 2004; Kitsantas & Pawloski, 2009; Kugyelka, Rasmussen, & Frongillo, 2004; Mok et al., 2008a; Jane A Scott et al., 2006b).

This study found significant determinants of successful 'exclusive breastfeeding' at four weeks were being housewives, mothers with higher education background, attended antenatal class, had vaginal birth, normal prepregnancy weight, had positive intention to breastfeed, had initiated breastfeeding within one hour, and had supportive biological mothers towards breastfeeding and with breastfeeding experience. Nonetheless, mothers who were obese, unemployed, lower education background, primiparous, had caesarean section, experienced health problems during pregnancy and breastfeeding difficulties include insufficient milk, sore nipples and baby's difficulties in sucking, delayed initiation of breastfeeding and without intention to exclusively breastfeed their babies were negatively associated with 'exclusive breastfeeding' at six months.

These findings are similar to a prospective cohort study done in Germany. Breastfeeding lesser than four months was strongly related to breastfeeding difficulties (OR 7.56, 95% CI 6.21, 9.19), smoking (OR 4.38, 95% CI 2.66, 7.21), younger mothers who aged less than 34 years old (OR 3.31, 95% CI 2.16, 5.06), lower educated (OR 3.88, 95% CI 2.11, 7.12), maternal grandmother's negative attitude towards

breastfeeding (OR 21.79, 95% CI 13.46, 35.27) and caesarean section (OR 1.69, 95% CI 1.36, 2.10) (Kohlhuber, Rebhan, Schwegler, Koletzko, & Fromme, 2008b).

4.6 OBJECTIVE 3: TO INVESTIGATE RISK FACTORS THAT ARE ASSOCIATED WITH DISCONTINUED 'EXCLUSIVE BREASTFEEDING' AMONG OVERWEIGHT/OBESE AND NORMAL WEIGHT WOMEN

This section will discuss further on the risk factors that were associated with discontinued 'exclusive breastfeeding' at three different periods among overweight/obese as compared to their normal weight counterparts.

4.6.1 Comparison of Mothers Who Stopped ‘Exclusive Breastfeeding’ At one month Between Women With Different BMI Classification

4.6.1.1 Socio-Demographic Factors

Table 4.52 :

Descriptive characteristics of mothers who stopped ‘exclusive breastfeeding’ at one month (N=140)

Characteristics	Underweight n=12/76	Normal n=48/337	Overweight n=36/160	Obese n=44/78	Total
Maternal factors					
<i>Mother’s age at pregnancy</i>					
18-30 years old	9 (75.0 %)	29 (60.4 %)	25 (69.4 %)	26 (59.1 %)	89 (63.6 %)
31-40 years old	3 (25.0 %)	19 (39.6 %)	11 (30.6 %)	18 (40.9 %)	51 (36.4 %)
<i>Maternal education</i>					
≤ 12 years	8 (66.7 %)	25 (52.1 %)	15 (41.7 %)	14 (31.8 %)	62 (44.3 %)
> 12 years	4 (33.3 %)	23 (47.9 %)	21 (58.3 %)	30 (68.2 %)	78 (55.7 %)
<i>Maternal employment</i>					
Housewife	4 (33.3 %)	14 (29.2 %)	8 (22.2 %)	6 (13.6 %)	32 (22.9 %)
Employed	8 (66.7 %)	34 (70.8 %)	28 (77.8 %)	38 (86.4 %)	108 (77.1 %)
Demographic factor					
<i>Household monthly income</i>					
Low (<RM3000)	9 (75.0 %)	28 (58.3 %)	18 (50.0 %)	24 (54.5 %)	79 (56.4 %)
Middle (RM3001 - 5000)	1 (8.3 %)	9 (18.8 %)	10 (27.8 %)	12 (27.3 %)	32 (22.9 %)
High (≥ RM5000)	2 (16.7 %)	11 (22.9 %)	8 (22.2 %)	8 (18.2 %)	29 (20.7 %)

Table 4.53 :

Association of socio-demographic factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status (N=652)

Characteristics	Underweight n=76		Normal n=337		Overweight n=160		Obese n=78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal factors													
<i>Mother's age at pregnancy</i>											1.801	3	0.615
21-30 years old	9	75.0	29	60.4	25	69.4	26	59.1	89	63.6			
31-40 years old	3	25.0	19	39.6	11	30.6	18	40.9	51	36.4			
<i>Maternal education</i>											6.491	3	0.090
≤ 12 years	8	66.7	25	52.1	15	41.7	14	31.8	62	44.3			
> 12 years	4	33.3	23	47.9	21	58.3	30	68.2	78	55.7			
<i>Maternal employment</i>											3.960	3	0.266
Housewife	4	33.3	14	29.2	8	22.2	6	13.6	32	22.9			
Employed	8	66.7	34	70.8	28	77.8	38	86.4	108	77.1			
Demographic factors													
<i>Household monthly income</i>											0.483	3	0.923
Low (<RM5000)	10	83.3	37	77.1	28	77.8	36	81.8	111	79.3			
High (≥ RM5001)	2	16.7	11	22.9	8	22.2	8	18.2	29	20.7			

Body Mass Index (BMI) categories are based on the World Health Organization guideline, where underweight is classified as having a BMI of less than 18.5 kg/m², normal weight is classified as having a BMI of 18.5 – 24.9 kg/m², overweight is classified as having a BMI of 25.0- 29.9 kg/m², and obese is classified as having a BMI of more than 30.0 kg/m².

*Analyses were done using Chi square test

There were 140 mothers who stopped 'exclusive breastfeeding' at four weeks from the total study population (N=652). The distribution of mothers who stopped 'exclusive breastfeeding' with different BMI status from total study population was as follow: underweight was 15.8 % (12/76), normal weight was 14.2 % (48/337), overweight was 22.5 % (36/160) and obese 56.4 % (44/78).

Table 4.52 shows descriptive data of characteristics of mothers who stopped 'exclusive breastfeeding' at one month and Table 4.53 shows association of socio-demographic factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status.

a) Maternal factors

There were no significant association between maternal age, education and employment status with stopping 'exclusive breastfeeding' at one month when compared between BMI statuses ($p > 0.05$).

Nonetheless, of 140 women who stopped 'exclusive breastfeeding' at one month, 63.6 % (89/140) of them were aged between 18 to 30 years old, 55.7 % (78/140) had more than 12 years of education and 77.1 % (108/140) were employed.

b) Demographic factors

There is no significant association between total household income and stopping 'exclusive breastfeeding' at one month, χ^2 (3, $N = 0.483$, $p = 0.923$).

56.4 % (79/140) of the mothers who stopped 'exclusive breastfeeding' at one month came from low household income (< RM 3000), followed by middle household income (22.9 %, 32/140) and high household income (20.7 %, 29/140).

4.6.1.2 Maternal Knowledge

Table 4.54 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at one month (N=140)

Characteristics	Underweight n=12/76	Normal n=48/337	Overweight n=36/160	Obese n=44/78	Total
Maternal knowledge					
<i>IIFAS score</i>					
Positive to formula feeding	-	1 (2.1 %)	1 (2.8 %)	1 (2.3 %)	3 (2.1 %)
Neutral	11 (91.7 %)	39 (81.3 %)	29 (80.6 %)	34 (77.3 %)	113 (80.7 %)
Positive to breastfeeding	1 (8.3 %)	8 (16.7 %)	6 (16.7 %)	9 (20.5 %)	24 (17.1 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	4 (33.3 %)	25 (52.1 %)	23 (65.7 %)	30 (68.2 %)	82 (59.0 %)
Class/seminar/lecture on BF	4 (33.3 %)	21 (43.8 %)	13 (37.1 %)	23 (52.3 %)	61 (43.9 %)
Demonstration of BF	7 (58.3 %)	25 (52.1 %)	11 (31.4 %)	23 (52.3 %)	66 (47.5 %)
Video/tv/slide show on BF	-	9 (18.8 %)	4 (11.4 %)	11 (25.0 %)	24 (17.3 %)
Counseling/discussion on BF	2 (16.7 %)	15 (31.3 %)	9 (25.7 %)	14 (31.8 %)	40 (28.8 %)
<i>Attending antenatal class</i>					
Yes	10 (83.3 %)	28 (58.3 %)	21 (58.3 %)	17 (38.6 %)	76 (54.3 %)
No	2 (16.7 %)	20 (41.7 %)	15 (41.7 %)	27 (61.4 %)	64 (45.7 %)

Table 4.55 :

Association of maternal knowledge factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status (N=140)

Characteristics	Underweight n=12/76		Normal n=48/337		Overweight n=36/160		Obese n=44/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal knowledge													
<i>IIFAS score</i>											1.831	3	0.608
High (≥ 65)	3	25.0	19	36.6	16	44.4	20	45.5	58	41.4			
Low (< 65)	9	75.0	29	60.4	20	55.6	24	54.5	82	58.6			
<i>Attending breastfeeding interventions</i>											2.311	3	0.510
Yes	8	66.7	41	85.4	29	82.9	36	81.8	114	82.0			
No	4	33.3	7	14.6	6	17.1	8	18.2	25	18.0			
<i>Attending antenatal class</i>											8.977	3	0.030
Yes	10	83.3	28	58.3	21	58.3	17	38.6	76	54.3			
No	2	16.7	20	41.7	15	41.7	27	61.4	64	45.7			

*Analyses were done using Chi square test

Table 4.54 shows descriptive data of characteristics of mothers who stopped 'exclusive breastfeeding' at one month and Table 4.55 shows association of maternal knowledge factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status.

There were no significant relationship between Iowa Infant Feeding Scale (IIFAS) scores and mothers attending 'any breastfeeding' interventions during pregnancy and stopping 'exclusive breastfeeding' at one month across four different BMI categories (χ^2 (3, N = 1.831, p = 0.608) and (3, N = 2.311, p = 0.510), respectively (p > 0.05). Nevertheless, 80.7 % (113/140) of the mothers had neutral attitude towards infant feeding and 82.0 % (11/140) of the mothers had received breastfeeding interventions, for example, pamphlets and classes on breastfeeding.

Nonetheless, there is a moderate strong significant association between mothers attending antenatal classes and breastfeeding practices at one month, χ^2 (3, N = 8.977, p = 0.030). Although 22.4 % of obese mothers (17/76) had attended antenatal class, but, they were the highest percentage of mothers who discontinued 'exclusive breastfeeding' at four weeks (56.4 %: 44/78).

4.6.1.3 Psychosocial Factors

Table 4.56 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at one month (N=140)

Characteristics	Underweight n=12/76	Normal n=48/337	Overweight n=36/160	Obese n=44/78	Total
Social factors					
<i>Father's preference</i>					
Breastfeeding	10 (83.3 %)	31 (64.6 %)	16 (44.4 %)	30 (68.2 %)	87 (62.1 %)
Formula feeding or ambivalent	2 (16.7 %)	17 (35.4 %)	20 (55.6 %)	14 (31.8 %)	53 (37.9 %)
<i>Grandmother's preference</i>					
Breastfeeding	7 (58.3 %)	20 (41.7 %)	10 (27.8 %)	7 (15.9 %)	44 (31.4 %)
Formula feeding or ambivalent	5 (41.7 %)	28 (58.3 %)	26 (72.2 %)	37 (84.1 %)	96 (68.6 %)
<i>Grandmother's breastfed for more than one month</i>					
Yes	5 (41.7 %)	27 (56.3 %)	16 (44.4 %)	11 (25.0 %)	59 (42.1 %)
No or ambivalent	7 (58.3 %)	21 (43.8 %)	20 (55.6 %)	33 (75.0 %)	81 (57.9 %)
Psychological factors					
<i>Early initiation of breastfeeding</i>					
Early	5 (41.7 %)	19 (39.6 %)	9 (25.0 %)	13 (29.5 %)	46 (32.9 %)
Delayed	7 (58.3 %)	29 (60.4 %)	27 (75.0 %)	31 (70.5 %)	94 (67.1 %)
<i>Intention to exclusive breastfeed</i>					
With intention	3 (25.0 %)	11 (22.9 %)	8 (22.2 %)	22 (50.0 %)	44 (31.4 %)
Without intention	9 (75.0 %)	37 (77.1 %)	28 (77.8 %)	22 (50.0 %)	96 (68.6 %)
<i>Time intended to breastfeed</i>					
Before pregnancy	6 (50.0 %)	19 (39.6 %)	17 (47.2 %)	22 (50.0 %)	64 (45.7 %)
During pregnancy	6 (50.0 %)	29 (60.4 %)	19 (52.8 %)	22 (50.0 %)	76 (54.3 %)
<i>Intention to breastfeed duration</i>					
< six months	2 (18.2 %)	7 (15.2 %)	7 (19.4 %)	2 (4.7 %)	18 (13.2 %)
6 to 12 months	4 (36.4 %)	17 (37.0 %)	18 (50.0 %)	14 (32.6 %)	53 (39.0 %)
More than 12 months	5 (45.5 %)	22 (47.8 %)	11 (30.6 %)	27 (62.8 %)	65 (47.8 %)

Table 4.57 :

Association of psychosocial factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status (N=140)

Characteristics	Underweight n=12/76		Normal n=48/337		Overweight n=36/160		Obese n=44/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Social factors													
<i>Father's preference</i>											7.887	3	0.048
Breastfeeding	10	83.3	31	64.6	16	44.4	30	68.2	87	62.1			
Formula feeding or ambivalent	2	16.7	17	35.4	20	55.6	14	31.8	53	37.9			
<i>Grandmother's preference</i>											11.505	2	0.009
Breastfeeding	7	58.3	20	41.7	10	27.8	7	15.9	44	31.4			
Formula feeding or ambivalent	5	41.7	28	58.3	26	72.2	37	84.1	96	68.6			
<i>Grandmother's breastfed for more than one month</i>											9.300	3	0.026*
Yes	5	41.7	27	56.3	16	44.4	11	25.0	59	42.1			
No or ambivalent	7	58.3	21	43.8	20	55.6	33	75.0	81	57.9			
Psychological factors													
<i>Breastfeeding initiation</i>											2.633	3	0.452
Early	5	41.7	19	39.6	9	25.0	13	29.5	46	32.9			
Delayed	7	58.3	29	60.4	27	75.0	31	70.5	94	67.1			
<i>Intention to breastfeed</i>											10.301	3	0.016
With intention	3	25.0	11	22.9	8	22.2	22	50.0	44	31.4			
Without intention	9	75.0	37	77.1	28	77.8	22	50.0	96	68.6			
<i>Time intended to breastfeed</i>											1.175	3	0.759
Before pregnancy	6	50.0	19	39.6	17	47.2	22	50.0	64	45.7			
Early pregnancy	6	50.0	29	60.4	19	52.8	22	50.0	76	54.3			
<i>Intention to breastfeed duration</i>											9.701	3	0.138
≤ six months	2	18.2	7	15.2	7	19.4	2	4.7	18	13.2			
> 6 to 12 months	4	36.4	17	37.0	18	50.0	14	32.6	53	39.0			
More than 12 months	5	45.5	22	47.8	11	30.6	27	62.8	65	47.8			

*Analyses were done using Chi square test

Table 4.56 presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at one month and Table 4.57 presents association of psychosocial factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status.

a) Social factors

There was a significant association between father's preference and mothers who stopped 'exclusive breastfeeding' at four weeks, $\chi^2 (3, N = 7.877, p = 0.048)$. Although more mothers perceived their husbands prefer breastfeeding for their infants (62.1 %: 87/140), however, 83.3 % (10/12) underweight, 64.6 % (31/48) normal weight and 68.2 % (30/44) obese mothers had stopped 'exclusive breastfeeding' at four weeks.

There was also a significant association between grandmother's preference and mothers who stopped 'exclusive breastfeeding' at four weeks, $\chi^2 (3, N = 11.505, p = 0.009)$. Mothers who perceived their biological mothers had preference towards formula feeding or were ambivalent about the feeding method, had higher percentage to discontinue 'exclusive breastfeeding' at four weeks. These trends can be seen among normal weight mothers with 58.3 % (28/48), overweight with 72.2 % (26/36) and the highest was obese mothers with 84.1 % (37/44).

Furthermore, there was a significant association between mothers who perceived their biological mothers had breastfeeding experience of more than one month and stopped 'exclusive breastfeeding' at four weeks, $\chi^2 (3, N = 9.300, p = 0.026)$. Obese mothers who reported that their biological mothers did not have experience in breastfeeding had highest percentage of stopping 'exclusive breastfeeding' at four weeks which was 75.0 % (33/44).

b) Psychological factors

There were no significant association seen between breastfeeding initiation, time intended to breastfeed and intention to breastfeed duration and stopped 'exclusive breastfeeding' at four weeks, $p > 0.05$.

Nevertheless, majority of the mothers who discontinued 'exclusive breastfeeding' at one month had delayed breastfeeding initiation of more than one hour after delivery (67.1 %: 94/140). In fact, there were higher prevalence of mothers who

discontinued 'exclusive breastfeeding' at four weeks among those who actually decided to breastfeed during early pregnancy (54.3 %: 76/140) and intended to breastfeed for more than 12 months (47.8 %: 65/140).

Lastly, 68.6 % (96/140) mothers who had no intention to 'exclusive breastfeeding' were more common to discontinue 'exclusive breastfeeding' at four weeks, $\chi^2(3, N = 10.301, p = 0.016)$.

4.6.1.4 Biological Factors

Table 4.58 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at one month (N=140)

Characteristics	Underweight n=12/76	Normal n=48/337	Overweight n=36/160	Obese n=44/78	Total
Maternal factors					
<i>Pregnancy health problems</i>					
Yes	4 (33.3 %)	16 (33.3 %)	21 (58.3 %)	37 (84.1 %)	78 (55.7 %)
No	8 (66.7 %)	32 (66.7 %)	15 (41.7 %)	7 (15.9 %)	62 (44.3 %)
Child-related factors					
<i>Parity</i>					
Primiparous	4 (33.3 %)	16 (34.0 %)	18 (50.0 %)	18 (40.9 %)	56 (40.3 %)
Multiparous	8 (66.7 %)	31 (66.0 %)	18 (50.0 %)	26 (59.1 %)	83 (59.7 %)
Birth factors					
<i>Birth delivery method</i>					
Vaginal	4 (33.3 %)	32 (66.7 %)	19 (52.8 %)	17 (38.6 %)	72 (51.4 %)
Assisted vaginal	4 (33.3 %)	4 (8.3 %)	6 (16.7 %)	6 (13.6 %)	20 (14.3 %)
Caesarean	3 (33.3 %)	12 (25.0 %)	11 (30.6 %)	21 (47.7 %)	48 (34.3 %)
<i>Birth problems</i>					
Yes	1 (8.3 %)	3 (6.3 %)	3 (8.6 %)	5 (12.2 %)	12 (8.8 %)
No	11 (91.7 %)	45 (93.8 %)	32 (91.4 %)	36 (87.8 %)	124 (91.2 %)
<i>Breastfeeding difficulties at or before four weeks</i>					
Painful swollen breasts	5 (41.7 %)	28 (58.3 %)	15 (41.7 %)	10 (22.7 %)	58 (41.4 %)
Sore breasts with high fever	1 (8.3 %)	13 (27.1 %)	5 (13.9 %)	6 (13.6 %)	25 (17.9 %)
Cracked or sore nipples	5 (41.7 %)	23 (47.9 %)	19 (52.8 %)	26 (59.1 %)	73 (52.1 %)
Poor milk flowing	10 (83.3 %)	36 (75.0 %)	31 (86.1 %)	37 (84.1 %)	114 (81.4 %)
Insufficient milk	8 (66.7 %)	34 (72.3 %)	30 (83.3 %)	35 (79.5 %)	107 (77.0 %)
Inverted nipples					
Baby has suckling problems	-	11 (22.9 %)	10 (27.8 %)	17 (38.6 %)	38 (27.1 %)

Table 4.59 :

Association of biological factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status (N=140)

Characteristics	Underweight n=12/76		Normal n=48/337		Overweight n=36/160		Obese n=44/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Child-related factors													
<i>Parity</i>													
Primiparous	4	33.3	16	34.0	18	50.0	18	40.9	56	40.3	2.422	3	0.490
Multiparous	8	66.7	31	66.0	18	50.0	26	59.1	83	59.7			
Birth factors													
<i>Delivery method</i>													
Vaginal	8	66.7	36	75.0	25	69.4	23	52.3	92	65.7	5.593	3	0.133
Cesarean section	4	33.3	12	25.0	11	30.6	21	47.7	48	34.3			
<i>Birth problems</i>													
Yes	1	8.3	3	6.3	3	8.6	5	12.2	12	8.8	0.981	3	0.806
No	11	91.7	45	93.8	32	91.4	36	87.8	124	91.2			
Maternal factors													
<i>Pregnancy health problems</i>													
Yes	4	33.3	16	33.3	21	58.3	37	84.1	78	55.7	26.641	3	< 0.001
No	8	66.7	32	66.7	15	41.7	7	15.9	62	44.3			

*Analyses were done using Chi square test

Table 4.59 :

Association of biological factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status (N=140)- continue

Characteristics	Underweight n=12/76		Normal n=48/337		Overweight n=36/160		Obese n=44/78		Total		χ^2	df	P value*																																																																																																																																																																																																																																																																														
	n	%	n	%	n	%	n	%	n	%																																																																																																																																																																																																																																																																																	
<i>Breastfeeding difficulties at or before four weeks</i>																																																																																																																																																																																																																																																																																											
Yes	12	100.0	47	97.9	35	97.2	41	93.2	135	96.4	2.166	3	0.539																																																																																																																																																																																																																																																																														
No	-	-	1	2.1	1	2.8	3	6.8	5	3.6				<i>Painful swollen breasts</i>														Yes	5	41.7	28	58.3	15	41.7	10	22.7	58	41.4	11.996	3	0.007	No	7	58.3	20	41.7	21	58.3	34	77.3	82	58.6	<i>Sore breasts with high fever</i>														Yes	1	8.3	13	27.1	5	13.9	6	13.6	25	17.9	4.448	3	0.217	No	11	91.7	35	72.9	31	86.1	38	86.4	115	82.1	<i>Cracked or sore nipples</i>														Yes	5	41.7	23	47.9	19	52.8	26	59.1	73	52.1	1.728	3	0.631	No	7	58.3	25	52.1	17	47.2	18	40.9	67	47.9	<i>Milk takes longer time to flow</i>														Yes	10	83.3	36	75.0	31	86.1	37	84.1	114	81.4	2.069	3	0.558	No	2	16.7	12	25.0	5	13.9	7	15.9	26	18.6	<i>Insufficient colostrum/milk</i>														Yes	8	66.7	34	72.3	30	83.3	35	79.5	107	77.0	2.275	3	0.517	No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0	<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27
<i>Painful swollen breasts</i>																																																																																																																																																																																																																																																																																											
Yes	5	41.7	28	58.3	15	41.7	10	22.7	58	41.4	11.996	3	0.007																																																																																																																																																																																																																																																																														
No	7	58.3	20	41.7	21	58.3	34	77.3	82	58.6				<i>Sore breasts with high fever</i>														Yes	1	8.3	13	27.1	5	13.9	6	13.6	25	17.9	4.448	3	0.217	No	11	91.7	35	72.9	31	86.1	38	86.4	115	82.1	<i>Cracked or sore nipples</i>														Yes	5	41.7	23	47.9	19	52.8	26	59.1	73	52.1	1.728	3	0.631	No	7	58.3	25	52.1	17	47.2	18	40.9	67	47.9	<i>Milk takes longer time to flow</i>														Yes	10	83.3	36	75.0	31	86.1	37	84.1	114	81.4	2.069	3	0.558	No	2	16.7	12	25.0	5	13.9	7	15.9	26	18.6	<i>Insufficient colostrum/milk</i>														Yes	8	66.7	34	72.3	30	83.3	35	79.5	107	77.0	2.275	3	0.517	No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0	<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																				
<i>Sore breasts with high fever</i>																																																																																																																																																																																																																																																																																											
Yes	1	8.3	13	27.1	5	13.9	6	13.6	25	17.9	4.448	3	0.217																																																																																																																																																																																																																																																																														
No	11	91.7	35	72.9	31	86.1	38	86.4	115	82.1				<i>Cracked or sore nipples</i>														Yes	5	41.7	23	47.9	19	52.8	26	59.1	73	52.1	1.728	3	0.631	No	7	58.3	25	52.1	17	47.2	18	40.9	67	47.9	<i>Milk takes longer time to flow</i>														Yes	10	83.3	36	75.0	31	86.1	37	84.1	114	81.4	2.069	3	0.558	No	2	16.7	12	25.0	5	13.9	7	15.9	26	18.6	<i>Insufficient colostrum/milk</i>														Yes	8	66.7	34	72.3	30	83.3	35	79.5	107	77.0	2.275	3	0.517	No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0	<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																											
<i>Cracked or sore nipples</i>																																																																																																																																																																																																																																																																																											
Yes	5	41.7	23	47.9	19	52.8	26	59.1	73	52.1	1.728	3	0.631																																																																																																																																																																																																																																																																														
No	7	58.3	25	52.1	17	47.2	18	40.9	67	47.9				<i>Milk takes longer time to flow</i>														Yes	10	83.3	36	75.0	31	86.1	37	84.1	114	81.4	2.069	3	0.558	No	2	16.7	12	25.0	5	13.9	7	15.9	26	18.6	<i>Insufficient colostrum/milk</i>														Yes	8	66.7	34	72.3	30	83.3	35	79.5	107	77.0	2.275	3	0.517	No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0	<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																																																																		
<i>Milk takes longer time to flow</i>																																																																																																																																																																																																																																																																																											
Yes	10	83.3	36	75.0	31	86.1	37	84.1	114	81.4	2.069	3	0.558																																																																																																																																																																																																																																																																														
No	2	16.7	12	25.0	5	13.9	7	15.9	26	18.6				<i>Insufficient colostrum/milk</i>														Yes	8	66.7	34	72.3	30	83.3	35	79.5	107	77.0	2.275	3	0.517	No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0	<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																																																																																																									
<i>Insufficient colostrum/milk</i>																																																																																																																																																																																																																																																																																											
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No	4	33.3	13	27.7	6	16.7	9	20.5	32	23.0				<i>Inverted nipples</i>														Yes	1	8.3	4	8.3	4	11.1	3	6.8	12	8.6	0.473	3	0.925	No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4	<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																																																																																																																																																
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No	11	91.7	44	91.7	32	88.9	41	93.2	128	91.4				<i>Baby has sucking problems</i>														Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049	No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																																																																																																																																																																																							
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Yes	-	-	11	22.9	10	27.8	17	38.6	38	27.1	7.851	3	0.049																																																																																																																																																																																																																																																																														
No	12	100.0	37	77.1	26	72.2	27	61.4	102	72.9																																																																																																																																																																																																																																																																																	

*Analyses were done using Chi square test

Table 4.58 presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at one month and Table 4.59 presents association of biological factors and stopping 'exclusive breastfeeding' at one month of mothers with different BMI status.

a) Child-Related Factors

There is no significant association between parity and rates of 'exclusive breastfeeding' discontinuation at four weeks across four different BMI categories, $\chi^2(3, N = 2.422, p = 0.490)$. Nonetheless, 59.7 % (83/140) of the mothers who discontinued 'exclusive breastfeeding' at four weeks had more than one child.

b) Birth factors

There were no significant association seen between types of birth delivery and birth problems and rates of 'exclusive breastfeeding' discontinuation at four weeks across four different BMI categories, $p = 0.133$).

However, majority of the mothers who discontinued 'exclusive breastfeeding' at four weeks had vaginal birth (65.7 %: 92/140) and had no health problems after delivery (91.2 %: 124/140).

c) Maternal Health Factors

58.3 % of overweight (21/36) and 84.1 % (37/44) who reported to experience health problems during pregnancy like gestational diabetes mellitus and hypertension were among the highest percentage to discontinue 'exclusive breastfeeding' at four weeks compared to normal and underweight mothers, $\chi^2(3, N = 26.641, p < 0.001)$.

d) Breastfeeding difficulties at or before four weeks postpartum

There was a significant association between mothers who experienced painful swollen breasts and discontinuing 'exclusive breastfeeding' at four weeks, $\chi^2(3, N = 11.996, p = 0.007)$. However, 58.6 % (82/140) of those mothers who did not experience this had higher percentage to stop 'exclusive breastfeeding' at four weeks, especially

seen among underweight (58.3 %: 7/12), overweight (58.3 %: 21/36) and the highest was in obese women (77.3 %: 34/44).

There was a significant association between mothers whose their babies had problems in sucking and discontinuing 'exclusive breastfeeding' at four weeks, $\chi^2(3, N = 7.851, p = 0.049)$.

However, 72.9 % (102/140) of those mothers who did not experience this had higher percentage to discontinue 'exclusive breastfeeding' at four weeks and this trend can be seen in all BMI categories with the highest was underweight (100.0 %: 12/12), normal (77.1 %: 37/48), overweight (72.2 %: 26/36) and obese (61.4 %: 27/44).

4.6.2 Comparison of Mothers Who Stopped 'Exclusive Breastfeeding' At Three months Between Women With Different BMI Classification

4.6.2.1 Socio-Demographic Factors

There were 253 mothers who stopped 'exclusive breastfeeding' at three months from the total study population (N=652). The distribution of mothers who stopped 'exclusive breastfeeding' with different BMI status from total study population was as follow: underweight was 38.2 % (29/76), normal weight was 28.8 % (97/337), overweight was 45.6 % (73/160) and obese 69.2 % (54/78).

Table 9 (Refer to Appendix) shows descriptive data of characteristics of mothers who stopped 'exclusive breastfeeding' at three months and Table 10 (Refer to Appendix) shows association of socio-demographic factors and stopping 'exclusive breastfeeding' at three months of mothers with different BMI status.

a) Maternal factors

There were no significant association between maternal age, education and employment status with stopping 'exclusive breastfeeding' at three months when compared between BMI statuses, $p > 0.05$.

On the other hand, of 253 women who stopped 'exclusive breastfeeding' at three months, 60.5 % (153/253) of them were aged between 18 to 30 years old, 62.5 % (158/253) had more than 12 years of education and 81.7 % (206/253) were employed.

b) Demographic factors

There is no significant association between total household income and stopping 'exclusive breastfeeding' at three months, χ^2 (3, $N = 5.277$, $p = 0.153$).

53.0 % (134/253) of the mothers who stopped 'exclusive breastfeeding' at three months came from low household income (< RM 3000), followed by high household income (24.9 %, 63/253) and middle household income (22.1 %, 56/253).

4.6.2.2 Maternal Knowledge

Table 11 (Refer to Appendix 1) shows the descriptive characteristics of mothers who stopped "exclusive breastfeeding" at three months and Table 12 (Refer to Appendix) presents association of maternal knowledge and stopping "exclusive breastfeeding" at three months of mothers with different BMI status.

Maternal knowledge has been described as scores in knowledge of breastfeeding and formula feeding through Iowa Infant Feeding Scale (IIFAS) and whether the mothers received other knowledge through breastfeeding interventions received from health clinic or by attending antenatal classes.

There were 253 mothers who stopped 'exclusive breastfeeding' at three months from the total study population ($N=652$). The distribution of mothers who stopped 'exclusive breastfeeding' with different BMI status from total study population was as follow: underweight was 38.2 % (29/76), normal weight was 28.8 % (97/337), overweight was 45.6 % (73/160) and obese 69.2 % (54/78).

There was no relationship between the Iowa Infant Feeding Scale (IIFAS) scores and whether mothers attended 'any breastfeeding' interventions during pregnancy and stopping 'exclusive breastfeeding' at three months across four different BMI categories (χ^2 (3, $N = 7.186$, $p = 0.066$) and (3, $N = 0.866$, $p = 0.834$), respectively.

About one half of the mothers (55.3 % (140/253)) had low IIFAS score (< 65) and 80.2 % (202/253) of the mothers had received breastfeeding promotion interventions, for example, pamphlets, classes or demonstrations on breastfeeding.

There was a significant association between attending antenatal class and discontinuing 'exclusive breastfeeding' at three months, χ^2 (3, $N = 10.419$, $p = 0.015$). 61.7 % of total 253 mothers who had attended antenatal class had discontinued 'exclusive breastfeeding' at three months. However, in obese mothers, 55.6 % of them

who did not attend antenatal class had the highest percentage of discontinuing 'exclusive breastfeeding'.

4.6.2.3 Psychosocial Factors

Table 13 (Refer to Appendix) presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at three months and Table 14 (Refer to Appendix) presents association of psychosocial factors and stopping 'exclusive breastfeeding' at three months of mothers with different BMI status.

a) Social Factors

There was no association between father's preference and discontinuing 'exclusive breastfeeding' at three months, $\chi^2(3, N = 2.041, p = 0.564)$. The mothers who discontinued 'exclusive breastfeeding' had partners who supported breastfeeding in 62.1 % (157/253).

There was also no significant association between grandmother's preference and mothers who stopped 'exclusive breastfeeding' at three months, $\chi^2(3, N = 6.752, p = 0.080)$. Mothers whose own biological mothers had a preference towards formula feeding or were ambivalent about the feeding method, had higher percentage to discontinue 'exclusive breastfeeding' at three months.

Cessation of 'exclusive breastfeeding' by three months was related to BMI levels; 51.7 % of underweight mothers (15/29), normal weight mothers with 51.5 % (50/97), overweight with 54.8 % (39/74) and the highest was obese mothers with 72.2 % (39/54).

However, there was a moderately strong significant association between mothers who perceived their biological mothers had breastfeeding experience of more than one month and stopping 'exclusive breastfeeding' at three months, $\chi^2(3, N = 15.985, p < 0.001)$. Obese mothers who reported that their biological mothers did not have experience in breastfeeding had the highest percentage of stopping 'exclusive breastfeeding' at three months that was 70.4 % (38/54).

b) Psychological Factors

No associations were seen between time intended to breastfeed and intention to breastfeed duration and stopping 'exclusive breastfeeding' at three months, $p > 0.05$.

Nevertheless, more than half of the mothers who discontinued 'exclusive breastfeeding' at three months had decided to breastfeed during early pregnancy (51.6 %: 130/253) and intended to breastfeed for more than 12 months (50.0 %: 123/253).

Meanwhile, obese mothers who had delayed breastfeeding initiation were more likely to discontinue 'exclusive breastfeeding' at three months (61.1 %: 33/78). There was a weak significant association between breastfeeding initiation and discontinuation of 'exclusive breastfeeding' at three months across four different BMI categories, $\chi^2(3, N = 8.444, p = 0.038)$.

Mothers who had no intention to 'exclusive breastfeeding' (71.9 % 182/253) were more likely to discontinue 'exclusive breastfeeding' at three months, $\chi^2(3, N = 13.847, p < 0.05)$. Obese mothers who intended to exclusively breastfeed their babies were more likely to discontinue 'exclusive breastfeeding' at three months.

4.6.2.4 Biological factors

Table 15 (Refer to Appendix 1) presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at three months and Table 16 (Refer to Appendix) presents association of biological factors and stopping 'exclusive breastfeeding' at three months of mothers with different BMI status.

a) Maternal factors

There was a strong significant association between mothers who had health problems during pregnancy and 'exclusive breastfeeding' discontinuation at three months, $\chi^2(3, N = 44.749, p < 0.001)$. The 81.5 % (44/54) of obese mothers who experienced health problems during pregnancy like gestational diabetes mellitus and hypertension were likely to discontinue 'exclusive breastfeeding' at three months compared to other BMI categories who experience health problems.

b) Child-related factors

There was a moderately strong significant association between birth delivery method and discontinuing 'exclusive breastfeeding' at three months, $\chi^2(3, N = 13.042, p = 0.05)$. Mothers who had vaginal delivery tend to discontinue 'exclusive breastfeeding' at three months compared to those who had c-section delivery.

c) Breastfeeding difficulties

There was a significant association between mothers who experienced painful swollen breasts and discontinuing 'exclusive breastfeeding' at three months, $\chi^2(3, N = 14.189, p = 0.003)$. Mothers who experienced this had the highest percentage to discontinue 'exclusive breastfeeding' as seen in normal weight (60.8 %: 59/97), followed by underweight (55.2 %: 16/29) and overweight (54.8 %: 40/73). However, in obese mothers, 70.4 % (38/54) of them did not experience this and were still discontinued 'exclusive breastfeeding' at three months.

On top of that, there was also a significant association between mothers who reported to experience insufficient colostrum/milk and stopping 'exclusive breastfeeding' at three months, $\chi^2(3, N = 10.703, p = 0.013)$. A total of 50.4 % (129/253) of mothers' discontinued 'exclusive breastfeeding' were not experience insufficient colostrum/milk. However, 66.7 % (36/54) of obese mothers who discontinued 'exclusive breastfeeding' were experiencing insufficient colostrum/milk at or before four weeks.

Normally, working mothers were entitled for three months maternity leave, therefore, the main reason for the mothers to discontinue 'exclusive breastfeeding' at three months were because they had to resume to work, $\chi^2(3, N = 8.156, p = 0.043)$.

4.6.3 Comparison of Mothers Who Stopped ‘Exclusive Breastfeeding’ At Six months Between Women With Different BMI Classification

4.6.3.1 Socio-Demographic Factors

Table 4.60 :

Descriptive characteristics of mothers who stopped ‘exclusive breastfeeding’ at six months (N=326)

Characteristics	Underweight n=36/76	Normal n=137/337	Overweight n=93/160	Obese n=60/78	Total
Maternal factors					
<i>Mother’s age at pregnancy</i>					
18-30 years old	27 (75.0 %)	83 (60.6 %)	52 (55.9 %)	35 (58.3 %)	197 (60.4 %)
31-40 years old	9 (25.0 %)	54 (39.4 %)	41 (44.1 %)	25 (41.7 %)	129 (39.6 %)
<i>Maternal education</i>					
≤ 12 years	16 (44.4 %)	57 (41.6 %)	33 (35.5 %)	17 (28.3 %)	123 (37.7 %)
> 12 years	20 (55.6 %)	80 (58.4 %)	60 (64.5 %)	43 (71.7 %)	203 (62.3 %)
<i>Maternal employment</i>					
Housewife	8 (22.2 %)	31 (22.6 %)	19 (20.7 %)	8 (13.3 %)	66 (20.3 %)
Employed	28 (77.8 %)	106 (77.4 %)	73 (79.3 %)	52 (86.7 %)	259 (79.7 %)
Demographic factor					
<i>Household monthly income</i>					
Low (<RM3000)	22 (61.1 %)	66 (48.2 %)	49 (52.7 %)	32 (53.3 %)	169 (51.8 %)
Middle (RM3001 - 5000)	8 (22.2 %)	32 (23.4 %)	18 (19.4 %)	15 (25.0 %)	73 (22.4 %)
High (≥ RM5000)	6 (16.7 %)	39 (28.5 %)	26 (28.0 %)	13 (21.7 %)	84 (25.8 %)

Table 4.61 :

Association of socio-demographic factors and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status (N=326)

Characteristics	Underweight n=36/76		Normal n=137/337		Overweight n=93/160		Obese n=60/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal factors													
<i>Mother's age at pregnancy</i>											4.101	3	0.251
21-30 years old	27	75.0	83	60.6	52	55.9	35	58.3	197	60.4			
31-40 years old	9	25.0	54	39.4	41	44.1	25	41.7	129	39.6			
<i>Maternal education</i>											4.021	3	0.259
≤ 12 years	16	44.4	57	41.6	33	35.5	17	28.3	123	37.7			
> 12 years	20	55.6	80	58.4	60	64.5	43	71.7	203	62.3			
<i>Maternal employment</i>											2.347	3	0.504
Housewife	8	22.2	31	22.6	19	20.7	8	13.3	66	20.3			
Employed	28	77.8	106	77.4	73	79.3	52	86.7	259	79.7			
Demographic factors													
<i>Household monthly income</i>											2.841	3	0.417
Low (<RM5000)	30	83.3	98	71.5	67	72.0	47	78.3	242	74.2			
High (≥ RM5001)	6	16.7	39	28.5	26	28.0	13	21.7	84	25.8			

Body Mass Index (BMI) categories are based on the World Health Organization guideline, where underweight is classified as having a BMI of less than 18.5 kg/m², normal weight is classified as having a BMI of 18.5 – 24.9 kg/m², overweight is classified as having a BMI of 25.0- 29.9 kg/m², and obese is classified as having a BMI of more than 30.0 kg/m².

*Analyses were done using Chi square test

There were 326 mothers who stopped 'exclusive breastfeeding' at six months from the total study population (N=652). The distribution of mothers who stopped 'exclusive breastfeeding' with different BMI status from total study population was as follow: underweight was 47.4 % (36/76), normal weight was 40.7 % (137/337), overweight was 58.1 % (93/160) and obese 76.9 % (60/78).

Table 4.60 shows descriptive data of characteristics of mothers who stopped 'exclusive breastfeeding' at six months and Table 4.61 shows association of socio-demographic factors and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status.

a) Maternal factors

There were no significant association between maternal age, education and employment status with stopping 'exclusive breastfeeding' at six months when compared between BMI statuses ($p > 0.05$).

Nonetheless, from the total of 326 women who stopped 'exclusive breastfeeding' at six months, 60.4 % (197/326) of them were aged between 18 to 30 years old, 62.3 % (203/326) had more than 12 years of education and 79.7 % (259/326) were employed.

b) Demographic factors

There is no significant association between total household income and stopping 'exclusive breastfeeding' at six months, χ^2 (3, $N = 2.841$, $p = 0.147$).

51.8 % (169/326) of the mothers who stopped 'exclusive breastfeeding' at six months came from low household income (< RM 3000), followed by middle household income (22.4 %, 73/326) and high household income (25.8 %, 84/326).

4.6.3.2 Maternal Knowledge

Table 4.62 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months (N=326)

Characteristics	Underweight n=36/76	Normal n=137/337	Overweight n=93/160	Obese n=60/78	Total
Maternal knowledge					
<i>IIFAS score</i>					
Positive to formula feeding	-	6 (4.4 %)	5 (5.4 %)	1 (1.7 %)	12 (3.7 %)
Neutral	30 (83.3 %)	108 (78.8 %)	69 (74.2 %)	47 (78.3 %)	254 (77.9 %)
Positive to breastfeeding	6 (16.7 %)	23 (16.8 %)	19 (20.4 %)	12 (20.0 %)	60 (18.4 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	17 (47.2 %)	84 (61.3 %)	61 (66.3 %)	37 (61.7 %)	199 (61.2 %)
Class/seminar/lecture on BF	15 (41.7 %)	61 (44.5 %)	37 (40.2 %)	28 (46.7 %)	141 (43.4 %)
Demonstration of BF	18 (50.0 %)	68 (49.6 %)	38 (41.3 %)	30 (50.0 %)	154 (47.4 %)
Video/tv/slide show on BF	6 (16.7 %)	21 (15.3 %)	11 (12.0 %)	12 (20.0 %)	50 (15.4 %)
Counselling/discussion on BF	8 (22.2 %)	34 (24.8 %)	31 (33.7 %)	17 (28.3 %)	90 (27.7 %)
<i>Attending antenatal class</i>					
Yes	28 (77.8 %)	95 (69.3 %)	61 (65.6 %)	29 (48.3 %)	213 (65.3 %)
No	8 (22.2 %)	42 (30.7 %)	32 (34.4 %)	31 (51.7 %)	113 (34.7 %)

Table 4.63 :

Association of maternal knowledge factors and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status (N=326)

Characteristics	Underweight n=36/76		Normal n=137/337		Overweight n=93/160		Obese n=60/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal knowledge													
<i>IIFAS score</i>											6.717	3	0.081
High (≥ 65)	13	36.1	50	36.5	49	52.7	27	45.0	139	42.6			
Low (< 65)	23	63.9	87	63.5	44	47.3	33	55.0	187	57.4			
<i>Attending breastfeeding interventions</i>											1.218	3	0.749
Yes	29	80.6	112	81.8	74	80.4	45	75.0	260	80.0			
No	7	19.4	25	18.2	18	19.6	15	25.0	65	20.0			
<i>Attending antenatal class</i>											11.093	3	0.011
Yes	28	77.8	95	69.3	61	65.6	29	48.3	213	65.3			
No	8	22.2	42	30.7	32	34.4	31	51.7	113	34.7			

*Analyses were done using Chi square test

Table 4.62 presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months and Table 4.63 presents association of maternal knowledge and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status.

There were 253 mothers who stopped 'exclusive breastfeeding' at six months from the total study population (N=652). The distribution of mothers who stopped 'exclusive breastfeeding' with different BMI status from total study population was as follow: underweight was 38.2 % (29/76), normal weight was 28.8 % (97/337), overweight was 45.6 % (73/160) and obese 69.2 % (54/78).

There were no significant relationship between Iowa Infant Feeding Scale (IIFAS) scores and mothers attending 'any breastfeeding' interventions during pregnancy and stopping 'exclusive breastfeeding' at six months across four different BMI categories (χ^2 (3, N = 6.717, p = 0.081) and (3, N = 1.218, p = 0.749), respectively.

Mothers who scored less than 65 (57.4 %: 187/326) in IIFAS were more common to discontinue 'exclusive breastfeeding' at six months compared to those who scored more than 65 (42.6 %: 139/326). However, 80.0% (260/326) of the mothers who had received breastfeeding interventions, for example, pamphlets, classes or demonstrations on breastfeeding also

There was a significant association between attending antenatal class and discontinuing 'exclusive breastfeeding' at three months, χ^2 (3, N = 11.093, p = 0.011). 65.3 % of total 326 mothers who had attended antenatal class were discontinued 'exclusive breastfeeding' at six months. However, in obese mothers, 48.3 % of them who did not attend antenatal class had the highest percentage of discontinuing 'exclusive breastfeeding' (76.9 %: 60/78).

4.6.3.3 Psychosocial Factors

Table 4.64 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months (N=326)

Characteristics	Underweight n=36/76	Normal n=137/337	Overweight n=93/160	Obese n=60/78	Total
Social					
<i>Father's preference</i>					
Breastfeeding	27 (75.0 %)	86 (62.8 %)	56 (60.2 %)	41 (68.3 %)	210 (64.4 %)
Formula feeding or ambivalent	9 (25.0 %)	51 (37.2 %)	37 (39.8 %)	19 (31.7 %)	116 (35.6 %)
<i>Grandmother's preference</i>					
Breastfeeding	17 (47.2 %)	70 (51.1 %)	46 (49.5 %)	17 (28.3 %)	150 (46.0 %)
Formula feeding or ambivalent	19 (52.8 %)	67 (48.9 %)	47 (50.5 %)	43 (71.7 %)	176 (54.0 %)
<i>Grandmother's breastfed for more than one month</i>					
Yes	22 (61.1 %)	89 (65.0 %)	56 (60.2 %)	19 (31.7 %)	186 (57.1 %)
No or ambivalent	14 (38.9 %)	48 (35.0 %)	37 (39.8 %)	41 (68.3 %)	140 (42.9 %)
Psychological factors					
<i>Early initiation of breastfeeding</i>					
Early	23 (63.9 %)	85 (62.0 %)	56 (60.2 %)	27 (45.0 %)	191 (58.6 %)
Delayed	13 (36.1 %)	52 (38.0 %)	37 (39.8 %)	33 (55.0 %)	135 (41.4 %)
<i>Intention to exclusive breastfeed</i>					
With intention	10 (27.8 %)	43 (31.4 %)	22 (23.7 %)	29 (48.3 %)	104 (31.9 %)
Without intention	26 (72.2 %)	94 (68.6 %)	71 (76.3 %)	31 (51.7 %)	222 (68.1 %)
<i>Time intended to breastfeed</i>					
Before pregnancy	17 (47.2 %)	60 (44.4 %)	45 (48.4 %)	31 (51.7 %)	153 (47.2 %)
During pregnancy	19 (52.8 %)	75 (55.6 %)	48 (51.6 %)	29 (48.3 %)	171 (52.8 %)
<i>Intention to breastfeed duration</i>					
< six months	3 (8.8 %)	14 (10.4 %)	12 (12.9 %)	3 (5.2 %)	32 (10.0 %)
6 to 12 months	15 (44.1 %)	56 (41.8 %)	39 (41.9 %)	20 (34.5 %)	130 (40.8 %)
More than 12 months	16 (47.1 %)	64 (47.8 %)	42 (45.2 %)	35 (60.3 %)	157 (49.2 %)

Table 4.65 :

Association of psychosocial factors and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status (N=326)

Characteristics	Underweight n=36/76		Normal n=137/337		Overweight n=93/160		Obese n=60/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Social factors													
<i>Father's preference</i>											3.038	3	0.386
Breastfeeding	27	75.0	86	62.8	56	60.2	41	68.3	210	64.4			
Formula feeding or ambivalent	9	25.0	51	37.2	37	39.8	19	31.7	116	35.6			
<i>Grandmother's preference</i>											9.441	3	0.024
Breastfeeding	17	47.2	70	51.1	46	49.5	17	28.3	150	46.0			
Formula feeding or ambivalent	19	52.8	67	48.9	47	50.5	43	71.7	176	54.0			
<i>Grandmother's breastfed for more than one month</i>											19.902	3	< 0.001
Yes	22	61.1	89	65.0	56	60.2	19	31.7	186	57.1			
No	14	38.9	48	35.0	37	39.8	41	68.3	140	42.9			
Psychological factors													
<i>Breastfeeding initiation</i>											5.759	3	0.124
Early	23	63.9	85	62.0	56	60.2	27	45.0	191	58.6			
Delayed	13	36.1	52	38.0	37	39.8	33	55.0	135	41.4			
<i>Intention to breastfeed</i>											10.666	3	0.014
With intention	10	27.8	43	31.4	22	23.7	29	48.3	104	31.9			
Without intention	26	72.2	94	68.6	71	76.3	31	51.7	222	68.1			
<i>Time intended to breastfeed</i>											0.944	3	0.815
Before pregnancy	17	47.2	60	44.4	45	48.4	31	51.7	153	47.2			
Early pregnancy	19	52.8	75	55.6	48	51.6	29	48.3	171	52.8			
<i>Intention to breastfeed duration</i>											4.784	6	0.572
≤ six months	3	8.8	14	10.4	12	12.9	3	5.2	32	10.0			
> 6 to 12 months	15	44.1	56	41.8	39	41.9	20	34.5	130	40.8			
More than 12 months	16	47.1	64	47.8	42	45.2	35	60.3	157	49.2			

*Analyses were done using Chi square test

Table 4.64 presents descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months and Table 4.65 presents association of psychosocial factors and stopping 'exclusive breastfeeding' at six months of mothers with different BMI status.

a) Social Factors

There was no significant association between father's preference and mothers who discontinued 'exclusive breastfeeding' at six months, $\chi^2(3, N = 3.038, p = 0.386)$. However, 64.4 % (210/326) of the mothers who discontinued 'exclusive breastfeeding' had supportive partners towards breastfeeding.

However, there was a weak significant association between grandmother's preference and mothers who stopped 'exclusive breastfeeding' at six months, $\chi^2(3, N = 9.441, p = 0.024)$. Obese mothers had the highest prevalence of discontinuing at six months and 71.7 % (43/78) of them had biological mothers with preference towards formula feeding or were ambivalent about the feeding method.

Furthermore, there was also a significant association between mothers who perceived their biological mothers had breastfeeding experience of more than one month and stopped 'exclusive breastfeeding' at six months, $\chi^2(3, N = 19.902, p < 0.001)$. Obese mothers who reported that their biological mothers did not have experience in breastfeeding had the highest percentage of quitting 'exclusive breastfeeding' at six months which was 68.3 % (41/60).

b) *Psychological factors*

There were no significant association seen between time intended to breastfeed and intention to breastfeed duration and stopped 'exclusive breastfeeding' at six months, $p > 0.05$.

Nevertheless, more than half of the mothers who discontinued 'exclusive breastfeeding' at six months had decided to breastfeed during early pregnancy (52.8 %: 171/326) and intended to breastfeed for more than 12 months (49.2 %: 157/326).

Meanwhile, mothers who delayed breastfeeding after delivery were more common to discontinue 'exclusive breastfeeding' at six months, the highest prevalence was seen in obese mothers (55.0 %: 33/60). Nonetheless, there was no significant

association seen between breastfeeding initiation and discontinuation of 'exclusive breastfeeding' at six months across four different BMI categories, χ^2 (3, N = 5.759, p = 0.124).

68.1 % (222/326) mothers who had no intention to 'exclusive breastfeeding' were more common to discontinue 'exclusive breastfeeding' at six months, χ^2 (3, N = 10.666, p = 0.014). 51.7 % (31/60) of obese mothers who had no intention to exclusively breastfeed their babies were more common to discontinue 'exclusive breastfeeding' at six months.

4.6.3.4 Biological Factors

Table 4.66 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months (N=326)

Characteristics	Underweight n=36/76	Normal n=137/337	Overweight n=93/160	Obese n=60/78	Total
Maternal factor					
<i>Pregnancy health problems</i>					
Yes	11 (30.6 %)	30 (21.9 %)	44 (47.3 %)	49 (81.7 %)	134 (41.1 %)
No	25 (69.4 %)	107 (78.1 %)	49 (52.7 %)	11 (18.3 %)	192 (58.9 %)
Child-related factors					
<i>Parity</i>					
Primiparous	12 (33.3 %)	48 (35.8 %)	30 (32.6 %)	22 (36.7 %)	112 (34.8 %)
Multiparous	24 (66.7 %)	86 (64.2 %)	62 (67.4 %)	38 (63.3 %)	210 (65.2 %)
Birth factors					
<i>Birth delivery method</i>					
Vaginal	25 (69.4 %)	101 (73.7 %)	49 (52.7 %)	25 (41.7 %)	200 (61.3 %)
Assisted vaginal	6 (16.7 %)	15 (10.9 %)	19 (20.4 %)	10 (16.7 %)	50 (15.3 %)
Caesarean	5 (13.9 %)	21 (15.3 %)	25 (26.9 %)	25 (41.7 %)	76 (23.3 %)
<i>Birth problems</i>					
Yes	1 (2.8 %)	6 (4.4 %)	7 (7.6 %)	8 (14.0 %)	22 (6.8 %)
No	35 (97.2 %)	131 (95.6 %)	85 (92.4 %)	49 (86.0 %)	300 (93.2 %)
<i>Breastfeeding difficulties at or before four weeks</i>					
Painful swollen breasts	21 (58.3 %)	89 (65.0 %)	49 (52.7 %)	19 (31.7 %)	178 (54.6 %)
Sore breasts with high fever	7 (19.4 %)	40 (29.2 %)	20 (21.5 %)	8 (13.3 %)	75 (23.0 %)
Cracked or sore nipples	14 (38.9 %)	53 (38.7 %)	44 (47.3 %)	29 (48.3 %)	140 (42.9 %)
Poor milk flowing	19 (52.8 %)	66 (48.2 %)	54 (58.1 %)	43 (71.7 %)	182 (55.8 %)
Insufficient milk	10 (27.8 %)	44 (32.4 %)	35 (37.6 %)	37 (61.7 %)	126 (38.8 %)

Table 4.66 :

Descriptive characteristics of mothers who stopped 'exclusive breastfeeding' at six months (N=326)-continue

Characteristics	Underweight n=36/76	Normal n=137/337	Overweight n=93/160	Obese n=60/78	Total
<i>Breastfeeding difficulties within 3 to six months</i>					
Yes	28 (77.8 %)	111 (81.0 %)	86 (92.5 %)	50 (83.3 %)	275 (84.4 %)
No	8 (22.2 %)	26 (19.0 %)	7 (7.5 %)	10 (16.7 %)	51 (15.6 %)
Painful swollen breasts	2 (5.6 %)	5 (3.6 %)	1 (1.1 %)	1 (1.7 %)	9 (2.8 %)
Cracked or sore nipples	-	5 (3.6 %)	3 (3.2 %)	3 (5.0 %)	11 (3.4 %)
Breasts engorgement	1 (2.8 %)	6 (4.4 %)	2 (2.2 %)	-	9 (2.8 %)
Insufficient milk	27 (75.0 %)	106 (77.4 %)	84 (90.3 %)	50 (83.3 %)	267 (81.9 %)
Baby has suckling problems	-	9 (6.6 %)	5 (5.4 %)	6 (10.0 %)	20 (6.1 %)
Baby refused to breastfeed	1 (2.8 %)	25 (18.2 %)	6 (6.5 %)	12 (20.0 %)	44 (13.5 %)
<i>Reasons to stop 'exclusive breastfeeding'</i>					
Insufficient milk	13 (92.9 %)	57 (85.1 %)	33 (94.3 %)	19 (100.0 %)	122 (90.4 %)
Resume to work	3 (21.4 %)	14 (20.9 %)	1 (2.9 %)	3 (15.8 %)	21 (15.6 %)

Table 4.67 :

Association of biological factors between mothers who stopped 'exclusive breastfeeding' at six months and BMI status (N=326)

Characteristics	Underweight n=36/76		Normal n=137/337		Overweight n=93/160		Obese n=60/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Child-related factors													
<i>Parity</i>											0.383	3	0.944
Primiparous	12	33.3	48	35.8	30	32.6	22	36.7	112	34.8			
Multiparous	24	66.7	86	64.2	62	67.4	38	63.3	210	65.2			
Birth factors													
<i>Delivery method</i>											18.642	3	< 0.001
Vaginal	31	86.1	116	84.7	68	73.1	35	58.3	250	76.7			
Cesarean section	5	13.9	21	15.3	25	26.9	25	41.7	76	23.3			
Maternal factors													
<i>Pregnancy health problems</i>											64.789	3	< 0.001
Yes	11	30.6	30	21.9	44	47.3	49	81.7	134	41.1			
No	25	69.4	107	78.1	49	52.7	11	18.3	192	58.9			

*Analyses were done using Chi square test

Table 4.67 :

Association of biological factors between mothers who stopped 'exclusive breastfeeding' at six months and BMI status (N=326)-continue

Characteristics	Underweight n=36/76		Normal n=137/337		Overweight n=93/160		Obese n=60/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
<i>Breastfeeding difficulties at or before four weeks</i>													
Yes	32	88.9	123	89.8	89	95.7	54	90.0	298	91.4	3.085	3	0.379
No	4	11.1	14	10.2	4	4.3	6	10.0	28	8.6			
<i>Painful swollen breasts</i>													
Yes	21	58.3	89	65.0	49	52.7	19	31.7	178	54.6	19.006	3	< 0.001
No	15	41.7	48	35.0	44	47.3	41	68.3	148	45.4			
<i>Sore breasts with high fever</i>													
Yes	7	19.4	40	29.2	20	21.5	8	13.3	75	23.0	6.510	3	0.089
No	29	80.6	97	70.8	73	78.5	52	86.7	251	77.0			
<i>Cracked or sore nipples</i>													
Yes	14	38.9	53	38.7	44	47.3	29	48.3	140	42.9	2.691	3	0.442
No	22	61.1	84	61.3	49	52.7	31	51.7	186	57.1			
<i>Milk takes longer time to flow</i>													
Yes	19	52.8	66	48.2	54	58.1	43	71.7	182	55.8	9.682	3	0.021
No	19	47.2	71	51.8	39	41.9	17	28.3	144	44.2			
<i>Insufficient colostrum/milk</i>													
Yes	10	27.8	44	32.4	35	37.6	37	61.7	126	38.8	17.493	3	0.001
No	26	72.2	92	67.6	58	62.4	23	38.3	199	61.2			
<i>Breastfeeding difficulties within 3 to six months</i>													
Yes	28	77.8	111	81.0	86	92.5	50	83.3	275	84.4	7.025	3	0.071
No	8	22.2	26	19.0	7	7.5	10	16.7	51	15.6			
<i>Insufficient milk</i>													
Yes	27	75.0	106	77.4	84	90.3	50	83.3	267	81.9	7.585	3	0.055
No	9	25.0	31	22.6	9	9.7	10	16.7	59	18.1			

*Analyses were done using Chi square test

Table 4.66 presents descriptive characteristics of mothers who stopped ‘exclusive breastfeeding’ at six months and Table 4.67 presents association of biological factors and stopping ‘exclusive breastfeeding’ at six months of mothers with different BMI status.

a) Child-related factors

There is no significant association between parity and rates of ‘exclusive breastfeeding’ discontinuation at six months across four different BMI categories, $\chi^2(3, N = 0.383, p = 0.944)$. Nonetheless, 65.2 % (210/326) of the mothers who discontinued ‘exclusive breastfeeding’ at six months had more than one child.

b) Birth factors

There was a moderately strong significant association between type of delivery and discontinuation of ‘exclusive breastfeeding’ at six months across four different BMI categories, $\chi^2(3, N = 18.642, p < 0.001)$. Mothers who had vaginal delivery (76.7 %: 250/326) tend to discontinue ‘exclusive breastfeeding’ at six months compared to those who had c-section delivery (23.3 %: 76/326).

c) Breastfeeding difficulties

There was a significant association between mothers who experienced painful swollen breasts and discontinuing ‘exclusive breastfeeding’ at six months, $\chi^2(3, N = 19.006, p < 0.001)$. Mothers who experienced this had the highest percentage to discontinue ‘exclusive breastfeeding’ as seen in normal weight (65.0 %: 89/137), followed by underweight (58.3 %: 21/36) and overweight (52.7 %: 49/93). However, in obese mothers, 68.3 % (41/60) of them did not experience this and were still discontinued ‘exclusive breastfeeding’ at six months.

On top of that, there was also a significant association between mothers who reported to experience insufficient colostrum/milk and stopping ‘exclusive breastfeeding’ at six months, $\chi^2(3, N = 17.493, p < 0.001)$. Majority of obese mothers (61.7%: 37/60) reported experienced insufficient colostrum/milk at or before four weeks postpartum discontinued ‘exclusive breastfeeding’ at six months.

4.6.4 Factors Predicting Discontinuation of ‘Exclusive Breastfeeding’ at Four weeks

Table 4.68 :

Crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued ‘exclusive breastfeeding’ at four weeks of obese and non-obese mothers (N=140)

Factor	Obese (n=44)	Non-obese (n=96)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Demographic factors						
<i>Maternal years of education</i>						
≤ 12 years	14 (31.8 %)	48 (50.0 %)	1 (reference)		1 (reference)	
> 12 years	30 (68.2 %)	48 (50.0 %)	2.143 (1.012 – 4.536)	0.046*	2.058 (0.926 – 4.574) ¹	0.076
<i>Maternal employment</i>						
Housewives	6 (13.6 %)	26 (27.1 %)	1 (reference)	0.084	1 (reference)	0.046*
Employed	38 (86.4 %)	70 (72.9 %)	2.352 (0.890 – 6.215)		2.827 (1.017 – 7.862) ¹	
<i>Household monthly income</i>						
Low (< RM 5000)	36 (81.8 %)	75 (78.1 %)	1 (reference)	0.617	1 (reference)	0.880
High (≥ RM5000)	8 (18.2 %)	21 (21.9 %)	0.794 (0.321 – 1.964)		0.915 (0.291 – 2.882) ²	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
No	27 (61.4 %)	37 (38.5 %)	1 (reference)	0.013*	1 (reference)	0.035*
Yes	17 (38.6 %)	59 (61.5 %)	0.395 (0.190 – 0.822)		0.409 (0.178 – 0.938) ³	
<i>Attending breastfeeding interventions</i>						
No	8 (18.2 %)	17 (17.9 %)	1 (reference)	0.967	1 (reference)	0.376
Yes	36 (81.8 %)	78 (82.1 %)	0.981 (0.388 – 2.482)		0.588 (0.182 – 1.906) ⁴	

*significantly different from reference (p< 0.05)

¹adjusted for attending antenatal class, husband’s preference, grandfather’s preference and grandmother’s breastfeeding experience, ²adjusted for maternal education, attending antenatal class, had pregnancy health problems, husband’s preference, grandfather’s preference and grandmother’s breastfeeding experience, ³adjusted for maternal education, maternal intention to breastfeed and had health problems during pregnancy, ⁴adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, had pregnancy health problems, husband’s preference, grandfather’s preference and grandmother’s breastfeeding experience

Table 4.68 presents crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued 'exclusive breastfeeding' at four weeks of obese and non-obese mothers.

Higher educated obese mothers are twice more likely to discontinue 'exclusive breastfeeding' at four weeks than non-obese mothers (crude OR 2.143, 95% CI of crude OR: 1.012 – 4.536, adjusted OR 2.058, 95% CI of adjusted OR: 0.926 – 4.574).

Meanwhile, obese mothers who were employed are 2.8 times more likely to discontinue 'exclusive breastfeeding' at four weeks after some adjustments were made (adjusted OR 2.827, 95% CI of adjusted OR: 1.017 – 7.862).

Obese mothers who had attended antenatal class were less likely to discontinue 'exclusive breastfeeding' at four weeks than mothers who did not attend (crude OR 0.395, 95% CI of crude OR: 0.190 – 0.822, adjusted OR 0.409, 95% CI of adjusted OR: 0.178 – 0.938).

Table 4.69 :

Unadjusted and adjusted odd ratios (ORs) for psycho-social predictors of discontinued 'exclusive breastfeeding' at four weeks of obese and non-obese mothers (N=140)

Factor	Obese (n=44)	Non-obese (n=96)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	30 (68.2 %)	57 (59.4 %)	1 (reference)	0.320	1 (reference)	0.547
Formula feeding or ambivalent	14 (31.8 %)	39 (40.6 %)	1.466 (0.690 – 3.116)		0.757 (0.306 – 1.872) ¹	
<i>Grandmother's preference</i>						
Breastfeeding	7 (15.9 %)	37 (38.5 %)	1 (reference)	0.010*	1 (reference)	0.033*
Formula feeding or ambivalent	37 (84.1 %)	59 (61.5 %)	3.315 (1.339 – 8.205)		2.919 (1.090 – 7.820) ²	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	11 (25.0 %)	48 (50.0 %)	1 (reference)	0.006*	1 (reference)	0.038*
No or ambivalent	33 (75.0 %)	48 (50.0 %)	3.000 (1.360 – 6.617)		2.607 (1.053 – 6.456)³	
Psychological factors						
<i>Time of initiation of breastfeeding</i>						
Early	13 (29.5 %)	33 (34.4 %)	1 (reference)	0.573	1 (reference)	0.880
Delayed	31 (70.5 %)	63 (65.6 %)	1.249 (0.577 – 2.705)		1.075 (0.418 – 2.765) ⁴	
<i>Intention to breastfeed</i>						
With intention	22 (50.0 %)	22 (22.9 %)	1 (reference)	0.002*	1 (reference)	0.018*
Without intention	22 (50.0 %)	74 (77.1 %)	0.297 (0.139 – 0.635)		0.339 (0.138 – 0.832)⁵	

*significantly different from reference level with p< 0.05

¹Adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, had pregnancy health problems, grandmother's preference and grandmother's breastfeeding experience, ²adjusted for maternal intention to breastfeed, had pregnancy health problems, ³adjusted for maternal education, maternal intention to breastfeed, had pregnancy health problems, ⁴adjusted for maternal education, maternal intention to breastfeed, grandmother's preference, attending antenatal class and had pregnancy health problems, ⁵adjusted for maternal education, attending antenatal class, had pregnancy health problems, husband's preference, grandmother's preference and grandmother's breastfeeding experience,

Table 4.69 shows unadjusted and adjusted odd ratios (ORs) for psycho-social predictors of discontinued 'exclusive breastfeeding' at four weeks of obese and non-obese mothers.

Obese mothers who perceived their biological mothers had preference towards formula feeding or were ambivalent about the feeding method, were 3.3 times more likely to discontinue 'exclusive breastfeeding' at four weeks than mothers who perceived their mothers preferred breastfeeding (crude OR 3.315, 95% CI of crude OR: 1.339 – 8.205, adjusted OR 2.919, 95% CI of adjusted OR: 1.090 – 7.820).

Obese mothers who also perceived that their biological mothers had no experience in breastfeeding for more than one month, were 3 times more likely to discontinue 'exclusive breastfeeding' at four weeks (crude OR 3.000, 95% CI of crude OR: 1.360 – 6.617, adjusted OR 2.607, 95% CI of adjusted OR: 1.053 – 6.456).

Finally, obese mothers who had no intention to 'exclusive breastfeeding' were less likely to discontinue 'exclusive breastfeeding' at four weeks (crude OR 0.297, 95% CI of crude OR: 0.139 – 0.635) and the adjusted odd ratios was 0.339 (95% CI of adjusted OR: 0.138, 0.832).

Table 4.70 :

Unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at four weeks of obese and non-obese mothers (N=140)

Factor	Obese (n=44)	Non-obese (n=96)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Health problems during pregnancy</i>						
Yes	37 (84.1 %)	41 (42.7 %)	7.091 (2.873 – 17.500)	< 0.001*	6.019 (2.270 – 15.963)¹	< 0.001*
No	7 (15.9 %)	55 (57.3 %)	1 (reference)		1 (reference)	
<i>Birth delivery method</i>						
Caesarean	21 (47.7 %)	27 (28.1 %)	2.333 (1.113 – 4.891)	0.025*	2.469 (1.099 – 5.548)²	0.029*
Vaginal	23 (52.3 %)	69 (71.9 %)	1 (reference)		1 (reference)	
<i>Breastfeeding difficulties at or before four weeks</i>						
<i>Painful swollen breasts</i>						
Yes	10 (22.7 %)	48 (50.0 %)	0.294 (0.131 – 0.662)	0.003*	0.365 (0.146 – 0.911)³	0.031*
No	34 (77.3 %)	48 (50.0 %)	1 (reference)		1 (reference)	
<i>Insufficient colostrum/milk</i>						
Yes	35 (79.5 %)	72 (75.8 %)	1.242 (0.520 – 2.965)	0.625	1.028 (0.344 – 3.073) ³	0.960
No	9 (20.5 %)	23 (24.2 %)	1 (reference)		1 (reference)	
<i>Baby has suckling problems</i>						
Yes	17 (38.6 %)	21 (21.9 %)	2.249 (1.035 – 4.887)	0.041*	1.242 (0.503 – 3.067) ³	0.639
No	27 (61.4 %)	75 (78.1 %)	1 (reference)		1 (reference)	

*significantly different from reference level with $p < 0.05$

¹Adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, husband's preference, grandmother's preference and grandmother's breastfeeding experience, ²adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, ³adjusted for maternal education, maternal intention to breastfeed, had pregnancy health problems and attending antenatal class

Table 4.70 presents unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at four weeks of obese and non-obese mothers.

Obese mothers who had health problems during pregnancy were 7 times more likely to discontinue at four weeks than non-obese mothers who did not experience this (crude OR 7.091, 95% CI of crude OR: 2.873 – 17.50, adjusted OR 6.019, 95% CI of adjusted OR: 2.270 – 15.963).

Furthermore, obese mothers who had caesarean delivery were 2.3 times more likely to discontinue 'exclusive breastfeeding' at four weeks than mothers who had vaginal delivery (crude OR 2.333, 95% CI of crude OR: 1.113 – 4.891) and the adjusted odd ratios was 2.469 (95% CI of adjusted OR: 1.099 – 5.548).

Obese mothers who experienced painful swollen breasts were less likely to discontinue 'exclusive breastfeeding' at four weeks (crude OR 0.294, 95% CI of crude OR: 0.131 – 0.662, adjusted OR 0.365, 95% CI of adjusted OR: 0.146 – 0.911). This is because in Malay culture, they believed that mothers who experienced this was actually had enough milk for the babies and they will seek for traditional advices using herbal remedies.

4.6.5 Factors Predicting Discontinuation of ‘Exclusive Breastfeeding’ At Three months

Table 4.71 :

Crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued ‘exclusive breastfeeding’ at three months of obese and non-obese mothers (N=253)

Factor	Obese (n=199)	Non-obese (n=54)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Demographic factors						
<i>Maternal years of education</i>						
≤ 12 years	14 (25.9 %)	81 (40.7 %)	1 (reference)	0.049*	1 (reference)	0.042*
> 12 years	40 (74.1 %)	118 (59.3 %)	1.961 (1.002 – 3.837)		2.264 (1.031 – 4.971)¹	
<i>Maternal employment</i>						
Housewives	6 (11.1 %)	40 (20.2 %)	1 (reference)	0.131	1 (reference)	0.163
Employed	48 (88.9 %)	158 (79.8 %)	2.025 (0.810 – 5.066)		2.246 (0.721 – 6.996) ²	
<i>Household monthly income</i>						
Low (< RM 5000)	43 (79.6 %)	147 (73.9 %)	1 (reference)	0.387	1 (reference)	0.482
High (≥ RM5000)	11 (20.4 %)	52 (26.1 %)	0.723 (0.347 – 1.506)		0.721 (0.290 – 1.794) ³	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
No	30 (55.6 %)	67 (33.7 %)	1 (reference)	0.004*	1 (reference)	0.014*
Yes	24 (44.4 %)	132 (66.3 %)	0.406 (0.220 – 0.749)		0.412 (0.203 – 0.835)⁴	
<i>Attending breastfeeding interventions</i>						
No	13 (24.1 %)	37 (18.7 %)	1 (reference)	0.380	1 (reference)	0.168
Yes	41 (75.9 %)	161 (81.3 %)	0.725 (0.353 – 1.487)		0.551 (0.236 – 1.285) ⁴	

*significantly different from reference (p< 0.05)

¹Adjusted for maternal intention to breastfeed, had pregnancy health problems, attended antenatal class, husband’s preference, grandmother’s preference and grandmother’s breastfeeding experience, ²adjusted for maternal education, maternal intention to breastfeed, had pregnancy health problems, attended antenatal class, grandmother’s breastfeeding experience and birth delivery, ³adjusted for maternal education, maternal intention to breastfeed, had pregnancy health problems, attended antenatal class, grandmother’s breastfeeding experience and birth delivery, ⁴adjusted for maternal education, maternal intention to breastfeed and had pregnancy health problems.

Table 4.71 shows crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued 'exclusive breastfeeding' at three months of obese and non-obese mothers.

Higher educated obese mothers had higher likelihood to discontinue 'exclusive breastfeeding' at three months than lower educated mothers did (crude OR 1.961, 95% CI of crude OR: 1.002 – 3.837 and the adjusted odd ratios was 2.264 (95% CI of adjusted OR: 1.031 – 4.971).

Obese mothers who had attended antenatal class were less likely to discontinue 'exclusive breastfeeding' at three months than mothers who never attend antenatal class (crude OR 0.406, 95% CI of crude OR: 0.220 – 0.749, adjusted OR 0.412, 95% CI of adjusted OR: 0.203 – 0.835).

Table 4.72 :

Unadjusted and adjusted odd ratios (ORs) for psycho-social predictors of discontinued 'exclusive breastfeeding' at three months of obese and non-obese mothers (N=253)

Factor	Obese (n=199)	Non-obese (n=54)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	35 (64.8 %)	122 (61.3 %)	1 (reference)	0.638	1 (reference)	0.618
Formula feeding or ambivalent	19 (35.2 %)	77 (38.7 %)	0.860 (0.459 – 1.610)		1.211 (0.572 – 2.564) ¹	
<i>Grandmother's preference</i>						
Breastfeeding	15 (27.8 %)	94 (47.2 %)	1 (reference)	0.012*	1 (reference)	0.031*
Formula feeding or ambivalent	39 (72.2 %)	105 (52.8 %)	2.328 (1.206 – 4.491)		2.202 (1.073 – 4.520)²	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	16 (29.6 %)	117 (58.8 %)	1 (reference)	< 0.001*	1 (reference)	0.009*
No or ambivalent	38 (70.4 %)	82 (41.2 %)	3.389 (1.771 – 6.483)		2.682 (1.276 – 5.638)³	
Psychological factors						
<i>Time of initiation of breastfeeding</i>						
Early	21 (38.9 %)	115 (57.8 %)	1 (reference)	0.015*	1 (reference)	0.053
Delayed	33 (61.1 %)	84 (42.2 %)	2.151 (1.163 – 3.980)		1.936 (0.991 – 3.782) ⁴	
<i>Intention to breastfeed</i>						
With intention	26 (48.1 %)	45 (22.6 %)	1 (reference)	<0.001*	1 (reference)	0.004*
Without intention	28 (51.9 %)	154 (77.4 %)	0.315 (0.168 – 0.590)		0.333 (0.158 – 0.703)⁵	

*significantly different from reference level with p< 0.05

¹Adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, had pregnancy health problems, grandmother's preference, grandmother's breastfeeding experience and birth delivery, ²adjusted for maternal intention to breastfeed, had pregnancy health problems, ³adjusted for maternal education, maternal intention to breastfeed, had pregnancy health problems and birth delivery, ⁴adjusted for maternal education, maternal intention to breastfeed and birth delivery, ⁵adjusted for maternal education, attending antenatal class, had pregnancy health problems, husband's preference, grandmother's preference, grandmother's breastfeeding experience and birth delivery

Table 4.72 presents unadjusted and adjusted odd ratios (ORs) for psychosocial predictors of discontinued 'exclusive breastfeeding' at three months of obese and non-obese mothers.

Obese mothers who perceived their biological mothers had preference towards formula feeding or were ambivalent on the feeding were 2.3 times more likely to discontinue 'exclusive breastfeeding' at three months than mothers who perceived their mothers preferred breastfeeding (crude OR 2.328, 95% CI of crude OR: 1.206 – 4.491, adjusted OR 2.202, 95% CI of adjusted OR: 1.073 – 4.520).

Obese mothers whose their biological mothers never had experience in breastfeeding were 3.4 times more likely to discontinue 'exclusive breastfeeding' at three months than mothers whose their mothers had breastfeeding experience for more than one month (crude OR 3.389, 95% CI of crude OR: 1.771 – 6.483, adjusted OR 2.682, 95% CI of adjusted OR: 1.276 – 5.638).

Obese mothers who had delay breastfeeding initiation were 2.2 times more likely to discontinue 'exclusive breastfeeding' than mothers who initiate breastfeeding within one hour after delivery (crude OR 2.151, 95% CI of crude OR: 1.163 – 3.980, adjusted OR 1.936, 95% CI of adjusted OR: 0.991 – 3.782).

Finally, obese mothers who had no intention to exclusive breastfeed before were less likely to discontinue 'exclusive breastfeeding' at three months than mothers who had intention to 'exclusive breastfeeding' (crude OR 0.315, 95% CI of crude OR: 0.168 – 0.590) and the adjusted odd ratios was 0.333 (95% CI of adjusted OR: 0.158 – 0.703).

Table 4.73 :

Unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at three months of obese and non-obese mothers (N=253)

Factor	Obese (n=199)	Non-obese (n=54)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Health problems during pregnancy</i>						
Yes	44 (81.5 %)	71 (35.7 %)	7.932 (3.764 – 16.715)	< 0.001*	7.231 (3.193 – 16.377)¹	< 0.001
No	10 (18.5 %)	128 (64.3 %)	1 (reference)		1 (reference)	
<i>Birth delivery method</i>						
Caesarean	23 (42.6 %)	40 (20.1 %)	2.949 (1.553 – 5.600)	0.001*	3.039 (1.526 – 6.050)²	0.002*
Vaginal	31 (57.4 %)	159 (79.9 %)	1 (reference)		1 (reference)	
<i>Breastfeeding difficulties at or before four weeks</i>						
<i>Painful swollen breasts</i>						
Yes	16 (29.6 %)	115 (57.8 %)	0.308 (0.161 – 0.588)	< 0.001*	0.288 (0.143 – 0.579)³	0.008*
No	38 (70.4 %)	84 (42.2 %)	1 (reference)		1 (reference)	
<i>Insufficient colostrum/milk</i>						
Yes	36 (66.7 %)	86 (43.7 %)	2.581 (1.372 – 4.856)	0.003*	2.220 (1.127 – 4.373)³	0.021*
No	18 (33.3 %)	111 (56.3 %)	1 (reference)		1 (reference)	
<i>Baby has suckling problems</i>						
Yes	18 (33.3 %)	24 (12.1 %)	3.646 (1.795 – 7.405)	< 0.001*	2.426 (1.122 – 5.246)³	0.024*
No	36 (66.7 %)	175 (87.9 %)	1 (reference)		1 (reference)	

*significantly different from reference level with $p < 0.05$

¹Adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, husband's preference, grandmother's preference, grandmother's breastfeeding experience and birth delivery, ²adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, ³adjusted for maternal education, maternal intention to breastfeed, attending antenatal class and birth delivery

Table 4.73 shows unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at three months of obese and non-obese mothers.

Obese mothers who had health problems like gestational diabetes mellitus and hypertension were 7.9 times more likely to discontinue 'exclusive breastfeeding' at three months than mothers who did not experience this (crude OR 7.932, 95% CI of crude OR: 3.764 – 16.715, adjusted OR 7.231, 95% CI of adjusted OR: 3.193 – 16.377).

Moreover, obese mothers who had caesarean delivery were nearly three times more likely to discontinue 'exclusive breastfeeding' than mothers who had vaginal delivery (crude OR 2.949, 95% CI of crude OR: 1.553 – 5.600, adjusted OR 3.039, 95% CI of adjusted OR: 1.526 – 6.050).

Obese mothers who experienced symptom of mastitis (breast infection) which was painful swollen breasts were less likely to discontinue 'exclusive breastfeeding' at three months than mothers who did not experience it (crude OR 0.308, 95% CI of crude OR: 0.161 – 0.588, adjusted OR 0.288, 95% CI of adjusted OR: 0.143 – 0.579).

Obese mothers who reported having insufficient colostrum/milk at or before four weeks were 2.6 times more likely to discontinue 'exclusive breastfeeding' at three months than mothers who did not have this difficulty (crude OR 2.581, 95% CI of crude OR: 1.372 – 4.856, adjusted OR 2.220, 95% CI of adjusted OR: 1.127 – 4.373).

Lastly, obese mothers whose their babies had difficulties in sucking were 3.6 times more likely to discontinue 'exclusive breastfeeding' at three months than mothers who did not experience this (crude OR 3.646, 95% CI of crude OR: 1.795 – 7.405, adjusted OR 2.426, 95% CI of adjusted OR: 1.122 – 5.246).

4.6.6 Factors Predicting Discontinuation of ‘Exclusive Breastfeeding’ At Six months

Table 4.74 :

Crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued ‘exclusive breastfeeding’ at six months of obese and non-obese mothers (N=326)

Factor	Obese (n=60)	Non-obese (n=266)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Demographic factors						
<i>Maternal years of education</i>						
≤ 12 years	17 (28.3 %)	106 (39.8 %)	1 (reference)	0.099	1 (reference)	0.192
> 12 years	43 (71.7 %)	160 (60.2 %)	1.676 (0.908 – 3.093)		1.540 (0.805 – 2.947) ¹	
<i>Maternal employment</i>						
Housewives	8 (13.3 %)	58 (21.9 %)	1 (reference)	0.142	1 (reference)	0.060
Employed	52 (86.7 %)	207 (78.1 %)	1.821 (0.819 – 4.050)		2.370 (0.964 – 5.827) ²	
<i>Household monthly income</i>						
Low (< RM 5000)	47 (78.3 %)	195 (73.3 %)	1 (reference)	0.422	1 (reference)	0.651
High (≥ RM5000)	13 (21.7 %)	71 (26.7 %)	0.760 (0.388 – 1.487)		0.828 (0.365 – 1.877) ³	
Knowledge in breastfeeding						
<i>Attending antenatal classes</i>						
No	31 (51.7 %)	82 (30.8 %)	1 (reference)	0.003*	1 (reference)	0.009*
Yes	29 (48.3 %)	184 (69.2 %)	0.417 (0.236 – 0.737)		0.418 (0.217 – 0.805)⁴	
<i>Attending breastfeeding interventions</i>						
No	45 (75.0 %)	215 (81.1 %)	1 (reference)	0.285	1 (reference)	0.079
Yes	15 (25.0 %)	50 (18.9 %)	0.698 (0.360 – 1.350)		0.499 (0.230 – 1.083) ⁵	

*significantly different from reference (p< 0.05)

¹adjusted for maternal intention to breastfeed, attending antenatal class, husband’s preference, grandmother’s preference and grandmother’s breastfeeding experience, ²adjusted for maternal intention, had pregnancy health problems, and grandmother’s breastfeeding experience, ³adjusted for maternal intention to breastfeed, maternal education, attending antenatal class, grandmother’s breastfeeding experience and had pregnancy health problems, ⁴adjusted for maternal education, maternal intention to breastfeed and had pregnancy health problems, ⁵adjusted for maternal education, maternal intention to breastfeed, attending antenatal class and had pregnancy health problems

Table 4.74 presents crude (unadjusted) and adjusted odd ratios (ORs) for socio-demographic predictors of discontinued 'exclusive breastfeeding' at six months of 326 obese and non-obese mothers.

Obese mothers who attended antenatal class were less likely to discontinue 'exclusive breastfeeding' at six months than mothers who never attend antenatal class (crude OR 0.417, 95% CI of crude OR: 0.236 – 0.737, adjusted OR 0.418, 95% CI of adjusted OR: 0.217 – 0.805).

Table 4.75 :

Unadjusted and adjusted odd ratios (ORs) for psycho-social predictors of discontinued 'exclusive breastfeeding' at six months of obese and non-obese mothers (N=326)

Factor	Obese (n=60)	Non-obese (n=266)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Social factors						
<i>Father's preference</i>						
Breastfeeding	41 (68.3 %)	169 (63.5 %)	1 (reference)	0.484	1 (reference)	0.991
Formula feeding or ambivalent	19 (31.7 %)	97 (36.5 %)	0.807 (0.444 – 1.469)		1.004 (0.526 – 1.914) ¹	
<i>Grandmother's preference</i>						
Breastfeeding	17 (28.3 %)	133 (50.0 %)	1 (reference)	0.003*	1 (reference)	0.021*
Formula feeding or ambivalent	43 (71.7 %)	133 (50.0 %)	2.529 (1.373 – 4.659)		2.140 (1.119 – 4.091)²	
<i>Grandmother's breastfeeding experience for more than one month</i>						
Yes	19 (31.7 %)	167 (62.8 %)	1 (reference)	< 0.001*	1 (reference)	0.001*
No or ambivalent	41 (68.3 %)	99 (37.2 %)	3.640 (2.002 – 6.620)		3.084 (1.632 – 5.828)²	
Psychological factors						
<i>Time of initiation of breastfeeding</i>						
Early	27 (45.0 %)	164 (61.7 %)	1 (reference)	0.019*	1 (reference)	0.085
Delayed	33 (55.0 %)	102 (38.3 %)	1.965 (1.116 – 3.459)		1.699 (0.930 – 3.105) ³	
<i>Intention to breastfeed</i>						
With intention	29 (48.3 %)	75 (28.2 %)	1 (reference)	0.003*	1 (reference)	0.006*
Without intention	31 (51.7 %)	191 (71.8 %)	0.420 (0.237 – 0.744)		0.417 (0.223 – 0.779)⁴	

*significantly different from reference level with p< 0.05

¹Adjusted for maternal intention to breastfeed, grandmother's breastfeeding experience and birth delivery, ²adjusted for maternal intention to breastfeed, maternal education, attending antenatal class and baby delivery, ³adjusted for maternal intention to breastfeed and birth delivery, ⁴adjusted for maternal education, attending antenatal class, husband's preference, grandmother's preference, grandmother's breastfeeding experience and birth delivery

Table 4.75 shows unadjusted and adjusted odd ratios (ORs) for psychosocial predictors of discontinued 'exclusive breastfeeding' at six months of 326 obese and non-obese mothers.

Obese mothers who perceived their biological mothers had preference towards formula feeding or were ambivalent about the feeding method were 2.5 times more likely to discontinue 'exclusive breastfeeding' at six months (crude OR 2.529, 95% CI of crude OR: 1.373 – 4.659, adjusted OR 2.140, 95% CI of adjusted OR: 1.119 – 4.091).

Furthermore, obese mothers whose their biological mothers did not have experience in breastfeeding for more than one month were 3.6 times more likely to discontinue 'exclusive breastfeeding' at six months (crude OR 3.640, 95% CI of crude OR: 2.002 – 6.620) and the adjusted odd ratios was 3.084 (95% CI of adjusted OR: 1.632 – 5.828).

Meanwhile, obese mothers whom delayed breastfeeding initiation were more likely to discontinue 'exclusive breastfeeding' at six months than mothers who initiate breastfeeding early (crude OR 1.965, 95% CI of crude OR: 1.116 – 3.459, adjusted OR 1.699, 95% CI of adjusted OR: 0.930 – 3.105).

Finally, obese mothers who had no intention to exclusive breastfeed before were less likely to discontinue 'exclusive breastfeeding' at three months than mothers who had intention to 'exclusive breastfeeding' (crude OR 0.420, 95% CI of crude OR: 0.237 – 0.744, adjusted OR 0.417, 95% CI of adjusted OR: 0.223 – 0.779).

Table 4.76 :

Unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at six months of obese and non-obese mothers (N=326)

Factor	Obese (n=60)	Non-obese (n=266)	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Biological factors						
<i>Health problems during pregnancy</i>						
Yes	49 (81.7 %)	85 (32.0 %)	9.486 (4.697 – 19.157)	< 0.001*	9.282 (4.333 – 19.753)¹	< 0.001
No	11 (18.3 %)	181 (68.0 %)	1 (reference)		1 (reference)	
<i>Birth delivery method</i>						
Caesarean	25 (41.7 %)	51 (19.2 %)	3.011 (1.657 – 5.471)	0.001*	2.934 (1.565 – 5.498)²	0.001*
Vaginal	35 (58.3 %)	215 (80.8 %)	1 (reference)		1 (reference)	
<i>Breastfeeding difficulties at or before four weeks</i>						
<i>Painful swollen breasts</i>						
Yes	19 (31.7 %)	159 (59.8 %)	0.312 (0.172 – 0.566)	< 0.001*	0.341 (0.180 – 0.647)³	0.001*
No	41 (68.3 %)	107 (40.2 %)	1 (reference)		1 (reference)	
<i>Insufficient colostrum/milk</i>						
Yes	37 (61.7 %)	89 (33.6 %)	3.181 (1.782 – 5.679)	< 0.001*	2.466 (1.309 – 4.644)³	0.005*
No	23 (38.3 %)	176 (66.4 %)	1 (reference)		1 (reference)	
<i>Baby has suckling problems</i>						
Yes	18 (30.0 %)	24 (9.0 %)	4.321 (2.160 – 8.645)	< 0.001*	2.963 (1.374 – 6.389)³	0.006*
No	42 (70.0 %)	242 (91.0 %)	1 (reference)		1 (reference)	

*significantly different from reference level with $p < 0.05$

¹Adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, husband's preference, grandmother's preference, grandmother's breastfeeding experience and birth delivery, ²adjusted for maternal education, maternal intention to breastfeed, attending antenatal class and husband's preference, ³adjusted for maternal education, maternal intention to breastfeed, attending antenatal class, husband's preference, grandmother's preference, grandmother's breastfeeding experience and birth delivery

Table 4.76 presents unadjusted and adjusted odd ratios (ORs) for biological predictors of discontinued 'exclusive breastfeeding' at six months of 326 obese and non-obese mothers.

Obese mothers who had health problems like gestational diabetes mellitus and hypertension were 9.5 times more likely to discontinue 'exclusive breastfeeding' at six months than mothers who were healthy during pregnancy (crude OR 9.486, 95% CI of crude OR: 4.697 – 19.157, adjusted OR 9.282, 95% CI of adjusted OR: 4.333 – 19.753).

Additionally, obese mothers who had caesarean delivery were nearly three times more likely to discontinue 'exclusive breastfeeding' than mothers who had vaginal delivery (crude OR 3.011, 95% CI of crude OR: 1.657 – 5.471, adjusted OR 2.934, 95% CI of adjusted OR: 1.565 – 5.498).

Meanwhile, obese mothers who experienced symptom of mastitis (breast infection) which was painful swollen breasts were less likely to discontinue 'exclusive breastfeeding' at six months than mothers who did not experience it (crude OR 0.312, 95% CI of crude OR: .172 – 0.566, adjusted OR 0.341, 95% CI of adjusted OR: 0.180 – 0.647).

Obese mothers who had insufficient colostrum/milk at or before four weeks were 3.2 times more likely to discontinue 'exclusive breastfeeding' at six months than mothers who did not have this difficulty (crude OR 3.181, 95% CI of crude OR: 1.782 – 5.679, adjusted OR 2.466, 95% CI of adjusted OR: 1.309 – 4.644).

Lastly, obese mothers whose their babies had sucking problems were 4.3 times more likely to discontinue 'exclusive breastfeeding' at six months than mothers who did not experience this (crude OR 4.321, 95% CI of crude OR: 2.160 – 8.645, adjusted OR 2.963, 95% CI of adjusted OR: 1.374 – 6.389).

4.6.7 Discussion on Objective 3

Prevalence of non-'exclusive breastfeeding' at three months and six months were 38.8 % and 50.0 % respectively. Factors that were significantly associated with shorter duration of 'exclusive breastfeeding' among obese mothers in this population were higher educated, not attending antenatal classes, grandmother preferred formula feeding or were ambivalent on infant feeding method, grandmother did not have more than one month breastfeeding experience, delayed breastfeeding initiation, had no intention to breastfeed prenatally, had health problems during pregnancy, caesarean

section and experienced breastfeeding difficulties such as painful swollen breasts, insufficient colostrum/milk and infant's sucking problem.

Obese mothers who were working were more likely to discontinue 'exclusive breastfeeding' earlier than six months. A similar finding was demonstrated by these studies done in Asia countries particularly Malaysia, Indonesia and Singapore with the same cultural and geographical (Idris et al., 2012; G. Ong, Yap, Foo, & Tai, 2005; Senarath, Dibley, & Agho, 2010; K. L. Tan, 2009). The relationship between employment status and breastfeeding practice were complex and it can be influenced by how and when employment status is measured. However, no matter how much time the mothers working out from home, the amounts of time spends at work has been proven will affect nursing (Taveras et al., 2003).

Many women reported that they faced difficulties during nursing or expressing milk in the workplace (Gatrell, 2007; Neville et al., 2014). Length of maternity leave, workplace flexibility, privacy concern and personal attitudes predicted breastfeeding duration for working mothers (Neville et al., 2014). In Malaysia, government workers were entitled for three months (90 days) of maternity leave and this can be extended up to 180 days for the purpose of breastfeeding infants. However, in private sectors, this could vary between 14 to 90 days. In a study done in Petaling district, Malaysia on 290 working women, they found that mothers who worked in private sector (57 %) were more likely to discontinue breastfeeding earlier than mothers worked in government sector (43 %), (OR 0.52, 95% CI: 0.32, 0.86) (R. M. Amin et al., 2011). The possibilities are due to government sectors are more likely to adopt breastfeeding supportive policies and have flexible time to express breastmilk compared to private sectors that were more rigid and had short resting time. Hence, it is compulsory to employers to provide a breastfeeding friendly environment for their employees at the office as well as offer flexibility and privacy schedules for mothers to express breastmilk.

Obese mothers who did not attend any antenatal classes were more likely to discontinue 'exclusive breastfeeding' at three different periods. Antenatal breastfeeding education is defined as information of breastfeeding being disseminated during pregnancy in a variety of forms. That could be home visiting programmes, clinic appointments and peer counselling as well. It is also may incorporate with spouses involvement (Lumbigannon et al., 2007). Few studies supported this finding that antenatal class were associated with higher rates of breastfeeding initiation and longer duration of 'exclusive breastfeeding' (Ahmad, Sughra, Kalsoom, Imran, & Hadi, 2012;

Su et al., 2007; Wong, Fong, Lee, Chu, & Tarrant, 2014). However, in a prospective cohort study done in Spain, they found that antenatal class only will efficiently improve exclusivity of breastfeeding at the first month (Artieta-Pinedo et al., 2013).

Meanwhile, this study also failed to show any associations between mothers who received 'any breastfeeding' interventions include demonstration, video, booklet and peer counselling on breastfeeding. These findings are comparable with a review published in Cochrane aimed to investigate the effectiveness of antenatal breastfeeding education on breastfeeding initiation and duration. They found that peer counselling significantly increased breastfeeding initiation, however, they also discovered that there is no intervention appeared to be more effective significantly than any other interventions in increasing breastfeeding initiation and duration. A combined breastfeeding education intervention has not significantly effective in improving breastfeeding outcomes except in one study that found a slightly significant increase in 'exclusive breastfeeding' at six months when the intervention is combined with booklet, video and lactation consultation (Lumbiganon et al., 2007).

A support from significant others is one of the factor contributes to positive breastfeeding outcomes (Gill, Reifsnider, & Lucke, 2007). This study revealed that grandmother's preference towards infant feeding were significantly correlated with the actual feeding practices of the babies. Mothers who perceived their biological mothers had preference towards breastfeeding were more likely to exclusively breastfeed their babies longer. Meanwhile, obese mothers who perceived their biological mothers had preference towards formula feeding or were ambivalent on the infant feeding method were more likely to discontinue 'exclusive breastfeeding' at any time intervals. The findings are supported by these studies (Kohlhuber et al., 2008b; Jane A Scott et al., 2006b). Never breastfeeding was associated with maternal perception that the infant's maternal grandmother had positive attitudes towards formula feeding only (Odom, Li, Scanlon, Perrine, & Grummer-Strawn, 2014). Besides that, maternal grandmother attitude towards breastfeeding was positively associated with maternal decision to breastfeed (Kohlhuber et al., 2008b).

Although this study failed to prove paternal attitudes towards breastfeeding is significantly associated with breastfeeding duration. However, social supports could be extend beyond than the father of the infants to the maternal grandmother, close families

and friends. These groups could potentially influence women's feeding selections (Jane A Scott et al., 2006b).

On top of that, maternal grandmother's breastfeeding history has persistently found to be one of the significant predictors in 'exclusive breastfeeding' discontinuation at all three time intervals in this study. Bf supports: Refer (Thulier & Mercer, 2009a).

Mothers who reported to experience breastfeeding difficulties during the first six months were more likely to discontinue 'exclusive breastfeeding' at all time intervals. The most common problems reported in this study were inadequate colostrum/milk, painful swollen breasts and infant's difficulties in sucking. These findings are similar to these studies (Kohlhuber et al., 2008b; Jane A Scott et al., 2006b; Tarrant et al., 2011; Tengku Alina et al., 2013a). Maternal perception of not having breast milk or insufficient milk supply was the most common reasons to early introduce infant formula. Many studies have noted the same perceptions for mothers to discontinue breastfeeding or supplement babies with infant formula (Arora, McJunkin, Wehrer, & Kuhn, 2000; Fjeld et al., 2008; Siah H Yadav & Yadav, 2002).

In this study, obese mothers who did not have intention to breastfeed were more likely to cease 'exclusive breastfeeding' at four weeks, three months and six months. Women's intention to breastfeed is one of the strongest predictor of breastfeeding initiation and duration (Colaizy, Saftlas, & Morriss, 2012; DiGirolamo, Thompson, Martorell, Fein, & Grummer-Strawn, 2005; S M Donath & Amir, 2003; Forster et al., 2006). Obese mothers appeared to have lower intention to breastfeed in many studies (Guelinckx, I., Devlieger, R., Bogaerts, A., Pauwels, S. and Vansant, 2011; Guendelman & Siega-Riz, 2002; Hauff, Leonard, & Rasmussen, 2014c) and intended to breastfeed shorter than their normal weight counterparts (Hilson et al., 2004).

Additionally, increased intended duration of breastfeeding also predict longer duration of breastfeeding (Blyth et al., 2004). For example, in a prospective cohort study done in Kelantan, Malaysia, they found women with longer duration of prenatal intended 'exclusive breastfeeding' were less likely to discontinue 'exclusive breastfeeding' at one month after delivery (Tengku Alina et al., 2013a).

Lastly, this study revealed obese women who had caesarean section were less likely to continue 'exclusive breastfeeding' longer. Caesarean sections were common among obese women due to obstetric complications they were likely to experience (S Y Chu et al., 2007; Minsart et al., 2014). Mothers who had caesarean deliveries were

less likely to initiate breastfeeding early (Pérez-Ríos, Ramos-Valencia, & Ortiz, 2008b; Theofiliannakou et al., 2006).

4.6.7.1 Clinical considerations in assisting obese women to breastfeed

Obese mothers have lower rates of initiating breastfeeding and in the maintenance of breastfeeding as well. It is compulsory to consider the biological aspects when considering breastfeeding difficulties experienced by obese mothers (Bever Babendure, Reifsnider, Mendias, Moramarco, & Davila, 2015). These are some interventions that would be helpful in helping obese mothers to successfully breastfeed their babies.

a) Prenatal

Healthcare providers should target this population by planning strategies to limit the weight gain during pregnancy. The rationale is to lower the risk of getting preeclampsia, gestational diabetes, macrosomia baby and caesarean delivery (Jevitt et al., 2007).

On top of that, higher BMI is related to increased risk to obstetric complications, therefore, it might be useful to provide constant support from certified doula or other trained healthcare provider during labor to prevent the incidence of caesarean delivery and shorten the length of labor (Hodnett et al., 2003; Qureshi, 2012).

b) Intrapartum

Obese pregnant women may have slow progression of labour and labour itself have shown to have higher levels of stress and anxiety. This contribute to a negative effect on uterine contractility (Bogaerts, Witters, Van den Bergh, Jans, & Devlieger, 2013). Therefore, constant support is highly needed for obese women during intrapartum and this could minimize the dependency on unnecessary augmentation and surgical intervention.

c) Early postpartum

Obese mothers normally shall perceive themselves to have insufficient colostrum/breastmilk, experience pain or discomfort during breastfeeding and latching difficulties due to anatomical of the breasts (Mok et al., 2008b). Hence, it

may be helpful if guidance were given to these women pertaining to how to know baby is getting enough milk, the correct positioning of breastfeeding to reduce nipple stress and additional assistance during breastfeeding (Brown, Baker, & Hoover, 2013; Lamontagne, Hamelin, & St-Pierre, 2008).

Lastly, a continuous support including regular phone support, referral to breastfeeding support groups and skilled in-person care such as certified lactation counsellor might be beneficial to obese women. An intervention study done on 207 dyads of obese mothers and their singleton, healthy, term infants that were assigned to six months of breastfeeding support by an International Board Certified Lactation Consultant (IBCLC) through structured interviews and telephone calls for six months (Carlsen et al., 2013). They were then be grouped into control (102 dyads) and support (105 dyads) groups. They found out that the support group breastfed exclusively (median 120 days) longer than control subjects (median 41 days, $p = 0.003$). Whilst, any breastfeeding in support group was maintained for a median of 184 days compared to 108 days in control group ($p = 0.002$). In conclusion, regular and constant telephone calls may increase the duration and exclusivity of breastfeeding.

4.7 OBJECTIVE 4: TO EXPLORE THE ASSOCIATION BETWEEN KNOWLEDGE OF BREASTFEEDING AND THE INITIATION AND DURATION OF BREASTFEEDING AMONG OBESE AND NON-OBESE WOMEN

4.7.1 Association Between Knowledge Of Breastfeeding and Early Initiation of Breastfeeding Among Obese and Non-Obese Women

Table 4.77 :

Descriptive characteristics of prenatal maternal knowledge and early initiation of breastfeeding with different BMI status (N=442)

Characteristics	Underweight n=54/76	Normal n=238/337	Overweight n=109/160	Obese n=41/78	Total
Maternal knowledge					
<i>Years of education</i>					
≤ 12 years	23 (42.6 %)	85 (35.7 %)	41 (37.6 %)	14 (34.1 %)	163 (36.9 %)
> 12 years	31 (57.4 %)	153 (64.3 %)	68 (62.4 %)	27 (65.9 %)	279 (63.1 %)
<i>IIFAS score</i>					
Positive to formula feeding	2 (3.7 %)	8 (3.4 %)	6 (5.5 %)	2 (4.9 %)	18 (4.1 %)
Neutral	43 (79.6 %)	175 (73.5 %)	81 (74.3 %)	28 (68.3 %)	327 (74.0 %)
Positive to breastfeeding	9 (16.7 %)	55 (23.1 %)	22 (20.2 %)	11 (26.8 %)	97 (21.9 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	29 (53.7 %)	141 (59.7 %)	79 (72.5 %)	24 (58.5 %)	273 (62.0 %)
Class/seminar/lecture on BF	24 (44.4 %)	109 (46.2 %)	54 (49.5 %)	21 (51.2 %)	208 (47.3%)
Demonstration of BF	26 (48.1 %)	107 (45.3 %)	57 (52.3 %)	22 (53.7 %)	212 (48.2 %)
Video/tv/slide show on BF	8 (14.8 %)	37 (15.7 %)	21 (19.3 %)	4 (9.8 %)	70 (15.9 %)
Counseling/discussion on BF	5 (9.3 %)	66 (28.0 %)	34 (31.2 %)	10 (24.4 %)	115 (26.1 %)
<i>Attending antenatal class</i>					
Yes	41 (75.9 %)	190 (79.8 %)	79 (72.5 %)	27 (65.9 %)	337 (76.2 %)
No	13 (24.1 %)	48 (20.2 %)	30 (27.5 %)	14 (34.1 %)	105 (23.8 %)

Table 4.78 :

Association of prenatal maternal knowledge and early initiation of breastfeeding among obese and non-obese women (N=442)

Characteristics	Obese n= 41/78		Non-obese n= 401/574		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>Years of education</i>									
≤ 12 years	14	34.1	149	37.2	163	36.9	0.145	1	0.704
> 12 years	27	65.9	252	62.8	279	63.1			
<i>IIFAS score</i>									
High (≥65)	19	46.3	177	44.1	196	44.3	0.073	1	0.787
Low (<65)	22	53.7	224	55.9	246	55.7			
<i>Attending breastfeeding interventions</i>									
Yes	33	80.5	324	81.2	357	81.1	0.012	1	0.911
No	8	19.5	75	18.8	83	18.9			
<i>Attending antenatal class</i>									
Yes	27	65.9	310	77.3	337	76.2	2.694	1	0.101
No	14	34.1	91	22.7	105	23.8			

IIFAS – Iowa Infant Feeding Scale

*Analyses were done using Chi square test

Table 4.77 shows descriptive characteristics of prenatal maternal knowledge and early breastfeeding initiation and Table 4.78 shows the associations between prenatal maternal knowledge and early breastfeeding initiation among obese and non-obese women.

In this study, the prevalence of early initiation of breastfeeding was 67.8 % (442/652). Early initiation was most common among underweight mothers (71.1 %: 54/76), followed by normal weight (70.6 %: 238/399), overweight (68.1 %: 109/160) and obese mothers (52.6 %: 41/78).

Nevertheless, there are no significant differences between maternal educations, scores of Iowa Infant Feeding of Scale (IIFAS), mothers received 'any breastfeeding' interventions and mothers attended antenatal classes with early initiation of breastfeeding among them, $p = 0.787$.

Higher score of IIFAS reflects positive attitudes towards breastfeeding meanwhile, lower scores posed positive attitudes towards formula feeding. Although there were 442 mothers initiated breastfeeding within one hour, non-obese women (55.9 %) had more attitudes towards formula feeding compared to obese women (53.7 %).

In addition, there are many forms of breastfeeding interventions that the mothers might receive during antenatal period. For example, pamphlets, lectures, videos, counselling and demonstrations on breastfeeding. Majority of the mothers reported to receive breastfeeding education in forms of pamphlets or notes on breastfeeding (62.0 %: 273/442), followed by demonstrations of breastfeeding by certified nurses/midwives/lactation counsellors (48.2 %: 212/442), classes/seminar/lectures (47.3 %: 208/442), counselling/one-to-one discussions (26.1 %: 115/442) and videos/slideshows/televisions viewing on breastfeeding (15.9 %: 70/442).

Non-obese women (77.3 %: 310/401) tend to attend antenatal classes more than obese women do (65.9 %: 27/41). In Malaysia, antenatal classes were normally organized by private hospitals where parents should have to pay for the attendance.

4.7.2 Association Between Knowledge of Breastfeeding and ‘Exclusive Breastfeeding’ Among Obese and Non-Obese Women

Table 4.79 :

Descriptive characteristics of prenatal maternal knowledge and ‘exclusive breastfeeding’ at four weeks with different BMI status (N=512)

Characteristics	Underweight n=65/76	Normal n=289/337	Overweight n=124/160	Obese n=34/78	Total
Maternal knowledge					
<i>Years of education</i>					
≤ 12 years	26 (40.0 %)	96 (33.2 %)	42 (33.9 %)	13 (38.2 %)	177 (34.6 %)
> 12 years	39 (60.0 %)	193 (66.8 %)	82 (66.1 %)	21 (61.8 %)	335 (65.4 %)
<i>IIFAS score</i>					
Positive to formula feeding	2 (3.7 %)	8 (3.4 %)	6 (5.5 %)	2 (4.9 %)	18 (4.1 %)
Neutral	43 (79.6 %)	175 (73.5 %)	81 (74.3 %)	28 (68.3 %)	327 (74.0 %)
Positive to breastfeeding	9 (16.7 %)	55 (23.1 %)	22 (20.2 %)	11 (26.8 %)	97 (21.9 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	35 (53.8 %)	184 (64.3 %)	85 (68.5 %)	18 (52.9 %)	322 (63.3 %)
Class/seminar/lecture on BF	32 (49.2 %)	139 (48.6 %)	60 (48.4 %)	14 (41.2 %)	245 (48.1 %)
Demonstration of BF	31 (47.7 %)	139 (48.6 %)	67 (54.0 %)	17 (50.0 %)	254 (49.9 %)
Video/tv/slide show on BF	12 (18.5 %)	41 (14.3 %)	22 (17.7 %)	3 (8.8 %)	78 (15.3 %)
Counseling/discussion on BF	9 (13.8 %)	83 (29.0 %)	39 (31.5 %)	7 (20.6 %)	138 (27.1 %)
<i>Attending antenatal class</i>					
Yes	49 (75.4 %)	233 (80.6 %)	88 (71.0 %)	25 (73.5 %)	395 (77.1 %)
No	16 (24.6 %)	56 (19.4 %)	36 (29.0 %)	9 (26.5 %)	117 (22.9 %)

Table 4.80 :

Association of prenatal maternal knowledge and 'exclusive breastfeeding' at four weeks among obese and non-obese women (N=512)

Characteristics	Obese n= 34/78		Non-obese n= 478/574		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>Years of education</i>									
≤ 12 years	13	38.2	164	34.3	177	34.6	0.216	1	0.642
> 12 years	21	61.8	314	65.7	335	65.4			
<i>IIFAS score</i>									
High (≥65)	16	47.1	220	46.0	236	46.1	0.014	1	0.907
Low (<65)	18	52.9	258	54.0	276	53.9			
<i>Attending breastfeeding interventions</i>									
Yes	24	70.6	391	82.3	415	81.5	2.898	1	0.089
No	10	29.4	84	17.7	94	18.5			
<i>Attending antenatal class</i>									
Yes	25	73.5	370	77.4	395	77.1	0.271	1	0.603
No	9	26.5	108	22.6	117	22.9			

*Analyses were done using Chi square test

Table 4.79 shows descriptive characteristics of prenatal maternal knowledge and ‘exclusive breastfeeding’ at four weeks and Table 4.80 shows the associations between prenatal maternal knowledge and ‘exclusive breastfeeding’ at four weeks among obese and non-obese women.

In this study, the prevalence of ‘exclusive breastfeeding’ at four weeks was 78.5 % (512/652). ‘exclusive breastfeeding’ at four weeks was most common among normal weight mothers (85.8 %: 289/337) and underweight (84.4 %: 65/76). It is least prevalent among obese (43.6 %: 34/78), followed by overweight mothers (77.5 %: 124/160).

Nevertheless, there were no significant association between maternal educations, scores of Iowa Infant Feeding of Scale (IIFAS), mothers received ‘any breastfeeding’ interventions and mothers attended antenatal classes with ‘exclusive breastfeeding’ at four weeks among them, $p > 0.05$.

For all BMI groups, higher educated mothers were more common to exclusively breastfeed their infants at four weeks. Higher score of IIFAS reflects positive attitudes towards breastfeeding meanwhile, lower scores posed positive attitudes towards formula feeding. Although the prevalence of ‘exclusive breastfeeding’ at higher rate, only 21.9 % (97/512) of them had positive attitudes towards breastfeeding and low percentage were favoured to formula feeding (4.1 %: 18/512). The rest were being neutral on infant feeding methods (74.0 %: 327/512).

In addition, there are many forms of breastfeeding interventions that the mothers might receive during antenatal period. For example, pamphlets, lectures, videos, counselling and demonstrations on breastfeeding. Majority of the mothers reported to receive breastfeeding education in forms of pamphlets or notes on breastfeeding (63.3 %: 322/512), followed by demonstrations of breastfeeding by certified nurses/midwives/lactation counsellors (49.9 %: 254/512), classes/seminar/lectures (48.1 %: 245/512), counselling/one-to-one discussions (27.1 %: 138/512) and videos/slideshows/televisions viewing on breastfeeding (15.3 %: 78/512). Majority of the mothers stated they have attended antenatal classes (77.1 %: 395/512).

4.7.3 Association Between Knowledge Of Breastfeeding And ‘Exclusive Breastfeeding’ At three months Among Obese And Non-Obese Women

Table 17 (Refer to Appendix) shows descriptive characteristics of prenatal maternal knowledge and ‘exclusive breastfeeding’ at three months and Table 18 (Refer to Appendix)

shows the associations between prenatal maternal knowledge and 'exclusive breastfeeding' at three months among obese and non-obese women.

In this study, the prevalence of 'exclusive breastfeeding' at three months was 61.2 % (399/652). 'exclusive breastfeeding' at three months was more common among normal weight mothers (71.2 %: 240/337) and underweight (62.3 %: 48/76). It is least prevalent among obese (30.8 %: 24/78) and followed by overweight mothers (54.4 %: 87/160).

There were no significant difference between maternal educations, scores of Iowa Infant Feeding of Scale (IIFAS), mothers received 'any breastfeeding' interventions and mothers attended antenatal classes with 'exclusive breastfeeding' at three months among them, $p > 0.05$.

Obese mothers (54.2 %: 13/24) who had higher score of IIFAS were more common to continue 'exclusive breastfeeding' at three months compared to non-obese mothers (44.8 %: 168/375). Higher score of IIFAS was related to positive attitudes towards breastfeeding.

In addition, there are many forms of breastfeeding interventions that the mothers might receive during antenatal period. For example, pamphlets, lectures, videos, counselling and demonstrations on breastfeeding. Majority of the mothers reported to receive breastfeeding education in forms of pamphlets or notes on breastfeeding (62.0 %: 273/442), followed by demonstrations of breastfeeding by certified nurses/midwives/lactation counsellors (48.2 %: 212/442), classes/seminar/lectures (47.3 %: 208/442), counselling/one-to-one discussions (26.1 %: 115/442) and videos/slideshows/televisions viewing on breastfeeding (15.9 %: 70/442). Majority of the mothers stated they have attended antenatal classes (78.5 %: 315/399).

4.7.4 Association Between Knowledge of Breastfeeding and ‘Exclusive Breastfeeding’ at Six months Among Obese and Non-Obese Women

Table 4.81 :

Descriptive characteristics of prenatal maternal knowledge and ‘exclusive breastfeeding’ at six months with different BMI status (N=326)

Characteristics	Underweight n=41/76	Normal n=200/337	Overweight n=67/160	Obese n=18/78	Total
Maternal knowledge					
<i>Years of education</i>					
≤ 12 years	18 (43.9 %)	64 (32.0 %)	24 (35.8 %)	10 (55.6 %)	116 (35.6 %)
> 12 years	23 (56.1 %)	136 (68.0 %)	43 (64.2 %)	8 (44.4 %)	210 (64.4 %)
<i>IIFAS score</i>					
Positive to formula feeding	2 (4.9 %)	6 (3.0 %)	3 (4.5 %)	2 (11.1 %)	13 (4.0 %)
Neutral	29 (70.7 %)	145 (72.5 %)	46 (68.7 %)	9 (50.0 %)	229 (70.2 %)
Positive to breastfeeding	10 (24.4 %)	49 (24.5 %)	18 (26.9 %)	7 (38.9 %)	84 (25.8 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	22 (53.7 %)	125 (63.5 %)	47 (70.1 %)	11 (61.1 %)	205 (63.5 %)
Class/seminar/lecture on BF	21 (51.2 %)	99 (50.3 %)	36 (53.7 %)	9 (50.0 %)	165 (51.1 %)
Demonstration of BF	20 (48.8 %)	96 (48.7 %)	40 (59.7 %)	10 (55.6 %)	166 (51.4 %)
Video/tv/slide show on BF	6 (14.6 %)	29 (14.7 %)	15 (22.4 %)	2 (11.1 %)	52 (16.1 %)
Counseling/discussion on BF	3 (7.3 %)	64 (32.5 %)	17 (25.4 %)	4 (22.2 %)	88 (27.2 %)
<i>Attending antenatal class</i>					
Yes	31 (75.6 %)	166 (83.0 %)	48 (71.6 %)	13 (72.2 %)	258 (79.1 %)
No	10 (24.4 %)	34 (17.0 %)	19 (28.4 %)	5 (27.8 %)	68 (20.9 %)

Table 4.82 :

Association of prenatal maternal knowledge and 'exclusive breastfeeding' at six months among obese and non-obese women (N=512)

Characteristics	Obese n= 18/78		Non-obese n= 308/574		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>Years of education</i>									
≤ 12 years	10	55.6	106	34.4	116	35.6	3.316	1	0.069
> 12 years	8	44.4	202	65.6	210	64.4			
<i>IIFAS score</i>									
High (≥65)	9	50.0	146	47.4	155	47.5	0.046	1	0.830
Low (<65)	9	50.0	162	52.6	171	52.5			
<i>Attending breastfeeding interventions</i>									
Yes	15	83.3	254	83.3	269	83.3	0.000	1	0.995
No	3	16.7	51	16.7	54	16.7			
<i>Attending antenatal class</i>									
Yes	13	72.2	245	79.5	258	79.1	0.552	1	0.457
No	5	27.8	63	20.5	68	20.9			

*Analyses were done using Chi square test

Table 4.81 shows descriptive characteristics of prenatal maternal knowledge and ‘exclusive breastfeeding’ at six months and Table 4.82 shows the associations between prenatal maternal knowledge and ‘exclusive breastfeeding’ at six months among obese and non-obese women.

In this study, the prevalence of ‘exclusive breastfeeding’ at six months was 50.0 % (326/652). ‘exclusive breastfeeding’ at six months was least common among obese mothers (23.1 %: 18/78) and overweight (41.9 %: 67/160). The highest was among normal weight mothers (59.3 %: 200/337) and followed by underweight (53.2 %: 41/76).

There were no significant difference between maternal educations, scores of Iowa Infant Feeding of Scale (IIFAS), mothers received ‘any breastfeeding’ interventions and mothers attended antenatal classes with ‘exclusive breastfeeding’ at six months among them, $p > 0.05$.

Obese women (50.0 %) had higher score in IIFAS score which reflects more attitudes towards breastfeeding compared to non-obese women (47.4 %).

The highest form of breastfeeding education received was pamphlets or notes on breastfeeding (63.5 %: 205/326), followed by demonstrations of breastfeeding by certified nurses or midwives or lactation counsellors (51.4 %: 166/326), classes or seminar or lectures (51.1 %: 165/326), counselling or one-to-one discussions (27.2 %: 88/326) and videos or slideshows or televisions viewing on breastfeeding (16.1 %: 52/399).

Non-obese women (79.5 %: 245/399) tend to attend antenatal classes more than obese women do (72.2 %: 13/18). However, as seen in this study, those who attended antenatal classes (79.1 %: 258/326) were prone to continue ‘exclusive breastfeeding’ at six months than who never did (20.9 %: 68/326).

4.7.5 Discussion on Objective 4

This study did not find any association between prenatal maternal knowledge and breastfeeding initiation and exclusivity among obese and non-obese women.

However, the prevalence of 'exclusive breastfeeding' at both three and six months were higher among lower educated obese mothers than higher educated non-obese mothers. This contradicts to the previous findings that shows higher maternal education are associated with longer duration of breastfeeding (Holbrook, White, Heyman, & Wojcicki, 2013b; L. Li et al., 2004; Riva et al., 1999). However, they did not specify if the mothers were obese or not.

Education interventions on breastfeeding received during pregnancy had positive impacts towards breastfeeding outcomes (Ryser, 2004). An intervention study named 'Best Start' program which aimed to determine the effect of breastfeeding educational program on breastfeeding attitudes, intention, and initiation was conducted in Texas, USA in a sample of urban women of lower socioeconomic status. It includes counselling, video tapes viewing and reading written materials specifically designed to address the common breastfeeding barriers perceived by low-income women. As a result, subjects who were exposed to the program (76.0 %) imposed higher breastfeeding intention than those in control group (25.9 %), $\chi^2(1, n = 52) = 11.10, P < .01$. Meanwhile, increased rate of breastfeeding initiation was observed in the experimental group (60.9 %) when compared to those in the control group (14.8 %)(Ryser, 2004).

Findings in Ryser and colleagues study are comparable with a review published in Cochrane aimed to investigate the effectiveness of antenatal breastfeeding education on breastfeeding initiation and duration (Lumbiganon et al., 2007). A total of 16 randomized-controlled studies involving 8262 women were analysed. They found that peer counselling significantly increased breastfeeding initiation; however, they also discovered that there is no intervention appeared to be more effective significantly than any other interventions in increasing breastfeeding initiation and duration. A combined breastfeeding education intervention has not significantly effective in improving breastfeeding outcomes except in one study that found a slightly significant increase in 'exclusive breastfeeding' at six months when the intervention is combined with booklet, video and lactation consultation (Lumbiganon et al., 2007).

Contradicted to another Cochrane review done including seven randomized-controlled studies on 1388 women done in USA. The evidence showed that prenatal breastfeeding education imposed a considerable effect on increasing breastfeeding initiation rates (RR 1.53, 95% CI 1.25, 1.88) (Dyson, McCormick, & Renfrew, 2014). Yet, in another quasi-experimental design study done on Hispanic women to investigate the effects of support on the initiation and duration of breastfeeding. The study suggested that prenatal education contribute to positive outcomes in breastfeeding initiation and duration (Gill et al., 2007).

Meanwhile, Scott and colleagues conducted a study to expectant parents to measure infant feeding attitude and the actual practice upon discharge after delivery. Their study proved that maternal infant feeding attitudes were a predictor of feeding choice compared to paternal infant feeding attitudes and demographic factors (Jane A. Scott, Shaker, and Reid, 2004).

Iowa Infant Feeding Scale is a tool that measures attitude and knowledge on infant feeding. Total scores range from 17 to 85 with higher score reflecting attitudes more positive to breastfeeding. Total scores are grouped into the following three categories: (1) positive to breastfeeding (70–85), (2) neutral (49–69), and (3) positive to formula feeding (17–48) (Arlene de la Mora, Russell, Dungy, Losch, & Dusdieker, 1999). In the meantime, according to various studies, higher scores of IIFAS are associated positively with breastfeeding initiation and longer duration of breastfeeding (Chen et al., 2013). Higher maternal IIFAS score was significantly associated with intended and actual breastfeeding practice (Dungy, McInnes, Tappin, Wallis, and Oprescu, 2008).

In a study done in Perth, Australia targeting Chinese population living there and comparing with Chinese population in Chengdu, China, they found out that higher scores of IIFAS were significantly associated with the likelihood of breastfeeding initiation (OR: 3.85, CI: 2.49 – 5.96, $p < 0.001$) and longer duration of breastfeeding (≥ 8 months) (OR: 2.52, CI: 1.87-3.40, $p < 0.001$) (Chen et al., 2013).

However, findings from a study that investigated the associations between IIFAS and breastfeeding initiation and duration in a cohort of pregnant Latina women in San Francisco (Holbrook et al., 2013a), showed no significant association between higher IIFAS score and positive breastfeeding outcomes. IIFAS was administered to the mothers prior to delivery, and they were followed up at six months and one year postpartum to gain information regarding feeding choice. They found out higher IIFAS

score was not linked to breastfeeding initiation and breastfeeding at six or 12 months or 'exclusive breastfeeding' at six months (Holbrook et al., 2013a).

4.8 OBJECTIVE 5: TO DETERMINE ASSOCIATION BETWEEN MATERNAL WEIGHT RETENTION AND BREASTFEEDING

This section will discuss further on the association between postpartum weight retention and breastfeeding practices among the mothers.

4.8.1 Maternal Weight Changes After six months Delivery

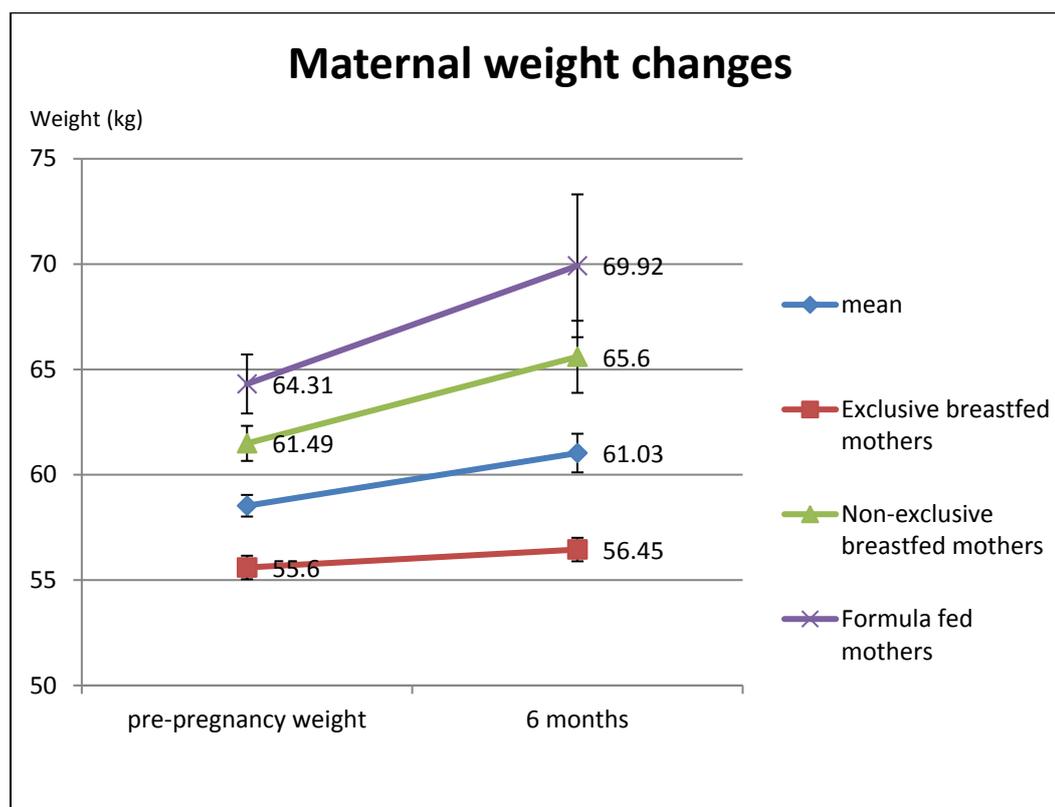


Figure 4.3 : Maternal weight changes in six months after delivery (kg)

Figure 4.3 shows maternal weight changes from pre-pregnancy weight to weight during six months postpartum.

For the whole population, the average weight during prepregnancy was 58.53 kg (SD = 13.04) meanwhile, average weight six months postpartum was 61.03 kg (SD = 23.41).

As shown in the graph above, exclusive breastfed mothers had weight retention of 0.85 kg after six months delivery. The average weight during prepregnancy was 55.6 kg (SD = 0.558) and increased to 56.45 kg (SD = 0.558). Meanwhile, mothers who

formula fed, had higher rates of gestational weight gain of 5.61 kg. The average weight during pregnancy of formula fed mothers was 64.31 kg (SD = 1.4) and six months postpartum was 69.92 kg (SD = 3.389).

4.8.2 Association Between Weight Retention And Breastfeeding Practices

Table 4.83 :

Weight changes between pre-pregnancy and six months after delivery (N=647)

Pre-pregnancy		six months postpartum		95% CI for mean difference	t	df	p value
Mean	Standard deviation	Mean	Standard deviation				
58.53	13.04	60.99	23.49	-3.999, -0.926	-3.146	646	0.002

*Analyses were done using linear regression analysis

Table 4.83 shows weight changes between pre-pregnancy and six months after delivery of the subjects analysed using linear regression analysis. The pre-pregnancy weight was self-reported by the mothers and weight measurement were taken during six months follow-up.

Mothers had significant weight retention of 2.46 kg at six months postpartum (M=60.99, SD=13.04) compared to weight at pre-pregnancy (M=58.53, SD=13.04), $t(646) = -3.146$, $p = 0.002$.

Meanwhile, Table 4.84 below shows weight changes at pre-pregnancy and six months postpartum between exclusively breastfed and non-exclusively breastfed mothers.

Table 4.84 :

Weight changes at pre-pregnancy and six months after delivery between mothers who exclusive breastfed and non-exclusively breastfed (N=652)

Outcome	Pre-pregnancy		six months postpartum		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Exclusive breastfed	55.60	10.06	56.44	10.08	325	-1.287, -0.398	-3.725	324	< 0.001
Non-exclusive breastfed	61.49	14.92	65.59	31.08	322	-7.150, -1.044	-2.640	321	< 0.001

* Analyses were done using paired samples t-test

There was a significant difference in the weight between exclusive and non-exclusive breastfed mothers at pre-pregnancy and six months after delivery. The paired samples t-test revealed that exclusively breastfeeding mothers had less weight retention of 0.842 kg compared to non-exclusively breastfeeding mothers upon six months delivery (M=56.44, SD=10.08) compared to weight at pre-pregnancy (M=55.60, SD=10.06), $t(324) = -3.725$, $p < 0.001$.

Meanwhile, non-exclusively breastfeeding mothers had greater significant of weight retention of 4.097 kg upon six months delivery (M=61.49, SD=14.92) compared to weight at pre-pregnancy (M=65.59, SD=31.08), $t(321) = -2.640$, $p < 0.001$.

The weight change at six months is significant to their pre-pregnancy weight for mothers who exclusively breastfeeding and non-exclusively breastfeeding ($p = 0.037$, $t = 2.085$, 95% CI for mean difference = 0.189, 6.32).

Table 4.85 below shows weight changes at pre-pregnancy and six months after delivery between mothers who formula fed and breastfed.

Table 4.85 :

Weight changes at pre-pregnancy and six months after delivery between mothers who formula fed and breastfed (N=647)

Outcome	Pre-pregnancy		six months postpartum		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Formula fed	64.31	17.37	67.00	42.87	154	-12.058, 0.683	-1.764	153	0.080
Breastfed	56.72	10.76	58.18	10.95	493	-1.830, -1.079	-7.610	492	< 0.001

* Analysis were done using paired samples t-test

A two-tailed paired samples t-test revealed that formula fed mothers had greater weight retention of 5.69 kg which was more than breastfed mothers upon six months delivery (M=67.00, SD=42.87) compared to weight at pre-pregnancy (M=64.31, SD=17.37), $t(153) = -1.764$, $p = 0.08$. Meanwhile, breastfed mothers had significant weight retention of only 1.45 kg upon six months delivery (M=58.18, SD=10.95) compared to weight at pre-pregnancy (M=56.72, SD=10.76), $t(492) = -7.610$, $p < 0.001$.

The weight change at six months is significant to their pre-pregnancy weight for mothers who formula fed and breastfed ($p = 0.021$, $t = -2.311$, 95% CI for mean difference = -7.829, 0.637).

4.8.3 Association of Weight Retention and Breastfeeding Practices Between Obese and Non-Obese Mothers

Table 4.86 :

Weight changes at pre-pregnancy and six months after delivery of mothers who exclusive breastfed and non-exclusively breastfed between obese and non-obese mothers (N=647)

Outcome	Pre-pregnancy		six months postpartum		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Exclusive breastfed	77.50	6.18	74.17	10.10	18	0.120, 6.535	2.189	17	0.043
Obese									
Non-exclusive breastfed	84.41	10.72	86.12	12.45	60	-3.105, -0.305	-2.437	59	0.018
Exclusive breastfed	54.31	8.67	55.40	9.08	307	-1.510, -0.664	-5.053	306	< 0.001
Non-obese Non-exclusive breastfed	56.24	9.98	60.88	32.15	262	-8.385, -0.905	-2.445	261	0.015

* Analysis were done using paired samples t-test

Table 4.87 :

Weight changes at pre-pregnancy and six months after delivery of mothers who formula fed and breastfed between obese and non-obese mothers (N=647)

Outcome	Pre-pregnancy		six months postpartum		N	95% CI for mean difference	t	df	p value	
	Mean	Standard deviation	Mean	Standard deviation						
Obese	Exclusive breastfed	86.66	11.23	88.34	13.35	42	-3.550, 0.188	-1.817	41	0.077
	Non-exclusive breastfed	78.34	6.70	77.55	9.71	36	-1.197, 2.763	0.803	35	0.427
Non-obese	Exclusive breastfed	55.93	10.47	63.12	47.87	112	-15.944, 1.563	-1.628	111	0.106
	Non-exclusive breastfed	55.02	9.04	56.65	9.50	457	-2.003, -1.259	-8.614	456	< 0.001

* Analyses were done using paired samples t-test

Table 4.86 shows weight changes at pre-pregnancy and six months after delivery of mothers whom exclusive breastfed and non-exclusively breastfed between obese and non-obese mothers.

There was a significant difference in the weight of mothers who exclusive and non-'exclusive breastfeeding' at pre-pregnancy and six months after delivery between obese and non-obese women. A paired samples t-test revealed that, obese mothers who exclusively breastfed at six months had lost weight of 3.328 kg compared to non-exclusive breastfed mothers who had weight retention of 1.705 kg at six months after delivery. Meanwhile, non-obese mothers who exclusively breastfed at six months had lesser weigh retention of 1.087 kg compared to non-exclusively breastfed mothers who had greater weight retention of 4.645 kg at six months after delivery.

In table 4.87 shows weight changes at pre-pregnancy and six months after delivery of mothers who formula fed and breastfed between obese and non-obese mothers.

There was no significant difference in the weight of mothers who formula fed and breastfed at pre-pregnancy and six months after delivery between obese and non-obese women. A paired samples t-test revealed that, obese mothers who formula fed at six months had weight retention of 1.68 kg compared to breastfed mothers who had weight loss of 0.78 kg at six months after delivery. Meanwhile, non-obese mothers who formula fed at six months had greater weigh retention of 7.19 kg compared to breastfed mothers who had lesser weight retention of 1.63 kg at six months after delivery.

4.8.4 Factors Associated With Weight Changes at Six months Postpartum

Table 4.88 :

Factors associated with weight changes at six months after delivery (N=632)

Variables (n)	B	p-value	95% confidence interval (CI)
<i>Intercept</i>	3.924	0.006	-0.450, 8.299
Pregnancy BMI			
Obese (78)	-3.326	0.046	-6.597,-0.055
Non-obese (554)	(Reference group)		
Education			
≤ 12 years (231)	-2.445	0.169	-5.926, 1.040
> 12 years (401)	(Reference group)		
Employment status			
Housewives (195)	4.140	0.029	0.419, 7.860
Work/Study (437)	(Reference group)		
'any breastfeeding'			
Yes (167)	3.216	0.102	-0.636, 7.069
No (465)	(Reference group)		
Formula breastfeeding			
Yes (149)	6.501	0.002	2.489, 10.514
No (483)	(Reference group)		
Received breastfeeding interventions			
Yes (517)	-3.673	0.071	-7.669, 0.322
No (115)	(Reference group)		

*Analysis were done using simple linear regression test

A simple linear regression was calculated to predict weight changes at six months after delivery based on the potential associated factors. These variables statistically significantly predicted weight changes after six months delivery, $F(6,633) = 3.031$, $p < 0.05$, $R^2 = 0.028$. Subjects predicted weight changes is equal to $3.924 - 3.326$ (being obese) + 4.140 (housewife) + 6.501 (formula-fed). Subject's weight increased by 4.140 if she is a housewife and 6.501 when formula-fed babies at six months and increased by 3.326 if she is obese during pre-pregnancy.

4.8.5 Discussion on Objective 5

After six months delivery, formula fed mothers (5.69 kg) had greater weight retention compared to breastfed mothers (1.45 kg). In this study, the women who retained more weight six months postpartum were those who had higher BMI more than 25 kg/m² during pre-pregnancy, housewives and formula-fed their babies.

Findings of this study are similar to a cohort study done in Brazil on 145 women; they found that lack of 'exclusive breastfeeding' was one of the predictor of weight retention. Greater weight retention was directly associated with greater parity, inter-pregnancy interval, calorie intake, pre-pregnancy BMI, depression scores and lack of 'exclusive breastfeeding' Meanwhile, women who retained less weight were those who ingested lower calories, had a lower BMI before pregnancy and breastfeed their babies exclusively for a longer period (Zanotti, Capp, & Wender, 2015).

Although this study failed to find an association between weight changes at six months after delivery and pre-pregnancy BMI, but, these studies found pre-pregnancy BMI was one of the predictor of postpartum weight retention (Herring et al., 2012; Zanotti et al., 2015). Maternal pre-pregnancy BMI was associated with gestational weight gain (GWG) (Z. Chen et al., 2010; Kirkegaard et al., 2015; N. Li et al., 2013).

Higher pre-pregnancy BMI was associated with a number of adverse health outcomes during pregnancy include gestational diabetes mellitus, gestational hypertension, preeclampsia, preterm premature rupture of membrane, preterm delivery, caesarean delivery, large-for-age babies and macrosomia (Z. Chen et al., 2010; N. Li et al., 2013). On top of that, higher risk of developing gestational hypertension, fetal macromomia and premature rupture of membrane was significantly influenced by a gestational weight gain of 0.5 kg per week or greater ($p < 0.05$) (Z. Chen et al., 2010). In the meantime, there were 2.2 to 5.9 folds higher risk of having gestational diabetes mellitus, gestational hypertension, caesarean delivery, large-for-age and macrosomia among women with both pre-pregnancy obesity and excessive weight gain as recommended by Institute of Medicine (IOM) (IOM, 2009).

Furthermore, women who had excessive gestational weight gain was significantly associated with greater weight retention at any time intervals of postpartum periods (A. M. Siega-Riz et al., 2009).

A prospective observational study done among 15 women in Brazil to investigate the risk factors for weight retention after childbirth. The study reported that age at menarche, gestational weight gain of more than 16 kg, body fat percentage of more than 30 at baseline and BMI of more than 25 kg/m² at 6 weeks postpartum were associated with weight retention. However, final statistical test revealed that excessive weight gain was the single risk factor in determining postpartum weight retention (PWR) (OR 74.1, 95% CI 9.0, 609.6) (Vasconcelos, Costa, Almeida, Araujo Júnior, & Sampaio, 2014).

Furthermore, this study also found no significant association between 'exclusive breastfeeding' at six months and weight retention, but, formula feeding was the predictor of greater weight retention, $p < 0.01$.

Nonetheless, the findings of this study are closest to this retrospective follow-up study that was done among mothers who registered in North Carolina's Pregnancy Surveillance System under Women, Infants and Children (WIC) programme between years 1996 to 2004 (Krause, Lovelady, Peterson, Chowdhury, & Østbye, 2010). Formula feeding mothers (6.8 ± 0.2 kg) had higher weight retention as compared to mixed feeding (5.2 ± 0.14 kg) and full breastfeeding (5.0 ± 0.19 kg) at six months postpartum. Meanwhile, they found no association between breastfeeding and weight retention at three months postpartum.

Nevertheless, extensive studies held the hypothesis that breastfeeding had positive impacts on lowering postpartum weight retention (Baker et al., 2008; Brandhagen et al., 2013; Kac, Benício, Velásquez-Meléndez, Valente, & Struchiner, 2004).

This study also used data on pre-gestational weight as self-reported by the patient itself, which may lead to an estimation bias. However, there is a correlation found between self-reported and measured pre-pregnancy weight (Holland, Simas, Curiale, Liao, & Waring, 2013).

4.9 OBJECTIVE 6: TO INVESTIGATE THE RELATIONSHIP BETWEEN INFANT GROWTH AND BREASTFEEDING

4.9.1 Infant Growth From Zero To Six months

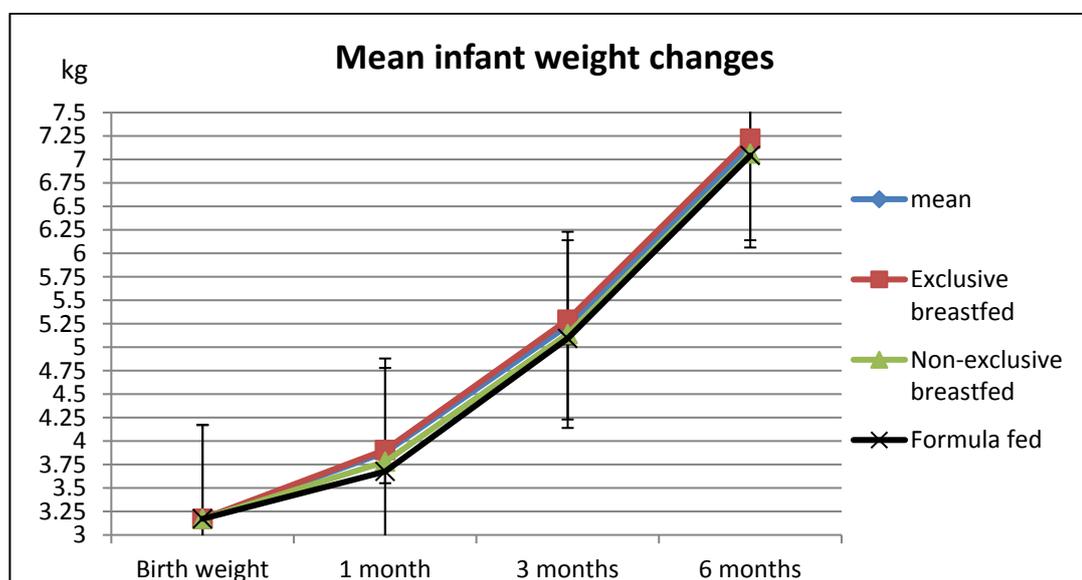


Figure 4.4 : Mean infant weight changes from birth until six months

Figure 4.4 shows the mean infant weight changes from birth until six months based on different infant feeding patterns.

Mean weight at one month old was 3.888 ± 0.018 kg for total population. Mean weight at one month old for exclusively breastfed infants was the highest, 3.91 ± 0.02 kg, followed by non-exclusive breastfed (3.78 ± 0.042 kg) and formula fed (3.68 ± 0.125 kg) infants.

At three months, exclusive breastfed infants had mean weight of 5.29 ± 0.03 kg, non-exclusive breastfed infants (5.14 ± 0.04 kg) and formula fed infants was 5.09 ± 0.65 kg. Meanwhile, at six months, mean weight of exclusive breastfed infants was 7.22 ± 0.05 kg, non-exclusive breastfed infants was 5.14 ± 0.04 kg and formula fed infants was 5.09 ± 0.07 kg. .

In conclusion, exclusively breastfed babies had the highest mean weight for all time intervals followed by non-exclusively breastfed and formula fed babies.

4.9.2 Breastfeeding and Infant Growth at One month

There was a significant difference of weight change between birth and at one month (Table 4.89). A paired samples t-test revealed that exclusively breastfed babies had a significant weight increment of 0.72 kg at one month ($M=3.91$, $SD=0.45$) compared to at birth ($M=3.19$, $SD=0.34$), $t(511) = -63.88$, $p < 0.001$. Meanwhile, non-exclusively breastfed babies had 0.66 kg increment at one month ($M=3.78$, $SD=0.50$) compared to at birth ($M=3.12$, $SD=0.41$), $t(139) = -26.48$, $p < 0.001$.

Table 4.89 :

Weight changes at birth and one month after delivery for infants who were exclusively and non-exclusively breastfed (N=647)

Outcome	At birth		one month		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Exclusive breastfed	3.19	0.34	3.91	0.45	512	-0.741, - 0.696	- 63.88	511	< 0.001
Non- exclusive breastfed	3.12	0.41	3.78	0.50	140	-0.709, - 0.611	- 26.48	139	< 0.001

*Analysis were done using paired samples t-test

Table 4.90 :

Weight changes at birth and one month after delivery for infants who were formula fed and breastfed (N=652)

Outcome	At birth		one month		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Formula fed	3.02	0.56	3.68	0.57	21	-0.749, -0.556	-14.122	20	< 0.001
Breastfed	3.18	0.35	3.89	0.45	631	-0.729, -0.687	-66.811	630	< 0.001

* Analysis were done using paired samples t-test

Similar trends were observed for formula and breastfed babies (Table 4.90). A paired samples t-test revealed that breastfed babies had a significant weight increment of 0.7 kg at one month ($M=3.89$, $SD=0.45$) compared to at birth ($M=3.18$, $SD=0.35$), $t(630) = -66.811$, $p < 0.001$. Meanwhile, formula fed babies had 0.65 kg increment at one month ($M=3.68$, $SD=0.57$) compared to at birth ($M=3.02$, $SD=0.56$), $t(20) = -14.122$, $p < 0.001$.

4.9.3 Breastfeeding and infant growth at three months

Table 4.91 :
Weight changes at birth and three months after birth between infants who exclusive and non-exclusive breastfed (N=647)

Outcome	At birth		three months		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Exclusively breastfed	3.19	0.35	5.29	0.65	399	-2.155, -2.057	-84.36	398	< 0.001
Non-exclusively breastfed	3.15	0.37	5.14	0.58	253	-2.041, -1.937	-74.85	252	< 0.001

*Analysis were done using paired samples t-test

There was a significant difference of weight changes between birth and at three months (Table 4.91). A paired samples t-test revealed that exclusively breastfed babies had significant weight increment of 2.11 kg at three months (M=5.29, SD=0.65) compared to at birth (M=3.19, SD=0.35), $t(398) = -84.364$, $p < 0.001$. Meanwhile, non-exclusively breastfed babies had 1.99 kg increment at three months (M=5.14, SD=0.58) compared to at birth (M=3.15, SD=0.37), $t(252) = -74.849$, $p < 0.001$.

Table 4.92 :

Weight changes at birth and three months after birth for infants who were formula fed and breastfed (N=652)

Outcome	At birth		three months		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Formula fed	3.09	0.40	5.09	0.57	77	-2.104, -1.912	-41.575	76	< 0.001
Breastfed	3.18	0.35	5.25	0.63	575	-2.107, -2.028	-103.31	574	< 0.001

* Analysis were done using paired samples t-test

There was a significant difference of weight changes between birth and at three months. A paired samples t-test revealed that formula fed babies had a significant weight increment of 2.01 kg at three months (M=5.09, SD=0.57) compared to at birth (M=3.09, SD=0.40), $t(574) = -41.575$, $p < 0.001$. Meanwhile, breastfed babies had 2.07 kg increment at three months (M=5.25, SD=0.63) compared to at birth (M=3.18, SD=0.35), $t(574) = -103.306$, $p < 0.001$.

4.9.4 Breastfeeding and Infant Growth at six months

Table 4.93 :
Weight changes at birth and six months after birth for infants who were exclusively and non-exclusively breastfed (N=647)

Outcome	At birth		six months		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Exclusive breastfed	3.19	0.35	7.22	0.803	324	-4.103, -3.953	-106.3	323	< 0.001
Non-exclusive breastfed	3.15	0.37	7.06	0.81	325	-3.989, -3.833	-99.45	324	< 0.001

* Analysis were done using paired samples t-test

There was a significant difference of weight changes between birth and at six months. A paired samples t-test revealed that exclusively breastfed babies had a significant weight increment of 4.03 kg at six months (M=7.22, SD=0.803) compared to at birth (M=3.19, SD=0.35), $t(323) = -106.274$, $p < 0.001$. Meanwhile, non-exclusively breastfed babies had 3.91 kg increment at six months (M=7.06, SD=0.81) compared to at birth (M=3.15, SD=0.37), $t(324) = -99.451$, $p < 0.001$.

Table 4.94 :

Weight changes at birth and six months after birth for infants who were formula fed and breastfed (N=649)

Outcome	At birth		six months		N	95% CI for mean difference	t	df	p value
	Mean	Standard deviation	Mean	Standard deviation					
Formula fed	3.11	0.38	7.04	0.85	156	-4.048, - 3.818	-67.409	155	< 0.001
Breastfed	3.19	0.35	7.17	0.80	493	-4.042, - 3.902	-128.49	492	< 0.001

* Analysis were done using paired samples t-test

There was a significant difference of weight changes between formula and breastfed babies during birth and at six months. A paired samples t-test revealed that formula fed babies had significant weight increment of 3.93 kg at six months (M=7.04, SD=0.85) compared to at birth (M=3.11, SD=0.38), $t(155) = -67.409$, $p < 0.001$. Meanwhile, breastfed babies had 3.98 kg increment at six months (M=7.17, SD=0.80) compared to at birth (M=3.19, SD=0.35), $t(492) = -128.493$, $p < 0.001$.

4.9.5 Discussion of Objective 6

Exclusive breastfeeding is defined as the child receiving breast milk only (including expressed breastmilk or from a wet nurse) and no other food or liquid, not even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines..

The growth of infants who were breastfed differs from those who were not breastfed during infancy (de Onis & Onyango, 2003; K. K. L. Ong, Preece, Emmett, Ahmed, & Dunger, 2002; Spyrides, Struchiner, Barbosa, & Kac, 2008). Breastfed infants usually had a steadily faster growth than non-breastfed infants during the first three months but slower growth later (de Onis & Onyango, 2003; Kramer et al., 2002). Such steady growth was noted in my study.

Faster gains in weight and length among early weaning infants may suggest the biological effect of formula feeding while slower gains related to prolonged and 'exclusive breastfeeding' may be the protective effect of developing overweight in later life (Kramer et al., 2002). Many studies have found that breastfeeding protects infants from later overweight and obesity (Binns, Lee, & Low, 2016b; B. L. Horta & Victora, 2013). This effect may be related to the higher levels of protein found in infant formula (Weber et al., 2014).

In summary, our findings show that differences in infant feeding patterns contribute to the difference in infant's growth albeit not significant. Breastfeeding had impact on growth status in the first six months of the infant's life.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of key findings from this research. The limitations of the study, directions for future research and recommendations for better health policies are also presented.

5.1 MAIN FINDINGS

5.1.1 Factors Associated With Breastfeeding Intention, Early Initiation of Breastfeeding and Duration of ‘Exclusive Breastfeeding’

The prevalence of maternal obesity in this study was 12.0 % and 15.3 % pre-pregnancy and six months after delivery, respectively and overweight (BMI more than 25 kg/m²) was 24.5 % and 26.5 %.

The number of mothers who were ‘exclusive breastfeeding’ at six months was 50.0 % for total population and early initiation of breastfeeding was 67.8 %. These rates are high compared to many other countries (C. Binns, Lee, Sauer, & Hewitt, 2012).

Younger and higher educated mothers, housewives, had lower educated spouses, had positive attitudes and supportive spouses and biological mothers towards breastfeeding and biological mothers with longer breastfeeding experience were more likely intended to breastfeed their infants, $p < 0.05$.

Meanwhile, mothers who attended antenatal class and had vaginal delivery were more likely to initiate breastfeeding within one hour after delivery, $p < 0.05$. Similarly, if they had supportive biological mothers with longer breastfeeding experience.

Breastfeeding supports from significant others include spouses and biological mothers and increase knowledge in breastfeeding from attending antenatal classes were predictors of longer duration of ‘exclusive breastfeeding’. Having prenatal intention to breastfeed longer, initiate breastfeeding within one hour and vaginal delivery were protective effects of increased duration of breastfeeding exclusivity.

Meanwhile, perceived of having breastfeeding difficulties at any time especially during the first four weeks were the main reasons of early discontinuation of 'exclusive breastfeeding'.

5.1.2 Association of Maternal Obesity and Breastfeeding Outcomes (Initiation, Intention and Duration)

Mothers who had BMI of more than 25 kg/m² were associated with less intention to exclusively breastfeed their infants prenatally and were prone to formula feed. However, there was no significant association seen between prenatal maternal intention to exclusively breastfeed their babies and BMI status. They also perceived to receive lack of support in breastfeeding from their biological mothers whom preferred formula feeding or were ambivalent on infant feeding methods. Factors that were linked to intention to breastfeed were younger age, higher educated, employed, normal BMI, had more than one child, and had positive attitudes towards breastfeeding, breastfeeding supports from close family members and being breastfed herself.

Early initiation rate in obese women was the lowest, 52.6 % and they also had the highest rate of delay initiation (47.4 %) compared to their normal weight counterparts. Delayed initiation of breastfeeding was associated with caesarean delivery, lack of breastfeeding support from their biological mothers, not being breastfed herself and not attending antenatal class.

Prevalence of overweight and obesity in this study were 24.5 % and 12.0 %, respectively based on weight before pregnancy and had substantial increased to 26.5 % and 15.3 %, respectively six months after delivery.

As the prevalence of maternal obesity increased, the prevalence of both 'exclusive breastfeeding' and 'any breastfeeding' at six months among in obese mothers decreased to 23.1 % when compared to their normal weight counterparts. More than half of them preferred formula feeding over breastfeeding when their babies reached six months old (53.8 %).

It is suggested that obese mothers were linked to shorter duration of 'exclusive breastfeeding'. Factors associated with early discontinuation of 'exclusive breastfeeding' in obese mothers were higher educated, employed, caesarean delivery, had no intention to breastfeed, experienced health problems during pregnancy and had biological mothers who preferred formula feeding or were ambivalent on infant feeding

with little or no breastfeeding experience. Obese mothers also were more likely to experience health problems during pregnancy, had breastfeeding difficulties such as insufficient colostrum/breastmilk, infants had problems in sucking and experienced swollen painful breasts.

Furthermore, obese women were more likely to retain more weight at six months postpartum.

5.2 LIMITATION OF STUDY

To date, this is the first prospective cohort study conducted in Malaysia, specifically for the State of Selangor. However, there are numbers of limitations that need to be considered before interpreting the results and findings of this study.

Firstly, this study focuses only on Malay population. Careful measures must be applied when extrapolating the results of this study to all population in Malaysia. Replication of this study on other ethnic groups would provide a better understanding on the relationship between BMI status and breastfeeding outcomes among women of different ethnicity.

Secondly, instruments used in this study were questionnaires and were based on self-reporting by the subjects. Specifically, questions on preferences in infant feeding methods were answered by the subjects not by their spouses as well as by their biological mother. Hence, it can be influenced by the mother's opinions or preferences on how they want to answer. Nevertheless, this method has been used widely and been accepted as the gold standard in majority studies.

In addition, there are questions that might be sensitive to some people. For example, questions on total household income and pre-pregnancy weight. Therefore, there might exist biases or discrepancies from the actual overall scenario.

Some of the tools used in this study should be done further analysis on the validity and reliability especially when it is translated to Malay language.

Lastly, there was no comparison done between mothers who remained in the study and those who dropped out or lost to follow-up.

5.3 RECOMMENDATIONS FOR FUTURE RESEARCH

Malaysia is a multiracial and multicultural country. About half of the population is ethnically Malay, followed by large minorities of Malaysian Chinese, Malaysian Indians and indigenous people. On top of that, Malaysia constitutes of 13 states and three federal territories with different geographical and cultural. Therefore, further cohort studies in different areas should be piloted in order to well document and outdo higher rate of ‘exclusive breastfeeding’ and lower the incidence of obesity.

Since there is a higher rate of early weaning or ‘exclusive breastfeeding’ discontinuation among obese women, more strategies need to be carried out focusing on this population. They could be exposed earlier during their antenatal follow up on the importance of breastfeeding to the infants as well as to the mothers in terms of weight management.

5.4 RECOMMENDATIONS FOR BETTER CLINICAL PRACTICE AND HEALTH POLICIES

Here are several relevant recommendations suggested based on the findings of literatures in order to achieve positive breastfeeding outcomes in obese mothers (Bever Babendure et al., 2015; Carlsen et al., 2013):

1. Educate and counsel women at childbearing years to achieve a healthy weight before pregnancy when possible
2. Create public health messages on the risks of being overweight and obese to themselves and specifically to the infants in short and long term.
3. Set healthy gestational weight gain goals according to Institute of Medicine (IOM) and explain the importance of following the guidelines
4. Provide series of counselling on lactation throughout pregnancy and during the postpartum period to assist women to overcome obesity-related encounters in breastfeeding for example latching on and what to expect especially during the first week of postpartum.
5. Educate the mothers on obesity-related breastfeeding difficulties due to hormone changes that may arise especially during the early postpartum period.

6. Create support groups comprise members within the same BMI categories in the mission of succeeding in breastfeeding. Women who had thrived in 'exclusive breastfeeding' should be the role mode to offer support and share their experience.

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APPENDIX 1 : TABLES

TABLE 1 MATERNAL, PATERNAL AND DEMOGRAPHIC FACTORS WITH INTENSITY OF BREASTFEEDING AT three months POSTPARTUM (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=399)	Non-'exclusive breastfeeding' (n=253)
Maternal factors			
<i>Maternal age</i>			
18 – 20 years old	12 (1.8 %)	7 (1.8 %)	5 (2.0 %)
21 – 30 years old	410 (62.9 %)	262 (65.7 %)	148 (58.5 %)
31 to 40 years old	230 (35.3 %)	130 (32.6 %)	100 (39.5 %)
<i>Maternal occupation</i>			
Housewife	202 (31.1 %)	156 (39.3 %)	46 (18.3 %)
Fulltime	393 (60.6 %)	204 (51.4 %)	189 (75.0 %)
Part-time	24 (3.7 %)	15 (3.8 %)	9 (3.6 %)
Self-employed	30 (4.6 %)	22 (5.5 %)	8 (3.2 %)
<i>Maternal educational background</i>			
Primary	8 (1.2 %)	3 (0.8 %)	5 (2.0 %)
Secondary	231 (35.4 %)	141 (35.3 %)	90 (35.6 %)
Tertiary	413 (63.3 %)	255 (63.9 %)	158 (62.5 %)
Paternal factors			
<i>Paternal occupation</i>			
Not working	5 (0.8 %)	4 (1.0 %)	1 (0.4 %)
Fulltime	538 (82.8 %)	323 (81.2 %)	215 (85.3 %)
Part-time	18 (2.8 %)	14 (3.5 %)	4 (1.6 %)
Self-employed	89 (13.7 %)	57 (14.3 %)	32 (12.7 %)
<i>Paternal educational background</i>			
Primary	10 (1.5 %)	6 (1.5 %)	4 (1.6 %)
Secondary	268 (41.2 %)	162 (40.7 %)	106 (42.1 %)
Tertiary	372 (57.2%)	230 (57.8 %)	142 (56.3 %)
Demographic factors			
<i>Household monthly income</i>			
< RM 1000	26 (4.0 %)	15 (3.8 %)	11 (4.3 %)
RM 1001- RM 3000	323 (49.5%)	200 (50.1 %)	123 (48.6 %)
RM 3001 – RM 5000	137 (21.0 %)	81 (20.3 %)	56 (22.1 %)
> RM 5000	166 (25.5 %)	103 (25.8 %)	63 (24.9 %)
<i>Marital status</i>			
Married	649 (99.5 %)	398 (99.7 %)	251 (99.2 %)
Never married	2 (0.3 %)	1 (0.3 %)	1 (0.4 %)
Divorced/separated	1 (0.2 %)	-	1 (0.4%)

TABLE 2 ASSOCIATION BETWEEN MATERNAL, PATERNAL AND DEMOGRAPHIC FACTORS AND INTENSITY OF BREASTFEEDING AT three months POSTPARTUM (N=652)

Characteristics	'exclusive breastfeeding' n=399		Non-'exclusive breastfeeding' n=253		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal factors									
<i>Age during pregnancy</i>							3.270	1	0.071
18 – 30 years old	269	67.4	153	60.5	422	64.7			
31 – 40 years old	130	32.6	100	39.5	230	35.3			
<i>Years of education</i>							0.142	1	0.706
≤ 12 years	144	36.1	95	37.5	239	36.7			
> 12 years	255	63.9	158	62.5	413	63.3			
<i>Employment</i>							31.835	1	< 0.001
Housewife	156	39.9	46	18.3	202	31.1			
Employed	241	60.7	206	81.7	447	68.9			
Paternal factors									
<i>Years of education</i>							0.131	1	0.718
≤ 12 years	168	42.2	110	43.7	278	42.8			
> 12 years	230	57.8	142	56.3	372	57.2			
<i>Employment</i>							0.748	1	0.387
Employed	4	1.0	1	0.4	5	0.8			
Unemployed	394	99.0	251	99.6	645	99.2			
Demographic factors									
<i>Household monthly income</i>							0.323	2	0.851
Low (<RM3000)	215	53.9	134	53.0	349	53.5			
Middle (RM3000 - 5000)	81	20.3	56	22.1	137	21.0			
High (> RM5000)	103	25.8	63	24.9	166	25.5			

*Analysis were done using Chi Square

TABLE 3 SOCIAL AND PSYCHOLOGICAL FACTORS WITH INTENSITY OF BREASTFEEDING AT three months POSTPARTUM (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=399)	Non-'exclusive breastfeeding' (n=253)
Social factors			
<i>Father's preference</i>			
Formula feeding	6 (0.9 %)	3 (0.8 %)	3 (1.2 %)
Breastfeeding	445 (68.3 %)	288 (72.2 %)	157 (62.1%)
Doesn't mind	201 (30.8 %)	108 (27.1 %)	93 (36.8 %)
<i>Grandmother's preference</i>			
Formula feeding	6 (0.9 %)	5 (1.3 %)	1 (0.4 %)
Breastfeeding	389 (59.7 %)	280 (70.2 %)	109 (43.1 %)
Doesn't mind	116 (17.8 %)	56 (14.0 %)	60 (23.7 %)
Never discussed	141 (21.6 %)	58 (14.5 %)	83 (32.8 %)
<i>Grandmother's breastfeeding experience</i>			
Yes	447 (68.6 %)	314 (78.7 %)	133 (52.6 %)
No	66 (10.1 %)	27 (6.8 %)	39 (15.4 %)
Don't know	139 (21.3 %)	58 (14.5 %)	83 (32.8 %)
Psychological factors			
<i>Initiation of breastfeeding</i>			
Less than one hour	442 (67.8 %)	306 (76.7 %)	136 (53.8 %)
1 to four hours	155 (23.8 %)	75 (18.8 %)	80 (31.6 %)
More than four hours, less than 1 day	41 (6.3 %)	14 (3.5 %)	27 (10.7 %)
More than 1 day after birth	14 (2.1 %)	4 (1.0 %)	10 (4.0 %)
<i>Intention to breastfeed</i>			
With intention	322 (49.6 %)	251 (63.4 %)	71 (28.1 %)
Without intention	327 (71.9 %)	145 (36.6 %)	182 (71.9 %)
<i>Time intended to breastfeed</i>			
Before pregnancy	321 (49.4 %)	199 (50.1 %)	122 (48.2 %)
Early pregnancy	300 (46.2 %)	184 (46.3 %)	116 (45.8 %)
Late pregnancy	27 (4.2 %)	13 (3.3 %)	14 (5.5 %)
<i>Intended breastfeeding duration</i>			
≤ six months	53 (8.3 %)	27 (6.9 %)	26 (10.6 %)
6 to 12 months	243 (38.0 %)	146 (37.1 %)	97 (39.4 %)
More than 12 months	344 (53.8 %)	221 (56.1 %)	123 (50.0 %)

TABLE 4 ASSOCIATION BETWEEN SOCIAL AND PSYCHOLOGICAL FACTORS WITH INTENSITY OF BREASTFEEDING AT three months POSTPARTUM (N=652)

Characteristics	'exclusive breastfeeding' n=399		Non-'exclusive breastfeeding' n=253		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Social factors									
<i>Father's preference</i>							7.325	1	0.007
Breastfeeding	288	72.2	157	62.1	445	68.3			
Formula feeding or ambivalent	111	27.8	96	37.9	207	31.7			
<i>Grandmother's preference</i>							47.221	1	< 0.001
Breastfeeding	280	70.2	109	43.1	389	59.7			
Formula feeding or ambivalent	119	29.8	144	56.9	263	40.3			
<i>Grandmother's breastfed for more than one month</i>							49.032	1	< 0.001
Yes	314	78.7	133	52.6	447	68.6			
No	85	21.3	120	47.4	205	31.4			
Psychological factors									
<i>Breastfeeding initiation</i>							37.305	1	< 0.001
Early	306	76.7	136	53.8	442	67.8			
Delayed	93	23.3	117	46.2	210	32.2			
<i>Intention to breastfeed</i>							77.039	1	< 0.001
With intention	251	63.4	71	28.1	322	49.6			
Without intention	145	36.6	182	71.9	327	50.4			
<i>Time intended to breastfeed</i>							0.209	1	0.648
Before pregnancy	199	50.3	122	48.4	321	49.5			
Early pregnancy	197	49.7	130	51.6	327	50.5			
<i>Intention to breastfeed duration</i>							3.796	2	0.150
≤ six months	27	6.9	26	10.6	53	8.3			
> 6 to 12 months	146	37.1	97	39.4	243	38.0			
More than 12 months	221	56.1	123	50.0	344	53.8			

*Analysis were done using Chi Square

TABLE 5 BREASTFEEDING KNOWLEDGE VARIABLES AND BREASTFEEDING INTENSITY AT three months POSTPARTUM (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=399)	Non-'exclusive breastfeeding' (n=253)
Knowledge in breastfeeding			
<i>IIFAS score</i>		63.6 ± 8.1	63.3 ± 7.7
<i>IIFAS Scoring category</i>			
Positive to formula feeding	25 (3.8 %)	16 (4.0 %)	9 (3.6 %)
Neutral	483 (74.1 %)	291 (72.9 %)	192 (75.9 %)
Positive to breastfeeding	144 (22.1 %)	92 (23.1 %)	52 (20.6 %)
<i>Antenatal classes</i>			
Yes, for this pregnancy	284 (43.6 %)	207 (51.9 %)	77 (30.4 %)
Yes, for previous pregnancy	187 (28.7 %)	108 (27.1 %)	79 (31.2 %)
No	181 (27.8 %)	84 (21.1 %)	97 (38.3 %)
<i>Notes/pamphlets on BF</i>			
Yes	404 (62.3 %)	252 (63.6 %)	152 (60.3 %)
No	244 (37.7 %)	144 (36.4 %)	100 (39.7 %)
<i>Class/seminar/lecture on BF</i>			
Yes	306 (47.2 %)	193 (48.7 %)	113 (44.8 %)
No	342 (52.8 %)	203 (51.3 %)	139 (55.2 %)
<i>Demonstration of BF</i>			
Yes	320 (49.4 %)	203 (51.3 %)	117 (46.4 %)
No	328 (50.6 %)	193 (48.7 %)	135 (53.6 %)
<i>Video/tv/slide show on BF</i>			
Yes	102 (15.7 %)	59 (14.9 %)	43 (17.1 %)
No	546 (84.3 %)	337 (85.1 %)	209 (82.9 %)
<i>Counselling/discussion on BF</i>			
Yes	178 (27.5 %)	109 (27.5 %)	69 (27.4 %)
No	470 (72.5 %)	287 (72.5 %)	183 (72.6 %)

TABLE 6 ASSOCIATION BETWEEN BREASTFEEDING KNOWLEDGE VARIABLES AND BREASTFEEDING INTENSITY AT three months POSTPARTUM (N=652)

Characteristics	'exclusive breastfeeding' n=399		Non-'exclusive breastfeeding' n=253		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>IIFAS score</i>							0.031	1	0.861
High (≥ 65)	181	45.4	113	44.7	294	45.1			
Low (< 65)	218	54.6	140	55.3	358	54.9			
<i>Attended breastfeeding interventions</i>							0.600	1	0.439
Yes	327	82.6	202	80.2	529	81.6			
No	69	17.4	50	19.8	119	18.4			
<i>Attended antenatal class</i>							23.073	1	< 0.001
Yes	315	78.9	156	61.7	471	72.2			
No	84	21.1	97	38.3	181	27.8			

*Analysis were done using Chi Square

TABLE 7 BIOLOGICAL FACTORS WITH INFANT FEEDING PRACTICES AT three months (N=652)

Variables	Total N (%)	'exclusive breastfeeding' (n=399)	Non-'exclusive breastfeeding' (n=253)
Biological factors			
<i>Maternal pre-pregnancy body mass index (BMI) status</i>			
Underweight	77 (11.8 %)	48 (12.0 %)	29 (11.5 %)
Normal	337 (51.7 %)	240 (60.2 %)	97 (38.3 %)
Overweight	160 (24.5 %)	87 (21.8 %)	73 (28.9 %)
Obese	78 (12.0 %)	24 (6.0 %)	54 (21.3 %)
<i>Parity</i>			
First	260 (40.4 %)	172 (43.5 %)	88 (35.3 %)
Second	206 (32.0 %)	113 (28.6 %)	93 (37.3 %)
Third or more	178 (27.6 %)	110 (27.8 %)	68 (27.3 %)
<i>Health problems during pregnancy</i>			
Hypertension	72 (11.0 %)	33 (8.3 %)	39 (15.4 %)
Gestational Diabetes	102 (15.6 %)	31 (7.8 %)	71 (28.1 %)
Anemia	22 (3.4 %)	14 (3.5 %)	8 (3.2 %)
Low blood pressure	4 (0.6 %)	2 (0.5 %)	2 (0.8 %)
Others	12 (1.8 %)	1 (0.3 %)	11 (4.3 %)
<i>Birth delivery method</i>			
Vaginal	459 (70.4 %)	313 (78.4 %)	146 (57.7 %)
Assisted vaginal	79 (12.1 %)	35 (8.8 %)	44 (17.4 %)
Caesarean	114 (17.5 %)	51 (12.8 %)	63 (24.9 %)
<i>Birth problems</i>			
Yes	34 (5.3 %)	17 (4.3 %)	5 (2.9 %)
No	547 (95.8 %)	379 (95.5 %)	168 (96.6 %)
<i>Baby birth weight</i>			
≤ 2.5kg	16 (2.5 %)	9 (2.3 %)	7 (2.8 %)
2.5 – 3.99 kg	631 (96.8 %)	387 (97.0 %)	244 (96.4 %)
≥ 4.0 kg	5 (0.8 %)	3 (0.8 %)	2 (0.8 %)

TABLE 7 BIOLOGICAL FACTORS WITH INFANT FEEDING PRACTICES AT three months (N=652) -CONTINUE

Variables	Total N (%)	'exclusive breastfeeding' (n=399)	Non-'exclusive breastfeeding' (n=253)
<i>Breastfeeding difficulties at or before four weeks</i>			
Swollen breasts	427 (65.5 %)	296 (74.2 %)	131 (51.8 %)
Sore breasts with fever	209 (32.1 %)	156 (39.1 %)	53 (20.9 %)
Sore breasts with body pain	38 (5.8 %)	24 (6.0 %)	14 (5.5 %)
Cracked nipples	287 (44.0 %)	172 (43.1 %)	81 (46.0 %)
Longer time to flow	307 (47.1 %)	148 (37.1 %)	159 (62.8 %)
Baby didn't wake up for feeds	21 (3.2 %)	13 (3.3 %)	8 (3.2 %)
Baby has suckling problems	49 (7.5 %)	7 (1.8 %)	42 (16.6 %)
Insufficient milk/colostrum	141 (21.7 %)	19 (4.8 %)	122 (48.6 %)
Inverted nipples	15 (2.3 %)	2 (0.5 %)	13 (5.1 %)
<i>Breastfeeding difficulties within 1 – three months</i>			
Insufficient milk	271 (41.6 %)	48 (12.0 %)	223 (88.1 %)
Cracked/sore nipples	24 (3.7 %)	9 (2.3 %)	15 (5.9 %)
Mastitis	4 (0.6 %)	2 (0.5 %)	2 (0.8 %)
Breasts engorgement	97 (14.9 %)	93 (23.3 %)	4 (1.6 %)
Inverted nipples	15 (2.3 %)	2 (0.5 %)	13 (5.1%)
Breastfeeding is painful	4 (0.6 %)	-	4 (1.6 %)
Baby not gaining weight	17 (2.6 %)	11 (2.8 %)	6 (2.4 %)
Baby has suckling problems	20 (3.1 %)	2 (0.5 %)	18 (7.1 %)
Baby refuses to breastfeed	46 (7.1 %)	9 (2.3 %)	37 (14.6 %)
Baby too tired to feed	9 (1.4 %)	5 (1.3 %)	4 (1.6 %)
Swollen breasts	24 (3.7 %)	19 (4.8 %)	5 (2.0 %)
Sore breasts with high fever	10 (1.5 %)	10 (2.5 %)	-
Sore breasts with body pains	7 (1.1 %)	1 (0.3 %)	6 (2.4 %)

TABLE 8 ASSOCIATION BETWEEN BIOLOGICAL FACTORS AND BREASTFEEDING INTENSITY AT three months (N=652)

Characteristics	'exclusive breastfeeding' n=399		Non-'exclusive breastfeeding' n=253		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Child-related factors									
<i>Parity</i>							4.269	1	0.039
Primiparous	172	43.5	88	35.3	260	40.4			
Multiparous	223	56.5	161	64.7	384	59.6			
<i>Birth weight</i>							0.150	1	0.698
Normal	387	97.0	244	96.4	631	96.8			
Under/overweight	12	3.0	9	3.6	21	3.2			
Birth factors									
<i>Delivery method</i>							15.762	1	< 0.001
Vaginal	348	87.2	190	75.1	538	82.5			
Cesarean section	51	12.8	63	24.9	114	17.5			
<i>Birth problems</i>							1.988	1	0.159
Yes	17	4.3	17	6.8	34	5.3			
No	379	95.5	232	93.2	612	94.7			
Maternal factors									
<i>Pre-pregnancy BMI</i>							33.451	1	< 0.001
Normal (BMI 18.5 – 24.9)	288	72.2	126	49.8	414	63.5			
Overweight and obese (BMI > 25)	111	27.8	127	50.2	238	36.5			
<i>Pregnancy health problems</i>							48.755	1	< 0.001
Yes	79	19.8	115	45.5	194	29.8			
No	320	80.2	138	54.5	458	70.2			
Breastfeeding difficulties at or before four weeks									
Yes	364	91.2	236	93.3	600	92.0	0.889	1	0.346
No	35	8.8	17	6.7					
Breastfeeding difficulties within 1 – three months									
Yes	145	36.3	227	89.7	372	57.1	180.068	1	< 0.001
No	254	63.7	26	10.3	280	42.9			

*Analysis were done using Chi Square

TABLE 9 DESCRIPTIVE CHARACTERISTICS OF MOTHERS WHO STOPPED ‘EXCLUSIVE BREASTFEEDING’ AT three months (N=253)

Characteristics	Underweight n=29/76	Normal n=97/337	Overweight n=73/160	Obese n=54/78	Total
Maternal factors					
<i>Mother’s age at pregnancy</i>					
18-30 years old	20 (69.0 %)	59 (60.8 %)	41 (56.2 %)	33 (61.1 %)	153 (60.5 %)
31-40 years old	9 (31.0 %)	38 (39.2 %)	32 (43.8 %)	21 (38.9 %)	100 (39.5 %)
<i>Maternal education</i>					
≤ 12 years	15 (51.7 %)	41 (42.3 %)	25 (34.2 %)	14 (25.9 %)	95 (37.5 %)
> 12 years	14 (48.3 %)	56 (57.7 %)	48 (65.8 %)	40 (74.1 %)	158 (62.5 %)
<i>Maternal employment</i>					
Housewife	7 (24.1 %)	19 (19.6 %)	14 (19.4 %)	6 (11.1 %)	46 (18.3 %)
Employed	33 (75.9 %)	78 (80.4 %)	58 (80.6 %)	48 (88.9 %)	206 (81.7 %)
Demographic factor					
<i>Household monthly income</i>					
Low (<RM3000)	19 (65.5 %)	47 (48.5 %)	39 (53.4 %)	29 (53.7 %)	134 (53.0 %)
Middle (RM3001 - 5000)	7 (24.1 %)	22 (22.7 %)	13 (17.8 %)	14 (25.9 %)	56 (22.1 %)
High (≥ RM5000)	3 (10.3 %)	28 (28.9 %)	21 (28.8 %)	11 (20.4 %)	63 (24.9 %)

TABLE 10 ASSOCIATION OF SOCIO-DEMOGRAPHIC FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253)

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*	
	n	%	n	%	n	%	n	%	n	%				
Maternal factors														
<i>Mother's age at pregnancy</i>											1.456	3	0.692	
21-30 years old	20	69.0	59	60.8	41	56.2	33	61.1	153	60.5				
31-40 years old	9	31.0	38	39.2	32	43.8	21	38.9	100	39.5				
<i>Maternal education</i>											6.857	3	0.077	
≤ 12 years	15	51.7	41	42.3	25	34.2	14	25.9	95	37.5				
> 12 years	14	48.3	56	57.7	48	65.8	40	74.1	158	62.5				
<i>Maternal employment</i>											2.703	3	0.440	
Housewife	7	24.1	19	19.6	14	19.4	6	11.1	46	18.3				
Employed	33	75.9	78	80.4	58	80.6	48	88.9	206	81.7				
Demographic factors														
<i>Household monthly income</i>											5.277	3	0.153	
Low (<RM5000)	26	89.7	69	71.1	52	71.2	43	79.6	190	75.1				
High (≥ RM5001)	3	10.3	28	28.9	21	28.8	11	20.4	63	24.9				

Body Mass Index (BMI) categories are based on the World Health Organization guideline, where underweight is classified as having a BMI of less than 18.5 kg/m², normal weight is classified as having a BMI of 18.5 – 24.9 kg/m², overweight is classified as having a BMI of 25.0- 29.9 kg/m², and obese is classified as having a BMI of more than 30.0 kg/m².

*Analysis were done using Chi square test

TABLE 11 DESCRIPTIVE CHARACTERISTICS OF MOTHERS WHO STOPPED ‘EXCLUSIVE BREASTFEEDING’ AT three months (N=253)

Characteristics	Underweight n=29/76	Normal n=97/337	Overweight n=73/160	Obese n=54/78	Total
Maternal knowledge					
<i>IIFAS score</i>					
Positive to formula feeding	-	5 (5.2 %)	3 (4.1 %)	1 (1.9 %)	9 (3.6 %)
Neutral	24 (82.8 %)	74 (76.3 %)	51 (69.9 %)	43 (79.6 %)	192 (75.9 %)
Positive to breastfeeding	5 (17.2 %)	18 (18.6 %)	19 (26.0 %)	10 (18.5 %)	52 (20.6 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	13 (44.8 %)	57 (58.8 %)	49 (68.1 %)	33 (61.1 %)	152 (60.3 %)
Class/seminar/lecture on BF	12 (41.4 %)	45 (46.4 %)	30 (41.7 %)	26 (48.1 %)	113 (44.8 %)
Demonstration of BF	15 (51.7 %)	45 (46.4 %)	30 (41.7 %)	27 (50.0 %)	117 (46.4 %)
Video/tv/slide show on BF	5 (17.2 %)	17 (17.5 %)	9 (12.5 %)	12 (22.2 %)	43 (17.1 %)
Counseling/discussion on BF	6 (20.7 %)	23 (23.7 %)	25 (34.7 %)	15 (27.8 %)	69 (27.4 %)
<i>Attending antenatal class</i>					
Yes	22 (75.9 %)	65 (67.0 %)	45 (61.6 %)	24 (44.4 %)	156 (61.7 %)
No	7 (24.1 %)	32 (33.0 %)	28 (38.4 %)	30 (55.6 %)	97 (38.3 %)

TABLE 12 ASSOCIATION OF MATERNAL KNOWLEDGE FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253)

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal knowledge													
<i>IIFAS score</i>											7.186	3	0.066
High (≥ 65)	11	37.9	37	38.1	42	57.5	23	42.6	113	44.7			
Low (< 65)	18	62.1	60	61.9	31	42.5	31	57.4	140	55.3			
<i>Attending breastfeeding interventions</i>											0.866	3	0.834
Yes	23	79.3	79	81.4	59	81.9	41	75.9	202	80.2			
No	6	20.7	18	18.6	13	18.1	13	24.1	50	19.8			
<i>Attending antenatal class</i>											10.419	3	0.015
Yes	22	75.9	65	67.0	45	61.6	24	44.4	156	61.7			
No	7	24.1	32	33.0	28	38.4	30	55.6	97	38.3			

*Analysis were done using Chi square test

TABLE 13 DESCRIPTIVE CHARACTERISTICS OF MOTHERS WHO STOPPED ‘EXCLUSIVE BREASTFEEDING’ AT three months (N=253)

Characteristics	Underweight n=29/76	Normal n=97/337	Overweight n=73/160	Obese n=54/78	Total
Social					
<i>Father’s preference</i>					
Breastfeeding	21 (72.4 %)	57 (58.8 %)	44 (60.3 %)	35 (64.8 %)	157 (62.1 %)
Formula feeding or ambivalent	8 (27.6 %)	40 (41.2 %)	29 (39.7 %)	19 (35.2 %)	96 (37.9 %)
<i>Grandmother’s preference</i>					
Breastfeeding	14 (48.3 %)	47 (48.5 %)	33 (45.2 %)	15 (27.8 %)	109 (43.1 %)
Formula feeding or ambivalent	15 (51.7 %)	50 (51.5 %)	40 (54.8 %)	39 (72.2 %)	144 (56.9 %)
<i>Grandmother’s breastfed for more than one month</i>					
Yes	17 (58.6 %)	61 (62.9 %)	39 (53.4 %)	16 (29.6 %)	133 (52.6 %)
No or ambivalent	12 (41.4 %)	36 (37.1 %)	34 (46.6 %)	38 (70.4 %)	120 (47.4 %)
Psychological factors					
<i>Early initiation of breastfeeding</i>					
Early	18 (62.1 %)	60 (61.9 %)	37 (50.7 %)	21 (38.9 %)	136 (53.8 %)
Delayed	11 (37.9 %)	37 (38.1 %)	36 (49.3 %)	33 (61.1 %)	117 (46.2 %)
<i>Intention to exclusive breastfeed</i>					
With intention	6 (20.7 %)	23 (23.7 %)	16 (21.9 %)	26 (48.1 %)	71 (28.1 %)
Without intention	23 (79.3 %)	74 (76.3 %)	57 (78.1 %)	28 (51.9 %)	182 (71.9 %)
<i>Time intended to breastfeed</i>					
Before pregnancy	14 (48.3 %)	40 (41.7 %)	39 (53.4 %)	29 (53.7 %)	122 (48.4 %)
During pregnancy	15 (51.7 %)	56 (58.3 %)	34 (46.6 %)	25 (46.3 %)	130 (51.6 %)
<i>Intention to breastfeed duration</i>					
< six months	3 (11.1 %)	11 (11.7 %)	9 (12.3 %)	3 (5.8 %)	26 (10.6 %)
6 to 12 months	12 (44.4 %)	35 (37.2 %)	32 (43.8 %)	18 (34.6 %)	97 (39.4 %)
More than 12 months	12 (44.4 %)	48 (51.1 %)	32 (43.8 %)	31 (59.6 %)	123 (50.0 %)

TABLE 14 ASSOCIATION OF PSYCHOSOCIAL FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253)

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*	
	n	%	n	%	n	%	n	%	n	%				
Social factors														
<i>Father's preference</i>												2.041	3	0.564
Breastfeeding	21	72.4	57	58.8	44	60.3	35	64.8	157	62.1				
Formula feeding or ambivalent	8	27.6	40	41.2	29	39.7	19	35.2	96	37.9				
<i>Grandmother's preference</i>												6.752	3	0.080
Breastfeeding	14	48.3	47	48.5	33	45.2	15	27.8	109	43.1				
Formula feeding or ambivalent	15	51.7	50	51.5	40	54.8	39	72.2	144	56.9				
<i>Grandmother's breastfed for more than one month</i>												15.985	3	0.001
Yes	17	58.6	61	62.9	39	53.4	16	29.6	133	52.6				
No	12	41.4	36	37.1	34	46.6	38	70.4	120	47.4				
Psychological factors														
<i>Breastfeeding initiation</i>												8.444	3	0.038
Early	18	62.1	60	61.9	37	50.7	21	38.9	136	53.8				
Delayed	11	37.9	37	38.1	36	49.3	33	61.1	117	46.2				
<i>Intention to breastfeed</i>												13.847	3	0.003
With intention	6	20.7	23	23.7	16	21.9	26	48.1	71	28.1				
Without intention	23	79.3	74	76.3	57	78.1	28	51.9	182	71.9				
<i>Time intended to breastfeed</i>												3.089	3	0.378
Before pregnancy	14	48.3	40	41.7	39	53.4	29	53.7	122	48.4				
Early pregnancy	15	51.7	56	58.3	34	46.6	25	46.3	130	51.6				
<i>Intention to breastfeed duration</i>												4.125	3	0.660
≤ six months	3	11.1	11	11.7	9	12.3	3	5.8	26	10.6				
> 6 to 12 months	12	44.4	35	37.2	32	43.8	18	34.6	97	39.4				
More than 12 months	12	44.4	48	51.1	32	43.8	31	59.6	123	50.0				

*Analysis were done using Chi square test

TABLE 15 DESCRIPTIVE CHARACTERISTICS OF MOTHERS WHO STOPPED ‘EXCLUSIVE BREASTFEEDING’ AT three months (N=253)

Characteristics	Underweight n=29/76	Normal n=97/337	Overweight n=73/160	Obese n=54/78	Total
Maternal factors					
<i>Pregnancy health problems</i>					
Yes	9 (31.0 %)	26 (26.8 %)	36 (49.3 %)	44 (81.5 %)	115 (45.5 %)
No	20 (69.0 %)	71 (73.2 %)	37 (50.7 %)	10 (18.5 %)	138 (54.5 %)
Child-related factors					
<i>Parity</i>					
Primiparous	7 (24.1 %)	34 (38.6 %)	25 (35.2 %)	22 (40.7 %)	88 (35.3 %)
Multiparous	22 (75.9 %)	61 (64.2 %)	46 (64.8 %)	32 (59.3 %)	161 (64.7 %)
Birth factors					
<i>Birth delivery method</i>					
Vaginal	19 (65.5 %)	68 (70.1 %)	37 (50.7 %)	22 (40.7 %)	146 (57.7 %)
Assisted vaginal	6 (20.7 %)	11 (11.3 %)	18 (24.7 %)	9 (16.7 %)	44 (17.4 %)
Caesarean	4 (13.8 %)	18 (18.6 %)	18 (24.7 %)	23 (42.6 %)	63 (24.9 %)
<i>Birth problems</i>					
Yes	1 (3.4 %)	4 (4.1 %)	6 (8.3 %)	6 (11.8 %)	17 (6.8 %)
No	28 (96.6 %)	93 (95.9 %)	66 (91.7 %)	45 (88.2 %)	232 (93.2 %)
<i>Breastfeeding difficulties at or before four weeks</i>					
Painful swollen breasts	16 (55.2 %)	59 (60.8 %)	40 (54.8 %)	16 (70.4 %)	131 (51.8 %)
Sore breasts with high fever	4 (13.8 %)	27 (27.8 %)	14 (19.2 %)	8 (14.8 %)	53 (20.9 %)
Cracked or sore nipples	10 (34.5 %)	42 (43.3 %)	34 (46.6 %)	29 (53.7 %)	115 (45.5 %)
Poor milk flowing	15 (51.7 %)	55 (56.7 %)	48 (65.8 %)	41 (75.9 %)	159 (62.8 %)
Insufficient milk	10 (34.5 %)	41 (42.7 %)	35 (48.6 %)	36 (66.7 %)	122 (48.6 %)
Baby has suckling problems	-	13 (13.4 %)	11 (15.1 %)	18 (33.3 %)	42 (16.6 %)

TABLE 15 DESCRIPTIVE CHARACTERISTICS OF MOTHERS WHO STOPPED ‘EXCLUSIVE BREASTFEEDING’ AT three months (N=253) - CONTINUE

Characteristics	Underweight n=29/76	Normal n=97/337	Overweight n=73/160	Obese n=54/78	Total
<i>Breastfeeding difficulties within 1 to three months</i>					
Yes	26 (89.7 %)	83 (85.6 %)	67 (91.8 %)	51 (94.4 %)	227 (89.7 %)
No	3 (10.3 %)	14 (14.4 %)	6 (8.2 %)	3 (5.6 %)	26 (10.3 %)
Painful swollen breasts	1 (3.4 %)	3 (3.1 %)	-	1 (1.9 %)	5 (2.0 %)
Cracked or sore nipples	2 (6.9 %)	5 (5.2 %)	3 (4.1 %)	5 (9.3 %)	15 (5.9 %)
Breasts engorgement	-	2 (2.1 %)	1 (1.4 %)	1 (1.9 %)	4 (1.6 %)
Insufficient milk	25 (86.2 %)	82 (84.5 %)	65 (89.0 %)	51 (94.4 %)	223 (88.1 %)
Baby has suckling problems	1 (3.4 %)	5 (5.2 %)	5 (6.8 %)	7 (13.0 %)	18 (7.1 %)
<i>Reasons to stop ‘exclusive breastfeeding’</i>					
Insufficient milk	18 (62.1 %)	58 (59.8 %)	45 (61.6 %)	24 (44.4 %)	145 (57.3 %)
Resume to work	8 (27.6 %)	25 (25.8 %)	16 (21.9 %)	4 (7.4 %)	53 (20.9 %)

TABLE 16 ASSOCIATION OF BIOLOGICAL FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253)

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Maternal factors													
<i>Pregnancy health problems</i>											44.749	3	< 0.001
Yes	9	31.0	26	26.8	36	49.3	44	81.5	115	45.5			
No	20	69.0	71	73.2	37	50.7	10	18.5	138	54.5			
Child-related factors													
<i>Parity</i>											2.291	3	0.514
Primiparous	7	24.1	34	35.8	25	35.2	22	40.7	88	35.3			
Multiparous	22	75.9	61	64.2	46	64.8	32	59.3	161	64.7			
Birth factors													
<i>Delivery method</i>											13.042	3	0.050
Vaginal	25	86.2	79	81.4	55	75.3	31	57.4	190	75.1			
Caesarean section	4	13.8	18	18.6	18	24.7	23	42.6	63	24.9			
<i>Birth problems</i>											3.846	3	0.279
Yes	1	3.4	4	4.1	6	8.3	6	11.8	17	6.8			
No	28	96.6	93	95.9	66	91.7	45	88.2	232	93.2			

*Analysis were done using Chi square test

TABLE 16 ASSOCIATION OF BIOLOGICAL FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253) - CONTINUE

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Breastfeeding difficulties at or before four weeks													
Yes	26	89.7	91	93.8	70	95.9	49	90.7	236	93.3	2.001	3	0.572
No	3	10.3	6	6.2	3	4.1	5	9.3	17	6.7			
<i>Painful swollen breasts</i>											14.189	3	0.003
Yes	16	55.2	59	60.8	40	54.8	16	29.6	131	51.8	5.039	3	0.169
No	13	44.8	38	39.2	33	45.2	38	70.4	122	48.2			
<i>Sore breasts with high fever</i>											3.109	3	0.375
Yes	4	13.8	27	27.8	14	19.2	8	15.1	53	20.9	7.326	3	0.062
No	25	86.2	70	72.2	59	80.8	46	85.2	200	79.1			
<i>Cracked or sore nipples</i>											10.703	3	0.013
Yes	10	34.5	42	43.3	34	46.6	29	53.7	115	45.5	17.533	3	0.001
No	19	65.5	55	56.7	39	53.4	25	46.3	138	54.5			
<i>Milk takes longer time to flow</i>											17.533	3	0.001
Yes	15	51.7	55	56.7	48	65.8	41	75.9	159	62.8	17.533	3	0.001
No	14	48.3	42	43.3	25	34.2	13	24.1	94	37.2			
<i>Insufficient colostrum/milk</i>											17.533	3	0.001
Yes	10	34.5	41	42.7	35	48.6	36	66.7	122	48.6	17.533	3	0.001
No	19	65.5	55	57.3	37	51.4	18	33.3	129	51.4			
<i>Baby has sucking problems</i>											17.533	3	0.001
Yes	-	-	13	13.4	11	15.1	18	33.3	42	16.6	17.533	3	0.001
No	29	100.0	84	86.6	62	84.9	36	66.7	211	83.4			

*Analysis were done using Chi square test

TABLE 16 ASSOCIATION OF BIOLOGICAL FACTORS AND STOPPING ‘EXCLUSIVE BREASTFEEDING’ AT three months OF MOTHERS WITH DIFFERENT BMI STATUS (N=253) -CONTINUE

Characteristics	Underweight n=29/76		Normal n=97/337		Overweight n=73/160		Obese n=54/78		Total		χ^2	df	P value*
	n	%	n	%	n	%	n	%	n	%			
Breastfeeding difficulties within 1 to three months													
Yes	26	89.7	83	85.6	67	91.8	51	94.4	227	89.7	3.458	3	0.326
No	3	10.3	14	14.4	6	8.2	3	5.6	26	10.3			
<i>Cracked or sore nipples</i>											1.660	3	0.646
Yes	2	6.9	5	5.2	3	4.1	5	9.3	15	5.9			
No	27	93.1	92	94.8	70	95.9	49	90.7	238	94.1			
<i>Breasts engorgement</i>											0.656	3	0.883
Yes	-	-	2	2.1	1	1.4	1	1.9	4	1.6			
No	29	100.0	95	97.9	72	98.6	53	98.1	249	98.4			
<i>Insufficient colostrum/milk</i>											3.419	3	0.331
Yes	25	86.2	82	84.5	65	89.0	51	94.4	223	88.1			
No	4	13.8	15	15.5	8	11.0	3	5.6	30	11.9			
<i>Baby has sucking problems</i>											3.956	3	0.266
Yes	1	3.4	5	5.2	5	6.8	7	13.0	18	7.1			
No	28	96.6	92	94.8	68	93.2	47	87.0	235	92.9			
Reasons to cease ‘exclusive breastfeeding’													
<i>Insufficient milk</i>											4.727	3	0.193
Yes	18	62.1	58	59.8	45	61.6	24	44.4	145	57.3			
No	11	37.9	39	40.2	28	38.4	30	55.6	108	42.7			
<i>Resume to work</i>											8.156	3	0.043
Yes	8	27.6	25	25.8	16	21.9	4	7.4	53	20.9			
No	21	72.4	72	74.2	57	78.1	50	92.6	200	79.1			

*Chi square test

TABLE 17 DESCRIPTIVE CHARACTERISTICS OF PRENATAL MATERNAL KNOWLEDGE AND ‘EXCLUSIVE BREASTFEEDING’ AT three months WITH DIFFERENT BMI STATUS (N=399)

Characteristics	Underweight n=48/76	Normal n=240/337	Overweight n=87/160	Obese n=24/78	Total
Maternal knowledge					
<i>Years of education</i>					
≤ 12 years	19 (39.6 %)	80 (33.3 %)	32 (36.8 %)	13 (54.2 %)	144 (36.1 %)
> 12 years	29 (60.4 %)	160 (66.7 %)	55 (63.2 %)	11 (45.8 %)	255 (63.9 %)
<i>IIFAS score</i>					
Positive to formula feeding	2 (4.2 %)	7 (2.9 %)	5 (5.7 %)	2 (8.3 %)	16 (4.0 %)
Neutral	35 (72.9 %)	179 (74.6 %)	64 (73.6 %)	13 (54.2 %)	291 (72.9 %)
Positive to breastfeeding	11 (22.9 %)	54 (22.5 %)	18 (20.7 %)	9 (37.5 %)	92 (23.1 %)
<i>Attending breastfeeding interventions</i>					
Notes/pamphlets on BF	26 (54.2 %)	152 (64.1 %)	59 (67.8 %)	15 (62.5 %)	252 (63.6 %)
Class/seminar/lecture on BF	24 (50.0 %)	115 (48.5 %)	43 (49.4 %)	11 (45.8 %)	193 (48.7 %)
Demonstration of BF	23 (47.9 %)	119 (50.2 %)	48 (55.2 %)	13 (54.2 %)	203 (51.3 %)
Video/tv/slide show on BF	7 (14.6 %)	33 (13.9 %)	17 (19.5 %)	2 (8.3 %)	59 (14.9 %)
Counseling/discussion on BF	5 (10.4 %)	75 (31.6 %)	23 (26.4 %)	6 (25.0 %)	109 (27.5 %)
<i>Attending antenatal class</i>					
Yes	37 (77.1 %)	196 (81.7 %)	64 (73.6 %)	18 (75.0 %)	315 (78.9 %)
No	11 (22.9 %)	44 (18.3 %)	23 (26.4 %)	6 (25.0 %)	84 (21.1 %)

TABLE 18 ASSOCIATION OF PRENATAL MATERNAL KNOWLEDGE AND ‘EXCLUSIVE BREASTFEEDING’ AT three months AMONG OBESE AND NON-OBESE WOMEN (N=399)

Characteristics	Obese n= 24/78		Non-obese n= 375/574		Total		χ^2	df	P value*
	n	%	n	%	n	%			
Maternal knowledge									
<i>Years of education</i>							3.618	1	0.057
≤ 12 years	13	54.2	131	34.9	144	36.1			
> 12 years	11	45.8	244	65.1	255	63.9			
<i>IIFAS score</i>							0.798	1	0.372
High (≥65)	13	54.2	168	44.8	181	45.4			
Low (<65)	11	45.8	207	55.2	218	54.6			
<i>Attending breastfeeding interventions</i>							0.206	1	0.650
Yes	19	79.2	308	82.8	327	82.6			
No	5	20.8	64	17.2	69	17.4			
<i>Attending antenatal class</i>							0.239	1	0.625
Yes	18	75.0	297	79.2	315	78.5			
No	6	25.0	78	20.8	84	21.1			

*Analysis were done using Chi square test

APPENDIX 2: APPROVAL LETTER



JABATAN KESIHATAN NEGERI SELANGOR
TINGKAT 9,10,11 & 17 WISMA SUNWAYMAS,
JALAN PERSIARAN KAYANGAN,SEKSYEN 9,
40100 SHAH ALAM,
SELANGOR DARUL EHSAN.

TEL : 03-51237333, 51237334, 51237335
FAX : 03-51237202 (Pengarah), 51237209 (Pengurusan)
03-5123 7299 (Perubatan), 51237389 (Pergigian), 51237399 (Kesihatan Awam)
03- 5510 8977 (Farmasi), 55185195 (Keselamatan Dan Kualiti Makanan)



Certified to ISO 9001:2008
Cert. No. AR 3856

Ruj Tuan :
Ruj Kami : bil(4)dlm.JKNS/KA/Q-712/04-01
Tarikh : 7 Mei 2013
24 Jamadilakhir 1434H

Syahrul Bariah Abdul hamid
Department of Nutrition & Dietetics
School of Public Health
Faculty of Health Sciences
Curtin University

Puan,

MAKLUMBALAS PERMOHONAN MENJALANKAN KAJIAN "A COHORT STUDY OF MATERNAL OBESITY AND BREASTFEEDING OUTCOMES IN SELANGOR , MALAYSIA"

Dengan hormatnya merujuk kepada perkara di atas dan surat permohonan daripada Puan yang bertarikh 19 April 2013 adalah berkaitan.

2. Sukacita dimaklumkan bahawa Bahagian Kesihatan Awam, Jabatan Kesihatan Negeri Selangor tiada halangan untuk pelaksanaan kajian tersebut di KD Merbau Sempak, KD Paya Jaras dan KK Sungai Buloh sekiranya pihak Puan memenuhi perkara-perkara berikut :

- i. Permohonan kajian perlu didaftarkan dan mendapat kelulusan *National Medical Research Register* (NMRR).
 - Sila serahkan se salinan surat kelulusan Jawatankuasa Etika dan Penyelidikan Kementerian Kesihatan Malaysia (NMRR) kepada Dr. Zaharah Zainuddin, Ketua Unit Kualiti (Kesihatan Awam), Jabatan Kesihatan Negeri Selangor setelah tuan memperolehinya (alamat emel : drzaharahz@sel.moh.gov.my).
- ii. Melantik pegawai dari Jabatan Kesihatan Negeri atau Pejabat Kesihatan Daerah di mana data diperolehi, sebagai pegawai penyelidik bersama

- iii. Membentangkan hasil kajian kepada pihak kami setelah kajian selesai.
 - iv. Memberikan se salinan hasil kajian kepada pihak kami untuk bahan bacaan dan rujukan pegawai-pegawai di jabatan ini.
 - v. Sebarang penerbitan, diseminasi atau sebarang hasil penyelidikan tersebut sama ada melalui penulisan, pengiklanan, pembentangan atau untuk ke media perlu mendapat kelulusan Ketua Pengarah Kesihatan Malaysia terlebih dahulu.
4. Untuk sebarang pertanyaan atau maklumat lanjut, sila hubungi Dr. Ismawati Ismail, Unit Kualiti (Kesihatan Awam) di talian 03-51237331/51237338.

Kerjasama dan perhatian Tuan adalah dihargai dan didahului dengan ucapan terima kasih.

Sekian.

“BERKHIDMAT UNTUK NEGARA”

**“PENYAYANG, KERJA BERPASUKAN DAN PROFESIONALISMA
ADALAH BUDAYA KERJA KITA”**

Saya yang menurut perintah,



(DR. HJ. ZAINUDIN BIN ABDUL WAHAB, NO.MPM: 25033)

Timbalan Pengarah Kesihatan Negeri (Kesihatan Awam)
b/p Pengarah Kesihatan Negeri,
Jabatan Kesihatan Negeri Selangor

s.k

Pengarah Kesihatan Negeri,
Jabatan Kesihatan Negeri Selangor

Pegawai Kesihatan Daerah
Pejabat Kesihatan Daerah Petaling

Pegawai Kesihatan Daerah
Pejabat Kesihatan Daerah Gombak



JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN
(Medical Research & Ethics Committee)
KEMENTERIAN KESIHATAN MALAYSIA
d/a Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 Kuala Lumpur

Tel. : 03 2282 9082/03 2282 9085
03 2287 4032/03 2282 0491
Faks : 03 2287 4030

Ruj. Kami : (2) dlm.KKM/NIHSEC/800-2/2/2 Jld2.P13-491
Tarikh : 18 Julai 2013

Shahrul Bariah Abd Hamid
School of Public Health
Curtin University

Puan,

NMRR-13-327-15884

A COHORT STUDY OF MATERNAL OBESITY AND BREASTFEEDING OUTCOMES OF MALAY WOMEN IN SELANGOR, MALAYSIA

**Lokasi Projek : 1) Klinik Kesihatan Desa Merbau 2) Klinik Kesihatan Desa Paya Jaras
3) Klinik Kesihatan Sg Buloh**

Dengan hormatnya perkara di atas adalah dirujuk.

2. Jawatankuasa Etika & Penyelidikan Perubatan (JEPP), Kementerian Kesihatan Malaysia (KKM) mengambil maklum bahawa projek tersebut adalah untuk memenuhi keperluan akademik Program PhD Kesihatan Awam, Curtin University.

3. Sehubungan dengan ini, dimaklumkan bahawa pihak JEPP KKM tiada halangan, dari segi etika, ke atas pelaksanaan projek tersebut. JEPP mengambil maklum bahawa kajian ini tidak melibatkan sebarang intervensi dan hanya menggunakan borang soalselidik sahaja untuk mengumpul data kajian. Segala rekod dan data adalah SULIT dan hanya digunakan untuk tujuan kajian dan semua isu serta prosedur mengenai *data confidentiality* mesti dipatuhi. Kebenaran daripada Pengarah Kesihatan Negeri di mana kajian akan dijalankan mesti diperolehi terlebih dahulu sebelum kajian dijalankan. Puan perlu akur dan mematuhi keputusan tersebut.

4. Adalah dimaklumkan bahawa kelulusan ini adalah sah sehingga 18 Julai 2014. Puan perlu menghantar 'Continuing Review Form' (Lampiran 1) selewat-lewatnya 2 bulan sebelum tamat tempoh kelulusan ini bagi memperbaharui kelulusan etika. Pihak Puan juga perlu mengemukakan laporan tamat kajian dan juga laporan mengenai "*All adverse events, both serious and unexpected*" kepada Jawatankuasa Etika & Penyelidikan Perubatan, KKM.

Sekian terima kasih.

BERKHIDMAT UNTUK NEGARA

Saya yang menurut perintah,

(DATO' DR CHANG KIAN MENG)

Pengerusi
Jawatankuasa Etika & Penyelidikan Perubatan
Kementerian Kesihatan Malaysia



JAWATANKUASA ETIKA & PENYELIDIKAN PERUBATAN

(Medical Research & Ethics Committee)

KEMENTERIAN KESIHATAN MALAYSIA

d/a Institut Pengurusan Kesihatan

Jalan Rumah Sakit, Bangsar

59000 Kuala Lumpur

Tel. : 03 2282 9082/03 2282 9085

03 2287 4032/03 2282 0491

Faks : 03 2287 4030

Ruj : (3)dlm.KKM/NIHSEC/P13-491

Tarikh: 1 April 2014

Shahrul Bariah Abd Hamid
School of Public Health
Curtin University

Tuan/ Puan,

NMRR-13-327-15884

A COHORT STUDY OF MATERNAL OBESITY AND BREASTFEEDING OUTCOMES OF MALAY WOMEN IN SELANGOR, MALAYSIA

Dengan hormatnya perkara di atas adalah dirujuk.

2. Jawatankuasa Etika & Penyelidikan Perubatan (JEPP), Kementerian Kesihatan Malaysia (KKM) tiada halangan ke atas permohonan Tuan / Puan untuk menambahkan sembilan (9) lokasi penyelidikan dalam projek ini

3. Lokasi Penyelidikan baru adalah:

- i) Klinik Kesihatan Seksyen 7
- ii) Klinik Kesihatan Selayang Baru.
- iii) Klinik Kesihatan Seksyen 19
- iv) Klinik Kesihatan Meru
- v) Klinik Kesihatan Kapar
- vi) Klinik Kesihatan Jinjang
- vii) Klinik Kesihatan Gombak Setia
- viii) Klinik Kesihatan Klang
- ix) Klinik Kesihatan Botanik

4. Tuan / Puan juga perlu menyediakan laporan *All adverse events, both serious and unexpected* kepada Jawatankuasa Etika & Penyelidikan Perubatan, KKM jika berkenaan.

Sekian, terima kasih.

"BERKHIDMAT/UNTUK NEGARA"

Saya yang menurut perintah,

.....
(DATO' DR CHANG KIAN MENG)

Pengerusi

Jawatankuasa Etika & Penyelidikan Perubatan

Kementerian Kesihatan Malaysia

Memorandum

To	Professor Colin Binns, Public Health
From	Professor Stephan Millett, Chair, Human Research Ethics Committee
Subject	Protocol Approval HR 134/2013
Date	12 September 2013
Copy	Syahrul Bariah Abdul Hamid Public Health Professor Andy H. Lee Public Health

Office of Research and Development
Human Research Ethics Committee

TELEPHONE 9266 2784
FACSIMILE 9266 3793
EMAIL hrec@curtin.edu.au

Thank you for providing the additional information for the project titled "A Cohort Study of Maternal Obesity and Breastfeeding Outcomes for Malay women in Selangor, Malaysia". The information you have provided has satisfactorily addressed the queries raised by the Committee. Your application is now **approved**.

- You have ethics clearance to undertake the research as stated in your proposal.
- The approval number for your project is **HR 134/2013**. Please quote this number in any future correspondence.
- Approval of this project is for a period of four years **12-09-2013 to 12-09-2017**.
- Your approval has the following conditions:
 - i) Annual progress reports on the project must be submitted to the Ethics Office.
- **It is your responsibility, as the researcher, to meet the conditions outlined above and to retain the necessary records demonstrating that these have been completed.**

Applicants should note the following:

It is the policy of the HREC to conduct random audits on a percentage of approved projects. These audits may be conducted at any time after the project starts. In cases where the HREC considers that there may be a risk of adverse events, or where participants may be especially vulnerable, the HREC may request the chief investigator to provide an outcomes report, including information on follow-up of participants.

The attached **Progress Report** should be completed and returned to the Secretary, HREC, C/- Office of Research & Development annually.

Our website https://research.curtin.edu.au/guides/ethics/non_low_risk_hrec_forms.cfm contains all other relevant forms including:

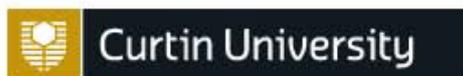
- Completion Report (to be completed when a project has ceased)
- Amendment Request (to be completed at any time changes/amendments occur)
- Adverse Event Notification Form (If a serious or unexpected adverse event occurs)

Yours sincerely



Professor Stephan Millett
Chair Human Research Ethics Committee

APPENDIX 3: INFORMATION LETTER



PARTICIPANT INFORMATION SHEET FOR MOTHERS

TITLE: A Cohort Study of Nutritional Status and Breastfeeding Outcomes for Malay women in Selangor, Malaysia

PURPOSE OF THE RESEARCH

This is an invitation to participate in a study conducted by researchers at the Curtin University. The purpose of the research is to investigate nutritional status, knowledge of infant feeding and associations with breastfeeding outcomes in Malaysian Malay mothers in Selangor, Malaysia.

METHOD AND DEMANDS ON PARTICIPANTS

If you choose to be included, you will be asked to complete a set of questionnaire regarding yourself and your opinions towards breastfeeding. Then, the research team will also interview you to obtain information on your food consumption during the preceding 6 months.

Then, you will be asked to inform the research team when you have delivered your baby by texting to the numbers given below.

After 1 month and 3 months delivery, the research team will meet you at the clinics based on the appointments set by the clinics for your child's vaccination. At these points, you will be asked to complete a set of questionnaire on breastfeeding practice and any problems arise during lactation.

Lastly, during your child's 6 months scheduled vaccination, the research team will obtain your weight and height measurement after completing a set of questionnaire on breastfeeding practice.

All interviews will be conducted within 30 minutes.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and you can refuse any specific question that you are uncertain or find it difficult to answer. During the interview, if you decide to withdraw from the study, please feel free to do so because there will be no negative consequences, especially with respect to the treatment you are receiving at this clinic. I can assure you that your treatment or therapy will not be affected at all by participation in this study.

PRIVACY, CONFIDENTIALITY AND DISCLOSURE OF INFORMATION

Please be assured that your information will only be accessed by the chief researcher of this project, and not anyone else. In particular, it will not be released to the medical staff and authority of this clinic. Your completed questionnaire and other documents will be kept confidentiality in a locked cabinet for five years at MARA University of Technology, Puncak Alam before being destroyed. Individuals will not be identified in any publication/dissemination of the research findings without their explicit consent.

After you have signed the enclosed consent form, I will assume that you have agreed to participate, and you allow me to use your data in this research project. The information you provided will be kept strictly confidential, and your identity will remain anonymous. Only aggregated data from all participants will be analysed and reported.

Thank you very much for your participation in this research project. Your contribution is important and greatly appreciated.

Regards,

Syahrul Bariah Abdul Hamid
Investigator
Curtin University
GPO Box U1987
Perth WA 6845
Tel: 0132884252
Email: syahrulbariah25@gmail.com

Colin Binns
Professor of Public Health
Curtin University
GPO Box U1987
Perth WA 6845
Tel: 9266-4341 or 0401 103 639
Fax: 9266-2968

Note: This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number HR 1002012). The Committee is comprised of members of the public, academics, lawyers, doctors and pastoral carers. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or by emailing hreo@curtin.edu.au.

APPENDIX 4: CONSENT FORM



CONSENT FORM FOR PROJECT

A Cohort Study of Nutritional Status and Breastfeeding Outcomes for Malay women in Selangor, Malaysia

I, _____, have read the information on the attached letter, and have been informed about the purpose of this research project.

I agree to participate in this research, but have the option to change my mind and withdraw at any time.

I agree to take part in an interview where my answers will be recorded onto a questionnaire.

I understand that all information provided by me will be treated as confidential and that my identity will remain anonymous.

I understand that no individual data will be used except in collected form for subsequent reporting purpose.

Participant's contact details:

(MOBILE) : _____ (HOME) : _____ (OFFICE) : _____

Address (home) : _____

Address (office) : _____

Name of participant	Signature of participant	Date
_____	_____	_____
Name of witness	Signature of witness	Date
_____	_____	_____

Note: This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number HR xx/2012). The Committee is comprised of members of the public, academics, lawyers, doctors and pastoral carers. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or by emailing hrec@curtin.edu.au.

Investigators:

Syahrul Bariah Abdul Hamid
Investigator
Curtin University
GPO Box U1987
Perth WA 6845
Tel: 0132884252
Email: syahrulbariah25@gmail.com

Colin Binns
Professor of Public Health
Curtin University
GPO Box U1987
Perth WA 6845
Tel: 9266-4341 or 0401 103 639
Fax: 9266-2958

APPENDIX 5: BASELINE QUESTIONNAIRE (ENGLISH VERSION)



**A Cohort Study of Nutritional Status and
Breastfeeding Outcomes for Malay women in
Selangor, Malaysia**

2013

APPENDIX B: QUESTIONNAIRE 1 (36 weeks gestation

Interview Date: ____ / ____ / ____ Interviewer Code: _____

Mother's name: _____

ID Number _____

Tel: (home) _____ (mobile) _____

Address (H): _____

Address (O): _____

Maternal and Child Health Clinics:

Sg. Buloh Hospital.....1	KD Paya Jaras..... 4
KK Sg Buloh..... 2	KD Merbau Sempak.....5

A. BREASTFEEDING INFORMATION

1. How are you going to feed your baby?

- breastfeeding only1
- bottle-feeding only2
- mainly bottle-feeding (formula) but also breastfeeding3
- mainly breastfeeding but 'topping up' with bottle-feeding (formula)4
- other (please specify) _____

2. When did you **first** decide how you were going to feed your new baby?

- before I became pregnant.....1
- early in my pregnancy.....2
- late in my pregnancy.....3
- during labour.....4
- after my baby was born5

3. Does the baby's father have any preference for how you will feed your baby?

- yes, he prefers bottle-feeding1
- yes, he prefers breastfeeding2
- he doesn't mind how I feed my
baby 3 never really
- discussed the matter with him.....4

4. When do you plan to first give your baby solids?

- before 2 months.....1
- between 2 and three months2
- between 4 and six months3
- between 7 and 9
months4

APPENDIX B: QUESTIONNAIRE 1 (36 weeks gestation

- between 10 and
12 months5
over 12 months6
when baby is ready7
I don't know8
other (please specify) _____ .
5. If you plan to breastfeed, at what age do you plan to stop breastfeeding your baby?
- before baby is 6 weeks old1
between 6 weeks and 2 months2
between 2 and three months3
between 4 and six months4
between 7 and 9
months 5
.....between 10 and
12 months 6
between 10 and 12 months6
over 12 months7
other (please specify) _____
7. Since you have been in hospital have you received any of the following from hospital staff?
(Please circle **all** that you have received. You can have more than one answer)
- a. pamphlets or booklets on **breastfeeding** your baby1
b. lectures or classes on **breastfeeding** your baby2
c. demonstrations on how to **breastfeed** your baby3
d. video (TV) or slide show on how to **breastfeed** your baby4
e. individual consultation or discussion with any of the staff about
breastfeeding your baby5
f. pamphlets or booklets on **bottle-feeding** your baby6
g. lectures or classes on **bottle-feeding** your baby7
h. demonstrations on how to **bottle-feed** your baby8
i. video (TV) or slide show on how to **bottle-feed** your baby9
j. individual consultation or discussion with any of the staff about
bottle-feeding your baby10
k. pamphlets or booklets on **introducing solids** to your baby11
l. classes on **introducing solids** to your baby12
m. demonstrations on **introducing solids** to your baby13
n. video (TV) or slide show on **introducing solids** to your baby14

APPENDIX B: QUESTIONNAIRE 1 (36 weeks gestation

o. none of the above15
other (please specify) _____

APPENDIX B: QUESTIONNAIRE 1 (36 weeks gestation)

B. IOWA INFANT FEEDING ATTITUDE SCALE

For each of the following statements, please indicate how much you agree or disagree by circling the number that most closely corresponds to your opinion. The number '1' indicates strong disagreement, whereas '5' indicates strong agreement.

Example: Drinking tea is good for you. You agree with the statement but not strongly agree. Your answer is 4. Circle number 4 in the options.

	Strongly disagree				Strongly agree
a	1	2	3	4	5
The nutritional benefits of breast milk last only until the baby is weaned from breast milk					
b	1	2	3	4	5
Formula-feeding is more convenient than breastfeeding					
c	1	2	3	4	5
Breastfeeding increases mother-infant bonding					
d	1	2	3	4	5
Breast milk is lacking in iron					
e	1	2	3	4	5
Formula-fed babies are more likely to be overfed than breast-fed babies					
f	1	2	3	4	5
Formula-feeding is the better choice if the mother works outside the home					
g	1	2	3	4	5
Mothers who formula-feed miss one of the great joys of motherhood					
h	1	2	3	4	5
Women should not breastfeed in public places such as restaurants					
i	1	2	3	4	5
Babies who are fed breast milk are healthier than babies who are fed formula					
j	1	2	3	4	5
Breast-fed babies are more likely to be overfed than formula-fed babies					
k	1	2	3	4	5
Fathers feel left out if a mother breastfeeds					
l	1	2	3	4	5
Breast milk is the ideal food for babies					
m	1	2	3	4	5
Breast milk is more easily digested than formula					
n	1	2	3	4	5
Formula is as healthy for an infant as breast milk					
o	1	2	3	4	5
Breastfeeding is more convenient than formula-feeding					
p	1	2	3	4	5
Breast milk is less expensive than formula					
q	1	2	3	4	5
A mother who occasionally drinks alcohol should not breastfeed her baby					

C. DEMOGRAPHIC INFORMATION

8. What is your age? _____ 9. What is your religion? _____

10. What is the highest level of education you have completed?

- Primary school.....1
- Lower Secondary School.....2
- Higher Secondary School.....3
- Certificate.....4
- Diploma.....5
- Degree6
- Other: _____7

11. How many years of schooling have you completed? _____

12. What is your occupation?

- Housewife.....1
- Full-time employed2
- Part-time employed3
- Self-employed.....4
- Please state your occupation: _____

13. What is your marital status?

- married.....1
- never married.....2
- divorced or separated3
- widowed.....4

14. What is your husband's / partner's occupation?

- Unemployed.....1
- Full-time employed2
- Part-time employed.....3
- Self-employed.....4
- Please state your occupation: _____

15. What is the highest level of education your husband / partner have completed?

- Primary school.....1
- Lower Secondary School.....2
- Higher Secondary School.....3
- Certificate.....4
- Diploma.....5
- Degree6
- Other: _____7

16. Approximate total monthly household income

- less than RM 5001
- RM 501 to RM 1000.....2
- RM 1001 to RM 1500.....3
- RM 1501 to RM 2000.....4
- RM 2001 to RM 2500.....5
- RM 2501 to RM 3000.....6
- more than RM 3000.....7

THANK YOU VERY MUCH FOR YOUR PARTICIPATION.

Interviewers signature: _____

APPENDIX 6 : FOLLOW UP QUESTIONNAIRE A



**A Cohort Study of Nutritional Status and
Breastfeeding Outcomes for Malay women in
Selangor, Malaysia**

2013

APPENDIX C: QUESTIONNAIRE 2 (one month POSTPARTUM)

Interview Date: ___/___/___ Interviewer Code: _____

Mother's name: _____ ID Number _____

Ethnic group _____ Tel: (home) _____

(mobile) _____

Address: _____

Baby's Date of Birth: ___/___/___ Baby's gender? Male 1 Female 2

A. BREASTFEEDING INFORMATION

1. How (were) you feeding your baby at discharge from hospital?

- Breastfeeding only.....1
- Breastfeeding + (sugar) water2
- Breastfeeding + juice.....3
- Mainly breastfeeding but "topping up" with bottle feeding.....4
- Mainly bottle feeding but also breastfeeding.....5
- Bottle feeding only.....6
- Other(please specify): _____

2. What was your baby's first feed after he/she was born?

- Breast milk (or colostrum).....1
- Formula2
- Sugar water.....3
- Plain water.....4
- Don't know.....5
- Other (please specify) _____

3. How long after birth did you first breastfeed your baby?

- Less than one hour.....1
- 1-four hours.....2
- More than four hours, Less than 1 day.....3
- More than 1 day after birth.....4
- Don't Know.....5

4. How are you feeding your baby now?

- Breastfeeding only.....1
- Breastfeeding + (sugar) water2
- Breastfeeding + juice.....3
- Mainly breastfeeding but "topping up" with bottle-feeding.....4
- Mainly bottle feeding but also breastfeeding.....5
- Bottle feeding only.....6
- Other(please specify): _____

5. How many of these feeds would be breastfeeds (in 2four hours)?

6. How many of these feeds would be formula feeds (in 2four hours)?

7. What is the average length of each feeding episode?

- Less than 15 minutes.....1 Between 30 minutes and one hour.....3
 Between 15 and 30.....2 More than one hour.....4

FOR MOTHERS WHO ARE FORMULA FEEDING THEIR INFANT.

8. Did you try to breastfeed your baby?

- Yes.....1
 No.....2

9. Why did you change to bottle feeding?

10. Why did you feed your baby formula?

- It is better than cow milk.....1
 It is as good as better than breast milk.....2
 Hospital staff told me to3

Mother has problem breastfeeding (describe): _____
 Other: _____

11. Which formula are you using?

- Domestic milk formula.....1
 Imported milk formula.....2
 Other _____3

12. How many times a day is your baby fed formula? _____

13. When did you first decide how to feed your new baby?

- After my baby was born.....1
 Before I became pregnant.....2
 Early in my pregnancy.....3
 Late in my pregnancy.....4
 Other: _____

14. Who helped you decide whether you would bottle-feed or breastfeed?

(Please circle any answers that apply) (You can have more than one answer)

- No one.....1
 The baby's father1
 My mother.....1
 Doctor1
 Other (please specify): _____..1

15. What were the reasons for your choice of bottle-feed?

(You can have more than one answer)

APPENDIX C: QUESTIONNAIRE 2 (one month POSTPARTUM)

- Bottle feeding is as good as breastfeeding.....1
Bottle-feed is easier.....2
I will go back to work.....3
Breastfeeding will make my breasts sag.....4
The baby's father prefers bottle-feeding.....5
My mother suggested bottle-feed.....6
My health problem: _____
Other: _____

FOR ALL MOTHERS

- 16. How many times do you feed during the day (6.0am to 9.0pm)?** _____
How many times do you feed during the night (9.0pm to 6.0am)? _____
- 17. Did your mother breastfeed any of her children for more than one month?**
Yes.....1
No.....0
Don't know.....2
- 18. Does your mother have any preference for how you feed your baby?**
Yes, she prefers bottle-feeding..... 1
Yes, she prefers breastfeeding 2
She doesn't mind how I feed my baby3
Never really discussed the matter with her4
- 19. Does the baby's father have any preference for how you feed your baby?**
He prefers bottle-feeding.....1
He prefers breastfeeding2
He doesn't mind how I feed my baby3
Never really discussed the matter with him.....4
- 20. Have you ever attended any antenatal classes on how to feed your baby?**
Yes, for this pregnancy 1
Yes, for a previous pregnancy2
No.....3
- 21. How was your baby delivered?**
Vaginal.....1
Caesarean.....2
- 22. Did your baby have any health problems while in hospital?**
Yes..... 1
No.....2
If yes, what were the health problems? _____
- 23. Did you have any health problems during this pregnancy?**
None.....1
Yes, high blood pressure.....2
Yes, high blood glucose level.....3

Others: _____

24. Did you smoke cigarettes?

- No.....1
- Yes, before I became pregnant.....2
- Yes, while I was pregnant.....3

How many cigarettes do you smoke every day before pregnancy? ____

How many cigarettes did you smoke every day while pregnant? ____

25. Did you drink alcohol while pregnant?

- No..... 0
- Yes..... 1
- a. How many glasses (drinks) per week? _____

26. Is your breastmilk enough for your baby?

- Yes..... 1
- No.....2
- Don't know.....3

27. How do you now that you have enough breastmilk? (one or more answers)

- Breast is engorged.....1
- Baby is full after breastfeeding.....2
- Baby is satisfied.....3
- Can feel effective sucking.....4
- Other:_____

28. If breastmilk is not enough, what do you do? _____

29. Why did you decide to breastfeed? (one or more answers)

- The baby's father wanted me to breastfeed.....1
- Breast milk is better for the baby2
- Breast-fed babies are more intelligent.....3
- Breastfeeding is the right thing to do4
- Breastfeeding is cheaper.....5
- Breastfeeding is more convenient.....6
- Breastfeeding helps you losing weight.....7
- Breastfeeding is fashionable.....8
- Mother and baby become closer.....9
- Emptying breast is good for mother.....10
- _____ advised me to breastfeed
- Other (please specify)_____

30. How long do you intend to breastfeed your baby? _____ (months)

**31. At what age do you plan to start giving your baby its first solid food?
_____ (months)**

**32. Have you experienced any of the following since you started breastfeeding?
(one or more answers)**

- A painful swelling of part of your breast
(pink, tender, hot, swollen area of the breast).....1
- When you had a sore breast did you have a high temperature (fever)?.....2
- When you had a sore breast did you have body aches, or headaches?.....3
- Did a nurse or doctor tell you that you had a breast problem?.....4
- Cracked or sore nipples5
- Baby gets too much milk.....6
- Takes a long time before milk starts flowing at start of feed7
- Baby has problems sucking.....8
- Baby doesn't wake up for feeds.....9
- Not enough milk or colostrum for baby.....10
- Other (please specify) _____

33. How old was the baby when you had breast problem(s)? _____ weeks

34. What is your occupation? _____

35. Were you employed or studying outside home in the past six months?

- Yes, full-time..... 1
- Yes, part-time.....2
- No.....3

36. What do you plan to do in the next six months?

- Will still be home with the baby.....1
- Work full-time.....2
- Work part-time.....3
- Undecided.....4
- Others _____

37. How long will you stay with baby at home before you go to work or study?

- For delivery leave (100 days).....1
- 6-12 months.....2
- 1 year or more.....3

38. Who will mainly take care of you baby after you go to work?

- My mother.....1
- My mother in law.....2
- Nursemaid.....3
- Myself.....4
- Other: _____

39. How is your health condition?

- Excellent.....1
- Not good.....2
- Details? _____

APPENDIX C: QUESTIONNAIRE 2 (one month POSTPARTUM)

C. TERMINATION OF BREASTFEEDING ONLY (If still breastfeeding go to Q48)

40. How old was your baby when you stopped breastfeeding? _____
weeks

41. Why did you decide to stop breast-feeding?

42. Did anyone advise you to stop breastfeeding? Who?

43. Did you plan to stop breastfeeding when you did? Yes.....1
No.....2

44. Were you disappointed for not breastfeeding for longer? Yes.....1
No.....2

45. Do you feel guilty for not breastfeeding for longer? Yes.....1
No.....2

46. Have other people made you feel guilty for not breastfeeding for longer?
Yes.....1 No.....2

47. Would you breastfeed another child if you had another baby?
Yes.....1 No.....2 Yes, if I
could.....3

a. Why?

THANK YOU VERY MUCH FOR YOUR PARTICIPATION.

Interviewer signature : _____

APPENDIX 7 : FOLLOW UP QUESTIONNAIRE B



**A Cohort Study of Nutritional Status and
Breastfeeding Outcomes for Malay women in
Selangor, Malaysia**

2013

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

Interview Date: ____/____/____ **Interviewer Code:** _____

Mother's name: _____

ID Number _____ **Ethnic group** _____

Tel: (home) _____ **(mobile)** _____

Address: _____

Maternal and Child Health Clinics:

Sg. Buloh Hospital.....1	KD Paya Jaras.....4
KK Sg Buloh..... 2	KD Merbau Sempak.....5

Baby's Date of Birth: ____/____/____ **Baby's gender?** Male 1 Female 2

A. BREASTFEEDING FOLLOW-UP INFORMATION

1. How are you feeding your baby now?

- Breastfeeding only.....1
- Breastfeeding + (sugar) water2
- Breastfeeding + juice.....3
- Mainly breast-feeding but "topping up" with bottle-feeding..... 4
- Mainly bottle-feeding but also breast-feeding.....5
- Bottle-feeding only.....6
- Other(please specify): _____

2. How many times per day on average do you feed your baby (2four hours)?

3. How many of these feeds would be breast-feeds (in 2four hours)?

4. How many of these feeds would be formula-feeds (in 2four hours)?

5. What is the average length of each feeding episode?

- Less than 15 minutes.....1 Between 30 minutes and one hour.....3
- Between 15 and 30.....2 More than one hour.....4

6. Have you changed the way you feed your baby since the last interview?

Yes.....1

No.....2

a. If you have changed feeding method, why?

b. How old was the baby when you changed? _____ (weeks)

c. What is the change?

Started solids.....1

Started formula.....2

Started other milk.....3

Others: _____

7. If you are bottle-feeding, what type of formula are you using? _____

The brand _____

8. When did you begin your baby on this formula? _____ (weeks)

9. Why did you choose this particular formula? _____

10. Who decided to change the way you feed your baby? (You may choose more than one answer)

Myself.....1

Baby's father.....2

My mother.....3

Doctor.....4

Nurse.....5

Others: _____

11. If you have gone back to work, how many times can you breastfeed during working hours _____

12. At what age do you plan to first give your baby solids? _____ (months)

13. Is your breast milk enough for your baby?

Yes.....1

No.....2

Don't know.....3

14. If breast milk is not enough, how do you deal with it?

15. Do you use any special food or herbal preparation to promote the production of breast milk?

Yes..... 1

No.....2

If Yes, please specify

16. Have you had any of these difficulties with breast-feeding since I spoke to you last time?

- Not enough milk for baby.....1
- Cracked or sore nipples.....2
- Mastitis or breast infection.....3
- Breasts engorged (too full).....4
- Inverted nipples.....5
- Breast-feeding is painful.....6
- My health condition is not good.....7
- Others: _____

17. Has your baby had any of the following since the last interview?

- Baby not gaining enough weight.....1
- Baby has difficulties sucking.....2
- Baby refuses to breast-feed.....3
- Baby too tired to feed i.e. falls asleep at breast.....4
- Other: _____

18. Questions on problems with your breasts. In the past four weeks have you had?

- A painful swelling of part of your breast (pink, tender, hot, swollen area of the breast).....1
- When you had a sore breast did you have a high temperature (fever)?2
- When you had a sore breast did you have body aches, or headaches?.....3
- Did a nurse or doctor tell you that you had a breast problem?4
- Any other difficulties with breastfeeding? _____

19. Have you asked for advice or help from anyone about your breast-feeding problem(s)? If yes, who? _____

20. Did you take any medicine for breast pain or swelling in the past four weeks?

- Yes.....1
- No.....2

20a. What was it? _____

21. Has your baby experienced any of these health problems since I spoke to you last?

- Vomiting.....1
- Diarrhea.....2
- Respiratory illness.....3
- Skin – rash, dermatitis, etc.....4
- Jaundice.....5
- Colic.....6

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

Other problem (baby): _____

22. Did you take your baby to any health professionals regarding the problem?

Yes.....1 No.....2

22a. If yes, who? _____

23. Total number of visits to health professionals since last interview _____

24. Have you experienced any health problems since I spoke to you last?

Yes.....1 No.....2

If yes, the problem is: _____

25. Did you see a health professional about this problem?

Yes.....1 No.....2

If yes, who? _____

26. How long do you intend to breastfeed (breastfeeding + other food) your baby?

27. How do you feel about your baby's weight since birth?

Satisfied / pleased1

A little concerned because too small.....2

Very worried or concerned because too small.....3

A little concerned because too big.....4

Very worried or concerned because too big.....5

28. Have you seen any advertisements for infant formula since we last spoke?

Yes.....1 No.....2

a. If yes, where did you see the ad? _____

29. Since your last interview, have you been drinking tea/

Yes.....1 No.....2

a. What kind of tea did you drink most often? _____

b. How many cups per day did you drink? _____

30. What is your weight? _____ (kg) date measured? ____/____/____

31. Do you smoke cigarettes?

Yes.....1 No.....2

b. How many cigarettes do you smoke every day? _____

32. Does the baby's father smoke?

Yes.....1 No.....2

How many cigarettes does he smoke every day? _____

33. Do you drink alcohol?

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

Yes.....1 No.....2

How many glasses (drinks) per week? _____

What kind do you drink most often? Beer 1. wine 2 , other? 3

34. Do you take any contraceptive pills?

Yes.....1 No.....2

If yes, what type? _____ what brand? _____

35. How would you rate your confidence in breastfeeding?

Totally Not Confident.....1

Not confident.....2

Neutral.....3

Confident.....4

Very Confident.....5

36. How enjoyable do you find breastfeeding?

Totally not enjoyable.....1

Not enjoyable.....2

Neutral.....3

Enjoyable.....4

Very Enjoyable.....5

37. How satisfied are you with your breastfeeding experience?

Totally not satisfied.....1

Not satisfied.....2

Neutral.....3

Satisfied.....4

Very satisfied.....5

38. In general, how comfortable do you feel while breastfeeding in front of other people?

Totally not comfortable.....1

Not comfortable.....2

Neutral.....3

Comfortable.....4

Very Comfortable.....5

39. Summary of breastfeeding

Exclusive breastfeeding duration _____ weeks

Any breastfeeding duration _____ weeks or still breastfeeding (please k)

Age introduced solid foods _____ weeks

40. Summary of Baby's Growth

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

Age (Months)	Weight (kgm)	Feeding Method
1		
2		
3		
4		
5		
6		

B. TERMINATION OF BREASTFEEDING ONLY (If still breastfeeding go to Section C)

41. How old was your baby when you stopped breast-feeding? _____ weeks

42. Why did you decide to stop breast-feeding? _____

43. Did anyone advise you to stop breast-feeding? Who?

44. Did you plan to stop breast-feeding when you did? Yes.....1
No.....2

45. Were you disappointed for not breast-feeding for longer? Yes.....1
No.....2

46. Do you feel guilty for not breast-feeding for longer? Yes.....1
No.....2

47. Have other people made you feel guilty for not breast-feeding for longer?
Yes.....1 No.....2

48. Would you breast-feed another child if you had another baby?
Yes.....1 No.....2 Yes, if I could.....3
a. Why?

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

C. IOWA INFANT FEEDING ATTITUDE SCALE

For each of the following statements, please indicate how much you agree or disagree by circling the number that most closely corresponds to your opinion. The number '1' indicates strong disagreement, whereas '5' indicates strong agreement.

	Strongly disagree			Strongly agree	
	1	2	3	4	5
a The nutritional benefits of breast milk last only until the baby is weaned from breast milk	1	2	3	4	5
b Formula-feeding is more convenient than breast-feeding	1	2	3	4	5
c Breast-feeding increases mother-infant bonding	1	2	3	4	5
d Breast milk is lacking in iron	1	2	3	4	5
e Formula-fed babies are more likely to be overfed than breast-fed babies	1	2	3	4	5
f Formula-feeding is the better choice if the mother works outside the home	1	2	3	4	5
g Mothers who formula-feed miss one of the great joys of motherhood	1	2	3	4	5
h Women should not breast-feed in public places such as restaurants	1	2	3	4	5
i Babies who are fed breast milk are healthier than babies who are fed formula	1	2	3	4	5
j Breast-fed babies are more likely to be overfed than formula-fed babies	1	2	3	4	5
k Fathers feel left out if a mother breast-feeds	1	2	3	4	5
l Breast milk is the ideal food for babies	1	2	3	4	5
m Breast milk is more easily digested than formula	1	2	3	4	5
n Formula is as healthy for an infant as breast milk	1	2	3	4	5
o Breast-feeding is more convenient than formula-feeding	1	2	3	4	5

Appendix D: QUESTIONNAIRE 3 (three and six months postpartum)

p	Breast milk is less expensive than formula	1	2	3	4	5
q	A mother who occasionally drinks alcohol should not breast-feed her baby	1	2	3	4	5

THANK YOU VERY MUCH FOR YOUR PARTICIPATION.

AUTHOR'S PROFILE

Syahrul Bariah Abdul Hamid completed her PhD in Public Health at the Faculty of Health Sciences, Curtin University. She received her MHSc in Clinical Nutrition at the Faculty of Allied Health Sciences, National University of Malaysia. She was a community dietitian at Majlis Amanah Rakyat (MARA) before joined Universiti Teknologi MARA (Puncak Alam) as a lecturer. Up to date, she has served as an academician for seven (7) years.