Breastfeeding by Chinese mothers in Australia and China: the healthy migrant effect

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Conflicts of Interest

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Well Established

The breastfeeding practices might be influenced by migration to another country. In spite of the popularity of the healthy migrant hypothesis, evidence for it in breastfeeding practices is weak. There is a need for a comparison the breastfeeding practices between Australian-Chinese migrants and Chinese mothers in mainland China and test the "healthy migrant effect" in this population.

Newly Expressed

This study has shown that the breastfeeding practices of Chinese migrant in Australia are unique to Chinese living in China and to other Australians. A "healthy migrant effect" was reflected in higher breastfeeding initiation and longer breastfeeding duration in Chinese Australian mothers than mothers in China.

Abstract

Background: Breastfeeding is the optimal way of infant feeding. The breastfeeding practices might be influenced by migration to another country. In spite of the popularity of the healthy migrant hypothesis, evidence for it in breastfeeding practices is weak.

Objectives: This study aimed to compare the initiation and duration of breastfeeding between Chinese Australian migrants and Chinese mothers in mainland China and test the "healthy migrant effect" in Chinese Australian migrants in Perth, Western Australia.

Methods: A survey was undertaken of 239 Chinese mothers living in Perth Australia and 1844 mothers living in Chengdu, Sichuan Province, PR China, with a response rate of 96.7% and 87.8% respectively.

Results: The breastfeeding initiation rate in Chinese Australian mothers (94.1%) was higher than it in mothers in China (86.2%, $P<0.001$). Chinese Australian mothers also had a longer breastfeeding duration, greater 'full breastfeeding' rate at 6 months and greater 'any breastfeeding' rates at 6 and 12 months. After controlling for potential confounding variables, the results of the binary logistic regression analysis showed that the location of the mother (in Australia or China) was associated with breastfeeding practices. Chinese mothers living in Chengdu were less likely to initiate breastfeeding (OR=0.47, 95%CI 0.25-0.89) and breastfeed their babies at 12 months (OR=0.48, 95%CI 0.33-0.69) than mothers in Perth.

Conclusion: The higher breastfeeding initiation and longer breastfeeding duration in Chinese migrants mothers in Perth than mothers in Chengdu suggests a "healthy migrant effect".

Key words: breastfeeding, healthy migrant effect, migrants, Chinese

Background

The type and duration of infant feeding may have an important role in the development of biological and behavioural processes and epigenetic modification affecting subsequent growth and health.[1-5] The World Health Organization (WHO) recommends exclusively breastfeeding for the first six months of life and continued breastfeeding up to two years of age or beyond.[6]

The Australian population has a high proportion of migrants and nearly 29% aged 15 years and over who born overseas.[7] In recent decades the focus of Australian immigration has shifted from Europe to Asian and China is now the largest source of migrants.[8] In the 2006 Australian Census 669,890 residents identified themselves as having Chinese ancestry and the number is increasing by 7.7% per year.[9] There were 53,390 Chinese born residents in Perth in 2006, including 5527 children about 2.9% of the city's population.[10]

A review of health statistics has found that most migrants enjoy health that is as good as, if not better than, that of the Australian-born population.[11] Overseas-born people are admitted to hospital at lower rates than the Australian-born population.[12] In 2005–06, the age-standardized total hospital separation rate for Australian born patients was 20% higher than for the overseas-born population (367 compared to 300 per 1,000 population).[13] Compared with other 'country of birth' groups, those born in North-East Asia, which includes China, Japan, the Republic of Korea and Taiwan, had the lowest hospital separation rate at 225 per 1,000 population.[12] This could reflect either "healthy migrant effect"; that is, migrants tend to be better educated, highly motivated and in better psychological and physical health than non-migrants, or underutilization of "mainstream" health services because of language and cultural barriers or a mixture of both.[14, 15]

There is also evidence that migrants, whether temporary or permanent, tend to be healthier than the population from which they originate.[14-17] To some extent, the "healthy migrant effect" can be partly explained by the fact that most migrants are selected by the recipient country on the basis of their health and, in some cases, their relatively high socioeconomic status. The "healthy migrant effect" is also due to a self-selection process as the chronically ill and disabled are less likely to migrate. People who are able to migrate and be mobile are more likely to be healthier when compared with native-born counterparts.[18]

In China, the 'any breastfeeding' rates in the majority of cities and provinces including minority areas have been above 80% at four months since the mid-1990s.[19] The mean duration of 'any breastfeeding' in the majority of cities or provinces was between seven and nine months, but only a small portion of Chinese mothers are still exclusively breastfeeding their infants at six months.[19] It was reported that the 'exclusive breastfeeding' rates in Han, Uygur and 'other ethnic groups' at six months in Xinjiang Province, P.R. China were 4.8%, 0.4% and 16.8% respectively.[20] Another cohort study undertaken in Zhejiang Province, P.R. China reported the 'exclusive breastfeeding' rates by sixth months were 0.2%, 0.5% and 7.2% in city, suburb and rural areas respectively.[21] The breastfeeding initiation rate in Chengdu was reported as 92.6 % to 96.5 % in different studies, which was similar to the average level in large cities in China.[19, 22, 23] At four months, about 40%-54% infants had been introduced to foods other than breastmilk in Chengdu.[19, 22, 23] A recent cohort study from Chengdu reported that 96.5% of mothers gave their infants prelacteal feeds , which means the "exclusive breastfeeding" was less than 3.5% at discharge. [22]

Migration to another country has potential influences on breastfeeding practices.[24] In Australia approximately 96% of women initiate breastfeeding, but initiation rates are not consistent across

all ethnic groups.[25] Mothers from non-English speaking backgrounds had lower breastfeeding initiation rates than their Australian-born counterparts.[26, 27] In particular, Chinese-speaking women were reported to have a lower initiation of breastfeeding compared with other ethnic groups.[28] A survey of the initiation and duration of breastfeeding in Chinese mothers in Perth, Western Australia revealed that less than 7% of Chinese mothers were still fully breastfeeding at 6 months.[29]

The aim of this study was to compare the initiation and duration of breastfeeding between Chinese Australian migrants and Chinese mothers in mainland China. We hypothesized that a "healthy migrant effect" would be reflected in the Chinese mothers in Australia who would have greater 'any breastfeeding' rates and longer 'any breastfeeding' duration.

Methods

A self-reporting survey was undertaken of Chinese mothers living in Perth Australia and mothers living in Chengdu, Sichuan Province, PR China. The participants in Perth were mothers with children under 5 years old who were recruited from the Perth Chinese community, including Chinese schools and community organizations. If the mother had more than one child under 5 years old, the youngest child was chosen as the "index child" for questions in the questionnaire. A total of 239 mothers agreed to participate with a response rate of 96.7%. Participants in China were recruited from 14 kindergartens in seven districts of Chengdu. A total of 2100 questionnaires were distributed to mothers whose child was under 5 years old by kindergarten teachers and 1844 were returned by the mothers, a response rate of 87.8%.

The study was approved by the Curtin University Human Research Ethics Committee. An information letter in English and/or Chinese, with an explanation of the project, was given to each mother.

Demographic and breastfeeding information was collected by validated and reliable questionnaire previously used in Chinese breastfeeding studies.[30] Precoded questions were asked to classify income into three groups using categories were based on local annual household income surveys.[31, 32] 'Full breastfeeding' was defined by the WHO as "exclusive (no other liquid or solid is given to the infant) or almost exclusive (vitamins, mineral water, juice, or ritualistic feeds are given infrequently in addition to breastfeeds)". [33, 34] The average recall period for mothers in Chengdu was 3.7±0.7 years and for mothers in Perth was 1.9±1.2 years. Those mothers who were still breastfeeding were all followed until they stop breastfeeding. The mothers' attitudes toward infant feeding was measured by the Iowa Infant Feeding Attitude Scale (IIFAS) which is a measure of attitudes towards infant feeding.[35] The IIFAS contains 17 items with a five-point Lickert scale that ranged from 'strongly disagree' to 'strongly agree' for each item. Total attitude scores range from 17 to 85 with higher scores reflecting attitudes more positive to breastfeeding.[35] The reliability and validity of the scale has been assessed by studies undertaken in English-speaking populations.[35-39] It has been translated into Romanian and traditional Chinese and showed good reliability and validity. In this study, the IIFAS was translated into simplified Chinese by three bilingual translators and subsequently back-translated.[40] For the purposes of the bivariate regression analysis, mothers were split into two groups: those with an IIFAS score at or above the median (58) and those with a score less than the median (58).

Data were analysed using the IBM Statistical Package for Social Sciences (SPSS) Version 20.0. Descriptive statistics were calculated for variables of interest. Continuous variables (e.g., mother's age and breastfeeding duration, etc) are presented as mean ± standard deviation and categorical variables (e.g., mother's working status, household economic status, infant feeding methods, etc) as number (%) in relevant categories.

Independent samples t-test was used to compare means between groups and Mann-Whitney U test was applied when the distribution of variables were not normal. Chi-square (χ^2) test was used to test associations between categorical variables. Potential influencing variables were chose basing on previous studies.[26, 37, 41] A multiple binary logistic regression model was performed to evaluate the influence of potential risk factors on 'breastfeeding initiation', and 'any breastfeeding' at six months and twelve months, respectively. A backward elimination procedure was then applied to obtain final models. P values <0.05 were considered statistically significant.

Results

There was no differences in marital status between the two countries and the average age of Chinese mothers in Perth, West Australia was 33.5±5.0 years, significantly older than mothers in Chengdu, P.R. China (31.3±4.3 years, P<0.001). Australia mothers had a higher education level compared to China mothers and higher economic status according to the local household economic standard (Table 1). The majority of Perth mothers were not employed, but in Chengdu the majority of mothers worked full-time. The percentage of caesarean delivery was nearly double in Chengdu compared to that of the Perth Chinese mothers. The result of Mann-Whitney U test shows that the average age of the "index child" in the Chengdu sample (median age=1.59 years, interquartile range=1.88 years) was older than it in Perth (median age=3.70 years, interquartile range=1.11 years, P<0.001).

Most Chinese mothers initiated breastfeeding, both in Australia (94.1%) and in China (86.2%). There was no difference between the 'full breastfeeding' duration in Australia and in China, both with the median 'full breastfeeding' duration of 4 months and the interquartile range of 5 months. However, Australia mothers were more likely to initiate breastfeeding (χ^2=11.7, df=1, *P*=0.001) and they had longer 'any breastfeeding' duration (*P*<0.001). In Australia, the median duration of 'any breastfeeding' was 9.25 months (interquartile range=7 months) compared to 8 months in China (interquartile range=5.62 months). Australian mothers also had a greater 'full breastfeeding' rate at 6 months and greater 'any breastfeeding' rates at six and twelve months (*P*<0.001) (see Figure).

Mother's age, mother's location (in Australia or China), infant feeding attitudes, marital status, household economic, working status, level of education and delivery method were entered into a binary logistic regression model using backward elimination. After controlling for potential confounding variables (e.g., mother's age, education level, infant feeding attitude, etc), the results of the binary logistic regression analysis showed that the location of the mother (Australia or China) was associated with breastfeeding practices. Chinese mothers living in Chengdu were less likely to initiate breastfeeding (OR=0.48, 95%CI 0.33-0.69) and breastfeed their babies at twelve months (OR=0.48, 95%CI 0.33-0.69) than mothers in Perth. Chinese women with higher IIFAS scores (mean IIFAS score>58) that favoured breastfeeding were more likely to initiate breastfeeding (OR=2.22, 95%CI 1.52-3.24), and continue breastfeeding at six months (OR=2.18, 95%CI 1.64-2.90) and at twelve months (OR=1.97, 95%CI 1.39-2.80) than those with lower scores.

Discussion

These results demonstrate a "healthy migrant effect" for breastfeeding by Chinese immigrant mothers now living in Australia. In the present study we found that the initiation rate of breastfeeding of Perth Chinese mothers (94%) was higher than Chengdu mothers (86.2%, $P<0.01$) and close to the rate of Australia women (approximately 96%).[37, 42] The 'any breastfeeding ' rate at 6 months for Chinese mothers in Perth was 75.7% in this study, which is higher than the rate of 45.9% reported for all Australian mothers in Perth.[37] It is also higher than the rate for Chinese mothers living in Chengdu, China (69.1%, $P<0.05$). The 'full breastfeeding' rate in Chinese mothers in Australia in this study was 33.8% compared to the 7% found in an earlier study.[30] This difference may be due to a combination of increased emphasis on breastfeeding in Australian hospitals, the availability of multicultural health education programs and to sampling errors.

The findings from this study show that after controlling for potential confounders, Chinese mother's location (in Australia or in China) was still a predictor for breastfeeding initiation (OR=0.48, 95%CI 0.33-0.69) and 'any breastfeeding' after twelve months (OR=0.48, 95%CI 0.29-0.67). This could be partly explained by the "health selection process" when these mothers migrate to Australia. Mothers in Perth might be healthier than mothers in Chengdu with a healthier lifestyle, which would affect their children's health. This could also reflect the benefits of their higher household income than participants in Chengdu reflecting the local economic levels in Perth and Chengdu respectively. Many studies have reported that health, including child health, is positively related to household income.[43-45]

It also could be explained by the influence of the new environment including better infant feeding education and information that is available to mothers in Australia. Both Australian and Chinese mothers are officially encouraged to exclusively breastfeed their infants to around six

months of age, although antenatal care and education would appear to be more intensive in Australia. In this study, the "healthy migrant effect" and the breastfeeding education in Australia were reflected in the higher 'any breastfeeding' rate in Chinese-Australian mothers compared to Australian-born mothers, and the higher breastfeeding initiation and duration of Chinese mothers in Australia compared to those living in China.

There are several limitations that need to be considered when interpreting the results of this study. This is a cross sectional study and is subject to recall bias, but this applies to both samples. Because of the possibility of recall bias, we did not measure exclusive breastfeeding in this study, instead, we use the term 'full breastfeeding' where an infant may also receive small amounts of culturally valued supplements—water, water-based drinks, fruit juice, or ritualistic fluids.[46] Although it also has the potential of recall errors, the use of 'full breastfeeding' is less misleading. Another limitation of this study is that the percentage of missing values in the "China" group in some variables is higher than the "Australian" group.

Conclusion

Because of the distinctive identity of migrants, their multi-cultural background and the integration of western and eastern culture and lifestyle, the breastfeeding practices of Chinese migrants in Australia were different both to Chinese living in China and to other Australians. The higher breastfeeding initiation and longer breastfeeding duration in Perth Chinese mothers than in Chengdu mothers and/or Australian mothers in Perth also suggest a "healthy migrant effect" on breastfeeding for Chinese mothers living in Perth.

Funding and Conflict of Interest

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Table 1. Characteristics of Chinese mothers in Australia and China

Characteristic	Australia (n*=239) n (%)	China (n*=1844) n (%)	2-sided *p*-value
Age (years)			<0.001
≤30	71 (30.3)	658 (50.2)	
>30	164 (70.1)	653 (49.8)	
Marital status			0.040
Married	237 (99.6)	1332 (97.4)	
Devoiced /single/widow	1 (0.4)	35 (2.6)	
Educational attainment			<0.001
High school diploma or less	29 (12.2)	438 (32.6)	
TAFE certificate/diploma	32 (13.4)	334 (24.9)	
University degree or higher	176 (74.4)	572 (42.6)	
Working status			<0.001
Full-time work	46 (19.3)	824 (60.8)	
Part-time or casual work	63 (26.5)	304 (22.4)	
Not employed	128 (54.2)	227 (16.8)	
Household income			<0.001
Low income	41 (18.3)	217 (19.1)	
Average income	69 (30.8)	640 (56.2)	
High income	114 (50.9)	228 (24.8)	
Mother's birth place			
Mainland China	190 (79.8)		
Hong Kong	3 (1.3)		
Malaysia	29 (12.2)		
Singapore	9 (3.8)		
Other countries	7 (2.9)		
Duration in Australia (years)			
<5	108 (45.2)		
5-10	79 (33.1)		
>10	48 (20.1)		
Delivery method			<0.001
Vaginal delivery	152 (64.1)	530 (30.3)	
Caesarean section	85 (35.9)	1221 (69.7)	
Age of the child			<0.001
≤3 years	186 (79.1)	279 (18.4)	
3-5 years	49 (20.9)	1237 (81.6)	
Infant feeding attitude (IIFAS score)			<0.001
<58	79 (33.6)	904 (51.1)	

≥58	156 (66.4)	865 (48.9)	
Breastfeeding initiation			0.001
Breastfed	225 (94.1)	1531 (86.2)	
Never breastfeed	14 (5.9)	245 (13.8)	
'Full breastfeeding' at 6 months			0.016
Yes	76 (33.8)	385 (26.1)	
No	149 (66.2)	1089 (73.9)	
'Any breastfeeding' at 6 months			0.046
Yes	168 (75.7)	1033 (69.1)	
No	54 (24.3)	462 (30.9)	
'Any breastfeeding' at 12 months			<0.001
Yes	85 (38.3)	244 (16.3)	
No	137 (61.7)	1251 (83.7)	

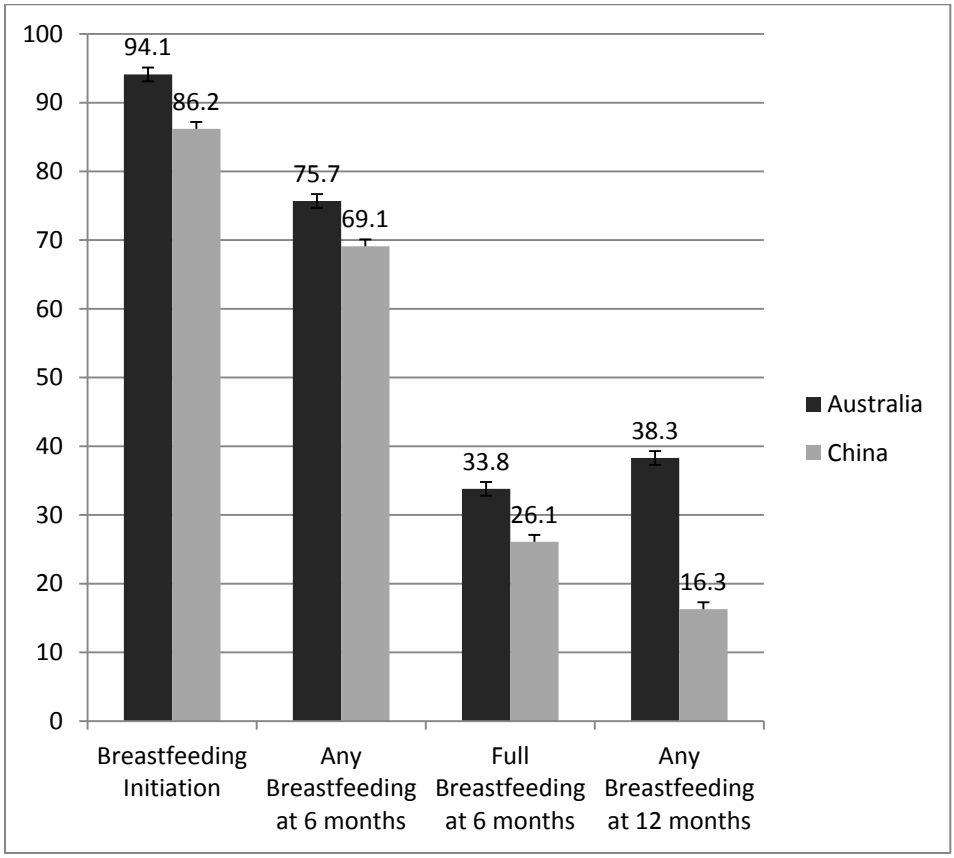
* The missing values vary for each variable in both countries.

Table 2 Odds ratios of factors for breastfeeding initiation, 'any breastfeeding' at 6 and 12 month

		Breastfeeding initiation		'any breastfeeding' at 6 month		'any breastfeeding' at 12 month	
Variables[a]	N	OR	95% CI	OR	95% CI	OR	95% CI
Age		NS		NS			
⩽30	727					1	
>30	816					1.49	1.06-2.09
Breastfeeding Attitude							
<58	983	1		1		1	
≥58	1021	2.22	1.52-3.24	2.18	1.64-2.90	1.97	1.39-2.80
Location				NS			
In Australia	239	1				1	
In China	1844	0.47	0.25-0.89			0.48	0.33-0.69
Education		NS				NS	
High school diploma or less	467			1			
TAFE certificate/diploma	366			0.49	0.32-0.74		
University degree or higher	749			0.63	0.44-0.91		
Working status		NS				NS	
Full time	870			1			
Part time	367			NS			
Not employed	356			1.57	1.07-2.28		
Delivery method		NS					
Vaginal delivery	682			1		1	
Caesarean section	1306			0.65	0.48-0.88	0.53	0.38-0.75

Variables in full model included mother's age, mother's location (in Australia or China), infant feeding attitudes, marital status, household economic, working status, level of education and delivery method.
OR, odds ratio; NS, not significant.

Figure Breastfeeding rates in Chinese mothers in Australia and China (%, 95% confidence interval)



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