

School of Psychology

Resilience in Nurses Working Shift Work in Australia

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**This thesis is presented for the degree of Doctor of Philosophy
of Curtin University**

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Declaration

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

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

The research study received human research ethics approval from the Curtin University Human Research Ethics Committee, Approval Number SONM-25-2013.

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Abstract

Introduction. As nursing care has to be delivered 24 hours a day, seven days a week, nurses are required to work shifts. This may impact on their psychological wellbeing as well as their work/life balance, which may lead to early attrition from the workforce. As it has been predicted that there will be a considerable international shortage of nurses by 2025, it is important to investigate factors that can impact on nurses' resilience and wellbeing, which in turn can influence not only the care they provide, but also retention within the workforce.

Aim. The aim of this research was to investigate the impact of shift work on nurse resilience and associated psychological outcomes. Specifically, the study aimed to: investigate whether nurses who work shift work have different levels of resilience and psychological functioning compared to those who do not; determine the relationship between depression, anxiety, stress, compassion fatigue [Secondary Traumatic Stress, burnout], compassion satisfaction and resilience in nurses; and to compare and contrast the concerns of nurse shift and non-shift workers regarding their profession.

Method. Quantitative methodology was selected for this research study. This study analysed data collected from an online self-report survey conducted among employed nurses who were members of the Queensland Nursing and Midwifery Union in 2013. To further explore nurses' perception regarding the impacts of shift work on their resilience, and reach triangulation of outcomes, two open-ended questions at the end of the survey were analysed for content.

Results. This study compared registered and enrolled nurses who worked shifts and those who did not ($n = 1,495$). This research project, for the first time in Australia, directly measured resilience among nurse shift and non-shift workers. Generalised Linear Mixed Model (GLMM) analysis revealed that nurse shift workers did not have significantly different scores on measures of resilience, depression, anxiety, stress and compassion fatigue (STS, burnout) compared to non-shift workers. However, nurse shift workers reported significantly lower levels of compassion satisfaction, which was mostly observed to be lower among female shift workers compared to male shift worker counterparts. Age, experience and work sector were positively correlated with years that nurses would remain in the profession. Nurse

shift workers working part-time were significantly more likely to remain in nursing for fewer years than full-time workers. Age and experience were also significantly positively linked to higher resilience. As predicted, a large, significant positive relationship was observed between resilience and compassion satisfaction. A content analysis of the open-ended responses in the survey revealed that nurse shift workers are dissatisfied compared to non-shift worker counterparts, and are coping with unique stressors that are in addition to the general stresses all nurses face.

Conclusion and Recommendations. Contrary to initial predictions, this study found no evidence that shift workers have lower resilience or worse psychological functioning than their non-shift worker colleagues. The results indicated that shift work may be associated with poorer psychological functioning only for some nurses, and that this is dependent on contextual and individual factors. Nurse shift workers, especially female nurses, had significantly lower levels of compassion satisfaction compared to their non-shift worker counterparts.

There is a need for more investigation to understand how the cohort of female dominated nurse shift workers cope with their social life as well as work and family commitments, while they are dealing with higher levels of stress compared to other Australian nurse professionals. Future studies should include not only longitudinal designs, but also mixed methods approaches. This may assist to better understand the cause-effect relationships of those variables with resilience and other highlighted psychological states as well as exploring nurses' perception of working shifts.

Employers should consider strategies that may help to improve the stressful nursing working environment of all nurses. This would not only improve the quality of care delivered but also patient safety. Solutions should focus on how employers can build resilience among nurses, enabling them to work effectively within a less stressful work environment. Therefore, potentially alleviating predicted shortages of nurses in Australia.

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Publications, Conference Presentations, and Award

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Tahghighi, M., Rees, C., Brown, J., & Breen, L. (2016). Resilience, compassion satisfaction, compassion fatigue, depression, anxiety and stress in nurses working shift work in Australia: Phase 1 results. Paper presented at the 18th International Conference on Nursing & Healthcare, USA, Dallas.

The author won the 2016 Curtin University-Postgraduate Student Association Research Award for conducting this research.

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Glossary of Terms

For the purposes of this study the following definitions are used.

Registered Nurse (RN): Registered Nurses are registered with the Nursing and Midwifery Board of Australia (NMBA). RNs complete an NMBA approved Bachelor or Master degree in an accredited university program. They plan, implement and evaluate nursing care, and supervise the work of Enrolled Nurses and Assistants-in-Nursing (also known as Personal Care Workers or Assistants - (AINs or PCWs) (Nursing and Midwifery Board of Australia, 2014).

Enrolled Nurses (EN): Enrolled Nurses are enrolled with the NMBA. They complete an NMBA approved diploma at an approved vocational institution, such as a college of Technical and Further Education (TAFE) or other approved vocational institution. The ENs provide direct nursing care, and observe and report changes in an individual's health status to the RN (Nursing and Midwifery Board of Australia, 2014).

Full time Employee: Full time employee is defined as a nurse who works 35 hours or more per week (Australian Institute of Health and Welfare, 2013).

Part time Employee: Part time employee is defined as a RN who works fewer than 35 hours per week (Australian Institute of Health and Welfare, 2013).

Shift work: The term refers to work that occurs as rotating shifts (i.e. day, afternoon, evening, night shifts), and irregular shifts.

(a) "Shift Worker" means any eligible employee whose regular ordinary span of hours falls outside the hours of 7.30 a.m. and 6.00 p.m., Monday to Friday inclusive, and outside the hours of 7.30 a.m. and 12 noon on a Saturday.

(b) "Afternoon Shift" means any shift finishing after 6.00 p.m. and at or before 11.00 p.m.

(c) "Night Shift" means any shift starting at or after 11.00 p.m. and at or before 5.00 a.m. or finishing subsequent to 11.00 p.m. and at or before 7.30 a.m.

(d) "Permanent Shift" means a night shift which does not rotate with another shift or shifts or day work and which continues for a period of not less than four consecutive weeks.

(e) "Early Morning Shift" applies to an employee whose ordinary hours on regular shift commence between 5.00 a.m. and 7.30 a.m. except where such a shift is part of a shift system and preceding an afternoon shift finishing at 11.00 p.m.

(f) "Seven-Day Shift Worker" means an employee who is rostered to work regularly on Sundays and Public Holidays.

For the purpose of the present study, "shift work" is defined as any irregular and rotating shift schedule, including morning, evening, and night shifts that falls outside the hours of 7:30 am and 6:00 pm, regardless of the day that a staff member works. This definition excludes daytime nurses who permanently work only morning shifts (Australian Commonwealth Government, 2011).

The Queensland Nurses' and Midwives' Union (QNMU): For the purpose of this study, members of the QNMU were selected as the study participants. The QNMU is a state-registered union and a branch of the Australian Nursing and Midwifery Federation (ANMF), which has branches in each state and territory of Australia. Members of the QNMU are also members of the ANMF. The union is active in promoting the interests of nurses on a national and international level. The QNMU covers RNs, ENs and AINs who are employed in the public, private (for profit and not-for-profit) health sectors including aged care. Their members work across a variety of settings and full range of classifications from entry level to senior management. The vast majority of nurses in Queensland are members of the QNMU. Their numbers would suggest that they represent the majority of nurses in Queensland (Queensland Nurses' Union, 2015).

Abbreviations and Acronyms

For the purpose of this study the following abbreviations and acronyms will be used:

ANMF	Australian Nursing and Midwifery Federation
AHPRA	Australian Health Practitioner Regulation Agency
EN	Enrolled Nurse
CF	Compassion Fatigue
CS	Compassion Satisfaction
CD-RISC	Connor-Davidson Resilience Scale
DASS	Depression, Anxiety, Stress Scale
EE	Emotional Exhaustion
ED	Emergency Department
GDP	Gross Domestic Product
HADS	Hospital Anxiety and Depression Scale
ICU	Intensive Care Unit
IWS	Index of Work Satisfaction
MDD	Major Depression Disorder
NREM	Non-Rapid Eye Movement
NSF	National Sleep Foundation
OECD	Organisation for Economic Co-operation and Development
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PCWs	Personal Care Workers
PTSD	Post-traumatic Stress Disorder
PDS	Post-traumatic Diagnosis Scale
ProQoL	Professional Quality of Life Scale

QNMU	Queensland Nurses' and Midwives' Union of Employees
RN	Registered Nurse
RS	Resilience Scale
REM	Rapid Eye Movement
SSI	Standard Shift work Index
STS	Secondary Traumatic Stress
SPSS	Statistical Package for the Social Sciences
STAI	Spielberg State-Trait Anxiety Inventory Trait Scale
USA	United States of America
UK	United Kingdom

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CHAPTER 1

INTRODUCTION

Chapter Preamble

This chapter provides background to the overall study. The chapter begins by providing a brief overview and rationale for the study. This is followed by an in-depth review of the construct of resilience and how the construct is defined. The Australian health care system and the role of nursing within this system is then introduced. An overview of shift work and its impact on general employee health is then provided. Finally, the chapter introduces the key outcome variables of interest in this study.

Overview and Rationale for the Study

There is worldwide concern about the increasing shortage in the nursing workforce (Drury, Francis, & Chapman, 2009; Nei, Anderson Snyder, & Litwiler, 2015) to deliver care to a substantially increasing world population. For example, it is estimated that there will be 9 billion people living on the planet by 2050 (United States Census Bureau, 2014). Similarly, the Australian population is expected to double by 2075 (Australian Bureau of Statistics, 2013a). These predictions raise a concern about how many health professionals, especially nurses, will be required to meet the population needs. According to Health Workforce Australia there will be a shortage of 109,000 nurses by 2025 (Health Workforce Australia 2025, 2012). Although the report highlighted the efforts made to increase the recruitment of nurses, it noted more attention should be paid to retaining nurses within the workforce (Health Workforce Australia 2025, 2012).

There is national and international evidence that nurses plan to leave their profession if they are unsatisfied with their work (Aiken et al., 2001; Hegney, Plank, & Parker, 2003; Nei et al., 2015; Tummers, Landeweerd, & Van Merode, 2002). Hegney et al. (2003) studied nursing workloads among 1,477 nurses from different public and private aged care, public and private hospitals sectors in Queensland in

2001. They found that many of the nurses highlighted poor job satisfaction caused by insufficient staff-to-patient ratio and poor mix of skills due to lack of funding. In addition, nurses indicated that they planned to leave their career due to being unable to complete nursing work within their paid shift time (Hegney et al., 2003).

Shift work has been linked to many adverse psychological and biological outcomes (Fekedulegn et al., 2013; Flo et al., 2013) and can adversely affect different aspects of shift workers' lives, including their wellbeing (Zhao & Turner, 2008). Wellbeing is referred to as the dynamic process that gives a person a feeling of how his or her life is going, through the interaction between his or her circumstances, activities and psychological resources (Beddington & Denham, 2013). It is suggested that nurses who demonstrate changes to their psychological level of wellbeing are significantly less resilient (Mealer et al., 2012).

In light of the projected nursing shortages in 2025, governments have already considered alternative methods such as making nursing a fully government supported course (Commonwealth of Australia, 2012), increasing the recruitment of nursing registered nursing students, and regulating the policy of task substitution of nurses. The latter is allocating clinical responsibilities of a registered nurse to less trained health professionals, with or without the direct supervision of registered nurses (Buchan & Dal Poz, 2002). It is postulated that these policies may alleviate the projected global shortage of registered and enrolled nurses (Nevidjon & Erickson, 2001). However, as is noted by Health Workforce Australia (2012), recruiting more nurses without retaining them within the workforce is not cost-effective. Hence they urge that the focus also be on retaining nurses within the workforce (Health Workforce Australia 2025, 2012).

As a nurse shift worker, I was motivated to conduct the study after learning that there is little understanding about the impact of shift work on the resilience of nurses. Concerns about nursing shortages and retention, and previous studies into job satisfaction in the nursing workforce (Eley, Buikstra, Plank, Hegney, & Parker, 2007; Eley, Parker, Tuckett, & Hegney, 2010; Tuckett, Hegney, Parker, Eley, &

Dickie, 2011) highlight the need to investigate the factors that influence nurse resilience and how this resilience may impact on retention within the workforce.

Definitions and Models of Resilience

The word resilience has its origins in the Latin term '*resilire*' which means 'to spring back' (Edward, Welch, & Chater, 2009; Kumpfer, 1999). Despite the simple meaning of the word, the construct itself is complex to define. There are many different definitions of resilience used throughout the literature (Windle, 2011). These definitions have their backgrounds in various fields of research including developmental psychology, life course studies, social psychology, biological perspectives, and personality studies, all with their own unique understandings of the construct (Windle, 2011). Overall, the literature suggests that resilience is a contextual and dynamic process (Mullin & Arce, 2008), not a permanent capacity, with no universally accepted definition (Hegney et al., 2007).

Despite the differences in how the construct is defined, a number of researchers have described resilience as the process of 'bouncing back' or coping well in spite of significant stress or adversity (Bonanno, 2004; Garmezy, 1991a; Rutter, 1987). Rogerson and Emes (2008) propose that the way a person achieves this is linked to the environment in which one lives and the interactions there in (Bonanno, 2004; Garmezy, 1991a). Other researchers have used words such as 'flourishing', 'thriving', and 'succeeding' to reflect 'rising above' trauma (Garmezy, Masten, & Tellegen, 1984; Hildon, Montgomery, Blane, Wiggins, & Netuveli, 2009). Masten (2001b) suggests that individual strength gained from past experiences and support from friends and family in the stressful situation are critical to be resilient.

Hu, Zhang, and Wang (2015) propose that there are three different orientations that are used to define resilience: trait, outcome, and process. Trait approaches view resilience as a personal trait which assists a person deal with life disadvantages and achieve success. Advocates of this view consider resilience as a personality trait that immunises individuals against the effects of adversity (Connor

& Davidson, 2003a). Outcome orientation advocates define resilience as a behavioural outcome that can assist a person to recover from a traumatic event. Advocates of this view see behaviour as either a protective factor, which helps an individual to be resilient in times of adversity, or a risk factor that exposes a person to adversity, depending on the context (Harvey & Delfabbro, 2004; Masten, 2001a). The process-oriented view considers resilience as a dynamic process where a person can adjust and recover from traumatic events (Fergus & Zimmerman, 2005).

If resilience is regarded as a process, then individual resilience might present in diverse ways at different stages of the process, when an individual reacts well to one stressor, but not to another (Rutter, 1987). Certain individual characteristics have been identified to be central in determining how people react to stressors. Successful adaptation to stress has been linked to good intellectual functioning, effective self-regulation of emotions and attachment behaviours, a positive self-concept, optimism, altruism, a capacity to convert learned helplessness to learned helpfulness and an active coping style when confronting a stressor (Charney, 2004). Additionally, some studies show that hardiness, tolerance, faith, self-esteem, a sense of humour (Grafton, Gillespie, & Henderson, 2010) emotional intelligence, flexibility and hope (McDonald, Jackson, Wilkes, & Vickers, 2013), and personality traits such as extraversion and conscientiousness are strongly linked to resilience (Campbell-Sills, Cohan, & Stein, 2006).

A combination of capabilities and individual attributes have been proposed by researchers as essential for a person to function normally when facing adversity (Rutter, 1993). Some researchers have described resilience as consisting of four domains: work performance, psychological adjustment, behaviour adjustment, and physical health (Garmezy, 1991b; Masten, 1994; Rutter, 1993). The interaction between an individual and their environment impacts on each person's level of resilience (Egeland, Carlson, & Sroufe, 1993; Rutter, 1993). Also, the interaction between risk factors and protective factors play an important role in determining individual resilience. Risk factors can come from different stressors that a person is exposed to. Protective factors protect the person who is exposed to risk factors such

as average or above average intelligence and problem solving skills (Garmezy, 1991b). Both risk factors and protective factors can be individual or environmental. If the presence of risk factors become more than the number of protective factors, a resilient person may demonstrate negative symptoms in the domains of work performance, psychological adjustment, behaviour adjustment, and physical health (Garmezy, 1991b).

There have been definitional changes in the concept of resilience over the years (McAllister & Lowe, 2011), and conceptual criticism about it. Over time, studies started focusing on health and wellbeing instead of focusing on factors that cause illness among individuals. This concept impacted public health (Gregg & O'Hara, 2007) psychology (Suedfeld, 2005) and nursing (McAllister & Estefan, 2002). Denz-Penhey & Murdoch (2008) proposed that resilience is comprised of five dimensions: connectedness to social environment, connectedness to physical environment, connectedness to family, connectedness to experiential spirituality, and personal psychology with a supportive mindset (Denz-Penhey & Murdoch, 2008).

Richardson, Neiger, Jensen, and Kumpfer (1990) proposed a Resilience Process Model, which is similar to models developed by Wolin and Wolin (1993), Rutter (1987), and Masten (1994). They theorised that the existence of biopsychospiritual homeostasis in each individual can be impacted by negative life events. Bronfenbrenner theorised a 'microsystem model', in which individuals directly interact with structures and people including their family, friends, and workplace. He explained that these factors influence an individual's internal behaviour, and cognitions. He also highlighted the broader impacts of factors such as policies, regulations, religious and universal cultural beliefs as well as economic trends. These factors are all influenced by the environment and each element of this system affects each other interchangeably as he explained (Bronfenbrenner, 1977).

Despite the various explanations of resilience, there are common themes among the definitions including adaptation, overcoming and adjusting to adversity, resilience as a normative process, good mental health being synonymous with resilience, and the ability to bounce back (Aburn, Gott, & Hoare, 2016). The current

study investigates the individual psychological resilience of nurses, and defines resilience as the multi-dimensional processes involved in, and the characteristics of, an individual's ability to bounce back from adversity or change (Garcia-Dia, DiNapoli, Garcia-Ona, Jakubowski, & O'Flaherty, 2013). In this study resilience was measured using the well-validated Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003b). The CD-RISC measures resilience from a multidimensional perspective. The dimensions include: personal competence, high standards, and tenacity, trust in one's instincts, tolerance of negative emotions, affects, strengthening effects of stress, positive acceptance of change and secure relationships, control, and spiritual influences (Connor & Davidson, 2003a).

Resilience: Empirical Studies

Garmezy is one of the first researchers who studied resilience in the area of psychology. He published one of the first epidemiologic studies regarding resilience in 1973. He investigated the reason that some of his patients with schizophrenia could 'bounce back' and others could not. Both groups of his patients had stress according to their diagnosis and psychological condition; however, only one group showed behavioural adaptation to their condition and the other did not. Garmezy and Rodnick (1959) suggested that the presence of psychosocial resources could counteract the negative effect of a difficult situation and encourage positive behavioural adaptation. They also suggested the theory of 'cumulative factors' (Garmezy & Rodnick, 1959). They stated that the personality trait of a person is not the sole source of an outcome; instead, it is a combination of both internal and external factors. This mixing of psychosocial elements and biological predispositions combines as risk and 'protective factors', which assist to describe resilience.

In the 1970s, Garmezy began working on an international longitudinal study of resilience, conducted over 20 years, with the aim of explaining how children overcome adversity (Masten et al., 1999; Masten & Tellegen, 2012). He defined his sample into three groups: first, competence group who are competent in the absence of experiencing high trauma; second, resilience group who are competent with a

history of experiencing high trauma; third, maladaptation group who are low competence with a history of experiencing very high trauma. He tried to understand resilience and identify protective factors, measuring important aspects of competence and exposure to factors that can explain how children cope with adversity. He observed having positive parenting in childhood is linked to being resilient in later years, and resilient people had more adaptive capacity. He observed that adaptive children became adaptive adults. His research also determined the impact of internal and external factors on developing resilience. He found that competence is multidimensional including internalising and externalising structures. Internalising factors refer to antisocial and disruptive behaviour, and externalising factors refer to distress, anxiety and depressed affect. He found that an individual can show both external and internal competence or may show external competence, while suffering internally (Masten & Tellegen, 2012).

Werner and Smith (1992) also utilised a longitudinal study to examine the long term impacts of living in poverty and being exposed to divorce, alcoholism or mental illness among children in Hawaii. They found that internal and external factors can strengthen young people and their reaction to adversity. The internal factors considered to be essential were: personality type, advanced motor skills, self-help skills, and language skills. The external factors identified were: family and community.

While the earlier research studies focused on identifying the personal qualities of resilient children, later studies by Kumpfer (2002); Luthar (1999); Rutter (1987) concentrated on developing interventions for individuals at risk of maladaptation or not developing resilience. Bonanno (2004) used a different approach to resilience research compared to others, and worked on resilience in adults. He approached resilience by researching acute traumatic events that occurred at least once in an adult's life instead of focusing on chronic stressors (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). He proposed variable responses could be defined by four prototypical trajectories including chronic dysfunction, recovery, delayed reactions and resilience (Bonanno, 2004). He described resilience as the

capability of an individual to maintain good psychological and physical functioning following exposure to adversity.

Southwick and Charney (2012) integrated biological and physiological aspects of resilience and combined them to understand 'protective factors'. They defined this as 'neuroplasticity', which is the ability of one's brain to adapt to past experiences. They suggested that neuroplasticity can be increased or decreased by training, and factors such as social support and altruism. This can decrease the chances of developing depression, low mood and improve wellbeing. They also emphasised the importance of intervening earlier in the process of development.

As nursing is one of the health fields with a high level of stress, researchers started concentrating on resilience in the nursing workplace (Tusaie & Dyer, 2004). Working on nurse resilience is important because both recruiting and retaining nurses within the workforce is a challenge (Hart, Brannan, & De Chesnay, 2014). Although several studies have highlighted high levels of burnout to be associated with anxiety, depression and secondary traumatic stress among nurses, few studies have examined the association between these variables and resilience among nurses (Hegney, Rees, Eley, Osseiran-Moisson, & Francis, 2015). The few studies which have investigated resilience among the employed nursing workforce have focused on specific specialities: for example burn unit nurses (Kornhaber & Wilson, 2011), paediatric oncology nurses (Zander, Hutton, & King, 2010), residential care (Cameron & Brownie, 2010), operating theatre nurses (Gillespie, Chaboyer, & Wallis, 2009), mental health nurses (Matos, Neushotz, Griffin, & Fitzpatrick, 2010), and intensive care nurses (Mealer et al., 2012). All of the studies concluded that resilient nurses have high levels of job satisfaction and low levels of burnout. Additionally, nurses who had passion or pride in their work and were able to provide holistic care were more likely to also be resilient (Cameron & Brownie, 2010; Grafton et al., 2010; Matos et al., 2010; Zander et al., 2010). In contrast, nurses who were not resilient had higher level of anxiety, depression, Post-Traumatic Stress Disorder, emotional exhaustion and depersonalisation symptoms (Kornhaber & Wilson, 2011; Mealer et al., 2012; Zander et al., 2010). Hegney et al. (2014) found that low resilience was

associated with depression, anxiety, stress, compassion fatigue (secondary traumatic stress and burnout) and compassion satisfaction. None of the mentioned studies have considered the impact of shift work on the highlighted relationships and the majority of these studies have recommended further research to identify other variables that may help to understand resilience among nurses (Gillespie et al., 2009; Gillespie, Chaboyer, Wallis, & Grimbeek, 2007). Thus, it is important to understand whether shift work impacts on these relationships, and if nurses who work shifts are less likely to be resilient than their non-shift working counterparts.

Resilience and Occupational Stress

Occupational stress occurs as a result of the difference between the demands of the environment or workplace and the ability of staff to cope with these demands (Ekundayo, 2014). A stressor can cause the body to react physiologically and strain an individual physically and mentally. High workload and impacts of the work environment (Colligan & Higgins, 2006) are among the factors that contribute to workplace stress. In addition, many employees have home stressors such as housework, childcare, and other job responsibilities are only some of the factors that an employee has to deal with in the current work environment (Duane, 2010). Although evidence suggests that occupational stress is a considerable cause of employee turnover in an organisation (Manning & Preston, 2003), there are studies that argue resilient employees have the ability to remain in their position and survive instead of leaving and seeking a new vocation (Grafton et al., 2010; Rutter, 1987). The present study will investigate the resilience of nurse shift workers in order to understand the factors that impact upon their ability to remain resilient and cope with the environment of nursing in a modern society.

Australian Health Care System, Service Delivery, Expenditure and Workforce

The Australian health care system encompasses public and private services and non-government sectors that provide services in primary, secondary and tertiary care facilities (Australian Government & The Department of Health, 2013a).

Delivery of health care in Australia is challenging because of its large geographical area, the aging population, inequities of health care accessibility and delivery, care of chronically ill patients, difficulties regarding health care delivery to Indigenous and rural and remote Australians, current and veteran defence force members and socio-economically disadvantaged Australians (Australian Government & The Department of Health, 2013b). Funding arrangements of the Australian health system include federal, state and local governments and the public and private health care service delivery model. The private health care service includes both for-profit and not-for-profit organisations (Australian Institute of Health and Welfare, 2014a).

According to the Australian Institute of Health and Welfare, 9.7% of Australian gross domestic product (GDP) was spent on health expenditure during 2013 and 2014 (Australian Institute of Health and Welfare, 2013-2014). This is significantly less than the USA (17.1%), and slightly less than Canada (10.4%) (Organisation for Economic Co-operation and Development, 2014). Also, Australia's average health expenditure per person was (\$5,060) in 2013-2014, which was higher than the Organisation for Economic Co-operation and Development average (\$4,561) in the same year (Australian Institute of Health and Welfare, 2014b).

Australian nurses provide care and work alongside many other health professionals including, but not limited to, the following: medical practitioners, dentists, medical imaging workers, pharmacists, allied health workers, and other health workers (Allied Health Professions Australia, 2016). Also, nurses work a variety of shifts and the majority (67%) report having worked shift work in the preceding four weeks; this is substantially higher than the 16% reported for the general population (Australian Bureau of Statistics, 2007).

Shift Work in the Nursing Profession

Shift work is common in many professions and work settings. In the health care setting, shift work enables health care professionals, administration and operational staff to deliver patient/client/resident care 24 hours a day, seven days a week. In the general community other examples of shift workers include: transport

staff, police, security forces, firefighters, pilots, hotel services and telecommunications personnel. Prior research suggests that shift work can negatively impact on various dimensions of a shift worker's life (Zhao & Turner, 2008).

In 2010, over 1.4 million people worked shifts in Australia (Australian Bureau of Statistics, 2010a). Of all employees, 15% (over 200,000 people) worked a regular night or evening shift (Australian Bureau of Statistics, 2010a). The common shifts practiced by shift workers of both genders were rotating shifts, irregular shifts and evening shifts respectively (Australian Bureau of Statistics, 2010b).

Furthermore, from all sectors and states in Australia, Queensland had the highest proportion of shift workers in public sectors in 2009 (Australian Bureau of Statistics, 2010b). Although male workers in the mining industry had the highest prevalence of shift work, the most prevalent industries for female shift workers were in the health care and social assistant, accommodation and food services industries (Australian Bureau of Statistics, 2010a). Health workers comprise 75% of shift workers in Australia (Australian Bureau of Statistics, 2010b), and nurses are the largest group of health workers.

It is generally believed that shift work can negatively influence different aspects of nurse's lives and their psychological wellbeing (Flo et al., 2012). Nurses are exposed to both acute and chronic stressors such as: excessive workload, unsatisfactory skill-mix, unsupportive management, coping with death, dealing with patients/clients and their families, discrimination, and shift work (Colligan & Higgins, 2006; Ma et al., 2014; McVicar, 2003). In addition to these issues, nurses, like other employees, also have to deal with organisational cultures that may include violence in the workplace, disruptive behaviours (abuse, bullying) from co-workers, and sexual harassment (Roberts, Demarco, & Griffin, 2009; Roche, Diers, Duffield, & Catling-Paull, 2010). These stressors have been linked to the development of secondary traumatic stress (STS) and burnout which can lead to decreased job satisfaction and retention of nurses (Hart et al., 2014). Other psychological states linked to nursing work-related stressors are anxiety and depression (Hegney et al., 2014).

It has been suggested that shift workers may be more vulnerable to developing these psychological states. Nurses who demonstrate changes to their psychological wellbeing may be more likely to resign from their position or may reduce their working hours, both an economic cost to employers and the health care system (Mealer et al., 2012). In the long-term, these stressors can affect the resilience of nurses working shifts (Hart et al., 2014). According to the ANMF (2009) the cost of nurse turnover for public funds is \$150,000 per nurse (Australian Nursing Federation, 2009; Health Workforce Australia, 2013b). This economic cost and the projected national and worldwide shortage of nurses indicates the importance of retaining nurses within the workforce (Mealer et al., 2012).

While there has been some focus on retention and resilience in the nursing workforce, a significant emphasis of previous studies has been on the ability of the nurse to deliver a professional standard of care (Cameron & Brownie, 2010). For instance, some studies have highlighted the degree to which nurses are able to provide what the nurses would consider 'ideal care' as fostering resilience (Cameron & Brownie, 2010). Ideal care is a level of care where nurses are able to deliver safe nursing practice (Jackson, Firtko, & Edenborough, 2007; Mealer et al., 2012). Consequently, nurses who are limited by psychological states such as burnout, anxiety and depression may not be able to provide effective care to their patients, which decreases patient safety (Baumann et al., 2002; Mealer et al., 2012). In addition, adverse events and errors such as needle-stick injuries, work related injuries, patient falls, nosocomial infections (hospital-acquired infections), and medication errors can occur due to extended work hours (Olds & Clarke, 2010) and can endanger patient safety.

Further, an inability to provide the care that nurses believe is safe and effective can lead to decreased job satisfaction, which in turn leads to a lack of retention within the workforce (Hegney, Plank, & Parker, 2006; Klopper, Coetzee, Pretorius, & Bester, 2012; Mealer et al., 2012). According to Mealer et al. (2012) who studied 744 Intensive Care Unit (ICU) nurses in the USA, the presence of higher resilience was associated with lower levels of Post-Traumatic Stress Disorder

(PTSD), anxiety, depression and burnout syndrome (Mealer et al., 2012). Also, evidence suggests that a higher level of job satisfaction is associated with improved organisational commitment (Wagner & Gregory, 2015), and also decreased nurse turnover (Klopper et al., 2012).

The link between resilience and the impact of shift work on the psychological wellbeing of registered nurses has never been directly studied in Australia, and the few studies that have been conducted suggest that the phenomena are poorly understood (Trinkoff, 2006; Zhao & Turner, 2008). The lack of research into this area, along with the aforementioned issues around nurse retention, support the need to conduct the current research into how psychological and environmental factors are related to nurse resilience.

Shift Work as an Occupational Stressor

Shift work or rotating shift is considered a significant occupational stressor (Bohle, 1997) and has been linked to many adverse health outcomes such as cardiovascular disease, digestive problems, fatigue, cancer, depression, anxiety and insomnia (Fekedulegn et al., 2013; Flo et al., 2012). Studies reveal that staff who work night shift have an elevated incidence of sick leave (Fekedulegn et al., 2013). Fekedulegn et al. (2013) suggest that night shift workers are at higher risk for sickness absenteeism. Disruption of the circadian cycle and some biological factors such as melatonin and cortisol hormones, alertness, performance, body temperature and metabolism are linked to adverse health outcomes because of shift work (Fekedulegn et al., 2013).

One Australian study reviewed the impact of shift work on peoples' daily health habits and adverse health outcomes (Zhao & Turner, 2008). They concluded that shift workers had more adverse lifestyle behaviours such as poor dietary intake, smoking, and becoming overweight compared to non-shift workers. Other studies revealed nurses who worked rotating shifts showed fatigue, and this was reported to be highest in those working night shifts followed by evening then morning shift work (Arora et al., 2006; Barnes-Farrell et al., 2008; Choobineh, Rajaefard, & Neghab,

2006; De Cordova, Phibbs, & Stone, 2013; Geiger-brown, Muntaner, Lipscomb, & Trinkoff, 2004; Gold et al., 1992; Korompeli, Sourtzi, Tzavara, & Velonakis, 2009; Soares et al., 2012).

A higher level of fatigue has been also associated with poor quality of patient care (Hegney et al., 2014). Edéll-Gustafsson et al. (2002) studied sleep quality, strain and health in relation to work conditions among female nurses in Sweden (Edéll-Gustafsson, Kritz, & Bogren, 2002). They concluded that sleep disturbance and fatigue significantly predicted decreased sleep quality and reduced resilience to stress, and increased susceptibility to psycho-physiological disorders among female nurses (Edéll-Gustafsson et al., 2002). A similar study was conducted by Bjorvatn et al., 2012 among Norwegian hospital nurses in intensive care units (Bjorvatn et al., 2012). They reported nurses had more fatigue, more anxiety and more depression after night shift (Bjorvatn et al., 2012). Coffey et al., 1988 studied the effects of shift work on physical health and depression on nurses in the USA. They concluded that nurses' job performance and job related stress were affected by the type of shifts they worked. Rotating shift nurses had the highest job related stress, followed by afternoon, day and night shift nurses. Job performance was reported to be high among nurses on day shift followed by the night, afternoon, and rotating shifts (Coffey, Skipper, & Jung, 1988).

Shift Work and Cortisol

Cortisol is produced by the adrenal gland and it effects metabolism and regulation of the immune system. Hypothalamic pituitary-adrenal axis controls secretion of cortisol. Factors such as diurnal rhythm, consciousness, the sleep-wake cycle and neural pressure signals influence cortisol secretion. A negative slope regulates the normal cortisol secretion. During stage 1 sleep, cortisol secretion is lowest and increases slowly during stage 2 sleep (Kudielka, Kudielka, Buchtal, Uhde, & Wüst, 2007). The body has the highest concentration of cortisol when a person wakes up in the morning (Hennig et al., 1998). The rate of normal serum cortisol concentrations is 250–850nmol/L between 8.00 a.m. and 10.00 a.m., which

maintains daytime consciousness. This rate decreases throughout the day (Putignano et al., 2001). The normal range of cortisol concentration at night is 110–390nmol/L, which is almost half the daytime concentration (Putignano et al., 2001). Although the rate of cortisol secretion is stable throughout the day and night-time, it increases if an individual experiences stress or pressure (Kudielka et al., 2007; Putignano et al., 2001).

In normal situations body cortisol is high during the day and low at night (Niu et al., 2011). Disruption in cortisol secretion can cause fatigue, depression, obesity and immune dysfunction (Kudielka et al., 2007). Cortisol secretion is lower in the morning and higher at night in night shift workers in comparison with permanent day workers (Kudielka et al., 2007; Lac & Chamoux, 2004; Perkins, 2001). When night shift workers sleep during the day, high cortisol secretion and high body temperature can affect their quality of sleep and reduce the number of hours slept (Edéll-Gustafsson et al., 2002; Lamond et al., 2003; Purnell, Purnell, Feyer, & Herbison, 2002).

Nurses have to provide patient care 24-hours a day in a 7-day working week. There is an increasing concern that low circadian rhythms in physiological and psychological processes throughout the night causes night working nurses to be less alert, which can decrease the quality of the care they provide for their patients and even endanger the lives of the patients (Niu et al., 2011). Additionally, rotating shift workers suffer from chronic fatigue more than permanent shift workers (Brooks & Swailes, 2002; Seki & Yamazaki, 2006; Winwood, Winefield, & Lushington, 2006). Shift workers have significantly decreased objective cognitive performance due to fatigue and poor sleep quality over the long term. Also, increased reaction time and the occurrence of critical incidents have been linked to working night shifts (Dingley, 1996; Lee, Chan, & Kwok, 2003; Smith, Smith, Folkard, & Poole, 1994).

Poor sleep quality and decreased sleep cycles occur as a result of high cortisol concentration and low melatonin levels in night shift workers (Holmbäck et al., 2003; Kudielka et al., 2007; Lac & Chamoux, 2004; Mitani, Mitani, Fujita, & Shirakawa, 2006). Circadian rhythm is adapted in personnel who work shifts after

almost seven days, particularly among those who change from day shift to night shift. Both circadian rhythm and cortisol concentration in day shift workers increases from 6.00 a.m. Cortisol levels reduce between 9.00 p.m. and 12.00 a.m. from day 1 to day 4 of the night shift. On day 5 of the night shift, the cortisol levels begin to rise at 9.00 p.m. For the remainder of the night shifts, cortisol levels are higher in the afternoon than in the morning, and reverse rhythm and night shift adjustments have been revealed (Hennig et al., 1998; Lac & Chamoux, 2004). Changes in the rate of cortisol due to shift work can disrupt the circadian rhythm, which leads to behavioural changes similar to Major Depressive Disorder (MDD), and symptoms of jet lag. These symptoms are described as a lowered sense of well-being, depressed mood and impaired cognitive ability (Menet, Menet, & Rosbash, 2011; Srinivasan et al., 2010). It is unclear whether those biological and psychological changes can affect the resilience of nurses who work shifts.

Shift work: Impacts on Sleep and Attention

There are five stages of the sleep cycle in a typical night's sleep. Sleep stages 1 to 4 are known as non-rapid eye movement (NREM) stages, and stage 5 is a rapid eye movement (REM) stage. Stage 1 and 2 are considered as a light sleep stage when one first falls asleep. Stages 3 and 4 are deep sleep, when one's breathing and heart rate slow down and the body is still. Stage 5 is when one's brain is active and dreams. Each sleep cycle takes about 90–100 minutes to complete. Long term nightshift worker nurses have shown shorter NREM stages 1 and 2 (National Sleep Foundation (NSF), 2013).

Melatonin is responsible for inducing sleepiness in a dark environment, and cortisol secretion maintains daytime consciousness during the morning. Although peak sleepiness is between 3.00 a.m. and 6.00 a.m., night shift workers have to sleep in the daytime. This is inconsistent with normal circadian rhythm, therefore the sleep of night shift workers can be easily interrupted by factors such as light, noise, temperature and other environmental factors (Frey, 2002; Kudielka et al., 2007). As a result, night shift workers are significantly sleep deprived. According to one study,

when night shift workers were awakened during the REM stage of sleep, 60% to 90% stated they were dreaming at the time of awakening. It is believed sleep deprivation can cause emotional instability and restlessness (Kudielka et al., 2007) and in the long term lead to chronic fatigue (Edéll-Gustafsson et al., 2002; Lamond et al., 2003; Natale, Martoni, & Cicogna, 2003; Purnell et al., 2002; Rotenberg, Rotenberg, Moreno, Benedito Silva, & Menna, 1998).

The severity of sleepiness in the night shift workers is 6 to 14 times higher than day shift workers. It was 0.7 times and 2.3 times higher in evening shift workers and early morning shift workers respectively (Härmä et al., 2002). Sleep quality is greatly linked to change in sleep patterns. Shift workers are reportedly more likely to drink excessively, smoke, drink coffee, and take hypnotics and sedatives compared to non-shift workers (Frey, 2002). According to one study that asked shift worker nurses how they managed sleep, 60% used sleep aids, 62.7% took prescription medications and 26.9% drank alcohol (Dorrian et al., 2006). Sleep quality and physical condition after sleeping are linked to incidents of work-related error (Cheek, Shaver, & Lentz, 2004; Dorrian et al., 2006; Neylan et al., 2002).

Increased fatigue leads to slower shift worker reaction times, and decreased attention and judgment (Samaha, Samaha, Lal, Samaha, & Wyndham, 2007; Takeyama et al., 2005; Winwood et al., 2006). The level of chronic fatigue depends on different types of shift performed. Chronic fatigue is highest among those working multiple shifts except for the night shift, followed by permanent night shift workers and those working as permanent day shift workers (Samaha et al., 2007; Seki & Yamazaki, 2006; Winwood et al., 2006). Night shift nurses showed more fatigue than day or evening shift nurses. Studies reveal that fixed shift workers adjust better and suffer less fatigue than multiple shift staff (Edéll-Gustafsson et al., 2002; Seki & Yamazaki, 2006; Takeyama et al., 2005). The forward-rotating shift such as day shift followed by evening shift then night shift and rest produces more refreshing sleep and less fatigue than the backward-rotating shift (Brooks & Swailes, 2002; Hossain, 2004; Winwood et al., 2006).

Both the ability to adjust to circadian rhythm and physical condition reduce with increasing age. Staff older than 40 years showed more fatigue and poorer adaptation. Some studies suggest that since multiple shifts and night shifts cause more fatigue staff older than 50 years should not work at night (Härmä et al., 2002; Winwood et al., 2006). It is noticeable that not only the average age of RNs who worked in Australia from 2003 to 2009 was 44.2 years, but also about 22% of those were aged 55 and over (Health Workforce Australia, 2013a).

Fatigue is linked to issues in job performance and a high rate of incidence risks (Trinkoff, 2006). The majority of nurses are women who may have substantial responsibilities such as caring for children and domestic commitments that restrict their rest time. Such pressure can cause conflicts between job and family (Trinkoff, 2006), consequently may be a reason that nurses leave their job. One study revealed that working overtime and developing fatigue were the causes of bacterial infection outbreaks in a hospital setting (Russell, Ehrenkranz, & Hyams, 1983; Trinkoff, 2006). Trinkoff (2006) has argued there should be worldwide concern about fatigue and its risks to nurses and the health and safety of patients (Trinkoff, 2006).

Studies reveal that poor short term memory, attention, adaptation and concentration are the results of multiple shift work rotations (Niu et al., 2011; Valdez et al., 2005). Studies of neuropsychiatric functions in shift workers or night shift workers indicate that attention and cognitive speed, such as the speed of mathematical calculation and judgment, decrease if staff suffer from sleep deficit. Analyses of electroencephalograms indicate that night shift workers showed reduced alpha waves and increased beta and delta waves when compared with day shift workers. The analyses show reduced attention and psychomotor activity among night shift workers. A short sleep prior to starting a shift can reduce delta waves (Frey, 2002; Purnell et al., 2002). Additionally, decreased memory performance was observed among staff working shift work for 1 to 4 years. This was worse in shift workers with 10 to 20 years' experience (Dingley, 1996; Frey, 2002; Lee et al., 2003; Rouch, Rouch, Wild, Ansiau, & Marquié, 2005; Seki & Yamazaki, 2006; Valdez et al., 2005).

None of the studies reviewed have explored the impact of shift work on the resilience of nurses or their related psychological wellbeing in terms of compassion fatigue, compassion satisfaction, anxiety, depression and stress. The lack of evidence indicates a need to investigate the relationship between the concepts of compassion fatigue (CF), compassion satisfaction (CS), anxiety, depression and stress among shift worker nurses in different sectors of health care in Australia, in order to determine if there are differences in this group of nurses compared to those not working shifts.

Psychological and Physical Health of Nurses

An examination of the ratio of nurses to population implies a global shortage of nurses in advanced countries. For instance, the number of nurses per 1,000 people in 2010 was 9.8 in the USA, and in 2011 was 9.5 in the UK, 9.3 (Canada) and 10.6 in Australia (The World Bank, 2014). Nurses in these countries follow a patient-centred care model which is designed to ensure safe, effective, timely, efficient and equitable care to all clients. The Organisation for Economic Co-operation and Development (OECD) and WHO recognise patient-centred care as a key dimension of quality of care (Luxford, Piper, Dunbar, & Poole, 2010). Nurses in Australia and other developed nations are expected to provide higher quality patient care compared to developing countries (Luxford et al., 2010).

In addition to those criteria, which Australian nurses are expected to follow in the 21st century work environment, nurses are continually exposed to occupational related stress, which can lead to the development of psychological and physical problems such as depression, secondary traumatic stress, anxiety, anger, irritability and burnout symptoms (Israel, House, Schurman, Heaney, & Mero, 1989; Mealer et al., 2012), cardiovascular diseases, chest pain, asthma, hypertension, high cholesterol levels, diabetes, and ulcers (Flo et al., 2013; Israel et al., 1989; Lazarus, 2000). There is evidence that work related stress is a reason why nurses resign their position; however, those who are resilient show an ability to adapt and actively cope with stressors (Charney, 2004; Grafton et al., 2010).

It is important to understand the association between working shifts and resilience, depression, anxiety, stress, CF and CS among Australian nurses, because of the evidence that resilience is strongly associated with some psychological states such as depression, anxiety, stress, and compassion fatigue (Hegney et al., 2014). Additionally, it is suggested that shift work appears to be related to the experience of depression, anxiety, stress, and fatigue (Fekedulegn et al., 2013; Flo et al., 2012).

Further, Hegney et al. (2014) revealed lower levels of nursing education and years of experience are associated with higher levels of negative moods that may lead to burnout (Hegney et al., 2014). Younger nurses with lower levels of education had higher levels of anxiety than nurses with experience and higher levels of education, however the relationship between anxiety and hours worked has not been studied (Hegney et al., 2014). Further research is recommended to understand how current nurses maintain a healthier psychological profile and are resilient in the environment of working and how they cope with the work related stressors (Mealer et al., 2012). More specifically, research is needed to better understand the impact of shift work on resilience of nurses in Australia.

Professional Quality of Life

The overall notion of Professional Quality of Life was originally developed by Stamm and consists of two components, the positive (compassion satisfaction) and the negative (compassion fatigue) both of which will be described in detail in this chapter. In 1988, Figley and Stamm developed the Professional Quality of Life Scale (ProQoL) (Stamm, 2010). Figure 1.1 illustrates the ProQoL elements.

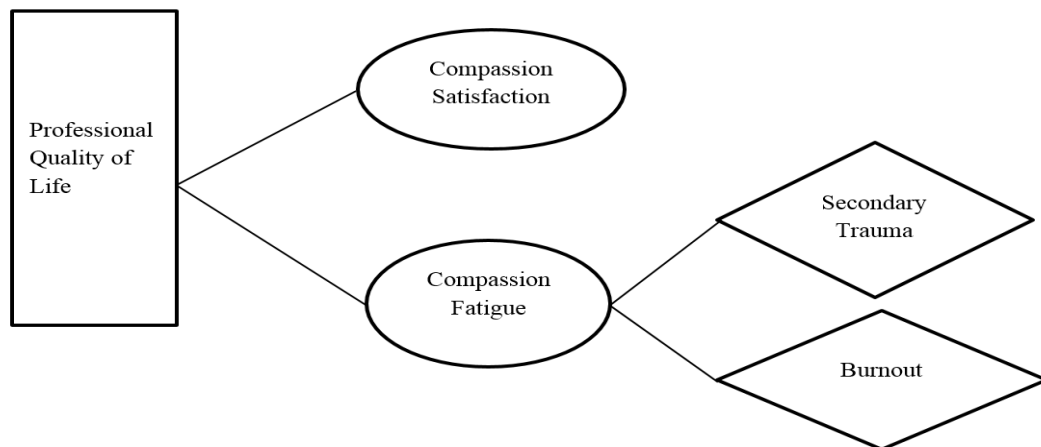


Figure 1.1. Diagram of professional quality of life. (Stamm, 2010)

Compassion Fatigue

Compassion fatigue is defined as an occupational hazard particular to clinical work that arises from severe emotional distress (Figley, 1995; Rossi et al., 2012). The phrase, *compassion fatigue*, was first used by Joinson (1992), who defined it as a “unique form of burnout” affecting “people in care giving professions”, especially nurses (Joinson, 1992). Joinson suggested that health professionals, who take care of clients, may absorb the traumatic stress of those they assist (Najjar, Davis, Beck-Coon, & Doebbeling, 2009). In 1995, the term *taxonomical conundrum* was applied to health care professionals to introduce the concept of the negative impacts of providing care to people who have been traumatised (Stamm, 1995).

Since that time, Figley, Stamm and Pearlman have worked together and written more than 50 scientific studies on the topic. The most accepted terms, *compassion fatigue*, *secondary traumatic stress*, and *vicarious trauma* are used interchangeably by Figley (compassion fatigue), Stamm (secondary traumatic stress) and Pearlman (vicarious traumatization) (Stamm, 1995).

Compassion fatigue comprises two sub-components: secondary traumatic stress and burnout. Secondary traumatic stress is a negative feeling caused by fear

and work-related trauma. Work-related trauma can include primary and secondary trauma (Stamm, 2010). The symptoms of secondary traumatic stress include experiencing the traumatic event, having intrusive thoughts, numbness, avoidance of places that are reminders of the event and having sleep disturbances (Stamm, 2002). Burnout is related to exhaustion, frustration, anger and depression. Burnout is defined as a feeling of hopelessness and difficulties in coping with work or working effectively. The condition has a gradual onset and can be linked with an increased workload or a lack of support in a work environment (Stamm, 2010).

Compassion Satisfaction

Compassion satisfaction is the “ability to receive gratification from caregiving” (Simon, Pryce, Roff, & Klemmack, 2006, p.7) and has been defined as feeling satisfied as a result of being able to assist others (Stamm, 2002) or having the ability to do the work well (Stamm, 2010). According to Stamm (2002), compassion fatigue and compassion satisfaction can be experienced at the same time. Compassion fatigue can increasingly overwhelm an individual’s sense of effectiveness and stop him or her from experiencing compassion satisfaction (Stamm, 1995). As Stamm describes it, people whose job requires assisting others might react to the crises that others face. These professions include health care professions, social services, teachers, police, firefighters, pilots, transportation services, and those who clean up disaster sites.

The complexity of the concept of professional quality of life is due to its link with characteristics of the work environment, the individual’s personal characteristics and the individual’s exposure to primary and secondary trauma in the work place. Compassion fatigue is the negative element of assisting others, and compassion satisfaction is positive. Work environment, client environment, and the person’s environment all play a role. For instance, compassion fatigue can be the result of a poor work environment. In contrast, work-related trauma is linked with a unique feature of fear. Although burnout is not a common feeling, it is significantly powerful in its impact on an individual, and life can be difficult for a person who

deals with both burnout and trauma. For the purpose of this present research, the ProQoL scale developed by Stamm will be utilised to measure compassion satisfaction and compassion fatigue (burnout and STS) among nurses.

Significance of this Study

To date, no published study has directly compared levels of resilience, depression, anxiety, stress, compassion satisfaction, and compassion fatigue between Australian nurse shift workers and non-shift workers.

The knowledge generated by this study:

1. Will contribute to the literature concerning the impact of shift work on nurse psychological functioning and resilience.
2. May allow stakeholders such as employers, policymakers, and government to better predict the risk profiles of their shift worker personnel based on depression, anxiety, stress, compassion fatigue, and compassion satisfaction.
3. May provide important evidence to justify the need for nursing workplaces to provide interventions to build resilience, in particular, for shift workers.

Research Aims

The aim of this research was to investigate the impact of shift work on the resilience and associated psychological functioning and professional quality of life of nurses. The objectives of the study were to:

1. Investigate whether nurses who work shifts have different levels of resilience and psychological functioning compared to those who work regular hours.
2. Determine the relationship between depression, anxiety, stress, compassion fatigue [STS, burnout], compassion satisfaction and resilience in nurses.

3. To compare and contrast the concerns of nurse shift and non-shift workers regarding their profession.

Chapter Summary and Thesis Structure

This chapter has introduced the reader to the context of nursing in Australia, its reliance on shift work, and defined psychological resilience. The physiological effects of working shifts were described, as was the importance of focusing on psychological constructs of resilience and professional quality of life. The background to, and significance of, the research was outlined and, although expanded upon in subsequent chapters, justification for the research aims was presented. Chapter 2 will provide a comprehensive review of the literature relating to the concept of resilience and shift work with a specific focus on nursing. Chapter 3 will outline the research paradigm and survey methodology. Chapter 4 will present the quantitative results and Chapter 5 will present the results of the open-ended questions in the overall survey. Finally, Chapter 6 will discuss the results within the context of existing literature and frameworks and explicate the ways in which the study has made a substantial and novel contribution to both theory and practice concerning the psychological impacts of shift work on nurses. In addition, Chapter 6 will present the strengths and limitations of the study, implications and recommendations from the results, and avenues for future research.

CHAPTER 2

LITERATURE REVIEW

Chapter Preamble

The previous chapter highlighted various impacts of shift work and explained the constructs of resilience and professional quality of life. The following chapter provides comprehensive literature review of the related literature and will identify the need for conducting this research project.

The literature review is a published integrative review. The version of the published paper that appears in this chapter has been modified to the format of the thesis. A reproduction of the published version as it appeared in the journal is presented in Appendix A, which also contains the statements of contribution and publisher's licence to reproduce the paper in this thesis.

Note: The reproduction of the published paper references hyperlinks to online supplementary tables 1-8. Each of those eight online supplementary tables is reproduced in this thesis in Appendix B (Supplementary tables to chapter 2).

Introduction

The International Council of Nurses acknowledged in 2007 that shift work is necessary in the nursing profession; however, there is also significant concern about the negative impact of working shifts on nurses' physical and mental health and their ability to provide high-quality patient care (International Council of Nurses, 2007). Nurse shift workers not only have to cope with the effects of shift work on family life (West et al., 2009), but also its effects on social and leisure activities (Faseleh et al., 2013). Work and family commitments usually cannot be fulfilled simultaneously. Therefore, working shifts commonly conflicts with valued time for family activities and also restricts domestic commitments, particularly for female shift workers who may also be responsible for child-rearing or other caring roles (Hsu & Kernohan 2006, West et al., 2009). Internationally, it is predicted that there will be a shortage of nurses by 2025 (Health Workforce Australia 2025, 2012). Understanding the factors that have an impact on nurse retention is therefore critical. Nursing is well-recognized as a stressful occupation and a large body of research has investigated the impact of nursing on psychological functioning (Cameron & Brownie, 2010, Manzano Garc'ia & Carlos, 2012, Mealer et al., 2012, McDonald et al., 2013). However, far less work has been conducted that focuses exclusively on understanding the impact of shift work on psychological outcomes.

Background

Nurses are continually exposed to both acute and chronic workplace stressors which can lead to the development of psychological syndromes and disorders such as depression, anxiety, anger, irritability and burnout (Israel et al. 1989, Mealer et al. 2012). Many factors are known to contribute to this stress such as workload, hours worked, work environment, relationships between co-workers, ineffective management, patients/clients and their families, doubts about treatment, coping with death, lack of preparation time, discrimination and shift work (Colligan & Higgins 2006, McVicar 2003, Ma et al. 2014). These psychological and physical factors have

been linked to decreased job satisfaction and retention problems among nurses (Donley 2005, Letvak & Buck 2008).

The adverse effects of occupational stressors on nurses with respect to nurse turnover, productivity, costs and the effect on quality of care are well known (Donley 2005, Letvak & Buck 2008). In light of these effects, governments have enacted various strategies to alleviate the global shortage of qualified nurses (Nevidjon & Erickson 2001). In the USA and Australia, these strategies have included assisting nurses with the cost of their pre-registration qualification by providing government subsidies (Commonwealth of Australia, 2012), increasing the recruitment of nursing students into programmes by providing funding to educational institutions (American Association of Colleges of Nursing, 2015) and proposing task substitution, which is defined as allocating clinical responsibilities to lesser trained health professionals with or without supervision (Buchan & Dal Poz 2002, Yong 2006). However, while attracting more people into nursing programmes is important, so too is retaining nurses in their current positions (Health Workforce Australia 2025, 2012). An important factor in the retention of nurses in the workforce is job satisfaction and this includes an understanding of the maintenance of both the psychological and physical well-being of nurses. Therefore, it is essential to clearly understand how nurses cope with work related stressors in the healthcare environment of the 21st Century and how they can maintain a healthier psychological profile and be resilient in the work environment. There is some evidence indicating that the majority of nurses who face work-related stress have a higher intention to resign from their position or reduce their working hours (Maville & Huerta 2013, Tei-Tominaga 2013), which has an economic cost to their employers and the healthcare system (Mealer et al. 2012). It has been suggested, however, that nurses who are resilient show successful adaptation and an active coping style in response to stressors and are therefore more likely to remain in the workforce for longer (Charney 2004, Grafton et al. 2010, Turner 2014).

Resilience is defined as a learnable, multidimensional ability of a person which enables him or her to function at a high level when facing an acute or chronic

threat to their well-being (Rutter 1987). Several studies have explored the link between nurse resilience and psychological outcomes such as stress, anxiety, depression, compassion fatigue and compassion satisfaction (Glasberg et al. 2007, Jackson et al. 2007, Ma et al. 2009, Gillespie et al. 2009, Cameron & Brownie 2010, Gustafsson et al. 2010, Grafton et al. 2010, Matos et al. 2010, Kornhaber & Wilson 2011, Manzano Garcia & Carlos 2012, Mealer et al. 2012, Sawatzky & Enns 2012, Hegney et al. 2014, Hinderer et al. 2014). However, far less work has been conducted regarding these variables as they relate specifically to nurses who work shifts. As such, there is currently very little understanding of the impact of shift work on the resilience and psychological well-being of nurses. Concerns about nursing shortages and retention and previous studies into job satisfaction in the nursing workforce (Eley et al. 2007, 2010, Tuckett et al. 2011), highlight the need to investigate how shift work may influence nurse resilience and related psychological functioning.

The Review

Aims

The aim of this integrative review was to synthesize and evaluate the evidence regarding the impact of shift work on the psychological functioning and resilience of nurses. Specifically, this review addressed the following question: Do nurses who work shifts have poorer psychological functioning and lower resilience than nurses who do not work shifts? Addressing this question will provide evidence that may be useful to assist policy makers to better understand the risk profile of their shift workers and manage the risk associated with shift work.

Design

An integrative review of the literature was undertaken, adhering to the reporting guidelines for mixed studies reviews (Whittemore & Knafl 2005). The preferred reporting items for systematic reviews and meta-analysis (PRISMA) checklist was followed (Moher et al. 2009). The review is registered on the

international prospective register of systematic reviews (PROSPERO) (Number CRD42015017369).

Search methods

This review included articles related to the impact of shift work on the psychological functioning and resilience of nurses. Articles that focused solely on the physical outcomes of shift work on nurses were excluded due to the presence of recent reviews on this topic (Niu et al. 2011) and the impacts of shift work on nurses' health (Matheson et al. 2014). Similarly, articles that focused on the relationship between nurse work hours/overtime and nurse and patient outcomes (Bae & Fabry 2014) were excluded. The articles for this systematic review were identified by searching the following electronic databases: CINAHL plus; PubMed; Medline (Ovid); Embase and Google scholar; and grey literature such as Australian Nursing Federation, Queensland Nurses Union and Australian Health Practitioner Regulation Agency. Articles published from January 1995–August 2016 were included in this review. The search terms included variations of the following key words: nurs*; shift work; rotating roster; night shift*; resilien*; hardiness; cop*; well-being; burnout; mental health; occupational stress; compassion fatigue; compassion satisfaction; stress; anxiety; depression.

Studies reporting on the psychological functioning and/or resilience of nurses were included, if the sample:

- comprised employed professional nurses (Registered or international equivalent); and
- worked any irregular and rotating shift schedule, including morning, evening and night shifts, regardless of the day of the week that a nurse worked. This definition excludes nurses who permanently work only morning shifts (Australian Commonwealth Government, 2011).

Studies that were not published in English, considered only midwives or included both nurses and midwives but did not report their data separately, or were published earlier than the year 1995 were excluded. The former criterion was due to the

difference between the scope of practice of nurses and midwives. The latter criterion was also due to the mid-1990s being considered pivotal in nurses' professional education (Keogh 1997, Bennett 1995, Andersson 1999). Since 1984, Australian nurses, for the first time, were given the opportunity to have tertiary education, instead of traditional hospital based training (Smith 1999). Following that, nurses universally were motivated to attain a university degree (Lusk et al. 2001). Having a lower educational qualification can be a risk factor for experiencing symptoms of burnout among nurses (Hegney et al. 2014). As a result of the difference between the two generations of nurses and by virtue of the date limiters, the cohort of exclusively hospital trained nurses was excluded.

Search outcomes

The initial search resulted in 275 articles of which 139 were excluded because they did not meet the inclusion criteria for this review. The 136 articles were screened using their title for the presence of a study on nurses working shifts as defined and its association with psychological functioning and resilience. From those 136 articles, the abstracts of 15 articles were reviewed, as it was difficult to apply the inclusion criteria to their title. A total of 95 articles were selected and underwent critical appraisal. Of these 95 articles, 58 were excluded, as: they were primarily concerned with the physical impact of shift work (20 articles); did not measure shift work (3 articles); were not conducted among shift worker nurses (29 articles); were review articles (2 articles); and did not include employed nurses (4 articles). Figure 1 provides the PRISMA diagram related to this integrative review.

Quality appraisal

Two authors (M.T., C.R.) independently reviewed the quality of the 37 studies using an assessing system for mixed methods research and mixed studies reviews (SMSR) (Pluye et al. 2009). The detailed breakdown of each reviewer's scores is presented in supplementary materials [See supplementary Tables S1–S3]. For each criterion, the presence/absence of the criterion was scored 1 and 0 respectively. Quantitative observational studies were assessed according to their appropriate sampling ($n > 100$ considered as appropriate), justification of

measurements and control of confounders. Qualitative studies were evaluated for appropriate qualitative objective and method, description of the context, participants and justification of participant selection, and description of qualitative data collection

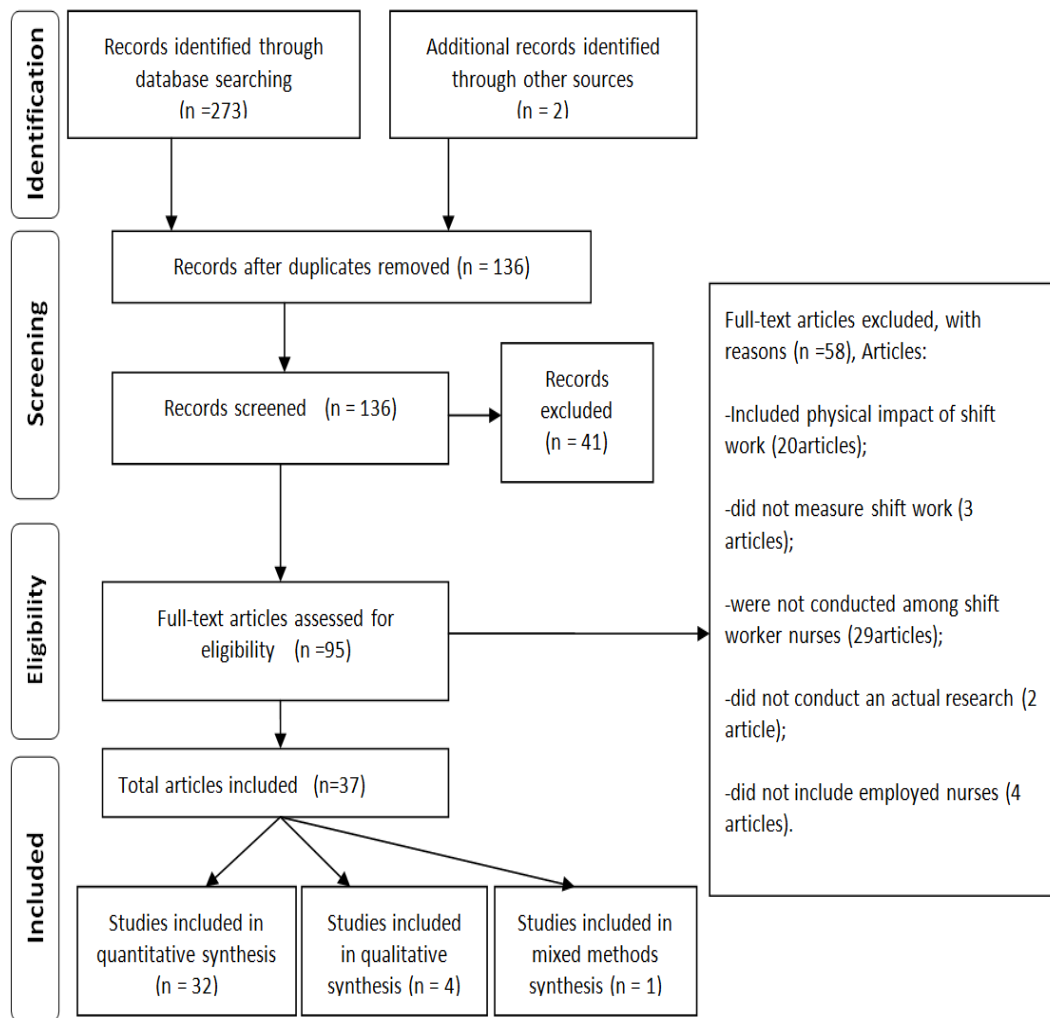


Figure 2.1 PRISMA diagram related to this integrative review.

and analysis and researcher reflexivity. The mixed method study was assessed for justification of the mixed-methods design, combination of qualitative and quantitative data collection analysis techniques and integration of qualitative and quantitative results. There were minimal subjective differences regarding assessment

of the articles which was discussed by the authors to reach an agreement. The comparison of the two sets of quality assessments demonstrated a substantial degree of agreement between coders; Cohen's kappa = 0.75, indicating a good reliability (Cohen 1960). Overall, the studies included in this review received moderate to high quality ratings.

Data extraction and synthesis

To assist with the synthesis of studies the same two authors (MT, CR) independently grouped the studies according to the main outcome variables they reported, namely: (1) general psychological well-being/quality of life; (2) job satisfaction/burnout; (3) depression, anxiety and stress; and (4) resilience/coping. There were no discrepancies between authors as to the grouping of the articles into these four categories. Furthermore, each study was classified according to whether it directly compared shift workers with non-shift workers (category A studies) or if it only compared or examined relationships between variables among different types of shift workers (category B studies). A similar synthesis was conducted for qualitative studies by examining the themes identified in each of the studies and grouping them according to the main outcome variables of this review. The synthesis of the final 37 qualitative and quantitative studies was then combined and the data were extracted and inserted into a four separate tables according to the main outcome variable: study setting; design; sample; measures and analytical methods (Tables 1–4). Additional key findings of the studies were included in additional tables (supplementary Table S4–S7). Figure 2 illustrates the method used for synthesizing articles.

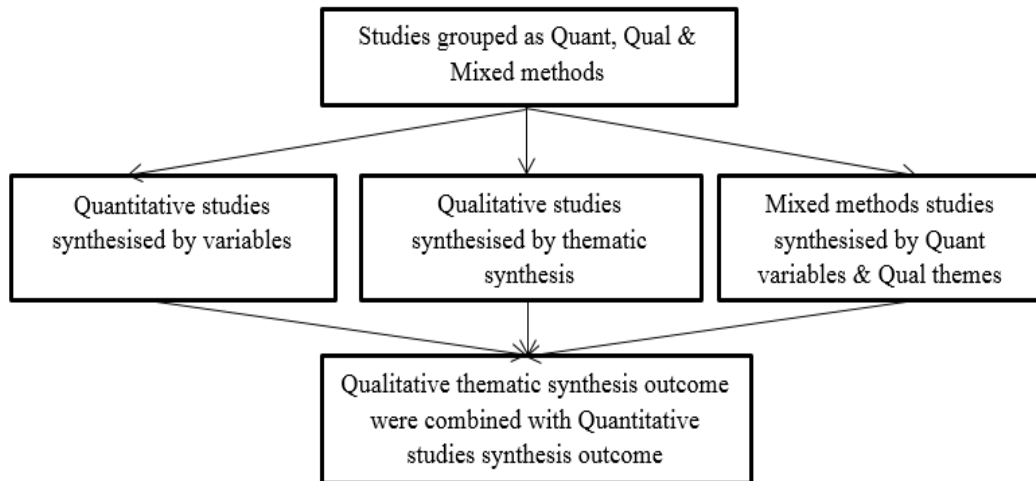


Figure 2.2 Study design for synthesising articles.

Results

Overview of studies

Of the final 37 studies included in this review, 32 were quantitative, four were qualitative and one was a mixed methods study. Overall, five of the articles used a longitudinal study design and the remainder used a cross sectional study design. Ten articles reported gender-specific results considering only female nurses. The quality of studies was excellent with 76% receiving a rating of 100%. The samples sizes ranged from 13-25924 and the majority of studies were conducted in Europe (n = 12, 32.43%), followed by Asia (n = 11, 29.73%), Australia/NZ (n = 6, 16.22%), USA/Canada (n = 4, 10.81%) and the Middle East (n = 4, 10.81%).

Outcomes

General psychological well-being/quality of life

This outcome category broadly captures overall psychological functioning in terms of well-being and quality of life. Three qualitative studies (West et al. 2009, Powell 2013, Faseleh et al. 2013) and five quantitative studies (Camerino et al. 2010, Estry-B'ehar & Beatrice 2012, Simuni'c & Gregov 2012, Lin et al. 2012, Sori'c et al. 2013) obtained information related to this outcome. The quantitative measures

included: a single-item measure of well-being (Estryn-B'ehar & Beatrice 2012); the scale of the negative effects of work time (Ahasan et al. 2002); conflict between work and family rating scale (Netemeyer et al. 1996); Chinese health questionnaire 12-item (Cheng & Williams 1986); and the World Health Organisation quality of life questionnaire brief version (WHOQOL-BREF) (World Health Organisation, 1996).

The qualitative studies by West et al. (2009) and Faseleh et al. (2013) both found themes relating to family disruption and stress associated with working shifts. Nurses reported having to restructure their lives to minimize disruption to family. The qualitative study by Powell (2013) with 14 nurses found that shift work was associated with fatigue and a sense of isolation. In terms of quantitative studies, Sori'c et al. (2013) compared the quality of life of shift workers and non-shift workers using the WHOQOLBREF and found shift workers had poorer quality of life scores than non-shift workers. Several studies compared well-being and quality of life scores across different patterns of shifts. Estryn-B'ehar and Beatrice (2012) found on a single item measure of well-being, that one-third of nurses working 12-hour days, nurses working 10-hour night shifts and nurses working alternating shifts, reported dissatisfaction with work time and low well-being. Nurses working part-time and 12-hour day shifts or 8-hour night shifts had less work/family conflict. Simuni'c and Gregov (2012) used the conflict between work and family rating scale and scale of the negative effects of work time and found less conflict between work and family among nurses working only morning shifts than those who worked forward rotation 12 hours, 8 hours and backward rotation, and irregular 8 hour shifts.

Table 1 Studies examining the effects of shift work on general well-being and quality of life

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Camerino et al., 2010), Italy A	Health care institutions	Quant, Cross sectional, Female nurses, $n = 664$ SW ¹ : Regular D ² , irregular D ² , shift work without N ³ , shift work with N ³	NEES ⁴ ;WAI ⁵ , CBI ⁶ , copenhagen psychological questionnaire, demand-control questionnaire, occupations health and safety prevention index	Data mining techniques, random forests & bayesian networks, hierarchical linear regression models
(Estryn-Béhar and Beatrice, 2012), Ten European countries A	Hospitals, nursing homes, home care	Quant, cross sectional, nurse, $n = 25924$ SW ¹ : D ² (8 hour,10 hour, 12 hour), N ³ (8 hour, 10 hour,12hr), Pt ⁸ , Alt ⁹	Work/family conflict 5 item scale, WAI ⁴ , copenhagen psychosocial questionnaire, intrinsic effort scale, their own questionnaire	Pearson's chi-square test, binary logistic regressions
(Faseleh Jahromi et al., 2013), Iran B	Two university hospitals	Qual, nurses, $n = 20$ SW ¹ : N ³ , R ¹⁰	Focus group interview (40-80 minutes)	Content comparative & qualitative content analysis
(Lin et al., 2012), Taiwan A	Two medical centres and five regional/district hospitals	Quant, cross sectional, female nurses, $n = 407$ SW ¹ : R ¹⁰ : D ² (8 am–4 pm), E ¹¹ (4 pm–12 pm or from 2 pm–10 pm), N ³ (12 pm–8am)	PSQI ¹² , CHQ ¹³	Chi-Square, ANOVA, univariate analysis, multivariate models, ANCOVA tests, linear & logistic regression models, paired <i>t</i> -test
(Powell, 2013), Australia B	Medical or surgical units of 3 regional hospitals	Qual. female ENs or RNs with 3-year experience, $n = 14$ SW ¹ : N ³	Semi-structural interviews	Thematic content analysis
(Šimunić and Gregov, 2012), Croatia A	One general hospital and one clinical hospital centre	Quant, cross sectional, nurses, $n = 128$ SW ¹ : Fast R ¹⁰ (rotated every 2 days): forward R ¹⁰ (M ¹⁴ -A ¹⁵ -N ³ -day off), backward R ¹⁰ (N ³ -M ¹⁴ - A ¹⁵ -day off), forward R ¹⁰ (D ² -N ³ -day off)	Psychological demands of work scale, negative effects of work time scale, modified conflict between work & family role scale, semantic differential items, affective component of job satisfaction, affective component of satisfaction with the family, affective component of life satisfaction	Chi-square test
(Sorić et al., 2013), Croatia A	Seven hospitals	Quant, cross-sectional, clinical nurses, $n = 1124$ SW ¹ : Do you work in shifts? Y/N	WAI ⁵ ; WHOQoL ¹⁶	Mann-Whitney U test, chi-square test, binary logistic regression models
(West et al., 2009), Australia B	Clinical setting from urban & rural areas	Qual, female RNs, $n = 13$ SW ¹ : no definition	Individual 45–min interview	Interpretation & phenomenological transformation

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4-NEES, nurses' early exit study; 5-WAI, work ability index; 6-CBI, copenhagen burnout inventor; 7-BO, burnout; 8-Pt, part time; 9-Alt, Altering shifts; 10-R, rota ing shifts; 11-E, evening shifts; 12-PSQI, pittsburgh sleep quality index; 13-CHQ: chines health questionnaire; 14-M, morning shifts; 15-A, afternoon; 16-WHOQoL, the world health organisation quality of life questionnaire brief version; 17-QoL, Quality of Life.

Similarly, Lin et al. (2012) found rotating shifts were associated with worse general mental health compared with day shifts.

The current evidence suggests that shift work is associated with poor quality of life and low psychological wellbeing among nurses but that this is dependent on the type of shifts worked and other circumstances such as whether the nurse works full or part-time. There were five quantitative studies in this group and all five (100%) were category A studies (directly compared outcomes for nurses working shifts against nurses not working shifts). Overall, the methodological quality of these studies was high (93.75) with four out of five quantitative studies also providing information on the precision of their findings. [See estimate of precision supplementary Table S8].

Job satisfaction/burnout

This outcome category captures psychological functioning specifically as it relates to perception of the work environment. The measures used to assess job satisfaction and burnout included: the Hoppock Scale 5-item General Job Satisfaction Scale (Nichols et al. 1978); the 6-item job satisfaction scale (Agho et al. 1992); the job/work environment nursing satisfaction survey (Halfer & Graf 2006); the Standard Shift Work Index Questionnaire (Barton et al. 1995); semantic differential items for measuring job, family and life satisfaction (Gregov 1994); index of work satisfaction (Stamps 1997); and for burnout, the 22-item Maslach Burnout Inventory (Maslach & Jackson 1981), Copenhagen Burnout Inventory (Kristensen et al. 2005) and the 27-item job stress questionnaire from the Korean occupational stress scale (Chang et al. 2005).

Table 2 Studies examining the effects of shift work on job satisfaction and burnout.

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Deori, 2012), India B	Acute care unit of a hospital,	Quant, prospective study, nurses, $n = 219$ SW ¹ : N ³	Questionnaire developed by Siseni Madide (2003)	Excel 2002 (not clear data analysis)
(Cheng et al., 2015), Taiwan B	Teaching hospital, non-academic teaching hospital	Quant, descriptive, correlational and longitudinal, new graduate employed nurses, $n = 206$ SW ¹ : 8 hour shift, 12 hour shift, both 8 & 12 hour	Work environment nursing satisfaction, clinical stress scale	Pearson correlation, generalized estimating equations
(Hoffman & Scott, 2003), USA B	Members of Michigan Nurses Association	Quant, cross-sectional, female RN, $n = 208$ SW ¹ : 8 hour shifts, 12 hour shifts, combination of 8-,10-,12-hour shifts	DQ ⁵ ; NSS ⁴ ; IWS ⁶	Two-tailed t -test procedures, pearson product
(Ha, 2015), Korea B	General hospitals	Qual, Q-methodology, Clinical nurses, $n = 39$ SW ¹ : R ⁷	11-point bipolar scale	Factor analysis using pc-QUANL program
(Jamal & Baba, 1997), Canada A	A psychiatric hospital	Quant, cross-sectional, nurses, $n = 175$ SW ¹ : D ² , E ⁸ , N ³ , R ⁷	MBI ⁹ , HS ¹⁰ , Job diagnostic survey; how many days have they been absent from the job in the last 2 months?	One-way ANOVA, t -test, two-way ANOVA
(Ruggiero, 2005), USA B	Members of American Association of Critical Care Nurses	Quant, cross-sectional, Critical care nurses, $N = 247$ SW ¹ : D ² (included E ⁸ 3 pm-11 pm), R ⁷ , N ³	GJSS ¹¹ , PSQI ¹² , BDI-II ¹³ , SSIGBIS ¹⁴	One-way ANOVA, pearson product moment correlation, coefficient, hierarchical multiple regression
(Rodwell & Fernando, 2016), Australia B	General acute hospital, maternity hospital, aged care	Quant, cross-sectional, nurses, $n = 446$ SW ¹ : D ² , E ⁸ , N ³	Job satisfaction scale, GHQ ¹⁵ -12, Kessler-10, centre for epidemiological studies depression scale, early/late preferences scale, negative affect schedule scale	Correlation, multiple linear regression analysis
(Shahriari et al., 2014), Iran A	Critical care units (ICU, CCU,ER) in 6 hospitals	Quant, retrospective cohort design, nurses, $n = 170$ SW ¹ : R ⁷ (combination of morning, E ⁸ and N ³); F ¹⁶ (only morning, only E ⁸ , only N ³)	MBI ⁹	Independent t -test, logistic regression
(Šimunić and Gregov, 2012), Croatia A	One general hospital and one clinical hospital centre	Quant, cross-sectional, Nurses, $n = 128$ SW ¹ : Fast R ⁷ (rotated every 2 days): forward R ⁷ (M ²¹ -A ²² -N ³ -day off), backward R ⁷ (N ³ -M ²¹ - A ²² -day off), forward R ⁷ (D ² ,-N ³ -day off)	Psychological demands of work scale, negative effects of work time scale, modified conflict between work & family role scale, semantic differential items, affective component of job satisfaction, affective component of satisfaction with the family, Affective component of life satisfaction	Chi-square test

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Teclaw and Osatuke, 2014), USA A	Veterans Health Administration (VHA) employees from 141 facilities	Quant, cross-sectional, exploratory of observational data (years: 2008, 2010, 2012), nurses, $n = 14057$ SW ¹ : D ² (7 am–6 pm), N ³ (7 pm–6 am), weekend shifts	Job satisfaction (12 items), agreement with specific description of work climate (31 items)	Graphical display, logistic regression, ordinal logistic regression, proportion odds version of cumulative, logistic model
(Wisetborisut et al., 2014), Thailand A	One hospital	Quant, cross-sectional, Healthcare workers, $n = 2772$ SW ¹ : E ⁸ (16:00–0:00), N ³ (0:00–08:00), Non-sw ¹	DQ ⁵ ; MBI ⁹	Chi-square tests, likelihood ratio test, multiple logistic regression

1-SW: shift worked; 2-D, day shifts; 3-N, night shifts; 4-NSS, nursing stress scale; 5-DQ, demographic questionnaire; 6-IWS, index of work satisfaction; 7-R, rotating shifts; 8-E, evening shifts; 9-MBI, maslach burnout inventory; 10-HS: hoppock scale; 11-GJSS, general job satisfaction scale; 12-PSQI, pittsburgh sleep quality index; 13-BDI-II, beck depression inventory-II; 14-SSIGBIS, standard shift work index general biographical information section; 15-GHQ, general health questionnaire; 16-F, fixed shifts; 17-EE, emotional exhaustion; 18-PA, personal accomplishment; 19-BO, burnout; 20-DP, depersonalisation; 21-M, morning shifts; 22-A, afternoon

Wisetborisut et al. (2014) found burnout scores were higher in shift workers compared with non-shift workers. In this study, shift workers who had six to eight sleeping hours per day and at least 8 days off per month had fewer burnout symptoms. Shahriari et al. (2014) found higher levels of burnout in fixed compared with rotating shift workers and this finding was irrespective of whether the shifts were morning or night. In contrast, Jamal and Baba (1997) found no difference between nurses working various shifts on burnout but found that nurses working night shifts had lower ratings of job satisfaction than their non-night shift counterparts. However, this finding was not supported in two other studies that found no difference between shift types on job satisfaction (Hoffman & Scott 2003, Ruggiero 2005). Ha (2015) used Q-Methodology with 39 nurses working rotating shifts and found three main findings; (1) Working rotating shifts is frustrating, (2) working rotating shifts is satisfactory, and (3) working rotating shifts is problematic but necessary. In a longitudinal study by Cheng et al. (2015), nurses who worked 12-hour shifts reported significantly higher job satisfaction than nurses working 8-hour shifts. In contrast, Simunič and Gregov (2012) found 12-hour shifts to be associated with lower cognitive-affective job satisfaction compared with nurses working morning shifts. Teclaw and Osatuke (2014) found that overall job satisfaction was lower in off-shift workers (e.g. evening and night shifts) compared with day workers. A recent study by Rodwell and Fernando (2016) found that shift work alone was not associated with lower job satisfaction but that job satisfaction was most dependent on work context and other lifestyle factors as opposed to just shift type.

Only five studies in this category directly compared shift workers with non-shift workers and found higher rates of burnout in the shift-working group. The majority of the studies compared various types of shift work and found mixed results regarding the impact on job satisfaction and burnout. Ten of the studies in this group were quantitative and 50% were Category A studies (directly compared shift workers with on-shift workers). Overall, the

methodological quality of these studies was very good (84.90), however, only three studies (30%) provided information on the precision of their findings [See estimate of precision supplementary Table S8].

Depression, anxiety and stress

This outcome captures the effect of shift work on psychological states such as depression, anxiety and stress. The measures used to assess these variables included: The nursing stress scale (Gray-Toft & Anderson 1981); Beck Depression Inventory-II (Beck et al. 1996); Centre for Epidemiological Studies Depression Scale (Radloff 1977); Patient Health Questionnaire-9 (Kroenke & Spitzer 2002); hospital anxiety and depression scale (Zigmond & Snaith 1983); Taiwan Nurse Stress Checklist (Tsai & Crockett 1993). State-Trait Anxiety Inventory (Spielberger 1983), Profile of Mood States (McNair et al. 1971), 12-item version of the General Health Questionnaire (Iwata et al. 1988, Goldberg 1972).

The study by Hea Young et al. (2015) found that nurses who worked shifts had higher odds of increased severity of depressive symptoms than those nurses who did not work shifts. In a prospective longitudinal study, Berthelsen et al. (2015) examined the impact of different shift types on depression and found that night shifts and rotating shifts were not associated with increased chances of ‘caseness’ of anxiety or depression after 12 months of follow-up. This result was supported by Ruggiero (2005) who found no difference between shift type and level of depression. A correlational study by Jung and Lee (2015) found that nurse shift workers, who had high levels of alertness early in the day (high levels of morningness) and were younger in age, had lower levels of depression. Morningness–eveningness reflects one’s diurnal preferences, those who have high scores on morningness have their peak of alertness earlier in the day compared with those with low scores (Roberts & Kyllonen 1999).

Table 3: Studies examining the effects of shift work on depression, anxiety, and stress

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Ardekani et al., 2008), Iran A	Twelve General hospitals	Quant, cross-sectional, nurses, $n = 1195$ SW ¹ : R ⁴ , F ⁵ (day time)	GHQ ²	Two sample t -test
(Brethelsen et al. 2015), Norway A	Registered members of Norwegian Nurse Organisation	Quant, repeated measures design, nurses, $n = 2059$ SW ¹ : Only D ² , Only E ⁶ , D ² & E ⁶ , Only N ³ , R ⁴ , Both D ² & N ³	General nordic questionnaire, swedish demand-control-support questionnaire, HADS ⁷	Bivariate binary logistic regression
(Cheng et al., 2015), Taiwan B	Teaching hospital, non-academic teaching hospital	Quant, descriptive, correlational and longitudinal, new graduate employed nurses, $n = 206$ SW ¹ : 8 hour shift, 12 hour shift, both 8 & 12 hours	Work environment nursing satisfaction, clinical stress scale	Pearson correlation, generalized estimating equations
(Faseleh Jahromi et al., 2013), Iran B	Two university hospitals	Qual, nurses, $n = 20$ SW ¹ : N ³ , R ⁴	Focus group interview (40–80 minutes)	Content comparative & qualitative content analysis
(Farzinpour et al. 2016), Iran B	Six non-governmental hospitals	Quant, random selection, cross-sectional, nurses, $n = 305$ SW ¹ : fixed morning, fixed E ⁶ , fixed N ³	SSI ⁸ , eysenck personality questionnaire (EPQ)	Pearson correlation coefficient, t -test, ANCOVA, Mann-Whitney test, Kruskal-Wallis test
(Hea et al. 2015), Korea A	Korea Nurse Health Study	Quant, cross-sectional, female nurses, $n = 9789$ SW ¹ : SW? Yes, No	(PHQ-9) ⁹	Descriptive, Spearman's correlation and multivariable ordinal logistic regression
(Hoffman & Scott, 2003), USA B	Members of Michigan Nurses Association	Quant, cross-sectional, female RN, $n = 208$ SW ¹ : 8 hour shifts, 12 hour shifts, combination of 8-,10-,12-hour shifts	DQ ¹⁰ , NSS ¹¹ , IWS ¹²	Two –tailed t -test procedures, pearson product
(Jung & lee, 2015), Korea B	One hospital	Quant, Cross-sectional, nurses, $n = 660$ SW ¹ : R ⁴ (D ² : 7 am–15 pm, E ⁶ : 15 pm–23pm, N ³ : 23 pm—7 am)	DS ¹³ , MSPSS ¹⁴ , BMI ¹⁵ , smoking status, questions about working condition, ISI ¹⁶ , PHQ ¹⁷	Hierarchical multiple regression, Durbin-Watson test

(Korompeli et al., 2014), Greece B	Three public general hospitals,	Quant, cross-sectional, nurses & nurses assistants, $n = 365$ SW ¹ : M ¹⁹ , R ⁴	SSI ²⁰ included: sleep questionnaire, general health satisfaction, chronic fatigue, physical health questionnaire, (measuring cardiovascular & gastrointestinal disorders), general health questionnaire, cognitive somatic anxiety questionnaire DQ ¹⁰ , NSC ²¹ , PSQI ²² , GHSC ²³	Multiple linear regression
(Lin et al., 2014), Taiwan B	Four hospitals	Quant, cross-sectional, nurses, $n = 266$ SW ¹ : Regular shift, clockwise rotation, counter-clockwise rotation, rapid rotation		Independent <i>t</i> -test, one way ANOVA, Scheffe's method of post hoc tests, Pearson's <i>r</i> , Hierarchical regression
(Lin et al., 2015), Taiwan A	Two medical centres & five regional/district hospitals, nurses from Kaohsiung City & County Nurses Associations	Quant, cross-sectional, female nurses, $n = 654$ SW ¹ : D ² , non-N ³ , R ⁴	Effort reward imbalance (ERI) model	Chi-square test, logistic regression analysis
(Natvik et al., 2011), Norway B	Members of the Norwegian Nurses Organisation	Quant, cross-sectional, nurses, $n = 1505$ SW ¹ : 3 R ⁴ (D ² & E ⁶ & N ³), 2 R ⁴ (D ² & E ⁶)	DQ ¹⁰ , WS ²⁴ , BIS ²⁵ , HADS ²⁶ , ESS ²⁷ , DS ¹³ , Rcti ²⁸ , short hardiness scale	Hierarchical multiple regression
(Ruggiero, 2005), USA B	Members of American Association of Critical Care Nurses	Quant, cross-sectional, Critical care nurses, $N = 247$ SW ¹ : D ² (included E ⁶ 3pm-11pm), R ⁴ , N ³	GJSS ²⁹ , PSQI ³⁰ , BDI-II ³¹ , SSIGBIS ³²	One-way ANOVA, pearson product Moment correlation, coefficient, hierarchical multiple regression
(Suzuki et al., 2004), Japan A	Eight general hospitals	Quant, cross-sectional, nurses, $n = 4407$ SW ¹ : N ³ /split/ irregular shifts (sw ¹ , non-sw ¹)	GHQ ³³ , questions on mental health, sleep, occupational accidents, the shift work system; DQ ¹⁰	Chi-square test, student <i>t</i> -test, univariate analysis, multiple logistic regression
(Samaha et al., 2007), Australia B	Three eldercare facilities	Quant, cross-sectional, nurses, $n = 111$ SW ¹ : Regular shifts, irregular shifts, flexible shifts,	DQ ¹⁰ , checklist individual scale, t-STAI ³⁴ , PMS ³⁵ , locus of control & behaviour scale, lifestyle appraisal questionnaire, PQSI ³⁶	Pearson's correlations, multiple regression, ANOVA
(Saksvik-Lehouillier et al., 2012), Norway B	Members of the Norwegian Nurses Association	Quant, longitudinal, Cohort, female nurses, $n = 642$ SW ¹ : Rotating 3 shifts: D ² , E ⁶ , N ³	DQ ¹⁰ ;DRS ³⁷ ; DS ¹³ ;CTI ³⁸ , ESS ²⁷ , FQ ³⁹ , HADS ²⁶ ; asking about number of N ³ worked last year, having children, SWT ¹⁸ , percentage of full time position	Hierarchical regression
(Storemark et al., 2013), Norway A	Norwegian Nurse Organisation's members	Quant, prospective stratified sample, longitudinal study, nurses, $n = 2048$ SW ¹ : D ² , E ⁶ , N ³	AUDIT-C ⁴⁰ ; DS ¹³ , DRS ³⁷ ; rCTI ²⁸ , BSWSQ ⁴¹ .	Hierarchical multiple regression

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4-R, rotating shifts; 5-F, fixed shifts; 6-E, evening shifts; 7-HADS, hospital anxiety and depression scale; 8-SSI, standard shift work index; 9-PHQ, patient health questionnaire; 10-DQ, demographic questionnaire; 11-NSS, nursing stress scale; 12-IWS, index of work satisfaction; 13-DS, diurnal scale; 14-MSPSS, multidimensional scale of perceived social support; 15-BMI, body mass index; 16-ISI, insomnia severity index; 17-PHQ, patient health questionnaire; 18-SWT, shift work tolerance; 19-M, morning shifts; 20-SSI, standard shift work index; 21-NSC, nurse stress checklist; 22-PSQI, pittsburgh sleep quality index; 23-GHSC, chine health questionnaire; 24-WS, work schedule; 25-BIS, bergen insomnia scale; 26-HADS, hospital anxiety and depression scale; 27-ESS, epworth sleepiness scale; 28-rCTI, revised circadian type inventory; 29-GJSS, general job satisfaction scale; 30-PSQI, pittsburgh sleep quality index; 31-BDI-II, beck depression inventory-ii; 32-SSIGBIS, standard shift work index general biographical information section; 33-GHQ, general health questionnaire; 34-t-STAI, t-version of state-trait anxiety inventory; 35-PMS, profile of mood states; 36-PQSI, pittsburgh quality of sleep index; 37-DRS, dispositional resilience (hardiness) scale; 38-CTI, circadian type inventory; 39-FQ, global sleep assessment questionnaire; 40-AUDITC, the alcohol use disorders identification test-consumption; 41-BSWSQ, the bergen shift work sleep questionnaire

In another longitudinal study, Saksvik-Lehouillier et al. (2012) found the relationship between shift work tolerance and depression was best explained by level of nurse hardiness. Hardiness is a general resilience factor influencing how one copes with stress and illness (Storemark et al. 2013). The ability to work shifts without experiencing any negative consequences is referred to as 'Shift Work Tolerance' (Andlauer et al. 1978). Similarly, Natvik et al. (2011) used regression analysis to determine predictors of depression in nurse shift workers and concluded that the impact of shift work is complex and interrelated with other factors such as morningness, languidity and hardiness.

In terms of stress and anxiety, Faseleh et al. (2013) interviewed night shift workers who reported being highly stressed at work. Lin et al. (2014) did not find a difference in job stress according to the type of shift worked, but in a later study by the same authors they found that rotating shifts were associated with effort-reward imbalance (Lin et al. 2015). In the study by Hoffman and Scott (2003), nurses working 12-hour shifts reported greater levels of stress than those working 8-hour shifts. However, in direct contrast to this study, Cheng et al. (2015) found nurses working 12-hour shifts reported less job stress than nurses working 8-hour shifts. One study found fixed shift nurses had higher anxiety and social dysfunction compared with rotating shift nurses (Ardekani et al. 2008). Korompeli et al. (2014) utilized the Standard Shift Work Index and found female nurses working rotating shifts had higher cognitive and somatic anxiety compared with their morning shift counterparts. Finally, the study by Samaha et al. (2007) found anxiety was associated with chronic fatigue in shift workers.

A methodological strength of the studies conducted in this category is that two were longitudinal in design, measuring nurse depression, anxiety and stress over time. However, these studies were conducted among nurse shift workers and so do not provide a direct comparison to non-shift workers. Only six studies compared shift workers with non-shift workers. Among the studies investigating the impact of different types of shifts on depression, anxiety and

stress, the findings are inconsistent. Of the 17 studies in this group, 16 were quantitative and only 37.5% directly compared shift with non-shift workers (Category A studies). Overall, the methodological quality of these studies was excellent (93.75), however, only 18% provided information on the precision of their findings [See estimate of precision supplementary Table S8].

Resilience and coping

This outcome captures how well nurses are coping and their level of individual psychological resilience, both which are known to be strongly related to psychological well-being. Resilience and coping are closely related constructs and so were assessed together. The constructs were measured with the following scales: the 24-item coping questionnaire (Spelten et al. 1993); the Dispositional Resilience (Hardiness) Scale Revised (Hystad et al. 2010); the 15-item Short Hardiness Scale (Barton 1995); and the Dispositional Resilience (Hardiness) Scale–Revised (Hystad et al. 2010).

A mixed-method study by Clendon and Walker (2013) examined coping and shift work. They found single participants reported that shift work suited them; while it had a somewhat negative impact on their social and family relationships. Flexible working hours and the ability to do jobs during normal working hours were the positive aspects of shift work highlighted and participants who worked part time appeared to be coping better with shift work. Participants also used coping mechanisms to help manage the impact of shift work on their health, social and family functioning. These coping techniques included choosing lifestyle-friendly shifts and allocating specific times for sleeping, eating and exercising. They recommended employers could assist with self-rostering and facilitate the work place to have a space for night shift workers to sleep prior to going home after night shifts (Clendon & Walker 2013). Overall, they found that nurses had very different opinions about working shifts with some reporting negative aspects and others reporting that they have adapted to cope with shifts in a way that they found worked well. The study by Samaha et al. (2007) found that maladaptive coping (drinking alcohol, letting emotions out

and avoiding the situation) was associated with chronic fatigue in shift workers. Pisarski et al. (1998) found a complex relationship between coping and social support in shift workers with disengagement coping (a type of emotion-focused coping) being negatively associated with poorer mental health.

Table 4: Studies examining the effects of shift work on resilience and coping

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Clendon and Walker, 2013), New Zealand A	Hospitals & primary health care positions (members of the New Zealand Nurse Organization)	Online survey, quant & qual analysis, Cohort, nurses, $n = 3273$ SW ¹ : Mixed of N ³ & D ² , D ² only, permanent N ³	DQ ⁵ included: qualification & nursing experience, nursing employment (setting, field, & shift patterns), intentions to changing employment or retirement, asking about experience of working as late career nurses, validated health score	Thematic analysis, two-tailed <i>t</i> -test
(Flo et al., 2012), Norway A	Norwegian Nurse Organisation's members	Quant, random selection, cross-sectional, nurses, $n = 1968$ SW ¹ : D ² only, N ³ only, 2 shifts rotation, 3 shifts rotation, other schedule with N ³	DQ ⁵ ; BIS ⁶ ; ESS ⁷ ; HADS ⁸ ;GSAQ ⁹ ; FQ ¹⁰ ; DRS ¹ -15-R; DS ¹² ; rCTI ¹³ ; AUDIT-C ¹⁴ ; Caffeine consumption; Use of sleep medications & bright light treatment	Logistic regression analysis
(Pisarski et al., 1998), Australia B	Metropolitan general hospitals	Quant, cross-sectional, female RNs, $n = 172$ SW ¹ : R ⁴ 8hr	GHQ ¹⁶ , PHQ ¹⁷ , 24 item coping questionnaire, 12 item scale by Caplan et al., asking about having control over shifts they work	Reflex procedure, square root transformation
(Powell, 2013), Australia B	Medical or surgical units of 3 regional hospitals	Qual, female ENs or RNs with 3-year experience, $n = 14$ SW ¹ : N ³	Semi-structural interviews	Thematic content analysis
(Samaha et al., 2007), Australia B	Three eldercare facilities	Quant, cross-sectional, nurses, $n = 111$ SW ¹ : Regular shifts, irregular shifts, flexible shifts	DQ ⁵ , Checklist Individual Scale, t-STAI ¹⁸ , PMS ¹⁹ , locus of control & behaviour scale, lifestyle appraisal questionnaire, PQSI ²⁰	Pearson's correlations, multiple regression, ANOVA
(Saksvik-Lehouillier et al., 2012), Norway B	Members of the Norwegian Nurses Association	Quant, longitudinal, cohort, female nurses, $n = 642$ SW ¹ : Rotating 3 shifts: D ² , E ²¹ , N ³	DQ ⁵ ;DRS ²² ; DS ¹² ;CTI ²³ , ESS ⁷ , FQ ¹⁰ , HADS ⁸ ; asking about number of N ³ worked last year, having children, SWT ²⁴ , percentage of full time position	Hierarchical regression
(Saksvik-Lehouillier et al., 2013), Norway B	Norwegian Nurses from first wave of a longitudinal study	Quant, cross-sectional data derived from a longitudinal study, newly graduate nurses & nurses, $n = 749$ SW ¹ : R ⁴ : D ² , E ²¹ & N ³	DQ ⁵ ; DRS ²⁵ -15-R; DS ¹² . CTI ²³ ; AUDIT-C ¹⁴ ; BIS ⁶ , smoking behaviour, BMI, physical activity, ESS ⁷ , FQ ¹⁰ , HADS ⁸ , Asking about sleep medication consumption.	ANCOVA, hierarchical regression
(Storemark et al., 2013), Norway A	Norwegian Nurse Organisation's members	Quant, prospective stratified sample, longitudinal study, nurses, $n = 2048$ SW ¹ : D ² , E ²¹ , N ³	AUDIT-C ¹⁴ ; DS ¹² .DRS ²⁵ ; rCTI ¹³ ; BSWSQ ²⁶ .	Hierarchical multiple regression

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Saksvik et al., 2016), Norway B	Members of the Norwegian Nurses Association	Quant, Longitudinal, nurses, $n = 1877$ at baseline, $n = 1228$ at 1-year follow-up, $n = 659$ at 2-year follow-up. SW ¹ ; R ⁴ , only N ³ , other shift with N ³ & D ²	DRS-15R ²⁵ , questionnaire including: hardiness, SWT ²⁴ (fatigue, sleepiness, anxiety, depression), fair leadership, social & role ambiguity.	Hierarchical multiple regression, ANOVA

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4-R, rotating shifts; 5-DQ, demographic questionnaire; 6-BIS, bergen insomnia scale; 7-ESS, epworth sleepiness scale; 8-HADS, hospital anxiety and depression scale; 9-GSAQ, global sleep assessment questionnaire; 10-FQ, global sleep assessment questionnaire; 11-DRS, dispositional resilience (hardiness) scale; 12-DS, diurnal scale; 13-rCTI, revised circadian type inventory; 14-AUDITC, the alcohol use disorders identification test-consumption; 15-SWD, shift work disorder; 16-GHQ, general health questionnaire; 17-PHQ, patient health questionnaire; 18-t-STAI, t-version of state-trait anxiety inventory; 19-PMS, profile of mood states; 20-PQSI, pittsburgh quality of sleep index; 21-E, evening shifts; 22-DRS, dispositional resilience (hardiness) scale; 23-CTI, circadian type inventory; 24-SWT, shift work tolerance; 25-DRS, dispositional resilience (hardiness) scale; 26-BSWSQ, the bergen shift work sleep questionnaire

Several studies have found that hardiness is associated with better tolerance to shift work (Saksvik-Lehouillier et al. 2012, Storemark et al. 2013, Saksvik-Lehouillier et al. 2013, 2016). This is consistent with the qualitative work of Powell (2013) who found that nurses reported relying on their own levels of resilience to overcome the stress and isolation associated with shift work. Overall, studies that directly investigated psychological resilience among nurse shift workers are limited. However, they show that both the use of coping strategies and individual level of resilience (hardiness) appears to play an important role in determining nurse psychological functioning in response to working shifts. Only three studies compared shift workers with nonshift workers. There were seven quantitative studies and one mixed-methods study in this group. Of these, only three were Category A studies. While the overall methodological quality of these studies was excellent (98.16) only one study providing information on the precision of their findings [See estimate of precision supplementary Table S8].

Discussion

This review synthesized and evaluated studies that investigated the impact of shift work on the psychological functioning and resilience of nurses. Specifically, we sought to answer the question: Do nurses who work shifts have poorer psychological functioning and lower resilience than those who do not work shifts? The existing evidence indicates that there is currently no clear answer to this question. Although some studies did report negative psychological outcomes for nurses working shifts, this was not a consistent finding across all studies.

Comparing the results of studies is also made more complex by the variety of different measures used to assess the various psychological outcomes. In addition, approximately half of the studies examined outcomes across different types of shifts as opposed to making clear comparisons between shift and non-shift workers. The vast majority of the studies are cross-sectional and

therefore several of them only report significant associations between outcomes such as burnout and depression in shift workers. This limits conclusions as to causality of shift work on psychological outcomes.

While recognizing that there are some inconsistencies in the results, overall, the findings of this review suggest several negative psychological outcomes are associated with working shifts. Some of the studies revealed that shift work limited social life and was associated with work/family conflict (Clendon & Walker 2013, Faseleh et al. 2013), low levels of well-being (Estryn-Béhar & Beatrice 2012), poor mental health (Lin et al. 2012), low levels of job satisfaction, high levels of burnout (Wisetborisut et al. 2014) and high rates of neuroticism (Korompeli et al. 2014).

Despite these findings, this review highlights the critical importance of studying context when attempting to understand the impact of shift work on nurses. The current evidence suggests that shift work may not have the same negative impact on all nurses but that how nurses respond to shift work is much dependent on other factors. Some of the factors that emerged in these studies included; how much sleep the nurse was getting, how many days off they had per month, whether they worked part-time or full-time, the gender of the nurse, their level of morningness–eveningness and their level of resilience. Although resilience/hardiness was found to predict how well the nurses tolerated working shifts, it is surprising that only six studies used a resilience scale as their measurement tool to investigate the impact of shift work on nurse resilience (Natvik et al. 2011, Flo et al. 2012, Saksvik-Lehouillier et al. 2012, Storemark et al. 2013, Saksvik-Lehouillier et al. 2013, 2016).

There is a clear need for more longitudinal and between groups studies to determine the impact of shift work on the psychological functioning and resilience of nurses. Overall, the methodological quality of the studies was excellent. However, when combined, only 33% provided important information regarding the precision of the results in terms of confidence intervals. More consistent use of outcome measurement tools would facilitate the comparison of

study outcomes. Additionally, given the importance of context, studies also need to be conducted among nurses working in a variety of nursing contexts, not only in acute hospitals but also in aged care facilities, home care and community settings. Such research that accounts for individual and contextual factors in determining nurses' well-being (Cusack et al. 2016) is essential to understand how to build and maintain resilience in nurses who work shifts. The findings will inform policy makers to promote health in the workforce. This may lead to increased recruitment and retention of nurses alleviating the economic burden associated with shortage of nurses and improve poor quality of patient care associated with higher rates of those negative psychological outcomes.

Conclusion

This integrative review aimed to critically evaluate the evidence regarding the impact of shift work on the psychological functioning and resilience of nurses. The majority of studies were correlational comparing different patterns of shift work schedules and utilised inconsistent outcome measures. Based on the current evidence, we cannot definitively conclude that nurses who work shifts have poorer psychological functioning than those who do not. Instead, the current evidence suggests that for some nurses, shift work is associated with negative psychological outcomes and these outcomes appear highly dependent on contextual and individual factors. Moreover, to clearly understand the impact of shift work on nurse psychological functioning it is imperative that future studies employ more between-groups, longitudinal designs.

Chapter Summary

This chapter has provided a detailed critical review of the literature regarding the concept of resilience and shift work among nurses. The literature review identified several shortcomings of the existing research. A major issue identified is the lack of between-group comparisons of psychological functioning between nurse shift workers and non-shift workers. Furthermore, resilience has not been directly measured in any study of nurse shift workers compared to non-shift workers. The central aim of this research is to address these gaps in the literature. The following chapter will describe the overall methodological framework used to address the research aims as well as a detailed overview of the procedure.

CHAPTER 3

RESEARCH METHODOLOGY

Chapter Preamble

This chapter describes the overall methodological framework for the project. Following that, a detailed overview of all components of the procedure, including background to the data collection, analysis, and ethical considerations, is explained.

Overview of Methodology

This research project utilised a quantitative, cross-sectional survey approach to address the research hypotheses and analysed responses to two open-ended questions in order to address the research question. Quantitative methods test hypotheses, determine relationships between variables, and measure the frequency of observation (Bowling, 2009; Fowkes & Fulton, 1991; Greenhalgh & Taylor, 1997). However, it is believed that quantitative approaches ignore the experiences of people and do not provide a holistic notion of individuals and their environment, which are important in nursing research (Hunt & Lavoie, 2011; Rahman, 2016). Therefore, quantitative methodology and its application to behavioural psychology, together with analysing the two open-ended questions at the end of survey, was considered appropriate for this study. This approach afforded the opportunity to create triangulation for outcomes after combining the two research results. The validity of the measurement tools used was also a key consideration. A review of the relevant literature (see Chapter 2) confirmed the lack of research regarding the topic of interest. The rationale for conducting the research underpinned selecting a quantitative research approach for the present study. This research analysed quantitative data from a survey of nurses to address hypotheses 1 to 6. This was followed by an analysis of responses to two open-ended questions to answer the related research question.

Detailed Overview of Study Methods

The survey

In 2013, a stratified random sample survey of members of the Queensland Nurses Union (QNU) was the fifth study, following others undertaken in 2001, 2004, 2007 and 2010 (Hegney, Francis, & Eley, 2013). The 2013 study enabled the QNMU to publish the first workforce study in Queensland with long-term comparative data. The aim of the study was to identify factors affecting nursing work, disseminate those outcomes to relevant industry and government sectors, and utilise the outcomes to improve strategic planning of QNMU (Hegney et al., 2013). The focus on the impact of shift work for this thesis was conceived by the team, with the author contributing to the conception and design of the study, and leading the data analysis, and interpretation, and writing.

The 2013 study collected data from respondents via an online self-report survey. Participants were required to respond to both structured (measures) and unstructured (open-ended) questions. The survey consisted of 47 questions (see Appendix D) which addressed the current employment; work status; working conditions; responsibilities outside work; professional development; future in nursing; personal experiences; and strategies, issues and QNU support.

The survey included four validated tools. They were:

- a) Professional Quality of Life (ProQoL) Scale version 5, to measure compassion fatigue (secondary traumatic stress and burnout), and compassion satisfaction;
- b) Depression, Anxiety and Stress (DASS21) Scale to measure depression, anxiety and stress;
- c) Spielberg State-Trait Anxiety Inventory Trait Scale (STAI) to measure anxiety (state and trait); and
- d) Connor-Davidson Resilience (CD-RISC) Scale to measure resilience.

In addition to those tools, the 47 questions included the following demographic data:

- a) type of nurse (registered, enrolled, assistant in nursing);
- b) level of nurse;
- c) sector in which employed (aged care, public or private);
- d) employment pattern (full or part time);
- e) age, sex, place of birth and citizenship;
- f) length of time in nursing;
- g) length of time at current health service;
- h) length of time planned to continue to work in nursing;
- i) shifts worked;
- j) dependents; and
- k) qualifications and educational activities (Hegney et al., 2013).

Ethical approval

To allow the researcher access to the previously collected data, ethical approval was obtained from the Curtin University Human Research Ethical Committee (HREC) (approval number: HRSONM25-2013), (see Appendix C). A later ethical amendment was approved to enable the author to have access to the data for the purposes of conducting this PhD project. The data was stored according to Western Australian data storage and disposal policy. The data was stored in the researcher's personal drive assigned to her by the university during the process of the research and for data storage following study completion, as required by the Western Australian University Sector Disposal Authority.

Participants and procedure

Participants were employed registered and enrolled nurses, midwives, assistants in nursing, and student nurses who were members of the QNMU. Inclusion criteria were nurses with a current email address who were currently employed in nursing and who were financial members of the QNMU. The membership was stratified into public, private, and aged care (public and private) sectors. There were 4,588 participants in the private and 4,661 in the aged care sectors who met the inclusion criteria. All of these participants were included in the study. In the public

sector, there were 30,000 participants who met the inclusion criteria. A total of 4,500 were randomly selected (using a random numbers table) to participate (Hegney et al., 2013). As this study utilised data from a larger project of the QNMU study and the database holds data from assistants in nursing (AIN), midwives, and student nurses, participants from those three work roles were excluded from the quantitative and content analysing of the data in this present study. This is because their scope of practice is different from registered nurses.

The invitation to participate in the study was sent by email by the QNMU to the 13,739 selected members. The email contained an information sheet, which included a link to the website where the participants could complete the survey. Of the 13,739 members invited, 2,857 responded. Of these 178 were blank and were therefore excluded, resulting in 2,679 respondents (Hegney et al., 2013). A subset of data from this larger study in 2013, is analysed in this present research study, in relation to shift workers and non-shift workers. The subset and related hypotheses have neither been analysed nor reported previously.

Measures

Professional Quality of Life (ProQoL) Scale version 5

The ProQoL was used to measure participants' levels of compassion satisfaction and compassion fatigue (burnout and STS) (Stamm, 2010). Each of its components have been described in chapter 1. It uses a 5-point item Likert scale (1 never to 5 very often) to measure the three subscales (10 items each). A score of 10 represents the lower score and 50 the higher score. Respondents were asked to read each statement in relation to their current work situation and select the number that reflected how "frequently they experienced these things in the last 30 days". Sample items include: Compassion Satisfaction ("I feel invigorated after working with those I [help]"); Burnout ("I feel worn out because of my work as a [helper]"); Secondary Traumatic Stress ("I feel as though I am experiencing the trauma of someone I have [helped]") (Stamm, 2010) (see Appendix E).

The Compassion Fatigue scale is specific. The inter-scale correlations indicates 2% shared variance ($r = -.23$; $co - \sigma = 5\%$; $n = 1187$) with STS and 5% shared variance ($r = -.14$; $co - \sigma = 2\%$; $n = 1187$) with burnout. Although burnout and STS subscales shared variance together, they measure different constructs, which demonstrate the distress that is prevalent in both circumstances. The shared variance between the burnout and STS scales is 34% ($r = .58$; $co - \sigma = 34\%$; $n = 1187$). Both scales measure negative affect; however, the STS scale indicates fear while the burnout scale does not (Stamm, 2010).

Over 200 published articles and over 100,000 papers acknowledge good construct validity for ProQoL scale with good to very good internal reliability (Stamm, 2010). The mean score for Compassion Satisfaction is 50 ($SD 10$, alpha scale reliability .88). The cut scores for the Compassion Satisfaction scale are 44 at the 25th percentile and 57 at the 75th percentile. The mean score for burnout scale is 50 ($SD 10$; alpha scale reliability .75). For the burnout scale the cut scores are 43 at the 25th percentile and 56 at the 75th percentile. The average score for STS scale is 50 ($SD 10$; alpha scale reliability .81). Also, the cut scores for the STS scale are at 42 for the 25th percentile and 56 for the 75th percentile (Stamm, 2010).

To score the ProQoL by SPSS, the three steps followed were recoding, converting raw score to Z score, and converting Z score to a t -score (see Appendix F). Each participant's scores were interpreted to identify their levels of compassion satisfaction, STS, and burnout. The risk profile of participants was measured by combining scales scores as suggested by Stamm (2010). Therefore, each participant was categorised in one of the following categories:

High CS, moderate to low burnout and STS

High burnout, moderate to low CS and STS

High STS with low burnout and low CS

High STS and high CS with low burnout

High STS and high burnout with low CS (Stamm, 2010).

According to Stamm (2010), individuals who are included in each category have different specific characteristics. For example, the *High CS, moderate to low burnout and STS* category represents a person with positive reinforcement from his or her job. The person does not have significant concerns about being efficient in work individually or in their organisation. The *High burnout, moderate to low CS and STS* category represents a person who is at risk. He or she has a feeling of inefficacy and a belief that nothing can be done to change things for better. *High STS with low burnout and low CS* category indicates a person overwhelmed by negative work experience and who is suffering from fear. *High STS and high CS with low burnout* category represents an individual who works in high risk situations, such as war or civil violence. Such a person is very effective and believes work matters; however, he or she thinks the work is extremely fearful due to working with others in the high risk situations. *High STS and high burnout with low CS* category represents a most distressed person who feels overwhelmed, useless and frightened by the work environment.

Depression, Anxiety and Stress (DASS21) Scale

The DASS21 was used to measure participants' mood symptoms (depression, anxiety, stress) over the previous week (Lovibond & Lovibond, 2004). A 4-point Likert scale was used to measure depression, anxiety, and stress subscales (0 did not apply to me at all to 3 applied to me very much/most of the time) (Appendix G). The alpha values, in the normative sample ($n = 717$), for Depression is .91; Anxiety .84 and Stress .90 in the 14-item scales. The normative sample mean score of Depression is 6.55 for male and 6.14 for female. It is 4.60 for male, and 4.80 for female in the Anxiety scale. Also, the normative sample mean score of Stress is 7.66 for male and 8.16 for female (Lovibond & Lovibond, 2002). DASS21's reliability and validity have been tested and internal consistency and construct validity have been supported in a number of studies (Mahmoud, Hall, & Staten, 2010; Sinclair et al., 2012).

DASS21 is a brief scale of DASS42 and represents all subscales. When scoring DASS 21, it is recommended to multiply by 2 the total for each scale. In this way it is possible to compare those scores to the scores from the full DASS scales

(Lovibond & Lovibond, 2002). For the present study, a scoring template was used to sum the scores related to this scale. For each of the three scales the scores for the 21 identified items were summed, the totals of each scale were multiplied by 2 and recorded (Lovibond & Lovibond, 2002).

Spielberg State-Trait Anxiety Inventory Trait Scale (STAI)

The STAI was used to measure participants' trait anxiety level (Spielberger, 2010). The STAI is a 4-point item Likert scale (1 almost never to 4 almost always) (see Appendix H). It contains two subscales of State-Anxiety (S-Anxiety) and Trait-Anxiety (T-Anxiety), and 40 items. Each subscale includes 20 items. A score of 4 shows the presence of a high level of anxiety for ten S-Anxiety items and eleven T-Anxiety items. A high score shows the absence of anxiety for the remaining ten S-Anxiety items and nine T-Anxiety items.

The mean score of the scale among working adults for S-Anxiety and T-Anxiety are 35.72 and 34.89 respectively (Spielberger, 2010). The test-retest coefficients ranged from 0.31 to 0.86. Also, most items were selected from other anxiety scales and over 10,000 people were tested throughout the test development of this tool (Julian, 2011). The scoring was weighted by reversing the respondent's mark. That is, if a respondent's mark was 1, 2, 3, 4 it was marked 4, 3, 2, 1 respectively. The scoring weights for the S-Anxiety and T-Anxiety scales were reversed for the anxiety absent (see Appendix I).

Connor-Davidson Resilience (CD-RISC) Scale

The CD-RISC was used for the measurement of participants' resilience (Connor & Davidson, 2003b). This is the most widely used measure of resilience for adults and is used with broad population samples such as adult community members, primary care outpatients, psychiatric outpatients, and participants in clinical trials (Connor & Davidson, 2003b). It is a 5-point item Likert scale (1 not at all true to 5 nearly always true) with a higher score meaning more resilience (Ahern, Kiehl, Sole, & Byers, 2006). A number of studies have tested and supported the reliability and validity of CD-RISC (Ahern et al., 2006; Connor & Davidson, 2003b) and Wang et

al. (2010) obtained a test-retest reliability correlation coefficient of .90 (Connor & Davidson, 2003b). The mean score for this scale was reported to be 80.4 ($SD = 12.8$), which can vary across populations and be affected by age. The total of scores for all 25 items was summed for each participant to obtain a resilience level for each individual. Thus, the range is between 0 to 100, and higher scores means higher resilience (Connor & Davidson, 2003b) (see Appendix J).

Planned data analyses

Quantitative data

Data from the structured measures was analysed to address hypothesised differences between nurse shift and non-shift workers on resilience, professional quality of life, depression, anxiety and stress. The data from the quantitative component was entered into the Statistical Package for Social Sciences (SPSS), and analysed using Generalised Linear Mixed Model and Bivariate Correlations dependent on the nature of the variables.

Open-ended responses

The online survey also included two open-ended questions. Participants were asked two questions about their perceptions of the future of nursing as well as ideas for strategies that the QNMU could put into place to improve nursing work. Open-ended questions can be utilised to prompt free thought, seek creative recommendations, and explore more detail about the topic (Taylor-Powell & Marshall, 1996). The two questions were:

1. What concerns you the most about the future of the nursing and midwifery profession?
2. What areas should the QNMU focus on to address these concerns?

The research question that was developed for this study was:

R1: Do nurses who work shifts have different concerns regarding the future of nursing compared to nurses who do not work shifts?

The responses to the two open-ended questions collected from nurses were analysed for content. The rationale for selecting the research question was to explore if shift work is a concern for nurses, and also the result could assist to contextualise the quantitative outcomes by exploring if there are any differences between shift and non-shift workers in their perception of their profession. More detail is provided in chapter 5. The emerging themes from analysing the two open-ended questions were compared to understand any similarities and differences between these two groups with regard to shift work. Although open-ended questions are normally easy to ask, the answers are not simple to analyse. Since responses are varied, they need to be categorised and summarised (Taylor-Powell & Marshall, 1996). The open ended responses were analysed with conventional content analysis methods (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). Content analysis is a common flexible method for analysing data (Cavanagh, 1997), the goal being to analyse the characteristics of content by investigating who says what, to whom, and with what effect (Bloor & Wood, 2006). It enables a researcher to choose a specific type of content analysis approach according to interest and problem being studied (Hsieh & Shannon, 2005). Conventional content analysis assists the researcher to describe a phenomenon when existing theory or research literature is limited, because the researcher is immersed in data to allow novel insights to emerge (Elo & Kyngäs, 2008; Kondracki, Wellman, & Amundson, 2002; Vaismoradi, Turunen, & Bondas, 2013).

There is no rule for using content analysis; however, the main feature is classifying words of the text into smaller content categories (Elo & Kyngäs, 2008). The analysis is started by selecting a word or theme or sentence related to what is to be analysed, examples being, shift work, fatigue, resilience, stress, anxiety, satisfaction, mood, depression, burnout, work/life balance, environment, etc. In the next step, the transcript is read several times to make sense of the data and understand the themes clearly. Then, open coding begins by writing notes and headings, and listing the different types of information found. The headings are categorised in a way that describes what they are about. Following that, the list of categories are linked as minor and major categories or themes, and then compared to

each other and examined in detail to consider relevance. A review of all categories ensures the information was categorised as it should be and to ensure all information has been collected from the data (Elo & Kyngäs, 2008). Chapter 5 will provide more detail about analysis of the open-ended question responses.

Chapter Summary

This chapter has demonstrated the utilisation of a quantitative approach to the research study exploring resilience of nurses working shift work in Australia. Also, it described an overview of the study's procedure including background to the data collection. The next chapter presents the outcomes of the quantitative component.

CHAPTER 4

RESILIENCE IN NURSES WORKING SHIFT IN AUSTRALIA- QUANTITATIVE RESULTS

Chapter Preamble

The previous chapter described the design, sample, data collection and data analysis related to this study. This chapter reports the results of the quantitative component of the project investigating resilience and the impact of shift work on psychological functioning of nurses in Australia.

Quantitative Data Analysis

As described in the literature review in chapter 2, existing studies have been mostly correlational and have also not measured resilience directly among nurse shift workers and non-shift workers. Studies that directly compare nurses who work shifts with those who do not are therefore required, especially as the findings in the existing literature are mixed. Given the association between resilience, compassion fatigue, depression, anxiety and stress, and the limitations of previous studies, the investigation of the effect of shift work on these relationships among nurses is warranted. Therefore, to investigate whether nurses who work shifts have different well-being and professional quality of life outcomes compared to those who work regular shifts, the following six hypotheses were tested:

H1: There will be a significant positive relationship between resilience and compassion satisfaction, and a significant negative relationship between resilience and compassion fatigue, depression, anxiety, stress among nurses who work shifts.

H2: Nurses working shifts will have significantly higher scores on compassion fatigue (secondary traumatic stress and burnout) compared to nurses who are not working shifts.

H3: Nurses working shifts will have significantly higher scores on depression, anxiety and stress compared to nurses who are not working shifts.

H4: Nurses working shifts will have significantly lower scores on compassion satisfaction compared to nurses who are not working shifts.

H5: Nurses working shifts will have significantly lower scores on the resilience measure compared to nurses who are not working shifts.

H6: Nurses working shifts will report that they will remain in the profession for significantly fewer years compared to nurses who are not working shifts.

Comprehensive information regarding the measures utilised and the ethical approval process of this study have been explained in chapter 3. The following results are discussed in light of extant literature.

The author tested the data for normality and found that normality was violated among highlighted variables (see appendices K, and L). Thus, non-parametric analyses such as bivariate correlation (Spearman rho) analysis (Acock, 2012; Allen, Bennett, & Heritage, 2014) and Generalised Linear Mixed Module were utilised. Appendix K contains histograms and boxplots of age, length of experience, anxiety, depression, stress, CS, burnout, resilience, and TNA among shift workers and non-shift workers. A scatterplot of variables is shown in Appendix L. Figure 4.1 and 4.2 shows the different sectors nurses worked as well as types of shift worked in the last four weeks.

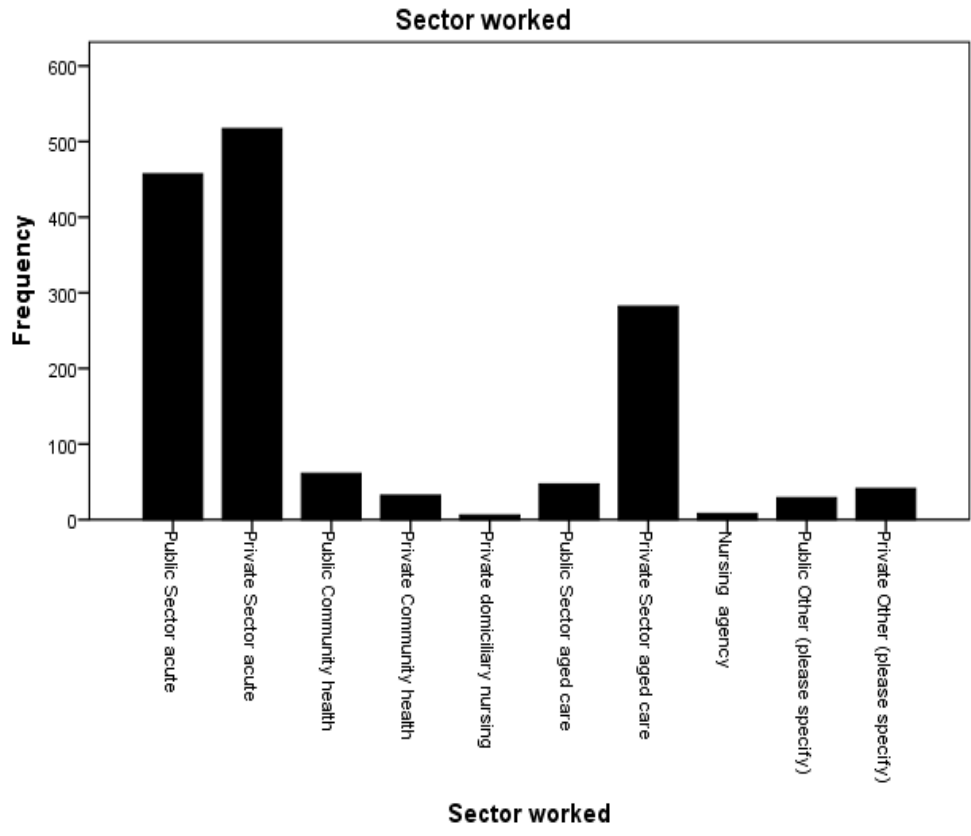


Figure 4.1. Sector nurses worked



Figure 4.2. Types of shift nurses worked in the last four weeks

Characteristics of the Participant Group

The data were analysed to compare resilience scores as well as scores on other psychological outcome measures between nurse shift workers and non-shift workers. Two datasets were generated: one each for nurse shift workers and nurse non-shift workers. The data were also sorted by the sector (public, private and aged care) in which nurses were working. The discussion of the data analysis represents the complementary nature of quantitative and qualitative results (Tashakkori & Teddlie, 2010).

Participants' demographics

The two groups of shift workers and non-shift workers differed in terms of age, experience, sector worked, and gender (see Table 4.1). The cohort of nurse shift workers was younger and had less years of experience than non-shift workers. Almost two-thirds of the nurse shift workers worked part-time (65.4%), one third worked full time (31.8%). The remainder worked temporary full time (0.5%) and temporary part-time (2.3%). The percentage of nurse non-shift workers who worked full time (50%) was almost similar to those who worked part-time (46.4%). The

remainder worked temporary full time (2.2%), and temporary part-time (1.4%). Casual workers ($n = 121$) were excluded from all analyses because of their low levels of representation. The majority of nurses had Australian citizenship (87.8%). Almost 59.2% of shift workers and 68.1% of non-shift workers had dependant persons, mainly children.

Table 4.1

Comparison between Shift workers and Non-shift workers in terms of Age, Years of experience, Sector worked, Shifts, and Gender.

Outcome variable	Shift workers ($n = 1046$)	Non-shift workers ($n = 449$)
Age (M [SD])	46.81 (11.50)	50 (9.99)
Experience (M [SD])	19.44 (13.44)	25.30 (12.67)
Sector		
Public sector acute (%)	33.10	25.70
Private sector acute (%)	38.80	26.00
Public community health (%)	1.10	11.30
Private community health (%)	1.20	4.50
Private domiciliary nursing (%)	0.30	0.70
Public sector age care (%)	2.60	4.50
Private sector aged care (%)	17.90	21.70
Nursing agency (%)	0.80	0.00
Other (%)	4.2	5.60
Shifts		
Three shifts (am, pm, night) (%)	47.39	0.0
Day (6 a.m. to 6 p.m.) (%)	0.00	97.84
Evening shift only (%)	7.10	0.0
Night shift only (%)	7.10	0.0
Morning and evening shift (%)	31.00	0.0
Evening and night shift (%)	2.51	0.0
Other (%)	4.90	2.16
Gender		
Female (%)	91	94
Male (%)	9	6

Correlations between DASS, CDRISC and PROQOL5 Subscales among Shift workers

Hypothesis 1 was tested by using bivariate correlation (Spearman rho) analysis (Acock, 2012; Allen et al., 2014). Table 4.2 shows the correlations between Resilience (CDRISC), depression, anxiety and stress (DASS), compassion satisfaction, STS and burnout (PROQOL5) among shift workers. The medium to large, significant correlations found between resilience, depression, anxiety, stress, compassion satisfaction, STS and burnout supported hypothesis one. As predicted, significant negative correlations were observed between resilience, STS, burnout and depression, anxiety and stress. Conversely, as predicted, a large, significant positive relationship was observed between resilience and CS.

Table 4.2

Bivariate correlations (Pearson) between DASS, CDRISC and ProQoL subscales.

Variable	DASS Stress	DASS Anxiety	DASS Depression	PROQOL5 CS	PROQOL5 STS	PROQOL5 BO	CD-RISC Resilience
DASS Stress		.69**	.73**	-.29**	.54**	.56**	-.40**
DASS Anxiety			.61**	-.27**	.49**	.47**	-.37**
DASS Depression				-.39**	.49**	.61**	-.49**
PROQOL5 CS					-.23**	-.69**	.61**
PROQOL5 STS						.55**	-.34**
PROQOL5 BO							-.60**

** Correlation is significant at .01 levels (2-tailed). $r = .10$ to $.29$ small; $r = .30$ to $.49$ medium; $r = .50$ to 1.00 large correlation (Cohen, 1988), $n = 958$

Between Groups Comparisons

Hypotheses 2–3 were tested within the context of a Shift (yes, no) x Full-time (full-time, part-time) x Gender (male, female) design. Rather than control for full-time and gender, they were included as factors in the analysis in order to test whether they moderated the impact of working shifts on the outcome measures.

Eight Generalised Linear Mixed Models (GLMMs) were developed, one for each of the dependent variables (burnout, compassion satisfaction, secondary traumatic stress, stress, anxiety, depression, resilience, and the number of years the

nurses intended to remain in the profession). The GLMMs were implemented through SPSS's (Version 22) GENLIMMIXED procedure. The GLMM represents a special class of regression model. The GLMM is 'generalised' in the sense that it can accommodate outcome variables with markedly non-normal distributions; the GLMM is 'mixed' in the sense that it includes both random and fixed effects. For the present GLMMs, there was one nominal random effect (participant), three nominal fixed effects (shift, full-time, gender), three 2-way interactions (Gender x Shift, Gender x Full-Time, Shift x Full-Time), and one 3-way interaction (Shift x Full-Time x Gender). Covariates were entered as additional fixed effects. Potential covariates were negative affect, age, experience in nursing, and sector. The effective sample size for the GLMMs was 1,369.

GLMM Analyses

Identifying potentially confounding covariates

There were no significant differences among the eight groups (shift/not-shift x full-time/part-time x men/women) in terms of trait negative affect (as measured by the STAI). There were, however, significant between-group differences in terms of age, experience, and sector. These factors were included as control variables in the GLMM only if they correlated significantly with the dependent variable.

Shift work and burnout

Age and experience were significantly correlated with burnout and were therefore entered as covariates in the burnout GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.40, p = .527$), as were the 2-way Gender x Shift ($F [1, 1336] = 1.15, p = .284$), Gender x Full-Time ($F [1, 1336] = 0.32, p = .571$), and Shift x Full-Time ($F [1, 1336] = 0.81, p = .368$) interactions. In addition, there were no significant main effects for shift ($F [1, 1336] = 0.54, p = .464$), full-time ($F [1, 1336] = 1.61, p = .464$), or gender ($F [1, 1336] = 2.15, p = .143$).

Shift work and secondary traumatic stress (STS)

Age and experience were significantly correlated with STS and were therefore entered as covariates in the STS GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.10, p = .748$), as were the 2-way Gender x Shift ($F [1, 1336] = 0.34, p = .557$), Gender x Full-Time ($F [1, 1336] = 0.20, p = .657$), and Shift x Full-Time ($F [1, 1336] = 0.18, p = .676$) interactions. In addition, there were no significant main effects for shift ($F [1, 1336] = 0.30, p = .582$), full-time ($F [1, 1336] = 0.23, p = .634$), or gender ($F [1, 1336] = 0.17, p = .683$).

Shift work and Compassion satisfaction (CS)

Age, experience, and sector were significantly correlated with CS and were therefore entered as covariates in the CS GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1333] = 0.70, p = .792$), as were the 2-way Gender x Full-Time ($F [1, 1333] = 0.21, p = .647$) and Shift x Full-Time ($F [1, 1333] = 0.02, p = .647$) interactions. The Gender x Shift interaction, however, was significant ($F [1, 1333] = 6.55, p = .011$). The interaction is plotted in Figure 4.3

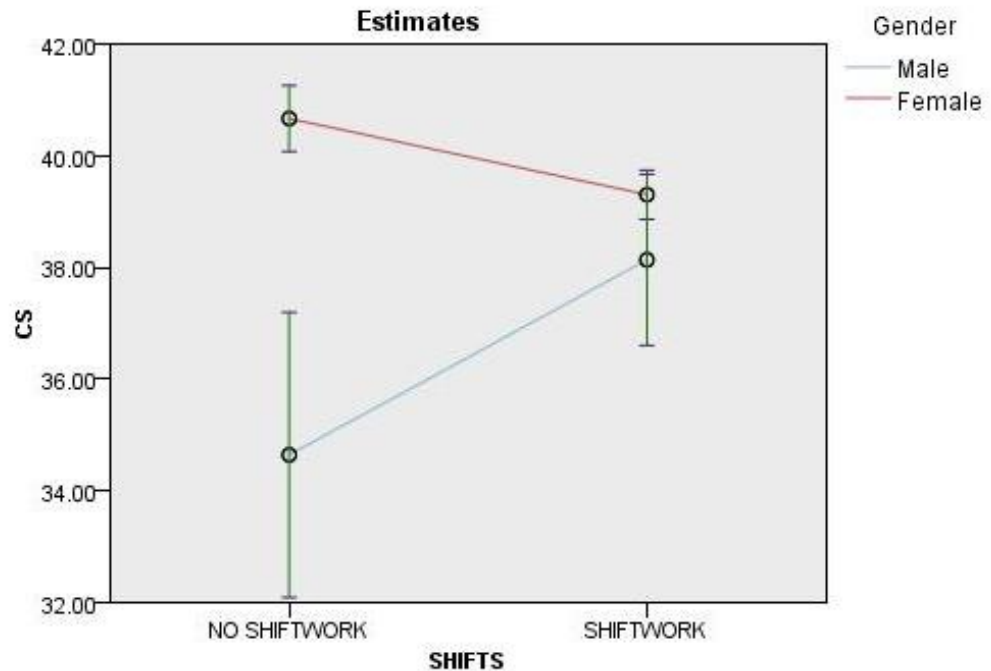


Figure 4.3. Interaction between shift work and compassion satisfaction among nurse shift workers and non-shift workers.

The simple main effects of shift work were tested separately for men and women. Women shift workers reported significantly less CS than women non-shift workers ($F [1, 1333] = 6.33, p = .012$), whereas men shift workers reported significantly more CS than men non-shift workers ($F [1, 1333] = 4.27, p = .039$). There were no significant main effects for shift ($F [1, 1333] = 2.19, p = .139$) or full-time ($F [1, 1333] = 0.02, p = .896$). There was a significant main effect for gender ($F [1, 1333] = 14.03, p < .001$) indicating that women reported significantly more CS than men, regardless of whether they worked shifts.

Shift work and depression

Age and experience were significantly correlated with depression and were therefore entered as covariates in the depression GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.43, p = .514$), as were the 2-way Gender x Shift ($F [1, 1336] = 1.05, p = .307$), Gender x Full-Time ($F [1, 1336] = 0.17, p = .684$), and Shift x Full-Time ($F [1, 1336] = 0.06, p = .810$)

interactions. In addition, there were no significant main effects for shift ($F [1, 1336] = 0.22, p = .641$), full-time ($F [1, 1336] = 0.77, p = .381$), or gender ($F [1, 1336] = 0.40, p = .530$).

Shift work and anxiety

Age and experience were significantly correlated with anxiety and were therefore entered as covariates in the anxiety GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.25, p = .618$), as were the 2-way Gender x Shift ($F [1, 1336] = 0.33, p = .567$), Gender x Full-Time ($F [1, 1336] = 0.79, p = .373$), and Shift x Full-Time ($F [1, 1336] = 1.96, p = .162$) interactions. In addition, there were no significant main effects for shift ($F [1, 1336] = 0.06, p = .813$), full-time ($F [1, 1336] = 0.41, p = .520$), or gender ($F [1, 1336] = 0.00, p = .950$).

Shift work and stress

Age and experience were significantly correlated with stress and were therefore entered as covariates in the stress GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.39, p = .531$), as were the 2-way Gender x Shift ($F [1, 1336] = 0.50, p = .482$), Gender x Full-Time ($F [1, 1336] = 0.13, p = .719$), and Shift x Full-Time ($F [1, 1336] = 0.18, p = .668$) interactions. In addition, there were no significant main effects for shift ($F [1, 1336] = 0.25, p = .621$), full-time ($F [1, 1336] = 0.43, p = .512$), or gender ($F [1, 1336] = 0.01, p = .925$).

Shift work and resilience

Age and experience were significantly correlated with resilience and were therefore entered as covariates in the resilience GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1336] = 0.21, p = .648$), as were the 2-way Gender x Shift ($F [1, 1336] = 3.04, p = .081$), Gender x Full-Time ($F [1, 1336] = 0.35, p = .552$), and Shift x Full-Time ($F [1, 1336] = 0.37, p = .546$) interactions. In addition, there were no significant main effects for shift ($F [1, 1336]$

= 1.22, $p = .269$), full-time ($F [1, 1336] = 0.40, p = .525$), or gender ($F [1, 1336] = 2.38, p = .123$).

Shift work and years nurses intended to remain in profession (YIP)

Age, experience, and sector were significantly correlated with YIP and were therefore entered as covariates in the YIP GLMM. The 3-way Shift x Full-Time x Gender interaction was non-significant ($F [1, 1311] = 0.61, p = .436$), as were the 2-way Gender x Shift ($F [1, 1311] = 1.37, p = .243$), Gender x Full-Time ($F [1, 1311] = 0.98, p = .324$), and Shift x Full-Time ($F [1, 1311] = 0.58, p = .449$) interactions. In addition, there were no significant main effects for shift ($F [1, 1311] = 1.03, p = .3111$) or gender ($F [1, 1311] = 2.24, p = .134$). There was, however, a significant main effect for full-time ($F [1, 1311] = 4.17, p = .041$) indicating that the part-timers intended to remain in nursing for significantly fewer years than the full-timers.

CF and CS profile analysis

To complete the GLMM analysis, raw scores were converted to t -scores as suggested by the ProQoL5 Manual (Stamm, 2010) to determine the risk profile of the participants. A chi-square test (X^2) of ProQoL5 among shift workers and non-shift workers was conducted. The contingency table for the analysis is presented in Table 4.3. Violation of the minimal cells for chi-square was addressed by removing high STS and CS and low burnout category as it only included $n = 4$ shift workers. As 527 shift workers and 231 non-shift workers were not included in any of the standardised categories by ProQoL5, they were excluded from this analysis. The chi-square test revealed a significant ($p = .04$) difference between shift workers and non-shift workers. The test detected that 32.55% of shift workers showed high levels of burnout and moderate to low CS and STS scores, indicating a feeling of inefficacy, in contrast to 25.41% of non-shift workers from the same category. Additionally, 20.61% of shift workers showed high STS, burnout, and low CS compared to only 16.76% of non-shift workers. Approximately 57.84% of non-shift workers had positive reinforcement from work profile that involved high CS and moderate to low burnout and STS symptoms, while only 46.84% of shift workers had the same

profile, which was statistically significant. Following this observation, a z-test was calculated to obtain a pairwise comparison between the two groups of shift and non-shift workers from each profile group. The z-test showed that shift and non-shift workers had a significant difference in the high CS and moderate to low burnout and STS group. This indicated that more non-shift workers had positive reinforcement from work profile than their shift worker counterparts.

Table 4.3

ProQoL and CS Profile Percentages for Shift workers, Non-shift workers, n = 612.

Profile	Non-shift work	Shift work	z-test
High CS and Moderate to Low BO and STS (Positive reinforcement from risk profile)	57.74%* n = 107	46.84% n = 200	z-value: 2.5** p-value:0.01**
High BO and Moderate to Low CS and STS (At risk profile)	25.41% n = 47	32.55%* n = 139	z-value:1.7 p-value:0.08
High STS and BO and Low CS (Very distressed profile)	16.76% n = 31	20.61%* n = 88	z-value:1.2 p-value:0.24
Total	185	427	

* Difference is significant at chi-square exact sig. (2-sided) (p=.04).

** Difference is significant at z-test (2-tailed) p≥.05

Comparison of study sample and standard deviations with Western Australian nurses' mean and Crawford et al., normative sample means

Further investigation was undertaken to compare the current study sample means of DASS21 subscales with normative data presented in the DASS manual. Table 4.4 shows the result of one sample t-test comparing current sample means with normative means of the DASS21 manual. DASS 21 stress, anxiety and depression scales were fairly similar to normative data presented in the DASS manual (Lovibond & Lovibond, 2002). Table 4.4 also compares the current samples' means for the ProQoL5 and the DASS 21 with normative means of Western Australian nurses (Hegney et al., 2014) as well as the Australian general adult population

(Crawford, Cayley, Lovibond, Wilson, & Hartley, 2011). As can be seen, the mean of ProQoL5 subscales are almost similar for both the current sample and the Western Australian nurses, while the means of the DASS 21 subscales for both the current sample and the Western Australian nurses are higher than the general adult sample of Crawford et al. (2011).

Table 4.4

A Comparison of Current Study Sample and Standard deviations (SD) with Western Australian nurses' mean (Hegney et al., 2014) and (Crawford et al. 2011) Normative Sample Means.

Subscale	West Australian nurses' mean(SD) ¹	Current sample Mean (SD) ²		Crawford et al. ³ Mean (SD)	One sample t-test sig. ⁴
		Shift workers	Non-shift workers		
CS	35.66 (7.60)	39.17 (6.68)	40.29 (6.15)		
Burnout	23.66 (5.91)	22.38(5.91)	21.91 (6.29)		
STS	18.60 (5.71)	20.20 (5.91)	20.06 (6.01)		
Stress	4.80 (3.76)	8.95 (7.75)	8.49 (8.13)	3.99 (4.24)	.29
Anxiety	2.17 (2.79)	4.54 (6.41)	3.49 (5.57)	1.74 (2.78)	.20
Depression	2.88 (3.83)	5.54 (7.81)	4.86 (7.19)	2.57 (3.86)	.26

1-Hegney et al. (2014), $n = 132$; 2-Current sample, $n = 1369$; 3-Crawford et al. (2011) adult sample, 4-comparing current sample means with normative means of DASS21 manual $p \geq .05$; $n = 497$

Discussion

The aim of this study was to investigate the impact of shift work on the resilience and related psychological adjustment of Australian nurses. This is the first Australian study to compare nurse shift workers and non-shift workers directly, using a specific measure of resilience and also measuring other indicators of psychological functioning. The sample was broadly representative of Australian nurse professionals in terms of age, gender, and sector worked, as the nursing workforce in Australia is ageing with 42.7% of the nursing workforce aged 50 years and over (Australian Institute of Health and Welfare, 2011-2015). After statistically equating the shift and

non-shift working nurses in terms of covariates, only one of the outcome measures showed a significant difference between groups: shift workers had significantly less compassion satisfaction. There were no significant differences between shift and non-shift workers on any of the other outcomes. Given the large sample size, these null effects cannot be attributed to low power and should therefore be of interest to researchers and stakeholders in this area.

Relationship between resilience, compassion satisfaction, compassion fatigue, depression, anxiety, and stress

The first hypothesis of this study was supported with significant medium to large correlations observed between found between resilience, depression, anxiety, stress, compassion satisfaction, STS and burnout. As predicted, significant negative correlations were observed between resilience, STS, burnout and depression, anxiety and stress. Conversely, as predicted, a large, significant positive relationship was observed between resilience and CS. This result confirms previous studies (Hegney et al., 2014).

Shift work and nurses' burnout and STS

In the present study, there were no significant differences in STS and burnout among nurse shift workers compared to non-shift workers, contrary to what was expected in hypothesis 2. This finding is consistent with a study by Jamal and Baba (1997) who found no significant differences in burnout among nurses working in different shifts (Jamal & Baba, 1997). However, the current findings are in contrast to other studies that have found differences in levels of burnout between shift and non-shift workers (Shahriari et al., 2014; Wisetborisut et al., 2014). Each of these three studies used the Maslach Burnout Inventory Scale. It is noted that Shahriari et al. and Wisetborisut et al. did not compare shift workers with non-shift workers, which may explain the outcome discrepancy with the present study.

Shift work and nurses' depression, anxiety, stress

Contrary to hypothesis 3, there was no difference in depression, anxiety and stress between nurses who worked shifts and those who did not, although the entire

sample had higher levels of depression, anxiety, and stress compared to another sample of Western Australian nurses (Hegney et al., 2014), and the general adult Australian population (Crawford et al., 2011). This suggests that while there were no differences on this measure between the shift and non-shift workers in this study, the entire group was reporting relatively high levels of depression, anxiety and stress. This could be due to a political issue at the time the data was collected. In 2013, the government of Queensland proposed legislation to cut the penalty rates for working shifts (Queensland Nurses' Union, 2013). This uncertainty may have negatively influenced the entire sample that reported high levels of depression, anxiety, and stress.

The lack of support for hypothesis 3 is consistent with studies of Hoffman and Scott (2003); Ruggiero (2005), and Berthelsen et al. (2015). Hoffman and Scott (2003) found similar levels of stress among those who worked 8-hour and 12-hour shifts, after statistically controlling for nurses' experience. In 2005, Ruggiero acknowledged no difference between types of shifts and depression, and 10 years later, Berthelsen reported no association between night shifts and rotating shifts with increased "caseness" of anxiety or depression. However, the result of current study is not supported by Hea Young, Mi Sun, Oksoo, Il-Hyun, and Han-Kyoul (2015) who concluded shift work increased the development of severe depression among female nurse. Similarly, Ardekani, Kakooei, Ayattollahi, Choobineh, and Seraji (2008) reported nurses on fixed day shifts had higher levels of anxiety than those on rotating shifts.

Shift work and nurses' compassion satisfaction

The present study is the first to investigate the impact of shift work on compassion satisfaction. As it was predicted in hypothesis 4, this study found significantly lower levels of compassion satisfaction among nurse shift workers, specifically female nurses, compared to their non-shift worker counterparts. The correlation analysis also revealed compassion satisfaction was significantly positively related to resilience among nurse shift workers. This explains why a nurse shift worker who is less satisfied could be less resilient. There is a need for more

investigation to understand how the cohort of female dominated nurse shift workers cope with their social life as well as work and family commitments, while they are dealing with higher levels of stress, depression and anxiety compared to other Australian nurse professionals.

Shift work and nurses' resilience

In the present study, resilience was found not to be affected by shift work, contrary to what was expected in hypothesis 5. The relationship between resilience and highlighted psychological outcomes has not been directly studied among nurse shift workers; only a few studies investigated associations between the variables (Flo et al., 2012; Natvik et al., 2011; Saksvik-Lehouillier et al., 2013; Saksvik-Lehouillier et al., 2012; Samaha et al., 2007; Storemark et al., 2013). The present findings run counter to the few studies undertaken in the last 21 years. In 2011, Natvik et al. conducted a quantitative investigation and concluded that hardiness was associated with depression and anxiety among rotating shift workers. In 2012, Sakvik et al. conducted a longitudinal study and reported hardiness correlated significantly negatively with depression and anxiety at Time 2 (one year after the first data collection). In 2013, the same authors reported hardiness was positively associated with shift work tolerance among newly graduated nurses and employed nurses who worked shifts (Saksvik-Lehouillier et al., 2013). In the same year, Clendon and Walker (2013) found nurse shift workers used coping strategies to deal with different aspects of working shifts on their life. However, they did not directly measure resilience in their mixed methods approach.

Shift work and nurses' intention to leave

This study did not find that shift work has significant effect on nurses' intention to remain in the nursing profession, contrary to hypothesis 6; however, nurses working part-time were significantly likely to remain in nursing for fewer years than full-time workers. This finding is inconsistent with those of Estryn-Béhar and Beatrice (2012) who found nurses from 10 European countries who worked part time ($n = 25,924$) had less work/family conflict, less tiredness and lower levels of

burnout compared to nurses that worked alternating shifts, 10-hour night shifts, 12-hour night shifts, and 10-hour and 12-hour day shifts. In a mixed methods study, Clendon and Walker (2013) reported that nurses working part time coped better with shift work than nurses working full-time. This implies a need for more studies to clearly understand factors impacting psychological functioning and resilience of nurses working shifts.

Strengths and Limitations

The large sample size and related statistical power, the use of validated scales and sophisticated analytic techniques, are strengths of this study. Also, this study is one of the few to have gone beyond the testing of associations between variables among shift workers to specifically investigate between-groups (shift versus non-shifts) differences in psychological outcomes. However, the cross sectional design of this study does not allow a clear interpretation of causation, and the self-report nature limits the interpretation of the outcomes, with memory and response biases possibly impacting data (Barton et al., 1995a). The sample might not be representative of Australian nurses as a result of low response (20%) to the QNMU survey. Further, it was not possible to investigate the effect of the outcome variables on nurses working different amounts of shift work as the study survey did not ask respondents to provide this level of detail. Although this study controlled for potential confounders such as age, experience, and sector nurses worked in GLMM analyses. There are other variables that could also influence resilience and the extent to which shift work affects psychological functioning of nurses in Australia. For example, the work performance of a nurse with higher level of anxiety could be different from a nurse with lower levels of anxiety. A similar pattern could be evident for nurses who have different levels of depression, stress, compassion fatigue, and compassion satisfaction. Consequently, the relationship between these variables could have impacted on responses of the sample to the study questions. Second, demographic variables such as relationship status and having dependents may have affected both number of shift nurses worked as well as the measured variables. For instance, work preference, experience and perception of a nurse who is single and working in a day

shift could be different from a nurse who is in a relationship and responsible for family/domestic duties, as well as working in rotating shifts. Nurses' response to the study questions could have been different depending on the work/life environment, and work setting nurses worked. Therefore, studies needed to compare similar groups of nurses from different settings to clearly understand factors are affecting their resilience.

Recommendations for Future Studies

Future studies should include longitudinal designs to better understand the cause-effect relationships of those variables with resilience and other highlighted psychological states in nurse shift workers compared to non-shift workers. Future research should consider mixed methods approaches to not only investigate the impact of shift work statistically, but also its subjective influence on nurses' lives and wellbeing. This approach would allow researchers to better understand the impact of shift work from the perspective of individuals' experiences and to explore how nurses cope with the demands of their profession. It would also provide a holistic approach to the topic. Further, it is for future studies to investigate the specific patterns of highlighted symptoms from the ProQoL risk profiles to assist a clear understanding of the topic of interest. Such studies can inform policymakers and stakeholders to better manage the risk profile of their shift workers, which may lead to improving shift worker psychological functioning and resilience and consequently retention within the workforce. This also may alleviate some of the economic burden associated with the shortage of nurses and improve poor quality patient care linked to the negative impacts of working shifts (Hea Young et al., 2015).

Conclusion

This is the first Australian study that has directly measured resilience among nurse shift and non-shift workers. This study showed that nurse shift workers from a variety of health sectors in Queensland, Australia reported significantly lower levels

of compassion satisfaction compared to their non-shift worker counterparts. After controlling for covariates, the results do not support the commonly-held belief that shift work affects psychological states of nurses, such as compassion fatigue (STS, burnout), depression, anxiety, stress and resilience. Furthermore, while part-time workers were more likely to report an intention to leave the profession than their full-time counterparts, there was no difference in intention to leave between nurses who worked shifts and those who did not work shifts. Despite increasing international concern about attracting and retaining the nursing workforce, shift work does not seem to be a key issue among nurses. This led the present researcher to conduct an analysis of the two open-ended questions at the end of survey to explore nurse shift workers' concerns of their profession. The results are presented and discussed in the next chapter.

Chapter Summary

This chapter has described the quantitative component of this research project regarding resilience, compassion satisfaction, compassion fatigue, depression, anxiety, and stress in nurses working shifts in Australia. It explained the analysis and results of the quantitative component, and discussed the findings and compared them with the previous relevant literature. Further, this chapter described the strengths and limitations of the present study and provided suggestions for future research. The next chapter presents the results related to the analyses of the responses to the two open-ended questions at the end of survey.

CHAPTER 5

THE IMPACT OF SHIFT WORK ON NURSES: VIEWS FROM THE FIELD

Chapter Preamble

This chapter presents the findings of the content analysis of data collected from two open-ended questions at the end of the original survey which was conducted among employed nurses' who were members of the QNMU in 2013. Analysis of the data for this study compared nurse shift and non-shift workers' concerns regarding nursing profession.

Aim

The aim of the content analysis of the open-ended questions was to compare and contrast the concerns of nurse shift and non-shift workers regarding their profession (considering specific keywords, such as resilience, shift work, fatigue, stress, anxiety, satisfaction, mood, morale, depression, burnout, work/life balance, and environment) and reach a triangulation.

Data Collection

The original survey, which was conducted among nurses who were members of QNMU in 2013, included two open-ended questions at the end. Participants had the opportunity (unlimited word counts space) to express their concerns about the future of the nursing and midwifery profession and to provide strategies for the QNMU to address those concerns. The research question of this research component was selected to be purposefully broad in order to gauge nurses' concerns about the nursing profession as a whole rather than to prime them specifically about shift work. Although the two open-ended questions were not specifically designed to answer the author's research question, it was considered worthwhile to analyse the comments. Given that a large proportion of those who completed the survey also completed the open-ended questions, comments from participants were analysed with the intention

of supporting and extending the quantitative findings. Analysis of qualitative data not only can assist to explore and understand human experiences, by interpreting phenomena in regard to the meaning people bring to them, but also it may raise issues that researcher had not considered in the research design, adding to the quality of results achieved (Bowling, 2009; Greenhalgh & Taylor, 1997). Therefore, as it was possible and valuable to deeply understand and compare the nurse shift and non-shift workers' perceptions about their work, and their concerns and suggested strategies about the future of nursing.

Open-ended Questions

The two open-ended questions at the end of the survey were:

- What concerns you the most about the future of the nursing and midwifery profession?
- What areas should the QNMU focus on to address these concerns?

The research question explored in this study was:

- Do nurses who work shifts have different concerns regarding the future of nursing compared to nurses who do not work shifts (considering specific keywords, such as resilience, shift work, fatigue, stress, anxiety, satisfaction, mood, morale, depression, burnout, work/life balance, and environment)?

Participant Demographics

The 1,495 participant nurses included 1,046 shift workers (male = 91, female = 954), and 449 non-shift workers (male = 25, female = 423). The participants' age ranged from 19 to 72 years. The mean age of nurses was 47 ($SD = 11$). Participants worked in a variety of health sectors including private and public aged care, private and public acute sector, private and public community health, private domiciliary nursing, and nursing agency. Shift worker nurses worked different shift patterns such as three shifts (am, pm, nights), only evening shifts, only night shifts, morning and

evening shifts, and evening and night shifts. As the data revealed, their work experience ranged between 0–55 years (mean = 21.20). See Table 4.1 which displays a comparison between shift workers and non-shift workers in terms of age, experience, sector worked, shifts and gender.

Data Analysis

A content analysis was undertaken of the transcripts in order to generate a rich description of participants' experience (Cavanagh, 1997; Elo & Kyngäs, 2008; Hill, Thompson, & Williams, 1997; Kondracki et al., 2002; Vaismoradi et al., 2013). Transcripts were divided into two groups: shift workers and non-shift workers. The author read a copy of the transcripts several times to understand the content related to each group. Then the statements that corresponded to specific keywords, such as resilience, shift work, fatigue, stress, anxiety, satisfaction, mood, morale, depression, burnout, work/life balance, and environment were identified. The meaningful units or words were then manually coded. For example, the statement: 'My future professional development as an aged care RN' was coded as 'career progression'. This process yielded 51 codes.

Following this initial process, the codes were manually categorised into themes and subthemes according to their contextual relation or link with each other. For instance, the code 'dissatisfaction' and all related keywords such as 'career progression', which had a link to the 'dissatisfaction' code, were categorised as subthemes under the main theme 'dissatisfaction'. Finally, the themes and subthemes were interpreted to gain a comprehensive understanding or re-contextualization of the topic. Appendix M shows the manual coding process of extracts from both nurse shift workers and non-shift workers.

Two main themes were extracted from the overall data. These were Dissatisfaction and Stress. Each theme also included several subthemes. These subthemes were then compared between the nurse shift workers and their non-shift worker counterparts in terms of the proportion of the sample whose responses reflected each subtheme. Following the suggestions by Hill et al. (1997), a subtheme

was described as *general* if it applied to 70–100% of each group, *typical* if it applied to 50–70% of each group, *variant* if it applied to 20–50%, and *absent* if the theme was absent from the group.

Content Analysis Results

Table 5.1 shows the emergent themes and subthemes from nurse shift workers and non-shift workers. The respondents are differentiated by codes that were generated by SPSS. The themes and their subthemes are now discussed by: shift-workers only; non-shift workers; both shift and non-shift workers.

Table 5.1

Emergent themes and Subthemes from Nurse Shift workers and Non-shift workers.

Themes and subthemes	Shift workers	Non-shift workers
Theme 1- Dissatisfaction		
Subtheme 1- Paper work	Variant	< General
Subtheme 2- Job cut	Variant	= Variant
Subtheme 3- Lack of respect	Variant	= Variant
Subtheme 4- Lack of support from managers/government	Typical	> Variant
Subtheme 5- Inadequate skill mix	General	= General
Subtheme 6- Privatisation of healthcare system	Variant	= Variant
Subtheme 7- Lack of job opportunities	Typical	> Variant
Subtheme 8- RN/EN ratio	Typical	> Variant
Subtheme 9- Career progression	Variant	= Variant
Subtheme 10- Lack of family friendly rostering	General	> Absent
Subtheme 11- Over worked	Typical	> Variant
Subtheme 12- Fatigue due to working shifts	General	> Absent
Subtheme 13- Low income	Typical	= Typical
Subtheme 14- Coping with inadequate patient /staff ratio	General	= General
Subtheme 15- High workload	General	= General
Subtheme 16- Lack of job for new graduates	Variant	< Typical
Theme 2- Stress		
Subtheme 1- Mandatory rostering	General	> Absent
Subtheme 2- Lack of family friendly shifts	General	> Absent
Subtheme 3- Inadequate nurse/patient ratio	General	= General
Subtheme 4- Unsupportive management/government	Typical	> Variant
Subtheme 5- High workload	General	= General
Subtheme 6- Inadequate skill mix	General	= General

* A subtheme was identified as general if it applied to 70-100% of each group, typical if it applied to 50-70% of each group, variant if it applied to 20-50%, absent if the themes was absent from the group. Differences in terms of the proportion of each subtheme between shift and non-shift workers are shown in bold.

Theme 1: Dissatisfaction

Nurse shift workers frequently identified factors such as **lack of family friendly rostering** (subtheme 10) and **fatigue due to working shifts** (subtheme 12) as negatively influencing their satisfaction. These are revealed in the following extracts:

Nurses not looked after by management, no family friendly rosters, too high patient ratios, not enough staff, burnout. (*Shift worker, 468*)

The expectation of management that if you work in a 24/7 workplace that you need to be available to work 24/7. This is not family friendly! You have to feel like you need to beg to have a particular day off to attend to family life. That is an inconvenience to management to agree to allow a regular day off. I am happy to be flexible, to miss the occasional gym class for work. To have to fill in forms that then needs to be approved by management just to go to the gym! It feels demeaning. (*Shift worker, 279*)

I feel shift work has aged me physically beyond my years, yet I like what I do but don't want others to be forced to work hours they would prefer not to. Why is it we have staff who like me are ok working late or early shift and staff who like late and nights forced to work all three shifts. I feel the people who make such demands on our bodies should get out of the office and try working the rosters for a few weeks and see how they would like it.... (*Shift worker, 523*)

I cannot work efficiently as I am getting older with all the change in shift work. I tire more easily and it takes me many days to recover from late shifts and night shifts, feeling fatigue at times, and dislike working all weekend. (*Shift worker, 450*)

Less time with our family. (*Shift worker, 61*)

Lack of flexibility in rostering. (*Shift worker, 66*)

Lobby local members and ask them to work for 1 month alongside a shift working nurse as a buddy and see if they can hack the change in times. We experience each week and every year, we continue to be on our feet at the bed side. They do not have to do the work but they have to shadow the nurse at all times except where patient privacy may be compromised. Do not think they would last a week! (*Shift worker, 822*)

A lot of new graduates are not prepared for shift work and make it quite clear that they won't be doing this in the next 5 years. (*Shift worker, 759*)

Shift workers, more so than non-shift workers, were dissatisfied regarding **lack of job opportunities** (subtheme 7), **RN/EN ratio** (subtheme 8), and being **overworked** (subtheme 11). These subthemes are exemplified in the following extracts:

...job shortages for nurses. (*Shift worker, 23*)

The ratio of RN to EN. Especially in the private sector it is becoming unsafe as they do not have the same training as an RN and don't understand a lot of elements to patient care. (*Shift worker, 68*)

Mainly we are all so overworked and tired. (*Shift worker, 63*)

Most days working well beyond their rostered hours without a break. (*Shift worker, 915*)

Nurse shift workers frequently requested shifts to assist them to achieve a balanced work/life. The following extracts are examples:

Pay attention to work/life balance and support nurses who are trying to achieve this. Campaign for better shift conditions.... (*Shift worker, 179*)

Job security, life/work balance. Shift work not getting time off to recover. (*Shift worker, 708*)

They also suggested that self-rostering to select their suitable shifts become a law. The following extracts demonstrate these concerns:

Nurses having less say regarding industry setting e.g. shift time and shift flexibility. (*Shift worker, 47*)

Rostering staff should have equal treatment to all staff. (*Shift worker, 756*)

Self-rostering as a law, no forced night duty. (*Shift worker, 264*)

Roster and the freedom of nurses to self-roster/work set shifts. (*Shift worker, 911*)

Rostering is appalling and the worst practice. Also, flexibility of roster-12 hours especially high stress areas-shift choice options. (*Shift worker, 874*)

Paper work (subtheme 1), and **lack of job opportunities for new graduates** (subtheme 16) seemed to be a dissatisfying factor mainly for non-shift workers rather than shift workers. The following extracts provide examples of these subthemes:

Increasing paper workload diminishing patient contact.
(*Non-shift worker, 1066*)

Supporting staff to reduce the amount of repetitive paperwork currently required. (*Non-shift worker, 1082*)

No positions for nurses who have just completed training.
(*Non-shift worker, 1117*)

One nurse, a former shift worker, stated that new nurses realise they can have easier jobs with easier conditions and a higher income in other occupations compared to nursing:

Changing nursing work environment cultures from toxic to positive. Making nursing more appealing to stay in long term. The ageing work force is a huge concern and I know that young people these days have far more options than the older nurses had. I know myself; I can now find jobs that pay me the same wage, if not more, to not have the

stresses of clinical nursing and shift work. There is no way I would go back to hospital nursing now. The sad thing is I enjoy the actual 'nursing' and looking after people and being busy. I just can't see how it is an appealing career long term. A lot of older nurses I know are burnt out, overweight, divorced and unhappy. I know that a lot of middle-aged people are like this, but it seems very common in nursing. In all of the nursing workplaces I've been in, the large majority of nurses were over 40/50 and the minority was in their 20s/30s. (*Non-shift worker, 1055*)

Approximately half of both shift and non-shift workers were dissatisfied about their **career progression** (subtheme 9), **privatisation of the health care system** (subtheme 6), **receiving respect** (subtheme 3), and **job cuts** (subtheme 2). The following extracts represent examples of these subthemes:

Aged care: it has a poor image and although I enjoy my job I am often embarrassed to say I work in this area as the public image aged care nursing receives is extremely poor... Government funding is appalling for this industry as are the poor rates of pay. We do not feel supported, appreciated and valued. We instead hear criticism. Lack and or no consultation with staff about rostering. (*Shift worker, 710*)

The fact that we are not paid enough for the difficult and challenging work that we do. We have no financial gain from staying in nursing and not really much career development. Nursing is at times very rewarding, however, unfortunately for myself, I have found clinical nursing (ward nursing/post-op/anaesthetic nursing) stressful and

now, although having good clinical skills, have no interest in returning to clinical nursing because I now have a job that is a lot less stressful and pays the same wage, with no shift work. I will definitely not stay in nursing forever. It doesn't pay well and there are far easier less stressful jobs out there that pay the same wage if not more with FAR better working conditions. I know that a lot of other young nurses feel the same as me. I don't regret trying nursing as it has taught me a lot about human nature and life, but it's a frustrating, difficult job and I would prefer to be happy in my life, and that means, not nursing. (*Non-shift worker, 1055*)

...I am concerned that job cuts mean there are fewer of us on the ground and people's lives are put at risk daily because we cannot provide the care they need... (*Non-shift worker, 170*)

Both groups of shift and non-shift workers stated career dissatisfaction was a result of **high workload** (subtheme 15), **inadequate skill mix** (subtheme 5) and **coping with inadequate patient/staff ratio** (subtheme 14) as well as **low income** (subtheme 13). These are revealed in the following extracts:

I will not stay in the nursing profession if I feel that every time I work I am struggling to meet basic patient care, purely because staffing is insufficient. (*Shift worker, 84*)

Increasing inadequate skill mixes (hiring large numbers of inexperienced or graduate nurses with great shortage of experienced nurses within critical care area), decreased number of nurses on per shift and subsequent rapid raise in

burnout nurses and decreased patient care and safety. (*Shift worker, 36*)

Wage not adequate for the demands of jobs and the shift work. (*Shift worker, 2*)

Poor pay compared to other professional jobs. (*Non-shift worker, 1116*)

Fight the system minimum staffing policy, which is ridiculous and budget cuts to staff, when desperately needed for life threatening emergencies in rural areas. (*Non-shift worker, 1282*)

Both groups of nurses also were concerned about unsafe practice due to **inadequate patient/staff ratio** (subtheme 14) and **high workload** (subtheme 15). These subthemes are exemplified in the following extracts:

Nurse to patient ratio that is safe where patients receive appropriate assessment/attention. Number of appropriate RNs with minimal number of years' experience per shift to ENs or graduate nurses. (*Shift worker, 477*)

Lack of staffing, extra workload, patient safety. (*Non-shift worker, 1063*)

Theme 2: Stress

Nurses who worked shifts were concerned that **mandatory rostering** (subtheme 1) and **lack of family friendly shifts** (subtheme 2) can lead to burnout in nurses, whereas nurses who did not work shifts did not mention either concern.

Get us more staff, allow us to choose our roster and who we work with, we have a lot of sick leave now and that adds stress to our already understaffed unit. (*Shift worker, 787*)

Being treated like a number instead of a human being with feelings. We as nurses have a responsibility to our clients as patient advocate. At the moment we are told what shifts to work with who and when. We seem to have lost our right to choose our shifts and day we work and as shift workers this makes our life very hard to add to the stress of being under staffed. (*Shift worker, 787*)

They also frequently acknowledged that nursing is a stressful profession and stated that concerns about mental health and anxiety of nurses should be a priority for employers and government to address. They requested an increase in the number of staff on each shift and to have a right to select their roster. The following extract demonstrates this concern:

Make mental health and anxiety of staff a prime concern, understand how the workload and workplace stressors including the feeling back biting and unsupportive management impact on daily life and family life. We do not take our jobs home; we take the stress associated with doing our jobs home. (*Shift worker, 543*)

Unsupportive managers/government (subtheme 4) was mainly a concern among shift workers rather than non-shift workers, which could be due to the political issues at the time of data collection when the Queensland government proposed legislation to cut penalty rates for working shifts (Queensland Nurses' Union, 2013). The following extract is an example:

The lack of staff and lack of understanding by government of the stress, family and health problems nurses experience due to the rigors of shift work. (*Shift worker, 822*)

Many shift workers highlighted how nurses not only have to cope with the current shortage of qualified nurses, but also with **mandatory rostering** (subtheme 1), **lack of family friendly shifts** (subtheme 2), and **inadequate nurse/patient ratios** (subtheme 3). They stated that mandatory rostering and the lack of family friendly shifts add to the stress caused by **high workload** (subtheme 5) and **inadequate skill mix** (imbalances of nursing staff with low and high levels of skills and experience) (subtheme 6) that nurses are facing due to the shortage of nurses. The following extracts provide examples of these subthemes:

Lack of family friendly shift work; i.e. employer not taking into account childcare arrangements and stating we must be available for all shifts every day, which leads to stress at home and uncertainty. Employer making difficult for families requiring childcare and lack of regard to the impact this has on families as a whole. (*Shift worker, 148*)

The loss of experienced RNs and increased EN and AIN positions are placing an increased burden on RNs. For example I can be the only RN on a shift and be expected to make clinical assessments on clients that I do not even have a handover for. I have been told what to do by many ENs on a shift, and have had to be very assertive to ensure safe practice. This makes working even more stressful as I feel I have all the responsibility with little or no support. (*Shift worker, 640*)

Because of the staffing levels, nurses are being rostered night duty near to 50 percent or 50 percent of their total shifts. This is causing increased stress, anxiety, unhappiness, and exhaustion amongst the nursing team. (*Shift worker, 199*)

The staff will experience increased workloads to maintain current care standards leading to stress and burnout in nursing staff. Stop the focus on documentation to gain funding and let us get back to nursing our clients. (*Shift worker, 1112*)

Similar to shift workers, non-shift workers expressed concerns regarding coping with **inadequate nurse/patient ratio** (subtheme 3), **high workload** (subtheme 5) and **inadequate skill mix** (subtheme 6) in their everyday work environment. The following extracts demonstrate these subthemes:

Increasing workload vs budget and staffing levels. (*Non-shift worker, 1223*)

Lack of skills and experienced nurses as people leave the workforce in droves. Lack of multi-skilled nurses and the extra workload...adds stress on us. (*Non-shift worker, 1102*)

Discussion

This section of project compared the concerns of nurse shift and non-shift workers regarding their profession. While there was some consistency between nurse shift workers and non-shift workers on the issues of most concern, there were also important differences. Nurse shift workers in this study stated that a lack of family friendly shifts, mandatory rostering, as well as inadequate nurse/patient ratio, and

lack of support from employers/government, were the central issues impacting their work and general wellbeing. Working according to a mandatory roster and not having family friendly shifts was reported to be adding to the general stress that all nurses are experiencing as a result of high workload and poor skill mix due to a shortage of nurses. This is consistent with the literature, which argues Australian nurse shift workers, specifically night workers, have to manage, intervene, and care for patients (Smith, Fisher, & Mercer, 2011) while working with fewer staff (Campbell, Nilsson, & Pilhammar Andersson, 2008), reduced managerial involvement (Nilsson, Campbell, & Andersson, 2008) and heavy workloads (Lim, Bogossian, & Ahern, 2010; McVicar, 2003).

Previous evidence suggest that the female dominated nurse shift workers not only have to cope with the physical adverse effects of working shifts, such as hormone and circadian disruption (Fekedulegn et al., 2013), but also limited social life, elevated levels of anxiety, work/family conflict, low levels of wellbeing, and poor mental health (Clendon & Walker, 2013; Estryn-Béhar & Beatrice, 2012; Lin et al., 2012). Hegney and colleagues suggested that Australian nurse professionals are coping with higher levels of anxiety (Hegney et al., 2014) compared to the Australian general adult population (Crawford et al., 2011). Experiencing high levels of stress has been found to correlate with burnout among nurses (Hegney et al., 2014). This is of concern given that burnout is a known factor associated with employee attrition in the nursing workforce (Hegney et al., 2006; Klopper et al., 2012; Mealer et al., 2012).

The nurse shift workers also highlighted their dissatisfaction with the lack of family friendly rostering, and being over worked and fatigued due to working shifts. Nursing is a female dominated profession, and the literature reports that nurses may be responsible for family commitments and childbearing (Howard, Hordacre, Moretti, & Spoehr, 2013). This can make it challenging for them to create a balance between their domestic commitments and allocated shifts. On the other hand, it is impossible to eliminate shift work from nursing as it is a 24-hour a day role. These competing demands can make nurses feel dissatisfied as they stated in this study.

Further, the consistent reports of dissatisfaction in this sample of nurses is concerning, because low job satisfaction is associated with low levels of resilience and high rates of burnout (Hegney et al., 2014; Klopper et al., 2012) as we found earlier in this study. It has been suggested that nurses who are limited by psychological states such as stress may not be able to provide effective care to their patients (Baumann et al., 2002; Mealer et al., 2012). A lack of ability to provide an effective level of patient care can lead to decreased job satisfaction, which can lead to a lack of retention within the nursing workforce (Hegney et al., 2006; Klopper et al., 2012; Mealer et al., 2012). Studies suggest if nurses are not able to provide safe nursing practice (Jackson et al., 2007; Mealer et al., 2012), they may be less resilient and consequently leave their profession (Camerino et al., 2010).

The majority of the nurse shift workers in this study requested flexible rostering to reduce social isolation and work/family conflict associated with working shifts, as well as childcare accessibility. They also suggested a need to increase managerial support and attention to shift workers' needs according to the work environment in which they are employed. They frequently emphasised the low rate of salary as one of the important factors linked to low job satisfaction. Nursing is a low paid career compared to other occupations that do not require shift work (Wolf, 2001). Participants also predicted that novice nurses will not remain in the profession, as they can find a well-paid career with regular working hours outside of nursing.

Importantly, all of the nurses in this study, regardless of shift work status, reported shared concerns about the future of the profession. These included concerns about privatisation of the health care system, job cuts, lack of respect and inadequate skill mix. They were also concerned about coping with inadequate patient/staff ratios and high workloads due to a shortage of nurses. It should be a priority for government and employers to address nurses' stated concerns about their current conditions in order to attract and retain nurse professionals.

Strengths and Limitations

The large sample size and the fact that participants were widely representative of Australian nurse professionals in terms of age, gender, and sector worked improve the transferability and generalisability of the results (Beck, 1993). Although the researcher was not blind to the respondents' status as shift or non-shift workers during the analysis, the potential for this issue to distort the findings was mitigated by conducting the research in a team and reviewing the findings with peers (Patton, 1999). This led the research team to accurately assess the data and confirm the credibility and auditability of the analytic processes (Beck, 1993; Sandelowski, 1993). Many of the themes from the content analysis were similar among all nurses, regardless of shift work status, which confirmed the quantitative results of this study in that there were fewer differences between shift and non-shift working nurses than might be expected. This triangulation of findings from different data sources can indicate the confirmability and robustness of the results (Sandelowski, 1993). Further, it should be considered that 60% of the participants worked part-time which can be a confounding factor for the outcomes; however, according to the Australian Bureau of Statistics (2013b) more nurses work part-time than full-time. Research suggests that working part-time is one of the mechanisms that shift workers use to cope with the influence of working shifts, since they can choose the shifts that suits their lifestyle (Clendon & Walker, 2013).

The investigation had several limitations. First, although the structure of the questions allowed a large amount of information to be gathered, the responses might have been different if they were asked specifically about shift work, resilience and using other key words of interest rather than being general. Conversely, the use of the open-ended questions could also be regarded as a strength of the study because respondents were not influenced as to the issues they reported on. Second, more shift workers than non-shift workers were represented in the sample which may have biased the overall results but perhaps was less likely to have influenced potential differences between shift and non-shift working nurses. The online nature of the survey also could have led more dissatisfied nurses to answer the open-ended

questions than satisfied nurses (Furnham, 1986; Furnham & Henderson, 1982; Sax, Gilmartin, & Bryant, 2003). Third, the survey methodology precluded engagement in a member checking process (Creswell, 1994), which would have enabled the participants to confirm the fittingness of the interpretations. A potentially fruitful avenue for further research would be to conduct in-depth interviews with nurses who work shifts to further explore the challenges they face but also to gain insights as to the coping strategies they utilise in their work. Such studies are needed to explore how nurses from different work settings cope with the impact of shift work on their resilience, compassion satisfaction and psychological functioning.

Conclusion

This section of the research compared nurse shift workers and non-shift workers' perceptions and concerns about nursing profession. Non-shift workers' concerns were mostly similar to shift workers, which showed all nurses had the same general concerns regarding their profession. However, nurse shift workers highlighted dissatisfaction as a result of working shifts. This was also highlighted as adding to the general stress that all nurses cope with due to a shortage of nurses.

Chapter Summary

This chapter has described the analysis of the response to two open-ended questions, in particular highlighting comments that reflect nurses' concerns about their profession as a consequence of working shifts in Queensland, Australia. It has also explained, discussed and compared outcomes with the relevant literature and concluded with suggestions for the future research. The next chapter will discuss the outcomes of this research project in general.

CHAPTER 6

DISCUSSION AND CONCLUSION

Chapter Preamble

The current project was motivated by existing reports of the adverse impacts of shift work on nurses (Brooks & Swailes, 2002; Seki & Yamazaki, 2006; Winwood et al., 2006) and my own experience as a nurse shift worker. In the context of current and predicted nurse shortages and issues with retention, it was considered an important and worthwhile endeavour to investigate the impact of shift work on resilience, mental health and professional quality of life of nurses. To achieve this, a quantitative design was undertaken which included comparing shift and non-shift worker nurses on a number of psychological outcomes, and a content analysis of data comparing nurse shift and non-shift workers' concerns about their profession. This chapter presents a comprehensive discussion of the outcomes to better understand the impacts of shift work on nurses.

Summary of the investigation

The comprehensive literature review of 21 years of literature on the impacts of shift work on the psychological functioning and resilience of nurses had an unexpected result. Analysis of the included studies produced inconclusive results regarding the impact of shift work on the psychological functioning and resilience of nurses. There are two major possible explanations for the inconclusive outcomes. First, there may be no difference between nurse shift and non-shift workers' psychological status and resilience. Second, it is possible that shift work is associated with poor psychological functioning only for some nurses, and is dependent on contextual and individual factors.

The literature review pointed to the need for longitudinal and between-groups studies, with appropriate measurement tools, in order to determine the impact of shift work on the psychological functioning and resilience of nurses. The quantitative

component of this research project attempted to address the aforementioned methodological issues with previous studies, by conducting a between-groups comparison of shift versus non-shift worker nurses in Australia. A number of key psychological outcome measures were included in the study as well as a measure of resilience. This was well-powered to capture any true differences between nurses who work shifts and nurses who do not. However, in contrast to the study hypotheses, there were few differences between shift workers and non-shift workers on the variables of interest. Surprisingly, no differences were observed between the groups on resilience, compassion fatigue, depression, anxiety or stress. The only statistically significant difference was on the measure of compassion satisfaction with nurse shift workers, specifically female nurses, having significantly lower compassion satisfaction compared to their non-shift worker counterparts. Age, experience and sector nurses worked were positively correlated with years they would remain in the profession. Age and experience were also significantly positively linked to resilience. Compassion satisfaction refers to the pleasure one derives from helping others (Stamm, 2002), and translates to the delivery of safe, high quality care. On the other hand, low compassion satisfaction can lead to decreases in the quality and safety of patient care (Edéll-Gustafsson et al., 2002; Mealer et al., 2012). Although compassion satisfaction is not a measure of psychological distress, it is of importance because it suggests that nurse shift workers are deriving less satisfaction from their work than non-shift workers and may have clear ramifications for the quality of care they can provide.

Although the entire nurses in the sample showed higher levels of depression, anxiety, and stress when they were compared to the Western Australian nurses, this may not be generalised to all current Australian nurses. The high levels of depression, anxiety and stress among nurses in this study could be due to the political situation at the time of data collection which is almost 5 years ago. In 2013, the government of Queensland had introduced a legislation for cutting penalty rates of working shifts (Queensland Nurses' Union, 2013), which could have negatively impacted the entire sample's response.

In order to contextualise the findings further, a content analysis of the data was undertaken in order to compare and contrast nurse shift and non-shift workers' concerns about their profession. Interestingly, most of the themes from the content analysis were shared across all nurses, irrespective of shift work status which not only confirmed the quantitative results of this study but also the confirmability of the findings (Sandelowski, 1993). The consistent issues noted were around coping with inadequate patient/staff ratio, inadequate nurse/patient ratio, inadequate skill mix, high workloads, lack of career progression opportunities, lack of respect, and low income. However, there were findings about lack of family friendly rostering, and mandatory rostering which might explain the lack of compassion satisfaction among nurse non-shift workers.

Implication of the Findings

Without doubt, modern nursing requires skill, knowledge and experience to care for people with complex comorbidities. To overcome the shortage of qualified nurses and inadequate patient/staff ratio, fundamental nursing care is increasingly provided by untrained health care personnel such as nursing assistants (Crossan & Ferguson, 2005; Twigg, Duffield, Thompson, & Rapley, 2010). Although limited literature has evaluated task substitution of nurses by other health professionals (Crossan & Ferguson, 2005), the available evidence suggests it is an unsuccessful strategy, since it can have adverse effects on quality of care (Aiken et al., 2014; Buchan & Dal Poz, 2002; McKenna, 1995). Task substitution of nursing care by other health workforce personnel has been shown to lead to a low level of confidence and negative feeling among nurses (McKenna, 1995), as well as poor patient outcomes including high mortality, morbidity and medical incidents (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Duffield et al., 2011; Needleman et al., 2011; Rafferty et al., 2007; Twigg et al., 2010). Twigg et al. (2010) argues that task substitution of nurses by less qualified carers should be rejected, as it threatens patients' safety. For instance, a 2010 research study revealed that the use of Registered Nurses instead of less skilled staff in a surgical ward caused a reduction in poor outcomes and mortality by 3–12% and 16% respectively (Twigg et al., 2010).

Nurses in the current study had similar concerns regarding inadequate patient/staff ratio, inadequate nurse/patient ratio, substitution of RNs with ENs, AINs and PCWs and skill mix, suggesting the need for action to mandate RN to patient ratios which also takes into consideration the skill-mix of the staff and patient acuity.

The quantitative components of this study found nurse shift workers had significantly less compassion satisfaction compared to non-shift worker counterparts; however, contrary to our expectations they did not show higher levels of depression, anxiety, stress, compassion fatigue (burnout, STS), and resilience. Further in our investigation, the content analysis of data found that nurses in general, regardless of shifts worked, are concerned about high workloads, career progression, lack of respect, job cut and low income. Evidence suggests that nurses are likely to remain in positions that offer career progression, autonomy and a satisfying salary (Buchan, 2002; Seago, Ash, Spetz, Coffman, & Grumbach, 2001). Working extra hours is one of the prominent reasons that negatively affects the ability of an organisation to satisfy its employees (McNeese-Smith & Nazarey, 2001; Romig, 2001; Steinbrook 2002). Wolf (2001) also argues that not receiving enough respect from managers and physicians in combination with earning less salary in comparison to other experts are issues that can affect nurses' contentment and, consequently, their retention (Wolf, 2001).

Although there were many similar concerns raised by all nurses when analysing the transcript, there were some themes that distinguished the shift workers from the non-shift workers. Nurses working shifts expressed dissatisfaction with the lack of family friendly shifts and having to work according to an allocated roster. This finding was similar to the quantitative outcomes of this study that nurse shift workers had significantly less compassion satisfaction compared to non-shift worker counterparts. As nursing is a female dominated profession and consequently they may be responsible for family commitments which makes it challenging for them to create a work/life balance, while working according to allocated shifts (Howard et al., 2013). Despite these challenges, it is impossible to eliminate shift work from nursing as it is a 24-hour a day profession. The other factors that shift working nurses

reported as contributing to feeling dissatisfied, was the combination of being over worked and fatigued due to working shifts. The consistent reports of dissatisfaction in this large sample of participants is a concern as low job satisfaction is linked to low levels of resilience and high rates of burnout (Hegney et al., 2014; Klopper et al., 2012).

Nurse shift workers also highlighted that, for them, the issues with mandatory rostering and lack of family friendly shifts are experienced in addition to the general stressors that all nurses are experiencing (high workload and inadequate skill mix). Baumann et al. (2002) and Mealer et al. (2012) argue that nurses experiencing high levels of stress may be unable to provide effective care to their clients, which can lead to reduced job satisfaction and a lack of retention within the workforce (Hegney et al., 2006; Klopper et al., 2012; Mealer et al., 2012). Also, there is evidence that being unable to provide safe nursing practice is associated with lowered resilience and increased intention to leave the profession (Camerino et al., 2010), however, this was not the finding of this present study.

Recommendations for Policy and Practice

Addressing the shortage of nurses has been under the attention of the Australian government for some time now. Throughout the past decades the Australian federal and state governments have made many efforts to resolve the shortage of nurses, as have governments of other countries such as USA, United Kingdom, and Canada (Buchan & Dal Poz, 2002; Health Workforce Australia, 2014). The Australian federal government has focused on improving the retention and productivity of nurses by increasing clinical training funding, increasing support services to retain nurses working in rural and remote areas, and expanding the scope of practice of nurses working in emergency and other specific settings such as endoscopy (Health Workforce Australia, 2014). As per finding of the content analysis of the data, the large cohort of Australian nurses expressed general concerns regarding their profession regardless of shifts they worked. This indicates that in

spite of the aforementioned government's efforts, there is a need for more planned strategies to manage the conditions of nurses.

The average age of Australian nurses in 2015 was 44 years (Australian Institute of Health and Welfare, 2011-2015). There is wide acknowledgement that a high percentage of those nurses may retire and leave the profession in the next decade, which will exacerbate the existing shortage of nurses (Health Workforce Australia, 2014). Therefore, it is important that policymakers focus on retention of the workforce and make it a priority to address the concerns related to the resilience and wellbeing of nurses.

Important policy and practice recommendations can be made in light of the current research. There is evidence that workplaces could reduce nurses' stress by optimising flexibility of their employees' working hours (Chang, Hancock, Johnson, Daly, & Jackson, 2005; Howard et al., 2013). Exactly how to achieve this flexibility within a profession that requires a 24-hour service remains a considerable challenge. Self-rostering or offering shorter shifts to nurses may assist them to manage their work and create a suitable work/life balance, as was recommended by participants of this study in the content analysis of data. Although there are benefits of flexible working arrangements, such as an increased ability to manage family commitments, increased life satisfaction, increased social support, and increased staff retention, there are also unavoidable barriers, such as lack of access to flexible rostering, and lack of knowledge of its benefits regarding work/life balance (Australian Department of Health, 2014).

An important finding of this research was that shift workers had lower levels of compassion satisfaction compared to their non-shift worker counterparts. The provision of in-house stress-management/resilience training for all nurses is one potential way of assisting them to cope better with work stressors. There is evidence for the effectiveness of resilience-building interventions for nurses (Craigie et al., 2016; Slatyer, Craigie, Heritage, Davis, & Rees, 2017). A total of 91 nurses ($n = 65$ intervention group, $n = 26$ control group) who participated in a mindful self-care and resiliency intervention showed a reduction in levels of burnout and depressed mood

post-completion of the intervention course (Slatyer et al., 2017). The participants attended a one-day workshop followed by three-weekly mindfulness sessions. This finding indicates that it is possible to improve nurse resilience after brief skill building interventions. Slatyer et al. (2017) suggest that resilience-building training can assist new nurses to build and strengthen their ability to cope with occupational stressors, and mindfulness training at work can increase their job satisfaction (Cusack et al., 2016; Hülshager, Alberts, Feinholdt, & Lang, 2013). A focus on both building the resilience of nurses and improving the workplace environment is most likely to lead to increased retention of all nurses (Cusack et al., 2016). This is especially the case given that the current research found no difference in intention to leave between nurses who worked shifts and those who did not. Increasing the retention of all nurses is likely to alleviate the economic burden associated with shortage of nurses and improve the quality of patient care associated with higher rates of those negative psychological outcomes.

Both retention and recruitment of nurses need special consideration. Most importantly, retention requires considerable action to reduce the nursing shortage and keep current nurses satisfied in their workforce. Cowin and Jacobsson (2003) argue that strategies should be implemented to keep current nurses in their position, otherwise focusing only on recruitments of nurses would be similar to “pouring water into a leaking kettle” (p. 31). Williams et al. (2006) found that almost half of Registered Nurses in their study, who did not work, cited that they are interested in working part-time. They suggested that the majority of nurses like to work 10 AM to 2 PM which are the busiest hours in hospitals, while a small number of nurses prefer to work full-time (Williams et al., 2006). They suggested that authorities should allow full-time nurses to choose their shifts first, and part-time nurses cover the rest. If working hours become more favourable for nurses, they could manage their private life and, as a result, inactive nurses may resume working in their field. This would not only improve the quality of care but also patients’ safety. Solutions should also focus on how the health system can build resilience among current nurses to work effectively and provide a less stressful work environment. Some combination

of these solutions seems to be more efficient to manage the nurse professionals' condition and alleviate the shortage of nurse professionals in Australia.

Strengths and Limitations

This is the first study in Australia to approach the research hypotheses from several dimensions. The study has a number of strengths. First, a comprehensive review of the literature evaluated the previous knowledge about the topic of interest. Second, the survey methodology used a large sample size. Third, the impact of shift work for nurses was determined from analysing the quantitative data as well as using content analysis to explore the open-ended responses. The triangulation of multiple sources of data increases the trustworthiness and applicability of the findings (Greene, Caracelli, & Graham, 1989). Fourth, reliable and validated research instruments were used to collect the quantitative data. This not only ensured the construct validity of the results, but also the results' consistency if the research project was replicated under the same conditions (Cronbach & Meehl, 1955). Fifth, a sophisticated analytical method (GLMM) was used to analyse the quantitative data, which adds to the accuracy of the results. Finally, this study was the first to directly measure levels of resilience and compassion satisfaction among two groups of nurse shift and non-shift workers. This was needed in order to directly understand the impact of shift work on resilience and associated mental health and professional quality of life of nurses.

There are a few limitations to this research project. The cross sectional design of the study allowed the collection of a large sample size, but limited the extent to which causal relationships between variables could to be determined. Also, its self-report nature could limit the interpretation of the results, due to memory and response biases (Barton et al., 1995b). This refers to participants' tendency to respond a certain way, regardless of the actual evidence they are assessing (Austin, Deary, Gibson, McGregor, & Dent, 1998). For instance, some participants might have been biased towards providing positive answers regarding their personal experience; however, they might have had the experience of a particular situation

only once. The online nature of the survey could have led fewer satisfied nurses to answer the open-ended questions than dissatisfied nurses (Furnham, 1986; Furnham & Henderson, 1982; Sax et al., 2003). Further, the participants were members of the QNMU, a national survey could have been well-representative of Australian nurses.

At the time of data collection in 2013, the Queensland government was trying to legislate for cutting penalty rates of working shifts. This could be the reason that the entire sample showed high levels of depression, anxiety and stress. Both the low response to the QNMU survey and the mentioned political situation may not allow the sample to be representative of Australian nurses in general. If the survey was to be repeated the results may well be different, as the government has changed and nurses' conditions differ to 5 years ago. This indicates a low external validity. Further, the survey methodology precluded engagement in a member checking process of the interpretations of the open-ended response (Creswell, 1994), which would have maximised the credibility of the results. While the open-ended questions facilitated the collection of experiential responses from a large sample of nurses, the responses could have been different if they were questioned directly about shift work, resilience, and other highlighted psychological states.

There are a few other possible confounders to this research outcomes such as demographic status, relationship status and having children, which should be considered. Nurses' response to the survey questions would have been different depending on their life situation and work environment. For example, a nurse who is responsible for his/her dependent such as children or parents may have different experience of working as a shift or non-shift worker. However, as this study includes a significant number of nurses, it can minimise the effects of confounding factors on the outcomes. Mertens (2015) argues that having larger sample size leads to less variability and increases validity of the outcome. Also, the outcomes could have been different for nurses who work in different work settings, as they might experience different working environment and have different working hours. This is important for the future studies to compare nurses who work in the same work settings to minimise the effects of confounding factors to the validity of the results.

Recommendations for Future Research

In light of the strengths and limitations of the current evidence, a number of recommendations for future research can be made. The literature review of previous studies revealed that only five longitudinal studies investigated the topic of interest, and the remaining studies were cross sectional designs (Cheng, Liou, Tsai, & Chang, 2015; Saksvik-Lehouillier et al., 2013; Saksvik-Lehouillier et al., 2012; Saksvik-Lehouillier, Bjorvatn, Magerøy, & Pallesen, 2016; Storemark et al., 2013). This clearly highlights a need for more longitudinal studies to consider between-groups comparisons among nurse shift and non-shift workers. Further, the literature review revealed a need for utilising consistent measurement tools. Future studies should utilise more validated, consistent measurement tools that allow the comparison of studies' outcomes to provide a clear picture of the condition of nurse shift workers.

As this study did not compare nurse shift and non-shift workers from similar work environment, future studies need to compare nurse shift workers with non-shift workers who work in similar settings. This would allow a better understanding of the experience of all nurses from a variety of nursing environments. More studies are also needed among nurses working in different nursing contexts such as aged care, community, and rural and remote areas.

As this study also did not conduct an in-depth-interview of nurse shift workers, there is an opportunity for future research to utilise qualitative methods that include in-depth interviews of shift working nurses. They could explore the impact of shift work on nurses by utilising questions that directly ask about their experience of working shifts, related to how this would affect compassion satisfaction. Such studies could inform policymakers and stakeholders to better manage the risk profile of their shift workers.

Conclusion

This research project investigated the impact of shift work on resilience and associated psychological functioning and professional quality of life of Australian nurses. An integrative review of the literature revealed inconsistent findings as to the

psychological consequences of working shifts, with some studies finding an association between shift work and poorer psychological functioning while others found no differences. Similarly, in the quantitative study and contrary to predictions, no differences were found between shift and non-shift workers on the major psychological outcome measures (depression, anxiety, stress, compassion fatigue [burnout and secondary traumatic stress] and resilience). However, as hypothesised, compassion satisfaction was found to be significantly lower among nurse shift workers compared to non-shift workers. Also, female nurse shift workers had lower levels of compassion satisfaction than male shift worker counterparts, while age, experience and sector nurses worked were positively correlated with years they would remain in the profession. Age and experience also significantly positively linked to resilience. The analysis of two open-ended questions did reveal that nurse shift workers felt dissatisfied due to working shifts and that shift work was an additional stressor to the high levels of general stress that all nurses experience. Taken together, the results of this research suggest that government and employers must take into account the concerns of all nurses, not only those working shifts. Strategies to improve the resilience of all nurses should be encouraged, as well as implementing strategies that improve nurse shift workers' satisfaction. Attending to these issues is likely to help build nurses resilience, improve the quality of nursing care, and retain nurses within the workforce.

References

- Aburn, G., Gott, M., & Hoare, K. (2016). What is resilience? An Integrative Review of the empirical literature. *Journal of Advanced Nursing*, 72(5), 980-1000. doi:10.1111/jan.12888
- Acock, C. A. (2012). *A gentle introduction to stata*. Texas, Dallas: Stata Press.
- Ahern, N. R., Kiehl, E. M., Sole, M. L., & Byers, J. (2006). A review of instruments measuring resilience. *Issues in Comprehensive Pediatric Nursing*, 29(2), 103-125. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009210697&site=ehost-live>
- Agho, A. O., Price, J. L., & Mueller, C. W. (1992) Discriminant validity of measures of job satisfaction, positive affectivity and negative affectivity. *Journal of Occupational and Organizational Psychology* 65, 185–195.
- Ahasan R., Mohiuddin G. & Khaleque A. (2002) Psychosocial implications of shift work: a case study. *Work Study* 51, 116–120.
- Aiken, Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA*, 288(16), 1987-1993. doi:10.1001/jama.288.16.1987
- Aiken, Clarke, S. P., Sloane, D. M., Sochalski, J. A., Busse, R., Clarke, H., . . . Shamian, J. (2001). Nurses' reports on hospital care in five countries. *Health Affairs*, 20(3), 43-53.
- Aiken, Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., . . . Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *The Lancet*, 383(9931), 1824-1830. doi:10.1016/S0140-6736(13)62631-8
- Allen, P., Bennett, K., & Heritage, B. (2014). *SPSS statistics Version 22: A practical guide* (3rd ed.). Victoria, Australia.
- Allied Health Professions Australia. (2016). Allied health professions Australia is the national voice of allied health in Australia.

- American Association of Colleges of Nursing (2015). *Using strategic partnerships to expand nursing education programs-2002* [Online]. US. Retrieved from: <http://www.aacn.nche.edu/aacn-publications/issue-bulletin/using-strategic-partnerships> on 04 December 2015.
- Andersson E.P. (1999) Nursing education in the global community. From vocational training to academic education: The situation of the schools of nursing in Sweden. *Journal of Nursing Education* 38, 33–38.
- Andlauer P., Reinberg A., Fourrè L., Battle W. & Duverneuil G. (1978) Amplitude of the oral temperature circadian rhythm and the tolerance to shift-work. *Journal de Physiologie* 75, 507–512.
- Ardekani, Z. Z., Kakooei, H., Ayattollahi, S., Choobineh, A., & Seraji, G. N. (2008). Prevalence of mental disorders among shift work hospital nurses in Shiraz, Iran. *Pakistan Journal of Biological Sciences: PJBS*, 11(12), 1605-1609. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18819649>
- Arora, V., Dunphy, C., Chang, V. Y., Ahmad, F., Humphrey, H. J., & Meltzer, D. (2006). The Effects of On-Duty Napping on Intern Sleep Time and Fatigue. *Annals of Internal Medicine*, 144(11), 792-W189. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=21080114&site=ehost-live>
- Austin, E. J., Deary, I. J., Gibson, G. J., McGregor, M. J., & Dent, J. B. (1998). Individual response spread in self-report scales: Personality correlations and consequences. *Personality and Individual Differences*, 24(3), 421-438. doi:[http://dx.doi.org/10.1016/S0191-8869\(97\)00175-X](http://dx.doi.org/10.1016/S0191-8869(97)00175-X)
- Australian Bureau of Statistics. (2007). Paid Work: Nursing Workers. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/94713ad445ff1425ca25682000192af2/8a87ef112b5bcf8bca25703b0080ccd9!OpenDocument>
- Australian Bureau of Statistics. (2010a). 1.4 million Australian employees work shift work.
- Australian Bureau of Statistics. (2010b). Shift workers, . *Australian Labour Market Statistics, Oct 2010*

Australian Bureau of Statistics. (2013a). Australia's population projected to double by 2075

Retrieved from [http://www.abs.gov.au/ausstats/abs@.nsf/lookup/3222.0Media%20Release12012%20\(base\)%20to%202101](http://www.abs.gov.au/ausstats/abs@.nsf/lookup/3222.0Media%20Release12012%20(base)%20to%202101)

Australian Bureau of Statistics. (2013b). Australian Social Trends, April 2013. *Doctors and Nurses*. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features20April+2013#>

Australian Commonwealth Government. (2011). Fair Work Australia consolidated award. *Clerical and Administrative Employees in Permanent Building Societies (State) Award*. Retrieved from https://www.fwc.gov.au/documents/consolidated_awards/an/an120129/asframe.html

Australian Department of Health. (2014). *Guideline for flexible working arrangements*. Queensland: Queensland Government Retrieved from https://www.health.qld.gov.au/__data/assets/pdf_file/0022/164443/qh-gdl-242.pdf.

Australian Government, & The Department of Health. (2013a). Primary Health Care in Australia. Retrieved from <http://www.health.gov.au/internet/publications/publishing.nsf/Content/NPHC-Strategic-Framework~phc-australia>

Australian Government, & The Department of Health. (2013b). Systemic National Challenges in Health Care. Retrieved from <http://www.health.gov.au/internet/publications/publishing.nsf/Content/NPHC-Strategic-Framework~systemic>

Australian Institute of Health and Welfare. (2011-2015). Who are nurses and midwives? Age and sex. Retrieved from <http://www.aihw.gov.au/workforce/nursing-and-midwifery/who-are-they/>

- Australian Institute of Health and Welfare. (2013). Nursing and midwifery workforce 2011.
- Australian Institute of Health and Welfare. (2013-2014). Health expenditure Australia 2013–14. Retrieved from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129552833>
- Australian Institute of Health and Welfare. (2014a). Australia's health system 2010. Retrieved from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442452951>
- Australian Institute of Health and Welfare. (2014b). Health expenditure Australia 2011-2012. Retrieved from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129544656>
- Australian Nursing Federation. (2009). Ensuring quality, safety and positive patient outcomes. *Why investing in nursing makes sense*.
- Bae S.H. & Fabry D. (2014) Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. *Nursing Outlook* 62, 138–156.
- Barnes-Farrell, J. L., Davies-Schrills, K., McGonagle, A., Walsh, B., Milia, L. D., Fischer, F. M., . . . Tepas, D. (2008). What aspects of shiftwork influence off-shift well-being of healthcare workers? *Applied Ergonomics*, 39(5), 589-596. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2009928907&site=ehost-live>
- Barton P. (1995) Short hardiness scale. In: *Paper presented at the Annual Convention of the American Psychological Society* (Reed W., ed.), US Army Medical Research Unit-Germany, New York.
- Barton, Spelten, E., Totterdell, P., Smith, L., Folkard, S., & Costa, G. (1995a). The Standard Shiftwork Index: A battery of questionnaires for assessing shiftwork-related problems. *Work and Stress*, 9(1), 4-30 27p. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107385648&site=ehost-live>

- Barton, Spelten, E., Totterdell, P., Smith, L., Folkard, S., & Costa, G. (1995b). The Standard Shiftwork Index: A battery of questionnaires for assessing shiftwork-related problems. *Work and Stress*, 9(1), 4-30. doi:10.1080/02678379508251582
- Baumann, A., O'Brien-Pallas, L., Armstrong-Stassen, M., Blythe, J., Bourbonnais, R. e., Cameron, F., . . . Ryan, L. (2002). Commitment and Care: The Benefits of a Healthy Workplace for Nurses, their Patients and the System. *Ottawa: Canadian Health Services Research Foundation*.
- Beck A.T., Steer R.A. & Brown G.K. (1996) *Beck Depression Inventory-II*. The Psychological Corporation, San Antonio, TX. Bennett M. (1995) Nursing education in Australian universities: report of the national review of nurse education in the higher education sector 1994 and beyond. *Collegian* 2, 18–22.
- Beck, C. T. (1993). Qualitative Research: The Evaluation of Its Credibility, Fittingness, and Auditability. *Western Journal of Nursing Research*, 15(2), 263-266. doi:10.1177/019394599301500212
- Beddington, & Denham. (2013). *Mental capital and wellbeing: Making the most of ourselves in the 21st century*. Government Office for Science.
- Berthelsen, M., Pallesen, S., Mageroy, N., Tyssen, R., Bjorvatn, B., Moen, B. E., & Knardahl, S. (2015). Effects of Psychological and Social Factors in Shiftwork on Symptoms of Anxiety and Depression in Nurses: A 1-Year Follow-Up. *Journal of Occupational and Environmental Medicine*, 57(10), 1127-1137. doi:http://dx.doi.org/10.1097/JOM.0000000000000532
- Bjorvatn, B., Dale, S., Hogstad-Erikstein, R., Fiske, E., Pallesen, S., & Waage, S. (2012). Self-reported sleep and health among Norwegian hospital nurses in intensive care units. *Nursing in Critical Care*, 17(4), 180-188. doi:10.1111/j.1478-5153.2012.00504.x
- Bloor, M., & Wood, F. (2006). *Keywords in qualitative methods: A vocabulary of research concepts*. UK: Sage.
- Bohle, P. (1997). Research note: does 'hardiness' predict adaptation to shiftwork? *Work and Stress*, 11(4), 369-376. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=1998065005&site=ehost-live>

- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*(1), 20.
- Bowling, A. (2009). *Research methods in health: Investigating health and health services*: McGraw-Hill International.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513.
- Brooks, I., & Swales, S. (2002). Analysis of the relationship between nurse influences over flexible working and commitment to nursing. *Journal of Advanced Nursing, 38*(2), 117-126. doi:10.1046/j.1365-2648.2002.02155.x
- Buchan. (2002). Global nursing shortages: Are often a symptom of wider health system or societal ailments. *British Medical Journal, 324*(7340), 751-752. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1122695/>
- Buchan, & Dal Poz. (2002). Skill mix in the health care workforce: Reviewing the evidence. *Bulletin of the World Health Organization, 80*(7), 575-580.
- Camerino, D., Sandri, M., Sartori, S., Conway, P. M., Campanini, P., & Costa, G. (2010). Shiftwork, work-family conflict among Italian nurses, and prevention efficacy. *Chronobiology International, 27*(5), 1105-1123.
- Cameron, F., & Brownie, S. (2010). Enhancing resilience in registered aged care nurses. *Australasian Journal on Ageing, 29*(2), 66-71. doi:10.1111/j.1741-6612.2009.00416.x
- Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy, 44*(4), 585-599. doi:10.1016/j.brat.2005.05.001
- Campbell, A.-M., Nilsson, K., & Pilhammar Andersson, E. (2008). Night duty as an opportunity for learning. *Journal of Advanced Nursing, 62*(3), 346-353. doi:10.1111/j.1365-2648.2008.04604.x
- Cavanagh, S. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher, 4*(3), 5-16. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1997037432&site=ehost-live>

- Chang S.J., Koh S.B., Kang D., Kim S.A., Kang M.G., Lee C.G., Chung J.J., Cho J.J., Son M. & Chae C.H. (2005) Developing an occupational stress scale for Korean employees. *Korean Journal of Occupational and Environmental Medicine* 17, 297–317.
- Chang, E. M., Hancock, K. M., Johnson, A., Daly, J., & Jackson, D. (2005). Role stress in nurses: Review of related factors and strategies for moving forward. *Nursing & Health Sciences*, 7(1), 57-65.
- Charney, D. S. (2004). Psychobiological Mechanisms of Resilience and Vulnerability: Implications for Successful Adaptation to Extreme Stress. *The American Journal of Psychiatry*, 2(3), 368-391. doi:<http://dx.doi.org/10.1176/foc.2.3.368>
- Cheek, R., Shaver, J., & Lentz, M. (2004). Lifestyle practices and nocturnal sleep in midlife women with and without insomnia. *Biological Research for Nursing*, 6(1), 46-58. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=RE&auplast=Cheek&atitle=Lifestyle%20practices%20and%20nocturnal%20sleep%20in%20midlife%20women%20with%20and%20without%20insomnia&id=pmid%3A15186707
- Cheng, C. Y., Liou, S.-R., Tsai, H.-M., & Chang, C.-H. (2015). Job stress and job satisfaction among new graduate nurses during the first year of employment in Taiwan. *International Journal of Nursing Practice*, 21(4), 410-418. doi:10.1111/ijn.12281
- Choobineh, A., Rajaeefard, A., & Neghab, M. (2006). Problems related to shiftwork for health care workers at Shiraz University of Medical Sciences. *Eastern Mediterranean Health Journal*, 12(3-4), 340-346. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2009259551&site=ehost-live>

- Clendon, J., & Walker, L. (2013). Nurses aged over 50 years and their experiences of shift work. *Journal of Nursing Management*, 21(7), 903-913. doi:10.1111/jonm.12157
- Coffey, L. C., Skipper, J. K., Jr., & Jung, F. D. (1988). Nurses and shift work: Effects on job performance and job-related stress. *Journal of Advanced Nursing*, 13(2), 245-254. doi:10.1111/j.1365-2648.1988.tb01414.x
- Cohen J. (1960) A coefficient for agreement for nominal scales. *Education and Psychological Measurement* 20, 37–46.
- Colligan, T. W., & Higgins, E. M. (2006). Workplace stress: Etiology and consequences. *Journal of Workplace Behavioral Health*, 21(2), 89-97. doi:10.1300/J490v21n02_07
- Commonwealth of Australia. (2012). Information for Commonwealth supported students. ACT: Department of Education, Employment and Workplace Relations.
- Connor, & Davidson. (2003a). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18(2), 76-82. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=cmedm&AN=12964174&site=ehost-live>
- Connor, & Davidson. (2003b). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression & Anxiety (1091-4269)*, 18(2), 76. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=10803485&site=ehost-live>
- Cowin, L., & Jacobsson, D. (2003). The nursing shortage: Part way down the slippery slope. *Collegian*, 10(3), 31-35. doi:http://dx.doi.org/10.1016/S1322-7696(08)60064-5
- Craigie, M., Slatyer, S., Hegney, D., Osseiran-Moisson, R., Gentry, E., Davis, S., . . . Rees, C. (2016). A pilot evaluation of a mindful self-care and resiliency (MSCR) intervention for nurses. *Mindfulness*, 7(3), 764-774.

- Crawford, J., Cayley, C., Lovibond, P. F., Wilson, P. H., & Hartley, C. (2011). Percentile Norms and Accompanying Interval Estimates from an Australian General Adult Population Sample for Self-Report Mood Scales (BAI, BDI, CRSD, CES-D, DASS, DASS-21, STAI-X, STAI-Y, SRDS, and SRAS). *Australian Psychologist*, 46(1), 3-14. doi:10.1111/j.1742-9544.2010.00003.x
- Creswell, J. W. (1994). *Research design—qualitative, quantitative, and mixed method*: London: SAGE Publications.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281.
- Crossan, F., & Ferguson, D. (2005). Exploring nursing skill mix: A review. *Journal of Nursing Management*, 13(4), 356-362.
- Cusack, L., Smith, M., Hegney, D., Rees, C. S., Breen, L. J., Witt, R. R., . . . Cheung, K. (2016). Exploring environmental factors in nursing workplaces that promote psychological resilience: Constructing a unified theoretical model. *Frontiers in Psychology*, 7, 1-8.
- De Cordova, P. B., Phibbs, C. S., & Stone, P. W. (2013). Perceptions and observations of off-shift nursing. *Journal of Nursing Management*, 21(2), 283-292. doi:10.1111/j.1365-2834.2012.01417.x
- Denz-Penhey, H., & Murdoch, C. (2008). Personal Resiliency: Serious Diagnosis and Prognosis With Unexpected Quality Outcomes. *Qualitative Health Research*, 18(3), 391-404. doi:10.1177/1049732307313431
- Deori (2012) The experience of night registered nurses in an acute care setting: A phenomenological study. *International Journal of Latest Research in Science and Technology* 1(2), D201–D204. Retrieved from http://www.mnkjournals.com/ijlrst_files/download/Vol%201%20Issue%202/31-Doli%20Deori.pdf.
- Donley R. (2005) Challenges for nursing in the 21st century. *Nursing Economic\$* 23, 312–318.
- Dingley, J. (1996). A computer-aided comparative study of progressive alertness changes in nurses working two different night-shift rotas. *Journal of Advanced Nursing*, 23(6), 1247-1253. doi:10.1046/j.1365-2648.1996.13024.x

- Dorrian, J., Dorrian, N., Lamond, C., van den Heuvel, J., Pincombe, A., Rogers, D., & Dawson. (2006). A Pilot Study of the Safety Implications of Australian Nurses' Sleep and Work Hours. *Chronobiology International*, 23(6), 1149-1163. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=J&aulast=Dorrian&title=A%20pilot%20study%20of%20the%20safety%20implications%20of%20Australian%20nurses%27%20sleep%20and%20work%20hours&id=doi%3A10.1080%2F07420520601059615&title=Chronobiology%20international&volume=23&issue=6&date=2006&spage=1149&issn=0742-0528
- Drury, Francis, K., & Chapman, Y. (2009). Where have all the young ones gone: Implications for the nursing workforce. *Online Journal of Issues in Nursing*, 14(1), 11-11. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2010238518&site=ehost-live>
- Duane, S. (2010). *Psychology and work Today*: Pearson Education India.
- Duffield, C., Diers, D., O'Brien-Pallas, L., Aisbett, C., Roche, M., King, M., & Aisbett, K. (2011). Nursing staffing, nursing workload, the work environment and patient outcomes. *Applied Nursing Research*, 24(4), 244-255. doi:<http://dx.doi.org/10.1016/j.apnr.2009.12.004>
- Edéll-Gustafsson, U. M., Kritz, E. I. K., & Bogren, I. K. (2002). Self-reported sleep quality, strain and health in relation to perceived working conditions in females. *Scandinavian Journal of Caring Sciences*, 16(2), 179-187. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2003160356&site=ehost-live>
- Edward, K. I., Welch, A., & Chater, K. (2009). The phenomenon of resilience as described by adults who have experienced mental illness. *Journal of Advanced Nursing*, 65(3), 587-595.
- Egeland, B., Carlson, E., & Sroufe, L. A. (1993). Resilience as process. *Development and Psychopathology*, 5(04), 517-528. doi:[doi:doi:10.1017/S0954579400006131](https://doi.org/10.1017/S0954579400006131)

- Ekundayo, J. A. (2014). Occupational Stress and Employees Productivity in the Workplace. *International Journal of Scientific Research in Education*, 7(2), 157-165.
- Eley, R., Buikstra, E., Plank, A., Hegney, D., & Parker, V. (2007). Tenure, mobility and retention of nurses in Queensland, Australia: 2001 and 2004. *Journal of Nursing Management*, 15(3), 285-293. doi:10.1111/j.1365-2834.2007.00652.x
- Eley, R., Parker, D., Tuckett, A., & Hegney, D. (2010). Career breaks and intentions for retirement by Queensland's nurses - A sign of the times? *Collegian*, 17(1), 38-42. doi:10.1016/j.colegn.2009.10.004
- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107-115. doi:10.1111/j.1365-2648.2007.04569.x
- Estryn-Béhar, M., & Beatrice, H. (2012). Effects of extended work shifts on employee fatigue, health, satisfaction, work/family balance, and patient safety. *Work*, 41, 4283-4290. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2011465397&site=ehost-live>
- Farzianpour F., Nosrati S.A., Foroushani A.R., Hasanpour F., Jelodar Z.K., Keykale M.S., Bakhtiari M. & Sadeghi N.S. (2016) Relationship Between Shift Work and Personality Traits of Nurses and Their Coping Strategies. *Global Journal of Health Science* 8(5), 166–174.
- Faseleh J.M., Moattari M. & Sharif F. (2013) Novice nurses' perception of working night shifts: a qualitative study. *Journal of Caring Sciences* 2, 169–176.
- Fekedulegn, D., Burchfiel, C. M., Hartley, T. A., Andrew, M. E., Charles, L. E., Tinney-Zara, C. A., & Violanti, J. M. (2013). Shiftwork and sickness absence among police officers: The BCOPS study. *Chronobiology International: The Journal of Biological & Medical Rhythm Research*, 30(7), 930-941. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=88907078&site=ehost-live>

- Fergus, S., & Zimmerman, M. A. (2005). Adolescent Resilience: A Framework for Understanding Healthy Development in the Face of Risk. *Annual Review of Public Health, 26*(1), 399-419. doi:10.1146/annurev.publhealth.26.021304.144357
- Figley, C. R. (1995). *Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized*: Psychology Press.
- Flo, E., Pallesen, S., Akerstedt, T., Magerøy, N., Moen, B. E., Grønli, J., . . . Bjorvatn, B. (2013). Shift-related sleep problems vary according to work schedule. *Occupational and Environmental Medicine, 70*(4), 238-245. doi:10.1136/oemed-2012-101091
- Flo, E., Pallesen, S., Magerøy, N., Moen, B. E., Grønli, J., Nordhus, I. H., & Bjorvatn, B. (2012). Shift work disorder in nurses - assessment, prevalence and related health problems. *PloS One, 7*(4), 1-9. doi:10.1371/journal.pone.0033981
- Fowkes, F., & Fulton, P. (1991). Critical appraisal of published research: Introductory guidelines. *BMJ: British Medical Journal, 302*(6785), 1136.
- Frey, R. (2002). Effect of rest on physicians' performance in an emergency department, objectified by electroencephalographic analyses and psychometric tests*. *Critical Care Medicine, 30*(10), 2322. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=R&aulast=Frey&atitle=Effect%20of%20rest%20on%20physicians%E2%80%99%20performance%20in%20an%20emergency%20department%2C%20objectified%20by%20electroencephalographic%20analyses%20and%20psychometric%20tests%2A&title=Critical%20care%20medicine&volume=30&issue=10&date=2002&spage=2322&issn=0090-3493
- Furnham, A. (1986). Response bias, social desirability and dissimulation. *Personality and Individual Differences, 7*(3), 385-400. doi:http://dx.doi.org/10.1016/0191-8869(86)90014-0
- Furnham, A., & Henderson, M. (1982). The good, the bad and the mad: Response bias in self-report measures. *Personality and Individual Differences, 3*(3), 311-320. doi:http://dx.doi.org/10.1016/0191-8869(82)90051-4

- Garcia-Dia, M. J., DiNapoli, J. M., Garcia-Ona, L., Jakubowski, R., & O'Flaherty, D. (2013). Concept Analysis: Resilience. *Archives of Psychiatric Nursing*, 27(6), 264-270. doi:<http://dx.doi.org/10.1016/j.apnu.2013.07.003>
- Garmezy, N. (1991a). Resilience in children's adaptation to negative life events and stressed environments. *Pediatric Annals*, 20(9), 459-466.
- Garmezy, N. (1991b). Resiliency and vulnerability to adverse developmental outcomes associated with poverty. *The American Behavioral Scientist*, 34(4), 416.
- Garmezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development*, 97-111.
- Garmezy, N., & Rodnick, E. H. (1959). Premorbid Adjustment and Performance in Schizophrenia: Implications for Interpreting Heterogeneity in Schizophrenia. *The Journal of Nervous and Mental Disease*, 129(5), 450-466. Retrieved from https://journals.lww.com/jonmd/Fulltext/1959/11000/PREMORBID_ADJUSTMENT_AND_PERFORMANCE_IN.6.aspx
- Geiger-brown, J., Muntaner, C., Lipscomb, J., & Trinkoff, A. (2004). Demanding work schedules and mental health in nursing assistants working in nursing homes. *Work and Stress*, 18(4), 292-304. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=15381789&site=ehost-live>
- Gillespie, B. M., Chaboyer, W., & Wallis, M. (2009). The influence of personal characteristics on the resilience of operating room nurses: A predictor study. *International Journal of Nursing Studies*, 46(7), 968-976. doi:10.1016/j.ijnurstu.2007.08.006
- Gillespie, B. M., Chaboyer, W., Wallis, M., & Grimbeek, P. (2007). Resilience in the operating room: Developing and testing of a resilience model. *Journal of Advanced Nursing*, 59(4), 427-438. doi:10.1111/j.1365-2648.2007.04340.x
- Glasberg A.L., Eriksson S. & Norberg A. (2007) Burnout and 'stress of conscience' among healthcare personnel. *Journal of Advanced Nursing* 57, 392-403.

- Goldberg D.P. (1972) *The Detection of Psychiatric Illness by Questionnaire: A Technique for the Identification and Assessment of Non-Psychotic Psychiatric Illness* Oxford University Press, London.
- Gold, D. R., Rogacz, S., Bock, N., Tosteson, T. D., Baum, T. M., Speizer, F. E., & Czeisler, C. A. (1992). Rotating Shift Work, Sleep, and Accidents Related to Sleepiness in Hospital Nurses. *American Journal of Public Health*, 82(7), 1011-1014. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=heh&AN=9208170782&site=ehost-live>
- Grafton, E., Gillespie, B., & Henderson, S. (2010). Resilience: The power within. *Oncology Nursing Forum*, 37(6), 698-705. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=55148291&site=ehost-live>
- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(3), 255-274.
- Greenhalgh, T., & Taylor, R. (1997). How to read a paper: Papers that go beyond numbers (qualitative research). *BMJ*, 315(7110), 740-743.
- Gregg, J., & O'Hara, L. (2007). Values and principles evident in current health promotion practice. *Health Promotion Journal of Australia: Official Journal of Australian Association of Health Promotion Professionals*, 18(1), 7-11. Retrieved from <http://search.informit.com.au.ezproxy.scu.edu.au/documentSummary;dn=452508374809542;res=IELHEA>
- Gray-Toft P. & Anderson J.G. (1981) The nursing stress scale: Development of an instrument. *Journal of Behavioral Assessment* 3, 11–23.
- Gregov L. (1994) *Nametnuti ritam rada kao stresor [Paced work rhythm as a stressor]*. Master Thesis, University of Zagreb.
- Gustafsson G., Eriksson S., Strandberg G. & Norberg A. (2010) Burnout and perceptions of conscience among health care personnel: A pilot study. *Nursing Ethics* 17, 23–38.

- Ha E.H. (2015) Attitudes towards rotating shift work in clinical nurses: A Q-methodology study. *Journal of Clinical Nursing* 24, 2488–2497.
- Halfer D. & Graf E. (2006) Graduate nurse perceptions of the work experience. *Nursing Economic\$* 24, 150–155.
- Härmä, M., Harma, M., Sallinen, R., Ranta, P., Mutanen, K., & Muller. (2002). The effect of an irregular shift system on sleepiness at work in train drivers and railway traffic controllers. *Journal of Sleep Research*, 11(2), 141-151. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=M&aulast=H%C3%A4rm%C3%A4&atitle=The%20effect%20of%20an%20irregular%20shift%20system%20on%20sleepiness%20at%20work%20in%20train%20drivers%20and%20railway%20traffic%20controllers&id=doi%3A10.1046%2Fj.1365-2869.2002.00294.x&title=Journal%20of%20sleep%20research&volume=11&issue=2&date=2002&spage=141&issn=0962-1105
- Hart, P. L., Brannan, J. D., & De Chesnay, M. (2014). Resilience in nurses: An integrative review. *Journal of Nursing Management*, 22(6), 720-734. doi:10.1111/j.1365-2834.2012.01485.x
- Harvey, & Delfabbro. (2004). Psychological resilience in disadvantaged youth: A critical overview. *Australian Psychologist*, 39(1), 3-13. doi:10.1080/00050060410001660281
- Hea Young, L., Mi Sun, K., Oksoo, K., Il-Hyun, L., & Han-Kyoul, K. (2015). Association between shift work and severity of depressive symptoms among female nurses: The Korea Nurses' Health Study. *Journal of Nursing Management*, 23(4), 1-9 9p. doi:10.1111/jonm.12298
- Health Workforce Australia 2025. (2012). Doctors, Nurses and Midwives. Retrieved from <https://www.hwa.gov.au/our-work/health-workforce-planning/health-workforce-2025-doctors-nurses-and-midwives>
- Health Workforce Australia. (2013a). Australia's Health Workforce Series, Nurse in focus.
- Health Workforce Australia. (2013b). *Submission to the Health Workforce Australia consultation paper on Nursing Workforce Retention and Productivity.*

- Australian Nursing Federation Retrieved from http://anmf.org.au/documents/submissions/ANF_submission_HWA_Retention_Productivity_May_2013.pdf.
- Health Workforce Australia. (2014). *Australia's future health workforce nurses*. Australia, Canberra: Commonwealth of Australia Retrieved from <https://www.health.gov.au/...nsf/.../AFHW%20-%20Nurses%20detailed%20report.pdf>.
- Hegney, Buikstra, E., Baker, P., Rogers-Clark, C., Pearce, S., Ross, H., . . . Watson-Luke, A. (2007). Individual resilience in rural people: a Queensland study, Australia. *Rural and remote health*, 7(14), 1-13.
- Hegney, Craigie, M., Hemsworth, D., Osseiran-Moisson, R., Aoun, S., Francis, K., & Drury, V. (2014). Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: Study 1 results. *Journal of Nursing Management*, 22(4), 506-518. doi:10.1111/jonm.12160
- Hegney, Francis, K., & Eley, R. (2013). *Your Work, Your Time, Your Life*.
- Hegney, Plank, & Parker. (2006). Extrinsic and intrinsic work values: Their impact on job satisfaction in nursing. *Journal of Nursing Management*, 14(4), 271-281. doi:10.1111/j.1365-2934.2006.00618.x
- Hegney, Plank, A., & Parker, V. (2003). Nursing workloads: The results of a study of Queensland nurses. *Journal of Nursing Management*, 11(5), 307-314. doi:10.1046/j.1365-2834.2003.00376.x
- Hegney, Rees, C. S., Eley, R., Osseiran-Moisson, R., & Francis, K. (2015). The contribution of individual psychological resilience in determining the professional quality of life of Australian nurses. *Frontiers in Psychology*, 6(1613). doi:10.3389/fpsyg.2015.01613
- Hennig, J., Hennig, P., Kieferdorf, C., Moritz, S., Huwe, P., & Netter. (1998). Changes in cortisol secretion during shiftwork: Implications for tolerance to shiftwork? *Ergonomics*, 41(5), 610-621. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=J&aualast=Hennig&atitle=Changes%20in%20cortisol%20secretion%20during%20shiftwork%3A%20implications%20for%20tolerance%20to%20shiftwork%3F&id=doi%3A10

[.1080%2F001401398186784&title=Ergonomics&volume=41&issue=5&date=1998&spage=610&issn=0014-0139](https://doi.org/10.1080/001401398186784&title=Ergonomics&volume=41&issue=5&date=1998&spage=610&issn=0014-0139)

- Hinderer K.A., Vonrueden K.T., Friedmann E., McQuillan K.A., Gilmore R., Kramer B. & Murray M. (2014) Burnout, compassion fatigue, compassion satisfaction and secondary traumatic stress in trauma nurses. *Journal of Trauma Nursing* 21, 160–169.
- Hildon, Z., Montgomery, S. M., Blane, D., Wiggins, R. D., & Netuveli, G. (2009). Examining resilience of quality of life in the face of health-related and psychosocial adversity at older ages: What is “right” about the way we age? *The Gerontologist*, 50(1), 36-47.
- Hill, C. E., Thompson, B. J., & Williams, E. N. (1997). A Guide to Conducting Consensual Qualitative Research. *The Counseling Psychologist*, 25(4), 517-572. doi:10.1177/0011000097254001
- Hoffman, A. J., & Scott, L. D. (2003). Role stress and career satisfaction among registered nurses by work shift patterns. *Journal of Nursing Administration*, 33(6), 337-342. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2003155050&site=ehost-live>
- Holmbäck, U., Forslund, A., Lowden, J., Forslund, T., kerstedt, M., Lennern, M., . . . Stridsberg, M. (2003). Endocrine responses to nocturnal eating - possible implications for night work. *European Journal of Nutrition*, 42(2), 75-83. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=U&aulast=Holmb%C3%A4ck&atitle=Endocrine%20responses%20to%20nocturnal%20eating%20E2%80%93possible%20implications%20for%20night%20work&id=doi%3A10.1007%2Fs00394-003-0386-6&title=European%20Journal%20of%20Nutrition&volume=42&issue=2&date=2003&spage=75&issn=1436-6207
- Hossain, J. L. (2004). Subjective and objective evaluation of sleep and performance in daytime versus nighttime sleep in extended-hours shift-workers at an underground mine. *Journal of Occupational and Environmental Medicine*,
- Page | 146

46(3), 212. Retrieved from
http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=JL&aulast=Hossain&atitle=Subjective%20and%20objective%20evaluation%20of%20sleep%20and%20performance%20in%20daytime%20versus%20nighttime%20sleep%20in%20extended-hours%20shift-workers%20at%20an%20underground%20mine&title=Journal%20of%20occupational%20and%20environmental%20medicine&volume=46&issue=3&date=2004&spage=212&issn=1076-2752

Howard, S., Hordacre, A.-L., Moretti, C., & Spoehr, J. (2013). Investigating Flexible Work Arrangements.

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277-1288.

Hsu M.Y. & Kernohan G. (2006) Dimensions of hospital nurses' quality of working life. *Journal of Advanced Nursing 54*, 120– 131.

Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences, 76*, 18-27. doi:<https://doi.org/10.1016/j.paid.2014.11.039>

Hunt, E, & Lavoie, AM. (2011). Quantitative and qualitative research methods, can they coexist yet? *Recherche en soins infirmiers*(105), 25-30.

Hülshager, U. R., Alberts, H. J., Feinholdt, A., & Lang, J. W. (2013). Benefits of mindfulness at work: The role of mindfulness in emotion regulation, emotional exhaustion, and job satisfaction. *Journal of Applied Psychology, 98*(2), 310.

Hystad S.W., Eid J., Johnsen B.H., Laberg J.C. & Thomas Bartone P. (2010) Psychometric properties of the revised Norwegian dispositional resilience (hardiness) scale. *Scandinavian Journal of Psychology 51*, 237–245.

International Council of Nurses. (2007) *Nurses and shiftwork* [Online]. Geneva. Retrieved from:

http://www.icn.ch/images/stories/documents/publications/position_statements/C07_Nurses_Shift_Work.pdf 2015 on 05 April 2016.

Israel, B. A., House, J. S., Schurman, S. J., Heaney, C. A., & Mero, R. P. (1989). The relation of personal resources, participation, influence, interpersonal

relationships and coping strategies to occupational stress, job strains and health: A multivariate analysis. *Work and Stress*, 3(2), 163-194. doi:10.1080/02678378908256942

- Iwata N., Okuyama Y., Kawakami Y. & Saito K. (1988) The twelve-item general health questionnaire among Japanese workers. *Environmental science, Hokkaido University: Journal of the Graduate School of Environmental Science, Hokkaido University, Sapporo* 11, 1–10.
- Jackson, D., Firtko, A., & Edenborough, M. (2007). Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: A literature review. *Journal of Advanced Nursing*, 60(1), 1-9. doi:10.1111/j.1365-2648.2007.04412.x
- Jamal, M., & Baba, V. V. (1997). Shiftwork, burnout, and well-being: A study of Canadian nurses. *International Journal of Stress Management*, 4(3), 197-204. doi:10.1007/BF02765324
- Joinson, C. (1992). Coping with compassion fatigue. *Nursing*, 22(4), 116. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1992143314&site=ehost-live>
- Jung H.S. & Lee B. (2015) Contributors to shift work tolerance in South Korean nurses working rotating shift. *Applied Nursing Research* 28, 150–155.
- Julian, L. J. (2011). Measures of anxiety: State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). *Arthritis Care & Research*, 63(S11), S467-S472.
- Keogh J. (1997) Professionalization of nursing: Development, difficulties and solutions. *Journal of Advanced Nursing* 25, 302–308. Kornhaber R.A. & Wilson A. (2011) Building resilience in burns nurses: A descriptive phenomenological inquiry. *Journal of Burn Care & Research* 32, 481–488.

- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, 52(12), 1048-1060.
- Klopper, H. C., Coetzee, S. K., Pretorius, R., & Bester, P. (2012). Practice environment, job satisfaction and burnout of critical care nurses in South Africa. *Journal of Nursing Management*, 20(5), 685-695. doi:10.1111/j.1365-2834.2011.01350.x
- Kondracki, N. L., Wellman, N. S., & Amundson, D. R. (2002). Content analysis: Review of methods and their applications in nutrition education. *Journal of Nutrition Education and Behavior*, 34(4), 224-230. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2003035433&site=ehost-live>
- Kornhaber, R. A., & Wilson, A. (2011). Building resilience in burns nurses: A descriptive phenomenological inquiry. *Journal of Burn Care & Research*, 32(4), 481-488. doi:10.1097/BCR.0b013e3182223c89
- Korompeli, A., Sourtzi, P., Tzavara, C., & Velonakis, E. (2009). Rotating shift-related changes in hormone levels in intensive care unit nurses. *Journal of Advanced Nursing*, 65(6), 1274-1282. doi:10.1111/j.1365-2648.2009.04987.x
- Korompeli A., Muurlink O., Tzavara C., Velonakis E., Lemonidou C. & Sourtzi P. (2014) Influence of shift work on Greek nursing personnel. *Safety and Health at Work* 5, 73–79.
- Kristensen T.S., Borritz M., Villadsen E. & Christensen K.B. (2005) The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress* 19, 192–207.
- Kroenke K. & Spitzer R.L. (2002) The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals* 32, 509– 515.
- Kudielka, B., Kudielka, J., Buchtal, A., Uhde, S., & Wüst. (2007). Circadian cortisol profiles and psychological self-reports in shift workers with and without recent change in the shift rotation system. *Biological Psychology*, 74(1), 92-103. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&aunit=BM&aulast=Kudielk

a&title=Circadian%20cortisol%20profiles%20and%20psychological%20self-reports%20in%20shift%20workers%20with%20and%20without%20recent%20change%20in%20the%20shift%20rotation%20system&id=doi%3A10.1016%2Fj.biopsycho.2006.08.008&title=Biological%20psychology&volume=74&issue=1&date=2007&spage=92&issn=0301-0511

Kumpfer. (1999). *Factors and processes contributing to resilience*. New York: Kluwer Academic/Plenum Publishers.

Kumpfer. (2002). Factors and processes contributing to resilience *Resilience and development* (pp. 179-224): Springer.

Lac, G., & Chamoux, A. (2004). Biological and psychological responses to two rapid shiftwork schedules. *Ergonomics*, 47(12), 1339-1349.

Lamond, N., Dorrian, J., Roach, G. D., McCulloch, K., Holmes, A., Burgess, H. J., . . . Dawson, D. (2003). The impact of a week of simulated night work on sleep, circadian phase, and performance. *Occupational and Environmental Medicine*, 60(11), e13-e13.

Lazarus, J. (2000). *Stress Relief & Relaxation Techniques*. Los Angeles, CA: Keats Publishing.

Lee, D. T. Y., Chan, S. W. W., & Kwok, S. P. Y. (2003). Introduction of night shift call system for surgical trainees: a prospective self-controlled trial. *Medical Education*, 37(6), 495-499. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2004165889&site=ehost-live>

Letvak S. & Buck R. (2008) Factors influencing work productivity and intent to stay in nursing. *Nursing Economic* 26, 159–166.

Lim, J., Bogossian, F., & Ahern, K. (2010). Stress and coping in Australian nurses: A systematic review. *International Nursing Review*, 57(1), 22-31.

Lin, Chen, C.-H., Pan, S.-M., Pan, C.-H., Chen, C.-J., Chen, Y.-M., . . . Wu, M.-T. (2012). Atypical work schedules are associated with poor sleep quality and mental health in Taiwan female nurses. *International Archives of Occupational and Environmental Health*, 85(8), 877-884. doi:10.1007/s00420-011-0730-8

- Lin P.C., Liao W.C., Chen M.Y. & Fan J.Y. (2014) The impact of shift work on nurses' job stress, sleep quality and self-perceived health status. *Journal of Nursing Management* 22, 604–612.
- Lin P.C., Chen C.H., Pan S.M., Chen Y.M., Pan C.H., Hung H.C. & Wu M.T. (2015) The association between rotating shift work and increased occupational stress in nurses. *Journal of Occupational Health* 57, 307–15.
- Lovibond, & Lovibond, P. F. (2002). Manual for the Depression Anxiety Stress Scale. In S. o. Psychology (Ed.), (2 ed.). Sydney: University of New South Wales.
- Lovibond, & Lovibond, P. F. (2004) *Manual for the depression anxiety stress scales*. The Psychology Foundation of Australia, NSW- Sydney.
- Lusk B., Russell R., Rodgers J. & Wilson-Barnett J. (2001) Preregistration nursing education in Australia, New Zealand, the United Kingdom and the United States of America. *The Journal of Nursing Education* 40, 197.
- Luthar, S. S. (1999). *Poverty and children's adjustment* (Vol. 41): Sage.
- Luxford, Piper, Dunbar, & Poole. (2010). *Patient-centred care: Improving Quality and Safety by Focusing care on Patients and Consumers*. Sydney, NSW: Australian Government Retrieved from <http://www.safetyandquality.gov.au/wp-content/uploads/2012/01/PCCC-DiscussPaper.pdf>.
- Ma, Andrew, M. E., Fekedulegn, D., Gu, J. K., Hartley, T. A., Charles, L. E., . . . Burchfiel, C. M. (2014). Shift Work and Occupational Stress in Police Officers. *Safety and Health at Work*, 6(1), 25-29. doi:10.1016/j.shaw.2014.10.001
- Ma J.C., Lee P., Yang Y. & Chang W. (2009) Predicting factors related to nurses' intention to leave, job satisfaction and perception of quality of care in acute care hospitals. *Nursing Economic\$* 27, 178.
- Madide S. (2003) *Effects of Night Shift Schedules on Nurses working in a Private Hospital in South Africa*. Master of Science Programme. Master Degree Thesis, Lulea University of Technology.
- Mahmoud, J. S. R., Hall, L. A., & Staten, R. (2010). The psychometric properties of the 21-Item Depression Anxiety and Stress Scale (DASS-21) among a sample

- of young adults. *Southern Online Journal of Nursing Research*, 10(4), 21-34.
Retrieved from
<http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010912189&site=ehost-live>
- Manning, D., & Preston. (2003). Organizational Stress: Focusing on Ways to Minimize Distress. *CUPA-HR Journal*, 54(2).
- Maslach C. & Jackson S.E. (1981) The measurement of experienced burnout. *Journal of Organizational Behavior* 2, 99– 113.
- Manzano García G. & Carlos J. (2012) Emotional exhaustion of nursing staff: Influence of emotional annoyance and resilience. *International Nursing Review* 59, 101–107.
- Masten. (1994). *Resilience in individual development: Successful adaptation despite risk and adversity*. M. Wang; E. Gordon. : Educational resilience in inner city America: Hillsdale, NJ.
- Masten. (2001a). Ordinary magic: Resilience processes in development. *American Psychologist*, 56(3), 227-238. doi:10.1037/0003-066X.56.3.227
- Masten. (2001b). Ordinary magic: Resilience processes in development. *American Psychologist*, 56(3), 227.
- Masten, Hubbard, J. J., Gest, S. D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology*, 11(01), 143-169. Retrieved from <http://journals.cambridge.org.ezproxy.auckland.ac.nz/action/displayAbstract?fromPage=online&aid=43635&fileId=S0954579499001996>
- Masten, & Tellegen, A. (2012). Resilience in developmental psychopathology: Contributions of the project competence longitudinal study. *Development and Psychopathology*, 24(2), 345-361.
- Matos, P. S., Neushotz, L. A., Griffin, M. T. Q., & Fitzpatrick, J. J. (2010). An exploratory study of resilience and job satisfaction among psychiatric nurses working in inpatient units. *International Journal of Mental Health Nursing*, 19(5), 307-312. doi:10.1111/j.1447-0349.2010.00690.x

- Matheson A., O'Brien L. & Reid J. (2014) The impact of shift work on health: A literature review. *Journal of Clinical Nursing* 23, 3309–3320.
- Maville J. & Huerta C. (2013) *Health Promotion in Nursing* Cengage Learning, Clifton Park.
- McAllister, & Estefan, A. (2002). Principles and strategies for teaching therapeutic responses to self-harm. *Journal of Psychiatric and Mental Health Nursing*, 9(5), 573-583. doi:10.1046/j.1365-2850.2002.00525.x
- McAllister, & Lowe, J. B. (2011). *The resilient nurse: Empowering your practice* New York: Springer Pub.
- McDonald, G., Jackson, D., Wilkes, L., & Vickers, M. H. (2013). Personal resilience in nurses and midwives: Effects of a work-based educational intervention. *Contemporary Nurse: A Journal for the Australian Nursing Profession*, 45(1), 134-143. doi:10.5172/conu.2013.45.1.134
- McNair D., Lorr M. & Dropplemn L. (1971) *EITS manual for the profile of mood states (POMS)*.
- McKenna, H. P. (1995). Nursing skill mix substitutions and quality of care: An exploration of assumptions from the research literature. *Journal of Advanced Nursing*, 21(3), 452-459. doi:10.1111/j.1365-2648.1995.tb02727.x
- McNeese-Smith, D. K., & Nazarey, M. (2001). A nursing shortage: Building organizational commitment among nurses/practitioner application. *Journal of Healthcare Management*, 46(3), 173.
- McVicar, A. (2003). Workplace stress in nursing: A literature review. *Journal of Advanced Nursing*, 44(6), 633-642.
- Mealer, M., Jones, J., Newman, J., McFann, K. K., Rothbaum, B., & Moss, M. (2012). The presence of resilience is associated with a healthier psychological profile in intensive care unit (ICU) nurses: Results of a national survey. *International Journal of Nursing Studies*, 49(3), 292-299. doi:10.1016/j.ijnurstu.2011.09.015
- Menet, J., Menet, M., & Rosbash. (2011). When brain clocks lose track of time: cause or consequence of neuropsychiatric disorders. *Current Opinion in*

Neurobiology, 21(6), 849-857. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=JS&aulast=Menet&title=When%20brain%20clocks%20lose%20track%20of%20time%3A%20cause%20or%20consequence%20of%20neuropsychiatric%20disorders&id=doi%3A10.1016%2Fj.conb.2011.06.008&title=Current%20Opinion%20in%20Neurobiology&volume=21&issue=6&date=2011&spage=849&issn=0959-4388

Mertens, D. M. (2015). *Research and evaluation in education and psychology : Integrating diversity with quantitative, qualitative, and mixed methods* (4 edition.. ed.): Thousand Oaks, CA : SAGE Publications, Inc.

Mitani, S., Mitani, M., Fujita, T., & Shirakawa. (2006). Circadian variation of cardiac autonomic nervous profile is affected in Japanese ambulance men with a working system of 24-h shifts. *International Archives of Occupational and Environmental Health*, 79(1), 27-32. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=S&aulast=Mitani&title=Circadian%20variation%20of%20cardiac%20autonomic%20nervous%20profile%20is%20affected%20in%20Japanese%20ambulance%20men%20with%20a%20working%20system%20of%2024-h%20shifts&id=doi%3A10.1007%2Fs00420-005-0026-y&title=International%20archives%20of%20occupational%20and%20environmental%20health&volume=79&issue=1&date=2006&spage=27&issn=0340-0131

Moher D., Liberati A., Tetzlaff J. & Altman D.G. (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine* 151, 264–269.

Mullin, W. J., & Arce, M. (2008). Resilience of families living in poverty. *Journal of Family Social Work*, 11(4), 424-440.

Najjar, N., Davis, L. W., Beck-Coon, K., & Doebbeling, C. C. (2009). Compassion fatigue a review of the research to date and relevance to cancer-care providers. *Journal of Health Psychology*, 14(2), 267-277.

- Natale, V., Martoni, M., & Cicogna, P. (2003). Effects of circadian typology on sleep–wake behavior of air traffic controllers. *Psychiatry and Clinical Neurosciences*, 57(5), 539-541.
- National Sleep Foundation (NSF). (2013). Sleep Cycles In A service of the National Sleep Foundation (Ed.).
- Natvik, S., Bjorvatn, B., Moen, B. E., Magerøy, N., Sivertsen, B., & Pallesen, S. (2011). Personality factors related to shift work tolerance in two-and three-shift workers. *Applied Ergonomics*, 42(5), 719-724. doi:10.1016/j.apergo.2010.11.006
- Needleman , J., Buerhaus , P., Pankratz , V. S., Leibson , C. L., Stevens , S. R., & Harris , M. (2011). Nurse Staffing and Inpatient Hospital Mortality. *New England Journal of Medicine*, 364(11), 1037-1045. doi:10.1056/NEJMsa1001025
- Nei, D., Anderson Snyder, L., & Litwiller, B. J. (2015). Promoting retention of nurses: A meta-analytic examination of causes of nurse turnover. *Health Care Management Review*, 40(3), 237-253 217p. doi:10.1097/HMR.0000000000000025
- Netemeyer R.G., Boles J.S. & McMurrian R. (1996) Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology* 81, 400.
- Nevidjon, B., & Erickson, J. I. (2001). The nursing shortage: Solutions for the short and long term. *Online Journal of Issues in Nursing*, 6(1), 16p. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001093227&site=ehost-live>
- Neylan, T., Metzler, T., Best, S., Weiss, D., Fagan, J., Liberman, A., . . . Marmar, C. (2002). Critical incident exposure and sleep quality in police officers. *Psychosomatic Medicine*, 64(2), 345-352. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=TC&aualast=Neylan&atitle=Critical%20incident%20exposure%20and%20sleep%20quality%20in%20police%20officers&id=pmid%3A11914452

- Nichols C.W.M., Stahl M.J. & Manley T.R. (1978) A validation of Hoppock's Job Satisfaction Measure. *The Academy of Management Journal* 21, 737–742.
- Nilsson, K., Campbell, A., & Andersson, E. P. (2008). Night nursing -- staff's working experiences. *BMC Nursing*, 7, 9p-9p 1p. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105449169&site=ehost-live>
- Niu, S.-F., Chung, M.-H., Chen, C.-H., Hegney, D., O'Brien, A., & Chou, K.-R. (2011). The effect of shift rotation on employee cortisol profile, sleep quality, fatigue, and attention level: A systematic review. *The Journal Of Nursing Research: JNR*, 19(1), 68-81. doi:10.1097/JNR.0b013e31820c1879
- Nursing and Midwifery Board of Australia. (2014). Fact sheet: Scope of practice for registered nurses and midwives. Retrieved from <http://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/FAQ/Scope-of-practice-for-registered-nurses-and-midwives.aspx>
- Olds, D. M., & Clarke, S. P. (2010). The effect of work hours on adverse events and errors in health care. *Journal of Safety Research*, 41(2), 153-162.
- Organisation for Economic Co-operation and Development. (2014). Health expenditure and financing. Retrieved from http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, 34(5 Pt 2), 1189-1208. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1089059/>
- Perkins, L. A. (2001). Occupational hazards. Is the night shift worth the risk? *RN*, 64(8), 65. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001082519&site=ehost-live>
- Pisarski A., Bohle P. & Callan V.J. (1998) Effects of coping strategies, social support and work-nonwork conflict on shift worker's health. *Scandinavian Journal of Work, Environment & Health* 141–145.

- Pluye P., Gagnon M.-P., Griffiths F. & Johnson-Lafleur J. (2009) A scoring system for appraising mixed methods research and concomitantly appraising qualitative, quantitative and mixed methods primary studies in mixed studies reviews. *International Journal of Nursing Studies* 46, 529–546.
- Powell I. (2013) Can you see me? Experiences of nurses working night shift in Australian regional hospitals: A qualitative case study. *Journal of Advanced Nursing* 69, 2172–2184.
- Purnell, M. T., Purnell, A. M., Feyer, G. P., & Herbison. (2002). The impact of a nap opportunity during the night shift on the performance and alertness of 12-h shift workers. *Journal of Sleep Research*, 11(3), 219-227. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=MT&auplast=Purnell&atitle=The%20impact%20of%20a%20nap%20opportunity%20during%20the%20night%20shift%20on%20the%20performance%20and%20alertness%20of%2012%E2%80%90h%20shift%20workers&id=doi%3A10.1046%2Fj.1365-2869.2002.00309.x&title=Journal%20of%20sleep%20research&volume=11&issue=3&date=2002&spage=219&issn=0962-1105
- Putignano, P., Dubini, A., Toja, P., Invitti, C., Bonfanti, S., Redaelli, G., . . . Cavagnini, F. (2001). Salivary cortisol measurement in normal-weight, obese and anorexic women: Comparison with plasma cortisol. *European Journal of Endocrinology*, 145(2), 165-171.
- Queensland Nurses' Union. (2013). Inquiry into the conditions of employment of state public sector employees and the adequacy of protection of their rights at work compared with other employees (pp. 1-29). Queensland: Queensland Nurses' Union.
- Queensland Nurses' Union. (2015). Nursing and midwifery in Queensland.
- Radloff L.S. (1977) The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement* 1, 385–401.

- Rafferty, A. M., Clarke, S. P., Coles, J., Ball, J., James, P., McKee, M., & Aiken, L. H. (2007). Outcomes of variation in hospital nurse staffing in English hospitals: Cross-sectional analysis of survey data and discharge records. *International Journal of Nursing Studies*, 44(2), 175-182. doi:http://dx.doi.org/10.1016/j.ijnurstu.2006.08.003
- Rahman, Md Shidur. (2016). The advantages and disadvantages of using qualitative and quantitative approaches and methods in language “testing and assessment” research: A literature review. *Journal of Education and Learning*, 6(1), 102.
- Richardson, G. E., Neiger, B. L., Jensen, S., & Kumpfer, K. L. (1990). The resiliency model. *Health Education*, 21(6), 33-39.
- Roberts R.D. & Kyllonen P.C. (1999) Morningness–eveningness and intelligence: Early to bed, early to rise will likely make you anything but wise! *Personality and Individual Differences* 27, 1123–1133.
- Roberts, Demarco, R., & Griffin, M. (2009). The effect of oppressed group behaviours on the culture of the nursing workplace: A review of the evidence and interventions for change. *Journal of Nursing Management*, 17(3), 288-293. doi:10.1111/j.1365-2834.2008.00959.x
- Roche, M., Diers, D., Duffield, C., & Catling-Paull, C. (2010). Violence toward nurses, the work environment, and patient outcomes. *Journal of Nursing Scholarship*, 42(1), 13-22. doi:10.1111/j.1547-5069.2009.01321.x
- Rodwell J. & Fernando J. (2016) Managing work across shifts: Not all shifts are equal. *Journal of Nursing Scholarship* 48, 397–405.
- Rogerson, M., & Emes, C. (2008). Fostering resilience within an adult day support program. *Activities, adaptation & aging*, 32(1), 1-18.
- Romig, C. (2001). The nursing shortage demands action now—state and federal legislation passed. *AORN Journal*, 74(5), 733-738.
- Rossi, A., Rossi, G., Cetrano, R., Pertile, L., Rabbi, V., Donisi, L., . . . Amaddeo. (2012). Burnout, compassion fatigue, and compassion satisfaction among staff in community-based mental health services. *Psychiatry Research*, 200(2), 933-

938. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=A&aulast=Rossi&title=Burnout%2C%20compassion%20fatigue%2C%20and%20compassion%20satisfaction%20among%20staff%20in%20community-based%20mental%20health%20services&id=doi%3A10.1016%2Fj.psychres.2012.07.029&title=Psychiatry%20research&volume=200&issue=2&date=2012&spage=933

Rotenberg, L., Rotenberg, C., Moreno, A., Benedito Silva, L., & Menna, B. (1998). Sleep/Wake Cycle Parameters and Sleep/Fatigue Complaints in Female Night Workers. *Biological Rhythm Research*, 29(5), 585-590. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=L&aulast=Rotenberg&title=Sleep%2Fwake%20cycle%20parameters%20and%20sleep%2Ffatigue%20complaints%20in%20female%20night%20workers&id=doi%3A10.1076%2Fbrhm.29.5.585.4814&title=Biological%20rhythm%20research&volume=29&issue=5&date=1998&spage=585&issn=0929-1016

Rouch, I., Rouch, P., Wild, D., Ansiau, J.-C., & Marquié. (2005). Shiftwork experience, age and cognitive performance. *Ergonomics*, 48(10), 1282-1293. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=I&aulast=Rouch&title=Shiftwork%20experience%2C%20age%20and%20cognitive%20performance&id=doi%3A10.1080%2F00140130500241670&title=Ergonomics&volume=48&issue=10&date=2005&spage=1282

Ruggiero, J. S. (2005). Health, work variables, and job satisfaction among nurses. *Journal of Nursing Administration*, 35(5), 254-263. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2005118615&site=ehost-live>

Russell, B., Ehrenkranz, N. J., & Hyams, P. J. (1983). An outbreak of staphylococcus aureus surgical wound infection associated with excess overtime employment of operating room personnel. *American Journal of Infection Control*, 11(2), 63-67. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1983008807&site=ehost-live>

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *The American Journal Of Orthopsychiatry*, 57(3), 316-331. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=cmedm&AN=3303954&site=ehost-live>

Rutter, M. (1993). Resilience: Some conceptual considerations. *Journal of Adolescent Health*, 14, 598-611.

Saksvik-Lehouillier, I., Bjorvatn, B., Hetland, H., Sandal, G. M., Moen, B. E., Magerøy, N., . . . Pallesen, S. (2013). Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work. *Journal of Advanced Nursing*, 69(5), 1136-1146. doi:10.1111/j.1365-2648.2012.06105.x

Saksvik-Lehouillier I., Bjorvatn B., Hetland H., Sandal G.M., Moen B.E., Magerøy N., Åkerstedt T. & Pallesen S. (2013) Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work. *Journal of Advanced Nursing* 69, 1136–1146.

Saksvik-Lehouillier, I., Bjorvatn, B., Hetland, H., Sandal, G. M., Moen, B. E., Magerøy, N., . . . Pallesen, S. (2012). Personality factors predicting changes in shift work tolerance: A longitudinal study among nurses working rotating shifts. *Work and Stress*, 26(2), 143-160. doi:10.1080/02678373.2012.686344

Saksvik-Lehouillier, I., Bjorvatn, B., Magerøy, N., & Pallesen, S. (2016). Hardiness, psychosocial factors and shift work tolerance among nurses -a 2-year follow-up study. *Journal of Advanced Nursing*, 72(8), 1800-1812. doi:10.1111/jan.12951

Samaha, E., Samaha, S., Lal, N., Samaha, J., & Wyndham. (2007). Psychological, lifestyle and coping contributors to chronic fatigue in shift-worker nurses. *Journal of Advanced Nursing*, 59(3), 221-232. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=E&aulast=Samaha&atitle=Psychological%2C%20lifestyle%20and%20coping%20contributors%2

[Oto%20chronic%20fatigue%20in%20shift%E2%80%90worker%20nurses&i
d=doi%3A10.1111%2Fj.1365-
2648.2007.04338.x&title=Journal%20of%20advanced%20nursing&volume=
59&issue=3&date=2007&spage=221&issn=0309-2402](https://doi.org/10.1111/j.1365-2648.2007.04338.x)

- Sawatzky J.V. & Enns C.L. (2012) Exploring the key predictors of retention in emergency nurses. *Journal of Nursing Management* 20, 696–707.
- Sandelowski, M. (1993). Rigor or rigor mortis: The problem of rigor in qualitative research revisited. *Advances in Nursing Science*, 16(2), 1-8.
- Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys. *Research in higher education*, 44(4), 409-432.
- Seago, J. A., Ash, M., Spetz, J., Coffman, J., & Grumbach, K. (2001). Hospital registered nurse shortages: Environmental, patient, and institutional predictors. *Health Services Research*, 36(5), 831-852. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1089263/>
- Seki, Y., & Yamazaki, Y. (2006). Effects of working conditions on intravenous medication errors in a Japanese hospital. *Journal of Nursing Management*, 14(2), 128-139. doi:10.1111/j.1365-2934.2006.00597.x
- Shahriari M., Shamali M. & Yazdannik A. (2014) The relationship between fixed and rotating shifts with job burnout in nurses working in critical care areas. *Iranian Journal of Nursing and Midwifery Research* 19, 360.
- Sinclair, S. J., Siefert, C. J., Slavin-Mulford, J. M., Stein, M. B., Renna, M., & Blais, M. A. (2012). Psychometric Evaluation and Normative Data for the Depression, Anxiety, and Stress Scales-21 (DASS-21) in a Nonclinical Sample of U.S. Adults. *Evaluation and the Health Professions*, 35(3), 259-279. doi:10.1177/0163278711424282
- Simunić A. & Gregov L. (2012) Conflict between work and family roles and satisfaction among nurses in different shift systems in Croatia: A questionnaire survey. *Archives of Industrial Hygiene and Toxicology* 63, 189–197.

- Slatyer, S., Craigie, M., Heritage, B., Davis, S., & Rees, C. (2017). Evaluating the Effectiveness of a Brief Mindful Self-Care and Resiliency (MSCR) Intervention for Nurses: A Controlled Trial. *Mindfulness*, 1-13.
- Smith, Fisher, C., & Mercer, A. (2011). Rediscovering nursing: A study of overseas nurses working in Western Australia. *Nursing & Health Sciences*, 13(3), 289-295 287p. doi:10.1111/j.1442-2018.2011.00613.x
- Smith, Smith, S., Folkard, C. J. M., & Poole. (1994). Increased injuries on night shift. *Lancet (London, England)*, 344(8930), 1137-1139. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=L&aulast=Smith&title=Increased%20injuries%20on%20night%20shift&id=doi%3A10.1016%2FS0140-6736%2894%2990636-X&title=Lancet%20%28London%2C%20England%29&volume=344&issue=8930&date=1994&spage=1137&issn=0140-6736
- Smith R.G. (1999) *In Pursuit of Nursing Excellence: A History of the Royal College of Nursing, Australia, 1949–1999* Oxford University Press, Melbourne.
- Soares, M. M., Jacobs, K., Rathore, H., Shukla, K., Singh, S., & Tiwari, G. (2012). Shift work - problems and its impact on female nurses in Udaipur, Rajasthan India. *Work*, 41, 4302-4314. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2011465396&site=ehost-live>
- Sorić M., Golubić R., Milošević M., Juras K. & Mustajbegović J. (2013) Shift work, quality of life and work ability among Croatian hospital nurses. *Collegium Antropologicum* 37, 379– 384.
- Southwick, S. M., & Charney, D. S. (2012). The science of resilience: Implications for the prevention and treatment of depression. *Science*, 338(6103), 79-82.
- Spelten E., Barton J. & Folkard S. (1993) Have we underestimated shiftworkers' problems? Evidence from a 'reminiscence' study. *Ergonomics* 36, 307–31
- Spielberger C.D. (1983) *Manual for the State-Trait Anxiety Inventory: STAI (Form Y)* CA, Consulting Psychologists Press, Palo Alto.
- Spielberger, C. D. (2010). *State-Trait Anxiety Inventory*: Wiley Online Library.

- Srinivasan, V., Srinivasan, J., Singh, S., Pandi Perumal, G., Brown, D., Spence, D., & Cardinali. (2010). Jet lag, circadian rhythm sleep disturbances, and depression: The role of melatonin and its analogs. *Advances in Therapy*, 27(11), 796-813. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=V&aulast=Srinivasan&atitle=Jet%20lag%20%20circadian%20rhythm%20sleep%20disturbances%20and%20depression%3A%20the%20role%20of%20melatonin%20and%20its%20analogs&id=doi%3A10.1007%2Fs12325-010-0065-y&title=Advances%20in%20therapy&volume=27&issue=11&date=2010&spage=796&issn=0741-238X
- Stamm. (1995). *Secondary traumatic stress: Self-care issues for clinicians, researchers, and educators*. USA: The Sidran Press.
- Stamm. (2002). Measuring compassion satisfaction as well as fatigue: Developmental history of the compassion satisfaction and fatigue test. Retrieved from <http://psycnet.apa.org/psycinfo/2002-17425-005>
- Stamm. (2010). The Concise ProQOL Manual. *Pocatello, ID: ProQoL.org*.
- Stamps P. (1997) *Scoring Workbook for the Index of Work Satisfaction*. Market Research, Northampton.
- Steinbrook , R. (2002). Nursing in the Crossfire. *New England Journal of Medicine*, 346(22), 1757-1766. doi:10.1056/nejm200205303462225
- Storemark, S. S., Fossum, I. N., Bjorvatn, B., Moen, B. E., Flo, E., & Pallesen, S. (2013). Personality factors predict sleep-related shift work tolerance in different shifts at 2-year follow-up: A prospective study. *BMJ open*, 3(11), e003696. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/24189084>
- Suedfeld, P. (2005). Invulnerability, Coping, Salutogenesis, Integration: Four Phases of Space Psychology. *Aviation, Space, and Environmental Medicine*, 76(6), B61-B66. Retrieved from <http://www.ingentaconnect.com/content/asma/asm/2005/00000076/A00106s1/art00009>
- Suzuki K., Ohida T., Kaneita Y., Yokoyama E., Miyake T., Harano S., Yagi Y., Ibuka E., Kaneko A. & Tsutsui T. (2004) Mental health status,

shift work, and occupational accidents among hospital nurses in Japan. *Journal of Occupational Health* 46, 448–454.

- Takeyama, H., Takeyama, T., Itani, N., Tachi, O., Sakamura, K., Murata, T., . . . Niwa. (2005). Effects of shift schedules on fatigue and physiological functions among firefighters during night duty. *Ergonomics*, 48(1), 1-11. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=H&aulast=Takeyama&atitle=Effects%20of%20shift%20schedules%20on%20fatigue%20and%20physiological%20functions%20among%20firefighters%20during%20night%20duty&id=doi%3A10.1080%2F00140130412331303920&title=Ergonomics&volume=48&issue=1&date=2005&spage=1
- Tashakkori, A., & Teddlie, C. (2010). *Sage handbook of mixed methods in social & behavioral research*: Sage.
- Taylor-Powell, E., & Marshall, M. G. (1996). *Questionnaire Design: Asking questions with a purpose*: University of Wisconsin-Extension Cooperative Extension Service.
- Teclaw R. & Osatuke K. (2014) Nurse perceptions of workplace environment: Differences across shifts. *Journal of Nursing Management* 23, 1137–1146.
- Tei-Tominaga M. (2013) Factors related to the intention to leave and the decision to resign among newly graduated nurses: A complete survey in a selected prefecture in Japan. *Environmental Health and Preventive Medicine* 18, 293–305.
- The World Bank. (2014). Nurses and Midwives (per 1,000 people). Retrieved from <http://data.worldbank.org/indicator/SH.MED.NUMW.P3>
- Trinkoff, A. (2006). How Long and How Much Are Nurses Now Working?: Too long, too much, and without enough rest between shifts, a study finds. *American Journal of Nursing*, 106(4), 60. Retrieved from http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=A&aulast=Trinkoff&atitle=How%20Long%20and%20How%20Much%20Are%20Nurses%20Now%20Working%3F%3A%20Too%20long%2C%20too%20much%2C%20and%20without%20enough%20rest%20between%20shifts%2C%20a%20stud

[y%20finds&title=American%20journal%20of%20nursing&volume=106&issue=4&date=2006&spage=60&issn=0002-936X](#)

- Tsai S.L. & Crockett M.S. (1993) Effects of relaxation training, combining imagery and meditation the stress level of Chinese nurses working in modern hospitals in Taiwan. *Issues in Mental Health Nursing* 14, 51–66.
- Tuckett, A., Hegney, D., Parker, D., Eley, R. M., & Dickie, R. (2011). The top eight issues Queensland Australia's aged-care nurses and assistants-in-nursing worried about outside their workplace: A qualitative snapshot. *International Journal of Nursing Practice*, 17(5), 444-454. doi:10.1111/j.1440-172X.2011.01966.x
- Turner S.B. (2014) The resilient nurse: an emerging concept. *Nurse Leader* 12, 7
- Tummers, G. E., Landeweerd, J. A., & Van Merode, G. G. (2002). Organization, work and work reactions: A study of the relationship between organizational aspects of nursing and nurses' work characteristics and work reactions. *Scandinavian Journal of Caring Sciences*, 16(1), 52-58.
- Tusaie, & Dyer. (2004). Resilience: A historical review of the construct. *Holistic Nursing Practice*, 18(1), 3-10.
- Twigg, D., Duffield, C., Thompson, P. L., & Rapley, P. (2010). The impact of nurses on patient morbidity and mortality the need for a policy change in response to the nursing shortage. *Australian Health Review*, 34(3), 312-316. doi:https://doi.org/10.1071/AH08668
- United States Census Bureau. (2014). International Data Base, World population: 1950-2050. Retrieved from <http://www.census.gov/population/international/data/idb/worldpopgraph.php>
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, 15(3), 398-405. doi:10.1111/nhs.12048
- Valdez, P., Valdez, C., Ramírez, A., García, J., Talamantes, P., Armijo, J., & Borrani. (2005). Circadian rhythms in components of attention. *Biological Rhythm Research*, 36(1-2), 57-65. Retrieved from

http://sfx.lis.curtin.edu.au/sfx_local?sid=google&auinit=P&aulast=Valdez&title=Circadian%20rhythms%20in%20components%20of%20attention&id=doi%3A10.1080%2F09291010400028633&title=Biological%20rhythm%20research&volume=36&issue=1-2&date=2005&spage=57&issn=0929-1016

Wagner, J. I. J., & Gregory, D. M. (2015). Spirit at Work (SAW). *Western Journal of Nursing Research*, 37(2), 197-216. doi:doi:10.1177/0193945914521304

Werner, E. E., & Smith, R. S. (1992). *Overcoming the Odds: High Risk Children from Birth to Adulthood*.

West S., Boughton M. & Byrnes M. (2009) Juggling multiple temporalities: The shift work story of mid-life nurses. *Journal of Nursing Management* 17, 110–119.

Whittemore R. & Knafl K. (2005) The integrative review: Updated methodology. *Journal of Advanced Nursing* 52, 546–553.

Wisetborisut A., Angkurawaranon C., Jiraporncharoen W., Uaphanthasath R. & Wiwatanadate P. (2014) Shift work and burnout among health care workers. *Occupational Medicine* 64, 279–286.

Williams, K. A., Stotts, R. C., Jacob, S. R., Stegbauer, C. C., Roussel, L., & Carter, D. (2006). Inactive nurses: a source for alleviating the nursing shortage? *Journal of Nursing Administration*, 36(4), 205-210.

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, 21(2), 152-169. doi:10.1017/S0959259810000420

Winwood, P. C., Winefield, A. H., & Lushington, K. (2006). Work-related fatigue and recovery: The contribution of age, domestic responsibilities and shiftwork. *Journal of Advanced Nursing*, 56(4), 438-449. doi:10.1111/j.1365-2648.2006.04011.x

Wolf, E. J. (2001). Four strategies for recruitment and retention. *Healthcare Executive*, 16(4), 14-18.

World Health Organisation. (1996) *WHOQOL-BREF introduction, administration, scoring and generic version of the assessment* [Online]. The WHOQOL Group. Retrieved from: http://www.who.int/mental_health/media/en/76.pdf on 07 May 2016.

- Yong C. (2006) Task substitution: The view of the Australian Medical Association. *Medical Journal of Australia* 185, 27.
- Zander, Hutton, & King. (2010). Coping and resilience factors in pediatric oncology nurses. *Journal of Pediatric Oncology Nursing*, 27(2), 94-108. doi:10.1177/1043454209350154
- Zhao, I., & Turner, C. (2008). The impact of shift work on people's daily health habits and adverse health outcomes. *Australian Journal of Advanced Nursing*, 25(3), 8-22. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2009881582&site=ehost-live>
- Zigmond A.S. & Snaith R.P. (1983) The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67, 361–370.

Appendices

Appendix A
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To Whom It May Concern,

I, Mozhdeh Tahghighi, contributed to the conception and design of the research project, the collection and analysis of the data obtained, the interpretation of the results, and drafted and revised the publication entitled "What is the impact of shift work on the psychological functioning and resilience of nurses? An integrative review" published in *Journal of Advanced Nursing*, 73(9), 2065–2083. doi: 10.1111/jan.13283



I, as a co-author, endorse that this level of contribution by the candidate indicated above is appropriate.

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REVIEW PAPER

What is the impact of shift work on the psychological functioning and resilience of nurses? An integrative review

Mozhdeh Tahghighi , Clare S. Rees, Janie A. Brown, Lauren J. Breen & Desley Hegney

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Abstract

Aim. To synthesize existing research to determine if nurses who work shifts have poorer psychological functioning and resilience than nurses who do not work shifts.

Background. Research exploring the impact of shift work on the psychological functioning and resilience of nurses is limited compared with research investigating the impact of shifts on physical outcomes.

Design. Integrative literature review.

Data Sources. Relevant databases were searched from January 1995–August 2016 using the combination of keywords: nurse, shift work; rotating roster; night shift; resilient; hardiness; coping; well-being; burnout; mental health; occupational stress; compassion fatigue; compassion satisfaction; stress; anxiety; depression.

Review Methods. Two authors independently performed the integrative review processes proposed by Whittemore and Knafl and a quality assessment using the mixed-methods appraisal tool by Pluye *et al.*

Results. A total of 37 articles were included in the review (32 quantitative, 4 qualitative and 1 mixed-methods). Approximately half of the studies directly compared nurse shift workers with non-shift workers. Findings were grouped according to the following main outcomes: (1) general psychological well-being/quality of life; (2) Job satisfaction/burnout; (3) Depression, anxiety and stress; and (4) Resilience/coping. We did not find definitive evidence that shift work is associated with poorer psychological functioning in nurses. Overall, the findings suggest that the impact of shift work on nurse psychological functioning is dependent on several contextual and individual factors.

Conclusion. More studies are required which directly compare the psychological outcomes and resilience of nurse shift workers with non-shift workers.

Keywords: anxiety, burnout, compassion fatigue, compassion satisfaction, depression, nursing, psychological outcomes, resilience, shift work, stress, well-being

Why is this research/review needed?

- Shift work is necessary in nursing but it may affect nurses' physical and mental health and their ability to provide high-quality patient care
- There is currently little knowledge regarding the specific impact of working shifts on nurse psychological functioning and resilience.
- This information is needed to assist nurse managers and policy makers regarding potential strategies to mitigate the risk associated with shift work.

What are the key findings?

- A few studies reported negative psychological outcomes associated with shift work while other studies did not find evidence of negative psychological impacts.
- The studies have used many different/inconsistent outcome measures. Only approximately half of the studies directly compared nurse shift workers with non-shift worker counterparts.
- There is a need for more investigation to directly compare nurse shift workers with non-shift workers, while considering different contextual (e.g. work setting) and individual factors (e.g. level of resilience).

How should the findings be used to influence policy/practice/research/education?

- More research is needed to clarify the association between specific variables associated with poor response to shift work
- Understanding these variables can assist managers/policy makers to support nurse shift workers to prevent possible negative psychological outcomes.

Introduction

The International Council of Nurses acknowledged in 2007 that shift work is necessary in the nursing profession; however, there is also significant concern about the negative impact of working shifts on nurses' physical and mental health and their ability to provide high-quality patient care (International Council of Nurses, 2007). Nurse shift workers not only have to cope with the effects of shift work on family life (West *et al.* 2009), but also its effects on social and leisure activities (Faseleh *et al.* 2013). Work and family commitments usually cannot be fulfilled simultaneously. Therefore, working shifts commonly conflicts with valued time for family activities and also restricts domestic commitments, particularly for female shift workers who may also be responsible for child-rearing or other caring roles

(Hsu & Kernohan 2006, West *et al.* 2009). Internationally, it is predicted that there will be a shortage of nurses by 2025 (Health Workforce Australia 2025, 2012). Understanding the factors that have an impact on nurse retention is therefore critical. Nursing is well-recognized as a stressful occupation and a large body of research has investigated the impact of nursing on psychological functioning (Cameron & Brownie 2010, Manzano García & Carlos 2012, Mealer *et al.* 2012, McDonald *et al.* 2013). However, far less work has been conducted that focuses exclusively on understanding the impact of shift work on psychological outcomes.

Background

Nurses are continually exposed to both acute and chronic workplace stressors which can lead to the development of psychological syndromes and disorders such as depression, anxiety, anger, irritability and burnout (Israel *et al.* 1989, Mealer *et al.* 2012). Many factors are known to contribute to this stress such as workload, hours worked, work environment, relationships between co-workers, ineffective management, patients/clients and their families, doubts about treatment, coping with death, lack of preparation time, discrimination and shift work (Colligan & Higgins 2006, McVicar 2003, Ma *et al.* 2014). These psychological and physical factors have been linked to decreased job satisfaction and retention problems among nurses (Donley 2005, Letvak & Buck 2008).

The adverse effects of occupational stressors on nurses with respect to nurse turnover, productivity, costs and the effect on quality of care are well known (Donley 2005, Letvak & Buck 2008). In light of these effects, governments have enacted various strategies to alleviate the global shortage of qualified nurses (Nevidjon & Erickson 2001). In the USA and Australia, these strategies have included assisting nurses with the cost of their pre-registration qualification by providing government subsidies (Commonwealth of Australia, 2012), increasing the recruitment of nursing students into programmes by providing funding to educational institutions (American Association of Colleges of Nursing, 2015) and proposing task substitution, which is defined as allocating clinical responsibilities to lesser trained health professionals with or without supervision (Buchan & Dal Poz 2002, Yong 2006). However, while attracting more people into nursing programmes is important, so too is retaining nurses in their current positions (Health Workforce Australia 2025, 2012). An important factor in the retention of nurses in the workforce is job satisfaction and this includes an understanding of the maintenance of both

the psychological and physical well-being of nurses. Therefore, it is essential to clearly understand how nurses cope with work related stressors in the healthcare environment of the 21st Century and how they can maintain a healthier psychological profile and be resilient in the work environment. There is some evidence indicating that the majority of nurses who face work-related stress have a higher intention to resign from their position or reduce their working hours (Maville & Huerta 2013, Tei-Tominaga 2013), which has an economic cost to their employers and the healthcare system (Mealer *et al.* 2012). It has been suggested, however, that nurses who are resilient show successful adaptation and an active coping style in response to stressors and are therefore more likely to remain in the workforce for longer (Charney 2004, Grafton *et al.* 2010, Turner 2014).

Resilience is defined as a learnable, multidimensional ability of a person which enables him or her to function at a high level when facing an acute or chronic threat to their well-being (Rutter 1987). Several studies have explored the link between nurse resilience and psychological outcomes such as stress, anxiety, depression, compassion fatigue and compassion satisfaction (Glasberg *et al.* 2007, Jackson *et al.* 2007, Ma *et al.* 2009, Gillespie *et al.* 2009, Cameron & Brownie 2010, Gustafsson *et al.* 2010, Grafton *et al.* 2010, Matos *et al.* 2010, Kornhaber & Wilson 2011, Manzano García & Carlos 2012, Mealer *et al.* 2012, Sawatzky & Enns 2012, Hegney *et al.* 2014, Hinderer *et al.* 2014). However, far less work has been conducted regarding these variables as they relate specifically to nurses who work shifts. As such, there is currently very little understanding of the impact of shift work on the resilience and psychological well-being of nurses. Concerns about nursing shortages and retention and previous studies into job satisfaction in the nursing workforce (Eley *et al.* 2007, 2010, Tuckett *et al.* 2011), highlight the need to investigate how shift work may influence nurse resilience and related psychological functioning.

The review

Aims

The aim of this integrative review was to synthesize and evaluate the evidence regarding the impact of shift work on the psychological functioning and resilience of nurses. Specifically, this review addressed the following question: Do nurses who work shifts have poorer psychological functioning and lower resilience than nurses who do not work shifts? Addressing this question will provide evidence that

may be useful to assist policy makers to better understand the risk profile of their shift workers and manage the risk associated with shift work.

Design

An integrative review of the literature was undertaken, adhering to the reporting guidelines for mixed studies reviews (Whittemore & Knafl 2005). The preferred reporting items for systematic reviews and meta-analysis (PRISMA) checklist was followed (Moher *et al.* 2009). The review is registered on the international prospective register of systematic reviews (PROSPERO) (Number CRD42015017369).

Search methods

This review included articles related to the impact of shift work on the psychological functioning and resilience of nurses. Articles that focused solely on the physical outcomes of shift work on nurses were excluded due to the presence of recent reviews on this topic (Niu *et al.* 2011) and the impacts of shift work on nurses' health (Matheson *et al.* 2014). Similarly, articles that focused on the relationship between nurse work hours/overtime and nurse and patient outcomes (Bae & Fabry 2014) were excluded. The articles for this systematic review were identified by searching the following electronic databases: CINAHL plus; PubMed; Medline (Ovid); Embase and Google scholar; and grey literature such as Australian Nursing Federation, Queensland Nurses Union and Australian Health Practitioner Regulation Agency. Articles published from January 1995–August 2016 were included in this review. The search terms included variations of the following key words: nurs*; shift work; rotating roster; night shift*; resilien*; hardiness; cop*; well-being; burnout; mental health; occupational stress; compassion fatigue; compassion satisfaction; stress; anxiety; depression.

Studies reporting on the psychological functioning and/or resilience of nurses were included, if the sample:

- comprised employed professional nurses (Registered or international equivalent); and
- worked any irregular and rotating shift schedule, including morning, evening and night shifts, regardless of the day of the week that a nurse worked. This definition excludes nurses who permanently work only morning shifts (Australian Commonwealth Government, 2011).

Studies that were not published in English, considered only midwives or included both nurses and midwives but did not report their data separately, or were published earlier than the year 1995 were excluded. The former criterion was due to the difference between the scope of practice of nurses and midwives. The latter criterion was also due to the mid-1990s being considered pivotal in nurses' professional education (Keogh 1997, Bennett 1995, Andersson 1999). Since 1984, Australian nurses, for the first time, were given the opportunity to have tertiary education, instead of traditional hospital based training (Smith 1999). Following that, nurses universally were motivated to attain a university degree (Lusk *et al.* 2001). Having a lower educational qualification can be a risk factor for experiencing symptoms of burnout among nurses (Hegney *et al.* 2014). As a result of the difference between the two generations of nurses and by virtue of the date limiters, the cohort of exclusively hospital trained nurses was excluded.

Search outcomes

The initial search resulted in 275 articles of which 139 were excluded because they did not meet the inclusion criteria for this review. The 136 articles were screened using their title for the presence of a study on nurses working shifts as defined and its association with psychological functioning and resilience. From those 136 articles, the abstracts of 15 articles were reviewed, as it was difficult to apply the inclusion criteria to their title. A total of 95 articles were selected and underwent critical appraisal. Of these 95 articles, 58 were excluded, as: they were primarily concerned with the physical impact of shift work (20 articles); did not measure shift work (3 articles); were not conducted among shift worker nurses (29 articles); were review articles (2 articles); and did not include employed nurses (4 articles). Figure 1 provides the PRISMA diagram related to this integrative review.

Quality appraisal

Two authors (M.T., C.R.) independently reviewed the quality of the 37 studies using an assessing system for mixed-methods research and mixed studies reviews (SMSR) (Pluye *et al.* 2009). The detailed breakdown of each reviewer's scores is presented in supplementary materials [See supplementary Tables S1–S3]. For each criterion, the presence/absence of the criterion was scored 1 and 0 respectively. Quantitative observational studies were assessed according to their appropriate sampling ($n > 100$ considered as appropriate), justification of measurements and control of

confounders. Qualitative studies were evaluated for appropriate qualitative objective and method, description of the context, participants and justification of participant selection, and description of qualitative data collection and analysis and researcher reflexivity. The mixed method study was assessed for justification of the mixed-methods design, combination of qualitative and quantitative data collection-analysis techniques and integration of qualitative and quantitative results. There were minimal subjective differences regarding assessment of the articles which was discussed by the authors to reach an agreement. The comparison of the two sets of quality assessments demonstrated a substantial degree of agreement between coders; Cohen's kappa = 0.75, indicating a good reliability (Cohen 1960). Overall, the studies included in this review received moderate to high quality ratings.

Data extraction and synthesis

To assist with the synthesis of studies the same two authors (MT, CR) independently grouped the studies according to the main outcome variables they reported, namely: (1) general psychological well-being/quality of life; (2) job satisfaction/burnout; (3) depression, anxiety and stress; and (4) resilience/coping. There were no discrepancies between authors as to the grouping of the articles into these four categories. Furthermore, each study was classified according to whether it directly compared shift workers with non-shift workers (category A studies) or if it only compared or examined relationships between variables among different types of shift workers (category B studies). A similar synthesis was conducted for qualitative studies by examining the themes identified in each of the studies and grouping them according to the main outcome variables of this review. The synthesis of the final 37 qualitative and quantitative studies was then combined and the data were extracted and inserted into a four separate tables according to the main outcome variable: study setting; design; sample; measures and analytical methods (Tables 1–4). Additional key findings of the studies were included in additional tables (supplementary Table S4–S7). Figure 2 illustrates the method used for synthesizing articles.

Results

Overview of studies

Of the final 37 studies included in this review, 32 were quantitative, four were qualitative and one was a mixed-methods study. Overall, five of the articles used a

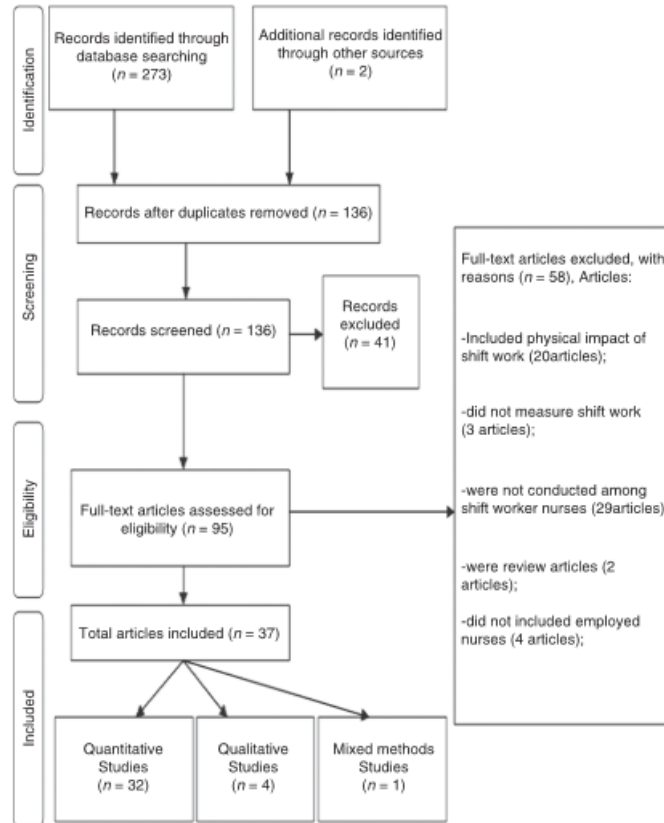


Figure 1 PRISMA diagram related to this integrative review.

longitudinal study design and the remainder used a cross-sectional study design. Ten articles reported gender-specific results considering only female nurses. The quality of studies was excellent with 76% receiving a rating of 100%. The samples sizes ranged from 13-25924 and the majority of studies were conducted in Europe ($n = 12, 32.43\%$), followed by Asia ($n = 11, 29.73\%$), Australia/NZ ($n = 6, 16.22\%$), USA/Canada ($n = 4, 10.81\%$) and the Middle East ($n = 4, 10.81\%$).

Outcomes

General psychological well-being/quality of life

This outcome category broadly captures overall psychological functioning in terms of well-being and quality of life. Three qualitative studies (West *et al.* 2009, Powell 2013, Faseleh *et al.* 2013) and five quantitative studies (Camerino

et al. 2010, Estryn-Béhar & Beatrice 2012, Šimunić & Gregov 2012, Lin *et al.* 2012, Sorić *et al.* 2013) obtained information related to this outcome. The quantitative measures included: a single-item measure of well-being (Estryn-Béhar & Beatrice 2012); the scale of the negative effects of work time (Ahasan *et al.* 2002); conflict between work and family rating scale (Netemeyer *et al.* 1996); chinese health questionnaire 12-item (Cheng & Williams 1986); and the World Health Organisation quality of life questionnaire brief version (WHOQOL-BREF) (World Health Organisation, 1996).

The qualitative studies by West *et al.* (2009) and Faseleh *et al.* (2013) both found themes relating to family disruption and stress associated with working shifts. Nurses reported having to restructure their lives to minimize disruption to family. The qualitative study by Powell (2013) with 14 nurses found that shift work was associated with

Table 1 Studies examining the effects of shift work on general well-being and quality of life.

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Camerino <i>et al.</i> 2010), Italy A	Healthcare institutions	Quant, Cross-sectional, Female nurses, $n = 664$ SW ¹ : Regular D ² , irregular D ² , shift work without N ³ , shift work with N ³	NEES ⁴ ;WAI ⁵ , CBI ⁶ , copenhagen psychological questionnaire, demand-control questionnaire, occupations health and safety prevention index	Data mining techniques, random forests & bayesian networks, hierarchical liner regression models
(Estryn-Béhar & Beatrice 2012), Ten European countries A	Hospitals, nursing homes, home care	Quant, cross-sectional, nurse, $n = 25924$ SW ¹ : D ² (8 hour,10 hour, 12 hour), N ³ (8 hour, 10 hour, 12 hour), Pt ⁸ , Alt ⁹	Work/family conflict 5-item scale, WAI ⁵ , copenhagen psychosocial questionnaire, intrinsic effort scale, their own questionnaire	Pearson's chi-square test, binary logistic regressions
(Faseleh <i>et al.</i> 2013), Iran B	Two university hospitals	Qual, nurses, $n = 20$ SW ¹ : N ³ , R ¹⁰	Focus group interview (40–80 minutes)	Content comparative & qualitative content analysis
(Lin <i>et al.</i> 2012), Taiwan A	Two medical centres and five regional/district hospitals	Quant, cross-sectional, female nurses, $n = 407$ SW ¹ : R ¹⁰ ; D ² (8 am–4 pm), E ¹¹ (4 pm–12 pm or from 2 pm to 10 pm), N ³ (12 pm–8 am)	PSQI ¹² ,CHQ ¹³	Chi-Square, ANOVA, univariate analysis, multivariate model's, ANCOVA tests, linear & logistic regression models, paired <i>t</i> -test
(Powell 2013), Australia B	Medical or surgical units of 3 regional hospitals	Qual, female ENs or RNs with 3-year experience, $n = 14$ SW ¹ : N ³	Semi-structural interviews	Thematic content analysis
(Šimunić & Gregov 2012), Croatia A	One general hospital and one clinical hospital centre	Quant, cross-sectional, Nurses, $n = 128$ SW ¹ : Fast R ¹⁰ (rotated every 2 days): forward R ¹⁰ (M ¹⁴ -A ¹⁵ -N ³ -day off), backward R ¹⁰ (N ³ -M ¹⁴ -A ¹⁵ -day off), forward R ¹⁰ (D ² -N ³ -day off)	Psychological demands of work scale, negative effects of work time scale, modified conflict between work & family role scale, semantic differential items, affective component of job satisfaction, affective component of satisfaction with the family, affective component of life satisfaction	Chi-square test
(Sorić <i>et al.</i> 2013), Croatia A	Seven hospitals	Quant, cross-sectional, Clinical nurses, $n = 1124$ SW ¹ : Do you work in shifts? Y/N	WAI ⁵ ; WHOQoL ¹⁶	Mann–Whitney U test, chi-square test, binary logistic regression models
(West <i>et al.</i> 2009), Australia B	Clinical setting from urban & rural areas	Qual, Female RNs, $n = 13$ SW ¹ : no definition	Individual 45–min interview	Interpretation & phenomenological transformation

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4- NEES, nurses' early exit study; 5- WAI, work ability index; 6-CBI, copenhagen burnout inventor; 7-BO, burnout; 8-Pt, part-time; 9-Alt, Altering shifts; 10- R, rotating shifts; 11-E, evening shifts; 12-PSQI, pittsburgh sleep quality index; 13-CHQ, chines health questionnaire; 14- M, morning shifts; 15- A, afternoon; 16- WHOQoL, the world health organisation quality of life questionnaire brief version; 17- QoL, quality of life.

fatigue and a sense of isolation. In terms of quantitative studies, Sorić *et al.* (2013) compared the quality of life of shift workers and non-shift workers using the WHOQOL-BREF and found shift workers had poorer quality of life

scores than non-shift workers. Several studies compared well-being and quality of life scores across different patterns of shifts. Estryn-Béhar and Beatrice (2012) found on a single item measure of well-being, that one-third of nurses

Table 2 Studies examining the effects of shift work on job satisfaction and burnout.

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Deori 2012), India B	Acute care unit of a hospital,	Quant, prospective study, nurses, $n = 219$ SW ¹ : N ³	Questionnaire developed by Sizeni Madide (2003)	Excel 2002 (not clear data analysis)
(Cheng <i>et al.</i> 2015), Taiwan B	Teaching hospital, non-academic teaching hospital	Quant, descriptive, correlational and longitudinal, new graduate employed nurses, $n = 206$ SW ¹ : 8 hours shift, 12hours sif, both 8 & 12 hours	Work environment nursing satisfaction, clinical stress scale	Pearson correlation, generalized estimating equations
(Hoffman & Scott 2003), USA B	Members of Michigan Nurses Association	Quant, cross-sectional, female RN, $n = 208$ SW ¹ : 8 hours shifts, 12 hours shifts, combination of 8-,10-,12-hours shifts	DQ ⁵ ; NSS ⁴ ; IWS ⁶	Two-tailed <i>t</i> -test procedures, pearson product
(Ha 2015), Korea B	General hospitals	Qual, Q-methodology, Clinical nurses, $n = 39$ SW ¹ : R ⁷	11-point bipolar scale	Factor analysis using pc-QUANL program
(Jamal & Baba 1997), Canada A	A psychiatric hospital	Quant, cross-sectional, nurses, $n = 175$ SW ¹ : D ² , E ⁸ , N ³ , R ⁷	MBI ⁹ , HS ¹⁰ , Job diagnostic survey; how many days have they been absent from the job in the last 2 months?	One-way ANOVA, <i>t</i> -test, two-way ANOVA
(Ruggiero 2005), USA B	Members of American Association of Critical Care Nurses	Quant, cross-sectional, Critical care nurses, $N = 247$ SW ¹ : D ² (included E ⁸ 3 pm–11 pm), R ⁷ , N ³	GJSS ¹¹ , PSQI ¹² , BDI-II ¹³ , SSIGBIS ¹⁴	One-way ANOVA, pearson product moment correlation, coefficient, hierarchical multiple regression
(Rodwell & Fernando 2016), Australia B	General acute hospital, maternity hospital, aged care	Quant, cross-sectional, nurses, $n = 446$ SW ¹ : D ² , E ⁸ , N ³	Job satisfaction scale, GHQ ¹⁵ -12, Kessler-10, centre for epidemiological studies depression scale, early/late preferences scale, negative affect schedule scale	Correlation, multiple linear regression analysis
(Shahriari <i>et al.</i> 2014), Iran A	Critical care units (ICU, CCU,ER)in 6 hospitals	Quant, retrospective cohort design, nurse, $n = 170$ SW ¹ : R ⁷ (combination of morning, E ⁸ and N ³); F ¹⁶ (only morning, only E ⁸ , only N ³)	MBI ⁹	Independent <i>t</i> -test, logistic regression
(Šimunić & Gregov 2012), Croatia A	One general hospital and one clinical hospital centre	Quant, cross-sectional, Nurses, $n = 128$ SW ¹ : Fast R ⁷ (rotated every 2 days): forward R ⁷ (M ²¹ -A ²² -N ³ -day off), backward R ⁷ (N ³ -M ²¹ -A ²² -day off), forward R ⁷ (D ² -N ³ -day off)	Psychological demands of work scale, negative effects of work time scale, modified conflict between work & family role scale, semantic differential items, affective component of job satisfaction, affective component of satisfaction with the family, Affective component of life satisfaction	Chi-square test

Table 3 Studies examining the effects of shift work on depression, anxiety and stress.

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Ardekani <i>et al.</i> 2008), Iran A	Twelve General hospitals	Quant, cross-sectional, nurses, $n = 1195$ SW ¹ : R ⁴ , F ⁵ (daytime)	GHQ ²	Two sample <i>t</i> -test
(Berthelsen <i>et al.</i> 2015), Norway A	Registered members of Norwegian Nurse Organisation	Quant, repeated measures design, nurses, $n = 2059$ SW ¹ : Only D ² , Only E ⁶ , D ² & E ⁶ , Only N ³ , R ⁴ , Both D ² & N ³	General nordic questionnaire, swedish demand-control- support questionnaire, HADS ⁷	Bivariate binary logistic regression
(Cheng <i>et al.</i> 2015), Taiwan B	Teaching hospital, non-academic teaching hospital	Quant, descriptive, correlational and longitudinal, new graduate employed nurses, $n = 206$ SW ¹ : 8 hours shift, 12 hours shift, both 8 & 12 hours	Work environment nursing satisfaction, clinical stress scale	Pearson correlation, generalized estimating equations
(Faseleh <i>et al.</i> 2013), Iran B	Two university hospitals	Qual, nurses, $n = 20$ SW ¹ : N ³ , R ⁴	Focus group interview (40–80 minutes)	Content comparative & qualitative content analysis
(Parzianpour <i>et al.</i> 2016), Iran B	Six non-governmental hospital	Quant, random selection, cross-sectional, nurses, $n = 305$ SW ¹ : fixed morning, fixed E ⁶ , fixed N ³	SSI ⁸ , eysenck personality questionnaire (EPQ)	Pearson correlation coefficient, <i>t</i> -test, ANCOVA, Mann –Whitney test, Kruskal –Wallis test
(Hea Young <i>et al.</i> 2015), Korea A	Korea Nurse Health Study	Quant, cross-sectional, female nurses, $n = 9789$ SW ¹ : SW? Yes, No	(PHQ-9) ⁹	Descriptive, Spearman's correlation and multivariable ordinal logistic regression
(Hoffman & Scott 2003), USA B	Members of Michigan Nurses Association	Quant, cross-sectional, female RN, $n = 208$ SW ¹ : 8-hour shifts, 12-hour shifts, combination of 8- 10-, 12-hour shifts	DQ ¹⁰ ; NSS ¹¹ ; IWS ¹²	Two-tailed <i>t</i> -test procedures, pearson product
(Jung & Lee 2015), Korea B	One hospital	Quant, cross-sectional, nurses, $n = 660$ SW ¹ : R ⁴ (D ² : 7 am–15 pm, E ⁶ : 15 pm–23 pm, N ³ : 23 pm–7 am)	DS ¹³ , MSPSS ¹⁴ , BMI ¹⁵ , smoking status, questions about working condition, ISI ¹⁶ , PHQ ¹⁷	Hierarchical multiple regression, Durbin–Watson test
(Korompeli <i>et al.</i> 2014), Greece B	Three public general hospitals,	Quant, cross-sectional, nurses & nurses assistants, $n = 365$ SW ¹ : M ¹⁹ , R ⁴	SSI ²⁰ included: sleep questionnaire, general health satisfaction, chronic fatigue, physical health questionnaire, (measuring cardiovascular & gastrointestinal disorders), general health questionnaire, cognitive somatic anxiety questionnaire	Multiple liner regression
(Lin <i>et al.</i> 2014), Taiwan B	Four hospitals	Quant, cross-sectional, Nurses, $n = 266$ SW ¹ : regular shift, clockwise rotation, counter-clockwise rotation, rapid rotation	DQ ¹⁰ , NSC ²¹ , PSQI ²² , GHSC ²³	Independent <i>t</i> -test, one-way ANOVA, Scheffe's method of post hoc tests, Pearson's r , Hierarchical regression

Table 3 (Continued).

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Lin <i>et al.</i> 2015), Taiwan A	Two medical centres & five regional/ district hospitals, Nurses from Kaohsiung City & County Nurses Associations	Quant, cross-sectional, female nurses, $n = 654$ SW ¹ : D ² , non-N ³ , R ⁴	Effort-reward imbalance (ERI) model	Chi-square test, logistic regression analysis
(Narvik <i>et al.</i> 2011), Norway B	Members of the Norwegian Nurses Organisation	Quant, cross-sectional, nurses, $n = 1505$ SW ¹ : 3 R ⁴ (D ² & E ⁶ & N ³), 2 R ⁴ (D ² & E ⁶)	DQ ¹⁰ , WS ²⁴ , BIS ²⁵ , HADS ²⁶ , ESS ²⁷ , DS ¹³ , Rcti ²⁸ , short hardiness scale	Hierarchical multiple regression
(Ruggiero 2005), USA B	Members of American Association of Critical Care Nurses	Quant, cross-sectional, Critical care nurses, $N = 247$ SW ¹ : D ² (included E ⁶ 3 pm–11 pm), R ⁴ , N ³	GJSS ²⁹ , PSQI ³⁰ , BDI-II ³¹ , SSIGBIS ³²	One-way ANOVA, pearson product Moment correlation, coefficient, hierarchical multiple regression
(Suzuki <i>et al.</i> 2004), Japan A	Eight General hospitals	Quant, cross-sectional, nurses, $n = 4407$ SW ¹ : N ³ /split/irregular shifts (sw ¹ , non-sw ¹)	GHQ ³³ , questions on mental health, sleep, occupational accidents, the shift work system; DQ ¹⁰	Chi-square test, student <i>t</i> -test, univariate analysis, multiple logistic regression
(Samaha <i>et al.</i> 2007), Australia B	Three eldercare facilities	Quant, cross-sectional, nurses, $n = 111$ SW ¹ : regular shifts, irregular shifts, flexible shifts,	DQ ¹⁰ , checklist individual scale, t-STAI ³⁴ , PMS ³⁵ , locus of control & behaviour scale, lifestyle appraisal questionnaire, PQSI ³⁶	Pearson's correlations, multiple regression, ANOVA
(Saksvik- Lehoullier <i>et al.</i> 2012), Norway B	Members of the Norwegian Nurses Association	Quant, longitudinal, Cohort, female nurses, $n = 642$ SW ¹ : rotating three shifts: D ² , E ⁶ , N ³	DQ ¹⁰ , DRS ³⁷ , DS ¹³ , CTT ³⁸ , ESS ²⁷ , FQ ³⁹ , HADS ²⁶ ; asking about number of N ³ worked last year, having children, SWT ¹⁸ , percentage of full-time position	Hierarchical regression
(Storemark <i>et al.</i> 2013), Norway A	Norwegian Nurse Organisation's members	Quant, prospective stratified sample, longitudinal study, nurses, $n = 2048$ SW ¹ : D ² , E ⁶ , N ³	AUDIT-C ⁴⁰ , DS ¹³ , DRS ³⁷ ; rCTI ²⁸ ; BSWSQ ⁴¹ .	Hierarchical multiple regression

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4- R, rotating shifts; 5-F, fixed shifts; 6-E, evening shifts; 7- HADS, hospital anxiety and depression scale; 8- SSI, standard shift work index; 9- PHQ, patient health questionnaire; 10- DQ, demographic questionnaire; 11- NSS, nursing stress scale; 12- IWS, index of work satisfaction; 13- DS, diurnal scale; 14- MSPSS, multidimensional scale of perceived social support; 15- BMI, body mass index; 16- ISI, insomnia severity index; 17- PHQ, patient health questionnaire; 18- SWT, shift work tolerance; 19- M, morning shifts; 20- SSI, standard shift work index; 21- NSC, nurse stress checklist; 22- PSQI, pittsburgh sleep quality index; 23- GHSC, chines health questionnaire; 24- WS, work schedule; 25- BIS, bergen insomnia scale; 26- HADS, hospital anxiety and depression scale; 27- ESS, epworth sleepiness scale; 28- rCTI, revised circadian type inventory; 29- GJSS, general job satisfaction scale; 30-PSQI, pittsburgh sleep quality index; 31- BDI-II, beck depression inventory-II; 32- SSIGBIS, standard shift work index general biographical information section; 33- GHQ, general health questionnaire; 34- t-STAI, t-version of state-trait anxiety inventory; 35- PMS, profile of mood states; 36- PQSI, pittsburgh quality of sleep index; 37- DRS, dispositional resilience (hardiness) scale; 38- CTI, circadian type inventory; 39- FQ, global sleep assessment questionnaire; 40- AUDITC, the alcohol use disorders identification test-consumption; 41- BSWSQ, the bergen shift work sleep questionnaire.

problematic but necessary. In a longitudinal study by Cheng *et al.* (2015), nurses who worked 12-hour shifts reported significantly higher job satisfaction than nurses working 8-hour shifts. In contrast, Šimunić and Gregov (2012) found 12-hour shifts to be associated with lower cognitive-affective

job satisfaction compared with nurses working morning shifts. Teclaw and Osatuke (2014) found that overall job satisfaction was lower in off-shift workers (e.g. evening and night shifts) compared with day workers. A recent study by Rodwell and Fernando (2016) found that shift work alone

was not associated with lower job satisfaction but that job satisfaction was most dependent on work context and other lifestyle factors as opposed to just shift type.

Only five studies in this category directly compared shift workers with non-shift workers and found higher rates of burnout in the shift-working group. The majority of the studies compared various types of shift work and found mixed results regarding the impact on job satisfaction and burnout. Ten of the studies in this group were quantitative and 50% were Category A studies (directly compared shift workers with on-shift workers). Overall, the methodological quality of these studies was very good (84.90), however, only three studies (30%) provided information on the precision of their findings [See estimate of precision supplementary Table S8].

Depression, anxiety and stress

This outcome captures the effect of shift work on psychological states such as depression, anxiety and stress. The measures used to assess these variables included: The nursing stress scale (Gray-Toft & Anderson 1981); Beck Depression Inventory-II (Beck *et al.* 1996); Centre for Epidemiological Studies Depression Scale (Radloff 1977); Patient Health Questionnaire-9 (Kroenke & Spitzer 2002); hospital anxiety and depression scale (Zigmond & Snaith 1983); Taiwan Nurse Stress Checklist (Tsai & Crockett 1993). State-Trait Anxiety Inventory (Spielberger 1983), Profile of Mood States (McNair *et al.* 1971), 12-item version of the General Health Questionnaire (Iwata *et al.* 1988, Goldberg 1972).

The study by Hea Young *et al.* (2015) found that nurses who worked shifts had higher odds of increased severity of depressive symptoms than those nurses who did not work shifts. In a prospective longitudinal study, Berthelsen *et al.* (2015) examined the impact of different shift types on depression and found that night shifts and rotating shifts were not associated with increased chances of 'caseness' of anxiety or depression after 12 months of follow-up. This result was supported by Ruggiero (2005) who found no difference between shift type and level of depression. A correlational study by Jung and Lee (2015) found that nurse shift workers, who had high levels of alertness early in the day (high levels of morningness) and were younger in age, had lower levels of depression. Morningness-eveningness reflects ones' diurnal preferences, those who have high scores on morningness have their peak of alertness earlier in the day compared with those with low scores (Roberts & Kyllonen 1999).

In another longitudinal study, Saksvik-Lehouillier *et al.* (2012) found the relationship between shift work tolerance

and depression was best explained by level of nurse hardiness. Hardiness is a general resilience factor influencing how one copes with stress and illness (Storemark *et al.* 2013). The ability to work shifts without experiencing any negative consequences is referred to as 'Shift Work Tolerance' (Andlauer *et al.* 1978). Similarly, Natvik *et al.* (2011) used regression analysis to determine predictors of depression in nurse shift workers and concluded that the impact of shift work is complex and interrelated with other factors such as morningness, languidity and hardiness.

In terms of stress and anxiety, Faseleh *et al.* (2013) interviewed night shift workers who reported being highly stressed at work. Lin *et al.* (2014) did not find a difference in job stress according to the type of shift worked, but in a later study by the same authors they found that rotating shifts were associated with effort-reward imbalance (Lin *et al.* 2015). In the study by Hoffman and Scott (2003), nurses working 12-hour shifts reported greater levels of stress than those working 8-hour shifts. However, in direct contrast to this study, Cheng *et al.* (2015) found nurses working 12-hour shifts reported less job stress than nurses working 8-hour shifts. One study found fixed shift nurses had higher anxiety and social dysfunction compared with rotating shift nurses (Ardekani *et al.* 2008). Korompeli *et al.* (2014) utilized the Standard Shift Work Index and found female nurses working rotating shifts had higher cognitive and somatic anxiety compared with their morning shift counterparts. Finally, the study by Samaha *et al.* (2007) found anxiety was associated with chronic fatigue in shift workers.

A methodological strength of the studies conducted in this category is that two were longitudinal in design, measuring nurse depression, anxiety and stress over time. However, these studies were conducted among nurse shift workers and so do not provide a direct comparison to non-shift workers. Only six studies compared shift workers with non-shift workers. Among the studies investigating the impact of different types of shifts on depression, anxiety and stress, the findings are inconsistent. Of the 17 studies in this group, 16 were quantitative and only 37.5% directly compared shift with non-shift workers (Category A studies). Overall, the methodological quality of these studies was excellent (93.75), however, only 18% provided information on the precision of their findings [See estimate of precision supplementary Table S8].

Resilience and coping

This outcome captures how well nurses are coping and their level of individual psychological resilience, both which are known to be strongly related to psychological

well-being. Resilience and coping are closely related constructs and so were assessed together. The constructs were measured with the following scales: the 24-item coping questionnaire (Spelten *et al.* 1993); the Dispositional

Resilience (Hardiness) Scale Revised (Hystad *et al.* 2010); the 15-item Short Hardiness Scale (Barton 1995); and the Dispositional Resilience (Hardiness) Scale-Revised (Hystad *et al.* 2010).

Table 4 Studies examining the effects of shift work on resilience and coping.

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Clendon & Walker 2013), New Zealand A	Hospitals & primary healthcare positions (members of the New Zealand Nurse Organization)	Online survey, quant & qual analysis, Cohort, nurses, $n = 3273$ SW ¹ : Mixed of N ³ & D ² , D ² only, permanent N ³	DQ ⁵ included: qualification & nursing experience, nursing employment (setting, field, & shift patterns), intentions to changing employment or retirement, asking about experience of working as late career nurses, validated health score	Thematic analysis, two-tailed <i>t</i> -test
(Flo <i>et al.</i> 2012), Norway A	Norwegian Nurse Organisation's members	Quant, random selection, cross-sectional, nurses, $n = 1968$ SW ¹ : D ² only, N ³ only, two shift rotation, three shifts rotation, other schedule with N ³	DQ ⁵ ; BIS ⁶ ; ESS ⁷ ; HADS ⁸ ; GSAQ ⁹ ; FQ ¹⁰ ; DRS ^{1-15-R} ; DS ¹² ; rCTI ¹³ ; AUDIT-C ¹⁴ ; Caffeine consumption; Use of sleep medications & bright light treatment	Logistic regression analysis
(Pisarski <i>et al.</i> 1998), Australia B	Metropolitan general hospitals	Quant, cross-sectional, female RNs, $n = 172$ SW ¹ : R ⁴ 8 hour	GHQ ¹⁶ , PHQ ¹⁷ , 24-item coping questionnaire, 12-item scale by Caplan <i>et al.</i> , asking about having control over shifts they work	Reflex procedure, square root transformation
(Powell 2013), Australia B	Medical or surgical units of three regional hospitals	Qual, female ENs or RNs with 3-year experience, $n = 14$ SW ¹ : N ³	Semi-structural interviews	Thematic content analysis
(Samaha <i>et al.</i> 2007), Australia B	Three eldercare facilities	Quant, cross-sectional, nurses, $n = 111$ SW ¹ : Regular shifts, irregular shifts, flexible shifts	DQ ⁵ , Checklist Individual Scale, t-STAI ¹⁸ , PMS ¹⁹ , locus of control & behaviour scale, lifestyle appraisal questionnaire, PQSI ²⁰	Pearson's correlations, multiple regression, ANOVA
(Saksvik- Lehouillier <i>et al.</i> 2012), Norway B	Members of the Norwegian Nurses Association	Quant, longitudinal, cohort, female nurses, $n = 642$ SW ¹ : Rotating three shifts: D ² , E ²¹ , N ³	DQ ⁵ ; DRS ²² ; DS ¹² ; CTT ²³ ; ESS ⁷ ; FQ ¹⁰ ; HADS ⁸ ; asking about number of N ³ worked last year, having children, SWT ²⁴ , percentage of full-time position	Hierarchical regression
(Saksvik- Lehouillier <i>et al.</i> 2013), Norway B	Norwegian Nurses from first wave of a longitudinal study	Quant, cross-sectional data derived from a longitudinal study, newly graduate nurses & nurses, $n = 749$ SW ¹ : R ⁴ , D ² , E ²¹ & N ³	DQ ⁵ ; DRS ^{25-15-R} ; DS ¹² - CTI ²³ ; AUDIT-C ¹⁴ ; BIS ⁶ , smoking behaviour, BMI, physical activity, ESS ⁷ , FQ ¹⁰ , HADS ⁸ , asking about sleep medication consumption.	ANCOVA, hierarchical regression
(Storemark <i>et al.</i> 2013), Norway A	Norwegian Nurse Organisation's members	Quant, prospective stratified sample, longitudinal study, nurses, $n = 2048$ SW ¹ : D ² , E ²¹ , N ³	AUDIT-C ¹⁴ ; DS ¹² ; DRS ²⁵ ; rCTI ¹³ ; BSWSQ ²⁶ .	Hierarchical multiple regression

Table 4 (Continued).

Author(s) country, CAT	Setting or context	Design & sample	Measures	Analytical methods
(Saksvik-Lehouillier <i>et al.</i> 2016), Norway B	Members of the Norwegian Nurses Association	Quant, longitudinal, nurses, <i>n</i> = 1877 at baseline, <i>n</i> = 1228 at 1-year follow-up, <i>n</i> = 659 at 2-year follow-up. SW ¹ : R ⁴ , only N ³ , other shift with N ³ & D ²	DRS-15R ²⁵ , questionnaire including: hardiness, SWT ²⁴ (fatigue, sleepiness, anxiety, depression), fair leadership, social & role ambiguity.	Hierarchical multiple regression, ANOVA

1-SW, shift worked; 2-D, day shifts; 3-N, night shifts; 4- R, rotating shifts; 5- DQ, demographic questionnaire; 6- BIS, bergen insomnia scale; 7- ESS, epworth sleepiness scale; 8- HADS, hospital anxiety and depression scale; 9- GSAQ, global sleep assessment questionnaire; 10- FQ, global sleep assessment questionnaire; 11- DRS, dispositional resilience (hardiness) scale; 12- DS, diurnal scale; 13-rCTI, revised circadian type inventory; 14- AUDITC, the alcohol use disorders identification test-consumption; 15-SWD, shift work disorder; 16- GHQ, general health questionnaire; 17- PHQ, patient health questionnaire; 18-t-STAI, t-version of state-trait anxiety inventory; 19- PMS, profile of mood states; 20- PQSI, pittsburgh quality of sleep index; 21- E, evening shifts; 22-DRS, dispositional resilience (hardiness) scale; 23- CTI, circadian type inventory; 24- SWT, shift work tolerance; 25- DRS, dispositional resilience (hardiness) scale; 26 -BSWSQ, the bergen shift work sleep questionnaire.

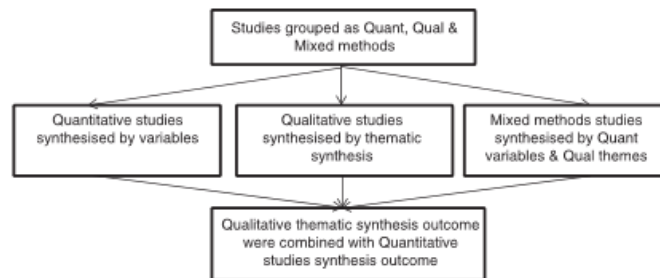


Figure 2 Study design for synthesising articles.

A mixed-method study by Clendon and Walker (2013) examined coping and shift work. They found single participants reported that shift work suited them; while it had a somewhat negative impact on their social and family relationships. Flexible working hours and the ability to do jobs during normal working hours were the positive aspects of shift work highlighted and participants who worked part-time appeared to be coping better with shift work. Participants also used coping mechanisms to help manage the impact of shift work on their health, social and family functioning. These coping techniques included choosing lifestyle-friendly shifts and allocating specific times for sleeping, eating and exercising. They recommended employers could assist with self-rostering and facilitate the work place to have a space for night shift workers to sleep prior to going home after night shifts (Clendon & Walker 2013). Overall, they found that nurses had very different opinions

about working shifts with some reporting negative aspects and others reporting that they have adapted to cope with shifts in a way that they found worked well. The study by Samaha *et al.* (2007) found that maladaptive coping (drinking alcohol, letting emotions out and avoiding the situation) was associated with chronic fatigue in shift workers. Pisarski *et al.* (1998) found a complex relationship between coping and social support in shift workers with disengagement coping (a type of emotion-focused coping) being negatively associated with poorer mental health. Several studies have found that hardiness is associated with better tolerance to shift work (Saksvik-Lehouillier *et al.* 2012, Storemark *et al.* 2013, Saksvik-Lehouillier *et al.* 2013, 2016). This is consistent with the qualitative work of Powell (2013) who found that nurses reported relying on their own levels of resilience to overcome the stress and isolation associated with shift work. Overall, studies that directly

investigated psychological resilience among nurse shift workers are limited. However, they show that both the use of coping strategies and individual level of resilience (hardiness) appears to play an important role in determining nurse psychological functioning in response to working shifts. Only three studies compared shift workers with non-shift workers. There were seven quantitative studies and one mixed-methods study in this group. Of these, only three were Category A studies. While the overall methodological quality of these studies was excellent (98.16) only one study providing information on the precision of their findings [See estimate of precision supplementary Table S8].

Discussion

This review synthesized and evaluated studies that investigated the impact of shift work on the psychological functioning and resilience of nurses. Specifically, we sought to answer the question: Do nurses who work shifts have poorer psychological functioning and lower resilience than those who do not work shifts? The existing evidence indicates that there is currently no clear answer to this question. Although some studies did report negative psychological outcomes for nurses working shifts, this was not a consistent finding across all studies.

Comparing the results of studies is also made more complex by the variety of different measures used to assess the various psychological outcomes. In addition, approximately half of the studies examined outcomes across different types of shifts as opposed to making clear comparisons between shift and non-shift workers. The vast majority of the studies are cross-sectional and therefore several of them only report significant associations between outcomes such as burnout and depression in shift workers. This limits conclusions as to causality of shift work on psychological outcomes.

While recognizing that there are some inconsistencies in the results, overall, the findings of this review suggest several negative psychological outcomes are associated with working shifts. Some of the studies revealed that shift work limited social life and was associated with work/family conflict (Clendon & Walker 2013, Faseleh *et al.* 2013), low levels of well-being (Estryn-Béhar & Beatrice 2012), poor mental health (Lin *et al.* 2012), low levels of job satisfaction, high levels of burnout (Wisetborisut *et al.* 2014) and high rates of neuroticism (Korompeli *et al.* 2014).

Despite these findings, this review highlights the critical importance of studying context when attempting to understand the impact of shift work on nurses. The current evidence suggests that shift work may not have the same

negative impact on all nurses but that how nurses respond to shift work is much dependent on other factors. Some of the factors that emerged in these studies included; how much sleep the nurse was getting, how many days off they had per month, whether they worked part-time or full-time, the gender of the nurse, their level of morningness-eveningness and their level of resilience. Although resilience/hardiness was found to predict how well the nurses tolerated working shifts, it is surprising that only six studies used a resilience scale as their measurement tool to investigate the impact of shift work on nurse resilience (Natvik *et al.* 2011, Flo *et al.* 2012, Saksvik-Lehouillier *et al.* 2012, Storemark *et al.* 2013, Saksvik-Lehouillier *et al.* 2013, 2016).

There is a clear need for more longitudinal and between-groups studies to determine the impact of shift work on the psychological functioning and resilience of nurses. Overall, the methodological quality of the studies was excellent. However, when combined, only 33% provided important information regarding the precision of the results in terms of confidence intervals. More consistent use of outcome measurement tools would facilitate the comparison of study outcomes. Additionally, given the importance of context, studies also need to be conducted among nurses working in a variety of nursing contexts, not only in acute hospitals but also in aged care facilities, home care and community settings. Such research that accounts for individual and contextual factors in determining nurses' well-being (Cusack *et al.* 2016) is essential to understand how to build and maintain resilience in nurses who work shifts. The findings will inform policy makers to promote health in the workforce. This may lead to increased recruitment and retention of nurses alleviating the economic burden associated with shortage of nurses and improve poor quality of patient care associated with higher rates of those negative psychological outcomes.

Conclusion

This integrative review aimed to critically evaluate the evidence regarding the impact of shift work on the psychological functioning and resilience of nurses. The majority of studies were correlational comparing different patterns of shift work schedules and utilized inconsistent outcome measures. Based on the current evidence, we cannot definitively conclude that nurses who work shifts have poorer psychological functioning than those who do not. Instead, the current evidence suggests that for some nurses, shift work is associated with negative psychological outcomes and these outcomes appear highly dependent on contextual and individual factors. Moreover, to clearly understand the impact of shift work on nurse psychological functioning it is

imperative that future studies employ more between-groups, longitudinal designs.

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- substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

Supporting Information

Additional supporting information may be found online in the supporting information tab for this article.

References

- Agho A.O., Price J.L. & Mueller C.W. (1992) Discriminant validity of measures of job satisfaction, positive affectivity and negative affectivity. *Journal of Occupational and Organizational Psychology* 65, 185–195.
- Ahasan R., Mohiuddin G. & Khaleque A. (2002) Psychosocial implications of shift work: a case study. *Work Study* 51, 116–120.
- American Association of Colleges of Nursing (2015). *Using strategic partnerships to expand nursing education programs-2002* [Online]. US. Retrieved from: <http://www.aacn.nche.edu/aacn-publications/issue-bulletin/using-strategic-partnerships> on 04 December 2015.
- Andersson E.P. (1999) Nursing education in the global community. From vocational training to academic education: the situation of the schools of nursing in Sweden. *Journal of Nursing Education* 38, 33–38.
- Andlauer P., Reinberg A., Fourré L., Battle W. & Duverneuil G. (1978) Amplitude of the oral temperature circadian rhythm and the tolerance to shift-work. *Journal de Physiologie* 75, 507–512.
- Ardekani Z.Z., Kakooei H., Ayattollahi S., Chooibineh A. & Seraji G.N. (2008) Prevalence of mental disorders among shift work hospital nurses in Shiraz Iran. *Pakistan Journal of Biological Sciences: PjBS* 11, 1605–1609.

- Australian Commonwealth Government (2011). *Fair Work Australia consolidated award* [Online]. New South Wales. Retrieved from: https://www.fwc.gov.au/documents/consolidated_awards/an/an120129/asframe.html on 31 March 2014.
- Bae S.H. & Fabry D. (2014) Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. *Nursing Outlook* 62, 138–156.
- Barton P. (1995) Short hardiness scale. In: *Paper presented at the Annual Convention of the American Psychological Society* (Reed W., ed.), US Army Medical Research Unit-Germany, New York.
- Barton J., Folkard S., Smith L., Spelten E. & Totterdell P. (1995) The Standard Shiftwork Index: a battery of questionnaires for assessing shiftwork-related problems. *An International Journal of Work, Health & Organisations* 9, 4–30.
- Beck A.T., Steer R.A. & Brown G.K. (1996) *Beck Depression Inventory-II*. The Psychological Corporation, San Antonio, TX.
- Bennett M. (1995) Nursing education in Australian universities: report of the national review of nurse education in the higher education sector 1994 and beyond. *Collegian* 2, 18–22.
- Berthelsen M., Pallesen S., Mageroy N., Tyssen R., Bjorvatn B., Moen B.E. & Knardahl S. (2015) Effects of psychological and social factors in shiftwork on symptoms of anxiety and depression in nurses: a 1-year follow-up. *Journal of Occupational & Environmental Medicine* 57, 1127–37.
- Buchan J. & Dal Poz M.R. (2002) Skill mix in the health care workforce: reviewing the evidence. *Bulletin of the World Health Organization* 80, 575–580.
- Camerino D., Sandri M., Sartori S., Conway P.M., Campanini P. & Costa G. (2010) Shiftwork, work-family conflict among Italian nurses and prevention efficacy. *Chronobiology International* 27, 1105–1123.
- Cameron F. & Brownie S. (2010) Enhancing resilience in registered aged care nurses. *Australasian Journal on Ageing* 29, 66–71.
- Chang S.J., Koh S.B., Kang D., Kim S.A., Kang M.G., Lee C.G., Chung J.J., Cho J.J., Son M. & Chae C.H. (2005) Developing an occupational stress scale for Korean employees. *Korean Journal of Occupational and Environmental Medicine* 17, 297–317.
- Charney D.S. (2004) Psychobiological Mechanisms of Resilience and Vulnerability: implications for Successful Adaptation to Extreme Stress. *The American Journal of Psychiatry* 2, 368–391.
- Cheng T.A. & Williams P. (1986) The design and development of a screening questionnaire (CHQ) for use in community studies of mental disorders in Taiwan. *Psychological medicine* 16, 415–422.
- Cheng C.Y., Liou S.R., Tsai H.M. & Chang C.H. (2015) Job stress and job satisfaction among new graduate nurses during the first year of employment in Taiwan. *International Journal of Nursing Practice* 21, 410–418.
- Clendon J. & Walker L. (2013) Nurses aged over 50 years and their experiences of shift work. *Journal of Nursing Management* 21, 903–913.
- Cohen J. (1960) A coefficient for agreement for nominal scales. *Education and Psychological Measurement* 20, 37–46.
- Colligan T.W. & Higgins E.M. (2006) Workplace stress: etiology and consequences. *Journal of Workplace Behavioural Health* 21, 89–97.
- Commonwealth of Australia (2012). *Information for commonwealth supported students*. ACT: Department of Education, Employment and Workplace Relations.

- Cusack L., Smith M., Hegney D., Rees C.S., Breen L.J., Witt R.R., Rogers C., Williams A., Cross W. & Cheung K. (2016) Exploring environmental factors in nursing workplaces that promote psychological resilience: constructing a unified theoretical model. *Frontiers In Psychology* 7, 1–8.
- Deori (2012) The experience of night registered nurses in an acute care setting: A phenomenological study. *International Journal of Latest Research in Science and Technology* 1(2), D201–D204. Retrieved from http://www.mnkjournals.com/ijlrst_files/download/Vol%201%20Issue%202/31-Doli%20Deori.pdf.
- Donley R. (2005) Challenges for nursing in the 21st century. *Nursing Economic\$* 23, 312–318.
- Eley R., Buikstra E., Plank A., Hegney D. & Parker V. (2007) Tenure, mobility and retention of nurses in Queensland, Australia: 2001 and 2004. *Journal of Nursing Management* 15, 285–293.
- Eley R., Parker D., Tuckett A. & Hegney D. (2010) Career breaks and intentions for retirement by Queensland's nurses - A sign of the times? *Collegian* 17, 38–42.
- Estryn-Béhar M. & Beatrice H. (2012) Effects of extended work shifts on employee fatigue, health, satisfaction, work/family balance and patient safety. *Work* 41, 4283–4290.
- Farzianpour F., Nosrati S.A., Foroushani A.R., Hasanpour F., Jelodar Z.K., Keykale M.S., Bakhtiari M. & Sadeghi N.S. (2016) Relationship Between Shift Work and Personality Traits of Nurses and Their Coping Strategies. *Global Journal of Health Science* 8(5), 166–174.
- Faseleh J.M., Moattari M. & Sharif F. (2013) Novice nurses' perception of working night shifts: a qualitative study. *Journal of Caring Sciences* 2, 169–176.
- Flo E., Pallesen S., Magerøy N., Moen B.E., Gronli J., Nordhus I.H. & Bjorvatn B. (2012) Shift work disorder in nurses - Assessment, prevalence and related health problems. *PLoS ONE* 7, 1–9.
- Gillespie B.M., Chaboyer W. & Wallis M. (2009) The influence of personal characteristics on the resilience of operating room nurses: a predictor study. *International Journal of Nursing Studies* 46, 968–976.
- Glasberg A.L., Eriksson S. & Norberg A. (2007) Burnout and 'stress of conscience' among healthcare personnel. *Journal of Advanced Nursing* 57, 392–403.
- Goldberg D.P. (1972) *The Detection of Psychiatric Illness by Questionnaire: A Technique for the Identification and Assessment of Non-Psychotic Psychiatric Illness* Oxford University Press, London.
- Grafton E., Gillespie B. & Henderson S. (2010) Resilience: the Power Within. *Oncology Nursing Forum* 37, 698–705.
- Gray-Toft P. & Anderson J.G. (1981) The nursing stress scale: development of an instrument. *Journal of Behavioral Assessment* 3, 11–23.
- Gregov L. (1994) *Nametnuti ritam rada kao stresor [Paced work rhythm as a stressor]*. Master Thesis, University of Zagreb.
- Gustafsson G., Eriksson S., Strandberg G. & Norberg A. (2010) Burnout and perceptions of conscience among health care personnel: a pilot study. *Nursing Ethics* 17, 23–38.
- Ha E.H. (2015) Attitudes towards rotating shift work in clinical nurses: a Q-methodology study. *Journal of Clinical Nursing* 24, 2488–2497.
- Haller D. & Graf E. (2006) Graduate nurse perceptions of the work experience. *Nursing Economic\$* 24, 150–155.
- Hea Young L., Mi Sun K., Oksoo K., Il-Hyun L. & Han-Kyoul K. (2015) Association between shift work and severity of depressive symptoms among female nurses: the Korea Nurses' Health Study. *Journal of Nursing Management* 23, 1–9.
- Health Workforce Australia 2025. (2012) *Doctors, nurses and midwives* [Online]. Canberra, ACT: Australian Government. Retrieved from <https://www.hwa.gov.au/our-work/health-workforce-planning/health-workforce-2025-doctors-nurses-and-midwives> 2014 on 05 December 2014.
- Hegney D.G., Craigie M., Hemsworth D., Osseiran-Moisson R., Aoun S., Francis K. & Drury V. (2014) Compassion satisfaction, compassion fatigue, anxiety, depression and stress in Registered Nurses in Australia: study 1 results. *Journal of Nursing Management* 22, 506–518.
- Hinderer K.A., Vonrueden K.T., Friedmann E., McQuillan K.A., Gilmore R., Kramer B. & Murray M. (2014) Burnout, compassion fatigue, compassion satisfaction and secondary traumatic stress in trauma nurses. *Journal of Trauma Nursing* 21, 160–169.
- Hoffman A.J. & Scott L.D. (2003) Role stress and career satisfaction among registered nurses by work shift patterns. *Journal of Nursing Administration* 33, 337–342.
- Hsu M.Y. & Kernohan G. (2006) Dimensions of hospital nurses' quality of working life. *Journal of Advanced Nursing* 54, 120–131.
- Hystad S.W., Eid J., Johnsen B.H., Laberg J.C. & Thomas Bartone P. (2010) Psychometric properties of the revised Norwegian dispositional resilience (hardiness) scale. *Scandinavian Journal of Psychology* 51, 237–245.
- International Council of Nurses. (2007) *Nurses and shiftwork* [Online]. Geneva. Retrieved from: http://www.icn.ch/images/stories/documents/publications/position_statements/C07_Nurses_Shift_Work.pdf 2015 on 05 April 2016.
- Israel B.A., House J.S., Schurman S.J., Heaney C.A. & Mero R.P. (1989) The relation of personal resources, participation, influence, interpersonal relationships and coping strategies to occupational stress, job strains and health: a multivariate analysis. *Work & Stress* 3, 163–194.
- Iwata N., Okuyama Y., Kawakami Y. & Saito K. (1988) The twelve-item general health questionnaire among Japanese workers. *Environmental science, Hokkaido University: Journal of the Graduate School of Environmental Science, Hokkaido University, Sapporo* 11, 1–10.
- Jackson D., Firtko A. & Edenborough M. (2007) Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: a literature review. *Journal of Advanced Nursing* 60, 1–9.
- Jamal M. & Baba V.V. (1997) Shiftwork, burnout and well-being: a study of Canadian nurses. *International Journal of Stress Management* 4, 197–204.
- Jung H.S. & Lee B. (2015) Contributors to shift work tolerance in South Korean nurses working rotating shift. *Applied Nursing Research* 28, 150–155.
- Keogh J. (1997) Professionalization of nursing: development, difficulties and solutions. *Journal of Advanced Nursing* 25, 302–308.
- Kornhaber R.A. & Wilson A. (2011) Building resilience in burns nurses: a descriptive phenomenological inquiry. *Journal of Burn Care & Research* 32, 481–488.

- Korompeli A., Muurlink O., Tzavara C., Velonakis E., Lemonidou C. & Sourtzi P. (2014) Influence of shiftwork on Greek nursing personnel. *Safety and Health at Work* 5, 73–79.
- Kristensen T.S., Borritz M., Villadsen E. & Christensen K.B. (2005) The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work & Stress* 19, 192–207.
- Kroenke K. & Spitzer R.L. (2002) The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric Annals* 32, 509–515.
- Lervak S. & Buck R. (2008) Factors influencing work productivity and intent to stay in nursing. *Nursing Economics* 26, 159–166.
- Lin P.C., Chen C.H., Pan S.M., Pan C.H., Chen C.J., Chen Y.M., Hung H.C. & Wu M.T. (2012) Atypical work schedules are associated with poor sleep quality and mental health in Taiwan female nurses. *International Archives of Occupational and Environmental Health* 85, 877–884.
- Lin P.C., Liao W.C., Chen M.Y. & Fan J.Y. (2014) The impact of shift work on nurses' job stress, sleep quality and self-perceived health status. *Journal of Nursing Management* 22, 604–612.
- Lin P.C., Chen C.H., Pan S.M., Chen Y.M., Pan C.H., Hung H.C. & Wu M.T. (2015) The association between rotating shift work and increased occupational stress in nurses. *Journal of Occupational Health* 57, 307–15.
- Lusk B., Russell R., Rodgers J. & Wilson-Barnett J. (2001) Preregistration nursing education in Australia, New Zealand, the United Kingdom and the United States of America. *The Journal of Nursing Education* 40, 197.
- Ma J.C., Lee P., Yang Y. & Chang W. (2009) Predicting factors related to nurses' intention to leave, job satisfaction and perception of quality of care in acute care hospitals. *Nursing Economics* 27, 178.
- Ma C.C., Andrew M.E., Fekedulegn D., Gu J.K., Hartley T.A., Charles L.E., Violanti J.M. & Burchfiel C.M. (2014) Shift work and occupational stress in police officers. *Safety and Health at Work* 6, 25–29.
- Madide S. (2003) *Effects of Night Shift Schedules on Nurses working in a Private Hospital in South Africa*. Master of Science Programme. Master Degree Thesis, Lulea University of Technology.
- Manzano García G. & Carlos J. (2012) Emotional exhaustion of nursing staff: influence of emotional annoyance and resilience. *International Nursing Review* 59, 101–107.
- Maslach C. & Jackson S.E. (1981) The measurement of experienced burnout. *Journal of Organizational Behavior* 2, 99–113.
- Matheson A., O'Brien L. & Reid J. (2014) The impact of shiftwork on health: a literature review. *Journal of Clinical Nursing* 23, 3309–3320.
- Matos P.S., Neushotz L.A., Griffin M.T.Q. & Fitzpatrick J.J. (2010) An exploratory study of resilience and job satisfaction among psychiatric nurses working in inpatient units. *International Journal of Mental Health Nursing* 19, 307–312.
- Maville J. & Huerta C. (2013) *Health Promotion in Nursing*. Cengage Learning, Clifton Park.
- McDonald G., Jackson D., Wilkes L. & Vickers M.H. (2013) Personal resilience in nurses and midwives: effects of a work-based educational intervention. *Contemporary Nurse: A Journal for the Australian Nursing Profession* 45, 134–143.
- McNair D., Lorr M. & Dropplem L. (1971) *EITS manual for the profile of mood states (POMS)*.
- McVicar A. (2003) Workplace stress in nursing: a literature review. *Journal of Advanced Nursing* 44, 633–642.
- Mealer M., Jones J., Newman J., McFann K.K., Rothbaum B. & Moss M. (2012) The presence of resilience is associated with a healthier psychological profile in intensive care unit (ICU) nurses: results of a national survey. *International Journal of Nursing Studies* 49, 292–299.
- Moher D., Liberati A., Tetzlaff J. & Altman D.G. (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine* 151, 264–269.
- Natvik S., Bjorvatn B., Moen B.E., Mageroy N., Sivertsen B. & Pallesen S. (2011) Personality factors related to shift work tolerance in two-and three-shift workers. *Applied Ergonomics* 42, 719–724.
- Netemeyer R.G., Boles J.S. & McMurrian R. (1996) Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology* 81, 400.
- Nevidjon B. & Erickson J.I. (2001) The nursing shortage: solutions for the short and long term. *Online Journal of Issues in Nursing* 6, 16p.
- Nichols C.W.M., Stahl M.J. & Manley T.R. (1978) A validation of Hoppock's Job Satisfaction Measure. *The Academy of Management Journal* 21, 737–742.
- Niu S.F., Chung M.-H., Chen C.-H., Hegney D., O'Brien A. & Chou K.-R. (2011) The effect of shift rotation on employee cortisol profile, sleep quality, fatigue and attention level: a systematic review. *The Journal Of Nursing Research: JNR* 19, 68–81.
- Pisarski A., Bohle P. & Callan V.J. (1998) Effects of coping strategies, social support and work-nonwork conflict on shift worker's health. *Scandinavian Journal of Work, Environment & Health* 141–145.
- Pluye P., Gagnon M.-P., Griffiths F. & Johnson-Lafleur J. (2009) A scoring system for appraising mixed methods research and concomitantly appraising qualitative, quantitative and mixed methods primary studies in mixed studies reviews. *International Journal of Nursing Studies* 46, 529–546.
- Powell I. (2013) Can you see me? Experiences of nurses working night shift in Australian regional hospitals: a qualitative case study. *Journal of Advanced Nursing* 69, 2172–2184.
- Radloff L.S. (1977) The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement* 1, 385–401.
- Roberts R.D. & Kyllonen P.C. (1999) Morningness-eveningness and intelligence: early to bed, early to rise will likely make you anything but wise! *Personality and Individual Differences* 27, 1123–1133.
- Rodwell J. & Fernando J. (2016) Managing work across shifts: not all shifts are equal. *Journal of Nursing Scholarship* 48, 397–405.
- Ruggiero J.S. (2005) Health, work variables and job satisfaction among nurses. *Journal of Nursing Administration* 35, 254–263.
- Rutter M. (1987) Psychosocial resilience and protective mechanisms. *The American Journal Of Orthopsychiatry* 57, 316–331.
- Saksvik-Lehouillier L., Bjorvatn B., Hetland H., Sandal G.M., Moen B.E., Mageroy N., Harvey A., Costa G. & Pallesen S.

- (2012) Personality factors predicting changes in shift work tolerance: a longitudinal study among nurses working rotating shifts. *Work & Stress* 26, 143–160.
- Saksvik-Lehouillier I., Bjorvatn B., Hetland H., Sandal G.M., Moen B.E., Mageroy N., Åkerstedt T. & Pallesen S. (2013) Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work. *Journal of Advanced Nursing* 69, 1136–1146.
- Saksvik-Lehouillier I., Bjorvatn B., Mageroy N. & Pallesen S. (2016) Hardiness, psychosocial factors and shift work tolerance among nurses - a 2-year follow-up study. *Journal of Advanced Nursing* 72, 1800–1812.
- Samaha E., Lal S., Samaha N. & Wyndham J. (2007). Psychological, lifestyle and coping contributors to chronic fatigue in shift-worker nurses. *Journal of Advanced Nursing* 59, 221–232.
- Sawatzky J.V. & Enns C.L. (2012) Exploring the key predictors of retention in emergency nurses. *Journal of Nursing Management* 20, 696–707.
- Shahriari M., Shamali M. & Yazdannik A. (2014) The relationship between fixed and rotating shifts with job burnout in nurses working in critical care areas. *Iranian Journal of Nursing and Midwifery Research* 19, 360.
- Šimunić A. & Gregov L. (2012) Conflict between work and family roles and satisfaction among nurses in different shift systems in Croatia: a questionnaire survey. *Archives of Industrial Hygiene and Toxicology* 63, 189–197.
- Smith R.G. (1999) *In Pursuit of Nursing Excellence: A History of the Royal College of Nursing, Australia, 1949–1999* Oxford University Press, Melbourne.
- Sorić M., Golubić R., Milošević M., Juras K. & Mustajbegović J. (2013) Shift work, quality of life and work ability among Croatian hospital nurses. *Collegium Antropologicum* 37, 379–384.
- Spelten E., Barton J. & Folkard S. (1993) Have we underestimated shiftworkers' problems? Evidence from a 'reminiscence' study. *Ergonomics* 36, 307–312.
- Spielberger C.D. (1983) *Manual for the State-Trait Anxiety Inventory: STAI (Form Y)* CA, Consulting Psychologists Press, Palo Alto.
- Stamps P. (1997) *Scoring Workbook for the Index of Work Satisfaction*. Market Research, Northampton.
- Storemark S.S., Fossum L.N., Bjorvatn B., Moen B.E., Flo E. & Pallesen S. (2013) Personality factors predict sleep-related shift work tolerance in different shifts at 2-year follow-up: a prospective study. *BMJ Open* 3, e003696.
- Suzuki K., Ohida T., Kaneita Y., Yokoyama E., Miyake T., Harano S., Yagi Y., Ibuka E., Kaneko A. & Tsutsui T. (2004) Mental health status, shift work, and occupational accidents among hospital nurses in Japan. *Journal of Occupational Health* 46, 448–454.
- Teclaw R. & Osatuke K. (2014) Nurse perceptions of workplace environment: differences across shifts. *Journal of Nursing Management* 23, 1137–1146.
- Tei-Tominaga M. (2013) Factors related to the intention to leave and the decision to resign among newly graduated nurses: a complete survey in a selected prefecture in Japan. *Environmental Health and Preventive Medicine* 18, 293–305.
- Tsai S.L. & Crockett M.S. (1993) Effects of relaxation training, combining imagery and meditation the stress level of Chinese nurses working in modern hospitals in Taiwan. *Issues in Mental Health Nursing* 14, 51–66.
- Tuckett A., Hegney D., Parker D., Eley R.M. & Dickie R. (2011) The top eight issues Queensland Australia's aged-care nurses and assistants-in-nursing worried about outside their workplace: a qualitative snapshot. *International Journal of Nursing Practice* 17, 444–454.
- Turner S.B. (2014) The resilient nurse: an emerging concept. *Nurse Leader* 12, 71.
- West S., Boughton M. & Byrnes M. (2009) Juggling multiple temporalities: the shift work story of mid-life nurses. *Journal of Nursing Management* 17, 110–119.
- Whittemore R. & Knaff K. (2005) The integrative review: updated methodology. *Journal of Advanced Nursing* 52, 546–553.
- Wisetborisut A., Angkurawaranon C., Jiraporncharoen W., Uaphanthasath R. & Wiwatanadate P. (2014) Shift work and burnout among health care workers. *Occupational Medicine* 64, 279–286.
- World Health Organisation. (1996) *WHOQOL-BREF introduction, administration, scoring and generic version of the assessment* [Online]. The WHOQOL Group. Retrieved from: http://www.who.int/mental_health/media/en/76.pdf on 07 May 2016.
- Yong C. (2006) Task substitution: the view of the Australian Medical Association. *Medical Journal of Australia* 185, 27.
- Zigmond A.S. & Snaith R.P. (1983) The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67, 361–370.

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Appendix B
Supplementary tables to chapter 2

Supplementary Tables S1–S3: Detailed breakdown of each reviewer’s scores

Supplementary Tables S4–S7: Additional key findings

Supplementary Table S8: Estimate of precision

Appendix B: Table S1
Quality assessment of quantitative articles.

Types of mixed methods study components or primary studies in a SMSR context (Quantitative observational)	Appropriate sampling and sample		Justification of measurements (validity and standards)		Control of confounding variables		Quality score%	
	A	B	A	B	A	B	A	B
Ardekani et al. (2008)	1	1	1	1	1	1	100	100
Brethelsen et al. (2015)	1	1	1	1	1	1	100	100
Camerino et al. (2010)	1	1	1	1	1	1	100	100
Cheng et al. (2015)	1	1	1	0	0	1	67	67
Deori (2012)	0	1	0	0	1	0	67	33
Estryn-Béhar et al.(2012)	1	1	1	1	1	1	100	100
Flo et al. (2012)	0	1	1	1	1	1	67	100
Farzinpour et al. (2016)	1	1	0	0	0	0	67	33
Hoffman & Scott (2003)	1	1	1	1	1	1	100	100
Hea et al. (2015)	1	1	1	1	1	1	100	100
Jung & Lee (2015)	1	1	1	1	0	1	67	100
Jamal et al. (1997)	1	1	1	1	1	1	100	100
Korompeli et al.(2014)	1	1	1	1	1	1	100	100
Lin et al. (2014)	1	1	1	1	1	1	100	100
Lin et al. (2012)	1	1	1	1	1	1	100	100
Lin et al. (2015)	1	1	1	1	1	1	100	100
Natvik et al. (2011)	1	1	1	1	1	1	100	100
Pisarski et al. (1998)	1	1	1	1	1	1	100	100
Ruggiero et al. (2005)	1	1	1	1	1	1	100	100
Rodwell & Fernando (2016)	1	1	1	1	1	1	100	100
Suzuki et al. (2004)	1	1	1	1	1	1	100	100
Samaha et al. (2007)	1	1	1	1	1	1	100	100
Simunic & Gregov(2012)	1	1	0	0	1	1	67	67
Soares et al. (2012)	0	1	1	0	1	1	67	67
Saksvik et al. (2012)	1	1	1	1	1	1	100	100
Saksvik et al. (2013)	1	1	1	1	1	1	100	100
Saksvik et al. (2016)	1	1	1	1	1	1	100	100
Storemark et al. (2013)	1	1	1	1	1	1	100	100
Sorić et al. (2013)	1	1	1	1	1	1	100	100
Shahriari et al. (2014)	1	1	1	1	1	1	100	100
Teclaw & Osatuke(2014)	1	0	1	1	1	1	100	67
Wisetborisut et al. (2014)	1	1	1	1	1	1	100	100

A: Author 1, B: Author 2

Appendix B: Table S2
Quality assessment of qualitative articles.

Types of mixed methods study components / primary studies in a SMSR context (Qualitative)	Qualitative objective/question		Appropriate qualitative approach/design/method		Description of the context		Description of participants & justification of sampling		Description of qualitative data collection & analysis		Discussion of researchers' reflexivity		Quality score%	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Faseleh et al.(2013)	1	1	1	1	1	1	0	0	1	1	1	1	83	83
Ha (2015)	1	1	1	1	1	1	1	1	1	1	1	1	100	100
Powell (2013)	1	1	1	1	1	1	1	1	1	1	1	1	100	100
West et al. (2009)	1	1	1	1	1	1	1	1	1	1	1	1	100	100

A: Author 1, B: Author 2

Appendix B: Table S3
Quality assessment of mixed methods articles.

Types of mixed methods study components /primary studies in a SMSR context (Mixed methods)	Justification of the mixed methods design		Combination of qualitative & quantitative data collection-analysis techniques/procedures		Integration of qualitative & quantitative data /results		Quality score%	
	A	B	A	B	A	B	A	B
Clendon & Walker (2013)	1	1	1	1	1	1	100	100

A: Author 1, B: Author 2

Appendix B: Table S4

Additional findings of studies examining the effects of shift work on general wellbeing and quality of life.

Author(s) country, CAT	Key findings
(Camerino et al., 2010), Italy A	<ul style="list-style-type: none"> • Problems with effective risk communication between workers & people in charge of health & safety, participants in preventative activities, workload, performing non-related task by nurses, & number of weekend/month spent at work were strongly associated with work-family conflict. • Work/family conflict was significantly associated with BO³, sleep, & presenteesim. A mediation impact of work/family conflict was observed in the relationship between job demand & BO³.
(Estryn-Béhar and Beatrice, 2012), Ten European countries A	<ul style="list-style-type: none"> • Nurses worked part time & 12hr day shifts & 8hr night shifts had ↓work/family conflict. • Nurses worked 12hr N² & those mentioned previously had ↑satisfaction with working time than nurses worked day 8hr, 10hr; night 10hr & alternating shifts. • Nurses worked alternating shifts & 10hrs N² reported ↑difficulties with private & family life than those worked day 8hr, 10hr, 12hr; night 8hr, 12hr, & part time. • One-third of nurse day 12hr workers, night 10hrs shifts & alternating shifts reported dissatisfaction with working time regarding their well-being. • Nurses worked day 10hr /12hr shifts, night 12hr shifts & alternating shifts reported ↑ tiredness & ↑ BO³ than nurses working day 8hr, night 8hr/10hr & part time. Extended SW¹ was greatest factor of BO³, low work ability index & frequent worries about making mistakes.
(Faseleh Jahromi et al., 2013), Iran B	<ul style="list-style-type: none"> • Themes: value system, physical & psychological problems, social relationships, organizational problems, appropriate opportunity • ↑Learning opportunities, ↑spiritual promotion, ↑stress, insomnia, sleep disorders, ↑family conflicts, disrupted social activity, feeling unsafe
(Lin et al., 2012), Taiwan A	<ul style="list-style-type: none"> • Nurses worked on rotating shifts had poorer sleep quality & mental health compared to day shifts work nurses. • Rotation shift worker nurses who had more than two days off after their last night shifts reported significant improve sleep quality, & mental health.
(Powell, 2013), Australia B	<ul style="list-style-type: none"> • Dimension: control, & value. • Themes: work relationships, work environment, work practices, personal impact. • Flexibility of hours, better than day shifts, preventing day time stressors, receiving inadequate support from society, lack of value in work.

Author(s) country, CAT	Key findings
(Simunić and Gregov, 2012), Croatia A	<ul style="list-style-type: none"> • ↓conflict between work & family among nurses worked only morning shifts than those worked forward rotation 12hr, 8hr, & backward rotation & irregular 8hr shifts. • Morning shift nurses had highest cognitive evaluative component of job satisfaction compared to nurses worked 12hr shifts with lowest related result. • Affective component of life satisfaction was lowest in nurses worked irregular & backward rotating shifts. SW¹ makes work/family role conflict worse, & kind of shift rotation matters.
(Sorić et al., 2013), Croatia A	<ul style="list-style-type: none"> • Lower education was predictor for ↓work ability & ↓physical health domain of QoL⁴. • More shift workers had poor QoL⁴ in environmental domain than non-shift workers. • Older age & not having partner was significantly associated with ↓social interaction. • No evidence of significant relationship between SW & work ability or QoL⁴. • Education had positive correlation with work ability & QoL⁴.
(West et al., 2009), Australia B	<ul style="list-style-type: none"> • Themes: arranging life around SW¹, intergenerational workplace, constructing a personal temporality, need for control, social effects • Flexibility of hours, ↓social life affected on family, difficulty negotiation for self-rostering.

1-SW: shift worked; 2-N: night shifts; 3-BO: burnout; 4- QoL: Quality of Life.

Appendix B: Table S5:

Additional finding of studies examining the effects of shift work on job satisfaction and burnout.

Author(s) country, CAT	Key findings
(Deori, 2012), India B	<ul style="list-style-type: none"> • Single male night workers were in favour of night shifts & considered it as comfortable shifts. • Night shift had negative influence on the social life of male nurses but not on their health. • 28% of the participants stated having low levels concentration due to working at night.
(Cheng et al., 2015), Taiwan B	<ul style="list-style-type: none"> • Nurses worked 12hrs had less job stress than 8hrs. • Job satisfaction significantly increased within 12month. • Nurses worked 12hrs had higher job satisfaction than 8hrs. • Job stress was negatively correlated with job satisfaction.
(Hoffman & Scott, 2003), USA B	<ul style="list-style-type: none"> • After statistical controlling of differences in nursing experience, similar rates of stress were found in both 8hr & 12hr shifts groups.
(Ha, 2015), Korea B	<ul style="list-style-type: none"> • Factor 1: R² frustrating (objectionable perspective). • Factor 2: R² (constructive perspective). • Factor 3: R² is problematic, but necessary (ambivalent perspective).
(Jamal & Baba, 1997), Canada A	<ul style="list-style-type: none"> • There was a significant difference among nurses working various shifts regarding job satisfaction. • No significant differences in burnout found among nurses working in various shifts. • Nurses on night shifts were suffering more seriously than other four hospitals shifts.
(Ruggiero, 2005), USA B	<ul style="list-style-type: none"> • No significant difference between job satisfaction, mental & physical work load, & perceived control over one's shift schedule, sleep quality, age, & number of individuals who needed care from the participants after work hours among shift worker nurses. • More weekends off per month & lower levels of depression & emotional stress contributed significantly to job satisfaction among nurses.
(Rodwell &Fernando, 2016), Australia B	<ul style="list-style-type: none"> • Significant correlation between Negative Affect and chronotype, age, shifts, psychological distress. • Significant variance in job satisfaction and depression in maternity hospital. • Significant variance in depression in medium-sized hospital. Significant variance in job satisfaction and depression in aged care facilities.

Author(s) country, CAT	Key findings
(Shahriari et al., 2014), Iran	<ul style="list-style-type: none"> • Nurses working fixed shifts had significantly high mean scores in EE³ & DP⁶ subscales compared to those working rotating shifts. • There was no significant difference in mean score of PA⁴ in fixed shift & rotating shift groups. • High levels of BO⁵ in the fixed shift workers were 60%, 32.9% and 27.1% & in rotating shift group were 12.9%, 18.8% & 43.5% in EE³, DP⁶, PA⁴ respectively.
A	<ul style="list-style-type: none"> • BO⁵ was more common in nurses working fixed shift schedules than those working rotating shifts.
(Šimunić and Gregov, 2012), Croatia	<ul style="list-style-type: none"> • ↓conflict between work & family among nurses worked only morning shifts than those worked forward rotation 12hr, 8hr, & backward rotation & irregular 8hr shifts. • Morning shift nurses had highest cognitive evaluative component of job satisfaction compared to nurses worked 12hr shifts with lowest related result.
A	<ul style="list-style-type: none"> • Affective component of life satisfaction was lowest in nurses worked irregular & backward rotating shifts. SW¹ makes work/family role conflict worse, & kind of shift rotation matters.
(Teclaw and Osatuke, 2014), USA	<ul style="list-style-type: none"> • Work/life balance had highest differences among shifts. • Second item with highest ranking differences was characteristics of supervisors. In the VHA, supervisors who assessed nurses' performance were not usually available during off-shifts. This led to rate their supervisors' performance with low marks. Nurses may have thought assessors who not present to evaluate their employees performance, cannot have a fair assessment.
A	
(Wisetborisut et al., 2014), Thailand	<ul style="list-style-type: none"> • BO⁵ was found more frequently among shift worker nurse than those who did not work shifts. • Shift workers who had 6-8 sleeping hours per day had ↓BO⁵ symptoms. • Nurse shift workers who had at least 8 days off per month had ↓odds of BO⁵ compared with those who had fewer than 8 days off, & having ↑years of experience was associated with ↑ BO⁵.
A	

1-SW: shift worked; 2- R: rotating shifts; 3- EE: emotional exhaustion; 4- PA: personal accomplishment;5- BO: burnout;6- DP: depersonalisation

Appendix B: Table S6

Additional findings of studies examining the effects of shift work on depression, anxiety and stress.

Author(s) country, CAT	Key findings
(Ardekani et al., 2008), Iran A	<ul style="list-style-type: none"> • Fixed shift nurses had higher anxiety & social dysfunction compared to rotating shift nurses.
(Brethelsen et al. 2015), Norway A	<ul style="list-style-type: none"> • Shift work was not associated with caseness anxiety or depression. • Effects of shift work on mental distress predicted role clarity, role conflict, fair leadership, and social support. • Job demands predicted symptoms of depression.
(Cheng et al., 2015), Taiwan B	<ul style="list-style-type: none"> • Nurses worked 12hrs had less job stress than 8hrs. • Job satisfaction significantly increased within 12month. • Nurses worked 12hrs had higher job satisfaction than 8hrs. • Job stress was negatively correlated with job satisfaction.
(Faseleh Jahromi et al., 2013), Iran B	<ul style="list-style-type: none"> • Themes: value system, physical & psychological problems, social relationships, organizational problems, appropriate opportunity • ↑Learning opportunities, ↑spiritual promotion, ↑stress, insomnia, sleep disorders, ↑family conflicts, disrupted social activity, feeling unsafe
(Farzinpour et al. 2016), Iran B	<ul style="list-style-type: none"> • Significant relationships between age and physical health, and sex and physical health, and educational level and physical health. • Significant relationships between sex and cognitive, somatic anxiety. • Significant relationships between age and social-family status. • Significant relationships between educational level and sleep and fatigue. • Significant relationships between work experience and coping strategies. • Significant relationships between sleep and fatigue and personality trait.
(Hea et al. 2015), Korea A	<ul style="list-style-type: none"> • Nurse shift workers had 1.5 times greater odds of experiencing a higher severity of depressive symptoms.
(Hoffman & Scott, 2003), USA B	<ul style="list-style-type: none"> • After statistical controlling of differences in nursing experience, similar rates of stress were found in both 8hr & 12hr shifts groups.

Author(s) country, CAT	Key findings
(Jung & lee, 2015), Korea	<ul style="list-style-type: none"> • Self-esteem, job stress and number of N³ were positively related to insomnia. Physical activity was negatively related to insomnia. • Self-esteem, social support & job stress were significantly positively related to fatigue. Morningness, heavy drinking, & physical activity were significantly, negatively related to fatigue. • Self-esteem & job stress had significant positive relationship to depression. Age & morningness had significant negative relationship to depression.
B	<ul style="list-style-type: none"> • Morningness, self-esteem, job stress, and physical activity had significant influence on SWT⁵. • Older shift workers showed ↓ depression. • Morningness was negatively correlated with depression among shift worker nurses.
(Korompeli et al., 2014), Greece	<ul style="list-style-type: none"> • Institute trained nurses presented ↓ job satisfaction than highly educated nurses. • Female nurses worked R⁴ had ↑disengagement & neuroticism, ↑cognitive & somatic anxiety.
B	<ul style="list-style-type: none"> • Divorced/widowed nurses had significantly ↑cognitive anxiety subscale of the cognitive & somatic anxiety questionnaire.
(Lin et al., 2014), Taiwan	<ul style="list-style-type: none"> • Nurses presented with poor sleep, moderate job stress & moderate self-received health, regardless of working shift work. • Job stress was negatively associated to sleep quality, & was directly related to self-perceived health status.
B	
(Lin et al. ,2015), Taiwan	<ul style="list-style-type: none"> • Over-commitment risk was higher in nurses worked rotating shifts than nurses worked day/non-night shifts. • Effort/reward imbalance was not directly associated with shifts. • Nurses worked rotating shifts with 2 days off after night shifts had alleviated risk of over-commitment.
A	<ul style="list-style-type: none"> • Nurses worked for 7 consecutive work days/month had increased risk of effort/reward imbalance. • Nurses who had no planning working hours and shifts and worked overtime at least 3 times/week during preceding 2 months had higher stress.
(Natvik et al., 2011), Norway	<ul style="list-style-type: none"> • Morningness was significantly associated with ↓depressive symptoms in rotating day, evening & N³. • Flexibility was associated with ↑depressive symptoms, & it was significantly negatively associated with insomnia for rotating day, evening & N³. • Languidity was associated with ↑sleepiness, depressive & anxiety symptoms,
B	Hardiness was associated with ↓insomnia, sleepiness, depression & anxiety among R ⁴ nurse workers.
(Ruggiero, 2005), USA	<ul style="list-style-type: none"> • No significant difference between job satisfaction, mental & physical work load, & perceived control over one's shift schedule, sleep quality, age, & number of individuals who needed care from the participants after work hours among shift worker nurses. • More weekends off per month & lower levels of depression & emotional stress contributed significantly to job satisfaction among nurses.

Author(s) country, CAT	Key findings
B	
(Suzuki et al., 2004), Japan A	<ul style="list-style-type: none"> • 69.8% of nurses working SW¹ stated being mentally in poor health. • 55.6% of nurses in without SW¹ group considered being in poor health.
(Samaha et al., 2007), Australia B	<ul style="list-style-type: none"> • Coping by drinking alcohol, letting emotions out, & avoiding situation were significant predictors of chronic fatigue caused by SW¹. • Problem focused coping behaviours were not associated with fatigue. • Participants had lesser issues coping with SW¹ associated problems (sleep, domestic, social & performance).
(Saksvik- Lehouillier et al., 2012), Norway B	<ul style="list-style-type: none"> • Hardiness correlated significantly negatively with depression, & anxiety at Time 2 (T2) at above .3. • Morningness was not linked to any SWT² indicators. • Flexibility was negatively associated to anxiety at T2.
(Storemark et al., 2013), Norway A	<ul style="list-style-type: none"> • Age was negatively, & morningness positively associated with sleep-related day shift tolerance. • Flexibility was positively linked with sleep related evening shift tolerance • Languidity was negatively associated with sleep-related day shift tolerance & sleep-related night shift tolerance.

1-SW: shift worked; 2-D: day shifts; 3-N: night shifts; 4- R: rotating shifts; 5- SWT: Shift Work Tolerance

Appendix B: Table S7

Additional findings of studies examining the effects of shift work on resilience and coping.

Author(s) country, CAT	Key findings
(Clendon and Walker, 2013), New Zealand A	<ul style="list-style-type: none"> • Single/with partner participants felt SW¹ had negative influence on their health; • Those with partner coped better than their single counterparts. • Single nurses felt SW¹ suited them; however, it is disruptive, tiring & led to making mistakes. • SW¹ had negative impact on social/family relationships. • Flexible working hours & ability to do jobs during normal working hours were positive aspects of SW¹. • Nurses worked part time coped better with SW¹. • Nurses used coping mechanisms to deal with SW¹ regarding health, social/ family functioning.eg: choosing lifestyle- friendly shifts, allocating specific sleeping, eating & exercising time. • Nurses recommended self-rostering & facilitating their work place to a space for night shift worker to sleep. • Some decided to work in other field of nursing without SW¹.
(Flo et al., 2012), Norway A	<ul style="list-style-type: none"> • SWD⁴ had positive association with N³, age, number of shift separated by less than 1 hr of time off, number of night shift worked over the past year, insomnia, languidity & anxiety. • Flexibility & gender were negatively related to SWD⁴. After adding BIS⁶ & ESS⁷ gender did not have association with SWD⁴. • After excluding subjects from SWD⁴ positive groups as a result of existence of other sleep disorders, anxiety did not have any relationship with SWD⁴ caseness. • Morningness, depression, use of sleep medication & melatonin were positively linked to SWD⁴ caseness. • Morningness was positively & hardiness negatively associated with SWD⁴ in the crude analysis, but adjusted analysis showed no relationship to SWD⁴.
(Pisarski et al., 1998), Australia B	<ul style="list-style-type: none"> • Structural work-non work conflict mediated effects of social support from supervisors & emotionally expressive coping on psychological symptoms. • Control of shifts mediated effects of social support from supervisors on structural work-non work conflict. • Disengagement coping had direct & mediated effects on psychological & physical health. • Co-worker support mediated effects of social support from supervisors on psychological symptoms.
(Powell, 2013), Australia B	<ul style="list-style-type: none"> • Dimension: control, & value. • Themes: work relationships, work environment, work practices, personal impact. • Flexibility of hours, better than day shifts, preventing day time stressors, receiving inadequate support from society, lack of value in work.

Author(s) country, CAT	Key findings
(Samaha et al., 2007), Australia B	<ul style="list-style-type: none"> • Coping by drinking alcohol, letting emotions out, & avoiding situation were significant predictors of chronic fatigue caused by SW¹. • Problem focused coping behaviours were not associated with fatigue. • Participants had lesser issues coping with SW¹ associated problems (sleep, domestic, social & performance).
(Saksvik- Lehouillier et al., 2012), Norway B	<ul style="list-style-type: none"> • Hardiness correlated significantly negatively with depression, & anxiety at Time 2 (T2) at above .3. • Morningness was not linked to any SWT² indicators. <p>Flexibility was negatively associated to anxiety at T2.</p>
(Saksvik- Lehouillier et al., 2013), Norway B	<ul style="list-style-type: none"> • No significant differences in SWT⁶ among new to N⁵ work nurses & experienced N⁵ nurses. • Young age was associated to ↑SWT⁶. • Hardiness was positively associated to SWT in both groups of nurses. • Morningness was associated to SWT⁶ among new to N⁵ work nurses. • Languidity, work hours per week & caffeine consumption were negatively related to SWT⁶ among experienced nurses. • Flexibility was positively related to SWT⁶.
(Storemark et al., 2013), Norway A	<ul style="list-style-type: none"> • Age was negatively, & morningness positively associated with sleep-related day shift tolerance. • Flexibility was positively linked with sleep related evening shift tolerance • Languidity was negatively associated with sleep-related day shift tolerance & sleep-related night shift tolerance.
(Saksvik et al., 2016), Norway B	<ul style="list-style-type: none"> • Sub-factor commitment can predict fatigue over 1 year and anxiety and depression over 2 years. • Challenge can predict anxiety over 1 year. • Control did not have relationship with SW. • Hardiness did not predict sleepiness. • Social support moderated the relationship between hardiness and shift work tolerance to some degree.

1-SW: shift worked; 2-D: day shifts; 3-N: night shifts; 4-SWD: shift work disorder; 5- SWT: Shift Work Tolerance; 6-BIS: Bergen Insomnia Scale; 7- ESS: Epworth Sleepiness Scale

Appendix B: Table S8
Estimates of precision for quantitative studies.

Quantitative studies	Variables	Pvalue/OR ¹	SD	Mean	CI	F Distribution	β
Ardekani et al. (2008)	Depression	0.23	3.5	2.70			
	Anxiety	0.03	4.1	7.20			
Brethelsen et al. (2015)	Anxiety & night shift	1.24OR			0.64-2.40		
	Depression & night shift	1.73OR			0.70-4.30		
Camerino et al. (2010)	Work/family conflict & night shift	0.06			-0.01-0.44		
Cheng et al. (2015)	Job satisfaction in 12 months	<0.001	8.61	65.18			
	Job stress in 12 months	0.18	30.21	88.90			
(Clendon and Walker, 2013), New Zealand	Health related quality of life & pain, anxiety & activities of daily living	=0.07					
Deori (2012)	Psychosocial aspects night shift	Not provided					
Estryn-Béhar et al.(2012)	Work/family conflict & night shift	Not significant			0.66-1.21		
	Dissatisfied working time/private life & night shift	Not significant			0.72-1.30		
	Dissatisfied working time/wellbeing & night shift	Not significant			0.92-1.67		
Flo et al. (2012)	Flexibility	0.97 OR			0.94-0.99		
	Depression	1.26OR			1.21-1.30		
	Hardiness	0.92OR			0.90-0.94		
Farzinpour et al. (2016)	Cognitive-somatic anxiety	<0.05					
	Coping strategies	<0.05					
Hoffman & Scott (2003)	Role stress	0.04	13.3	71.7			
Hea et al. (2015)	Depression & shift work	<0.001			1.380-1.674		

Quantitative studies	Variables	Pvalue/OR ¹	SD	Mean	CI	F Distribution	β
Jung & Lee (2015)	Morningness & depression	<0.05					-0.18
	Job stress & depression	<0.001					0.21
Jamal et al. (1997)	Burnout	<0.05					
	Job satisfaction	<0.05					
Korompeli et al.(2014)	Cognitive anxiety						0.90
	Somatic anxiety						0.34
	Shift time satisfaction	<0.001					-5.92
	Neuroticism						0.10
Lin et al. (2014)	Job stress	<0.80					
Lin et al. (2012)	Mental health & rotating shifts	1.91OR			1.39-2.63		
Lin et al. (2015)	Effort/reward imbalance & rotating shifts	<0.0001			1.03-4.66		
	Over commitment & rotating shifts	0.005			1.03-4.66		
Natvik et al. (2011)	Morningness	<0.05				(12,1373) =2841	0.13
	Flexibility	<0.01				(12,1373) =2841	0.11
	Languidity	<0.01				(12,1373) =2841	0.03
	Hardiness	<0.01				(12,1373) =2841	0.05
Pisarski et al. (1998)	Path model with good fit	>0.23					
Ruggiero et al. (2005)	General job satisfaction	-0.17					
	Emotional stress	0.64					
Rodwell & Fernando (2016)	Jab satisfaction &afternoon/night shift	<0.05					
	Well-being &afternoon/night shift	<0.01					
	Psychological distress &afternoon/night shift	<0.01					
	Depression &afternoon/night shift	<0.01					
Suzuki et al. (2004)	Poor Mental health	<0.0001					

Quantitative studies	Variables	Pvalue/OR ¹	SD	Mean	CI	F Distribution	β
Samaha et al. (2007)	Little difficulty coping	<0.001					-0.32
	Letting emotions out	0.193					0.12
Simunic & Gregov(2012)	Psychological work demands		1	3.64			
	Work/family conflict		1.27	3.43			
Soares et al. (2012)	Wellbeing	Not provided					
	Social condition	Not provided					
Saksvik et al. (2012)	Morningness	0.01	3.3	17.9			-0.05
	Languidity	0.01	3.5	20.8			-0.05
Variable & Anxiety	Hardiness	<0.01	4.1	31.7			-0.09
	Flexibility	<0.01	3.7	12.2			-0.10
Saksvik et al. (2013), New to night nurses	Morningness	<0.05					0.15
	Languidity	=0.03					-0.13
	Hardiness	<0.01					0.01
	Flexibility	=0.03					0.37
Saksvik et al. (2016)	Anxiety	<0.001	3.47	4.72			0.62
	Depression	<0.001	2.88	2.74			0.49
Storemark et al. (2013)	Morningness	<0.001					0.17
	Languidity	<0.001					-0.23
	Hardiness	<0.001					0.15
	Flexibility	<0.001					0.20
Sorić et al. (2013)	Psychological health	0.86 OR			0.65-1.18		
	Social interaction	1.02OR			0.76-1.86		
Shahriari et al. (2014)	Emotional exhaustion	10.1OR			4.68-21.75		
	Depersonalisation	2.20OR			1.19-4.21		
	Personal accomplishment	0.61OR			0.33-1.13		
Teclaw & Osatuke(2014)	Work/life balance			0.34	0.25-0.45		
Wisetborisut et al. (2014)	Burnout	<0.05			1.0-1.9		

1- OR: Odds ratio;

-Significant results were bold.

Appendix C Ethics Approval



Curtin University

Office of Research and Development

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02-Sep-2016

Name: Clare Rees
Department/School: School of Psychology and Speech Pathology
Email: C.Rees@curtin.edu.au

Dear Clare Rees

RE: Annual report acknowledgment
Approval number: SONM-25-2013

Thank you for submitting an annual report to the Human Research Ethics Office for the project **Your Work, Your Time, Your Life**.

The Human Research Ethics Office acknowledges the project is ongoing and approval will remain current until 07-Jul-2017.

Any special conditions noted in the original approval letter still apply.

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
 - proposed changes to the approved proposal or conduct of the study
 - unanticipated problems that might affect continued ethical acceptability of the project
 - major deviations from the HREC approved protocol procedures and/or regulatory guidelines
 - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the [Western Australian University Sector Disposal Authority \(WAUSDA\)](#) and the [Curtin University Research Data and Primary Materials policy](#)
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Ethics approval is dependent upon ongoing compliance of the research with the [Australian Code for the Responsible Conduct of Research](#), the [National Statement on Ethical Conduct in Human Research](#), applicable legal requirements, and with Curtin University policies, procedures and governance requirements

12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

A handwritten signature in black ink, appearing to read 'C. Gangell', written in a cursive style.

Dr Catherine Gangell
Manager, Research Integrity

Appendix D
On-line self-report survey

Are you currently in paid employment in NURSING in Queensland?

No Yes

2. Do you currently have more than one paid job?

No (go to Q4) Yes, but not all are in nursing Yes, and all are in nursing

3. If you currently have more than one paid job, what is the MAIN reason for this? (one response only)

- Maintaining clinical skills in other areas
- Cannot find full-time employment
- Insufficient income from one job
- Running a family business
- Other financial reasons
- Choice/Lifestyle balance
- Variety/Diversity of two jobs
- Cannot find full time employment
- Other (please specify):

4. In the last 12 months, have you worked for a nursing agency?

No (go to Q6) Yes

5. Is the nursing agency currently your MAIN employer?

No Yes

If you have more than one paid job, please answer the rest of the questions in this questionnaire in relation to what you consider to be your MAIN nursing job, unless otherwise stated.

6. How long have you worked for your employer in your MAIN nursing job?

- Less than 12 months 5 years to less than 10 years
- 1 year to less than 2 years 10 years to less than 15 years
- 2 years to less than 5 years 15 years or more

7. What is the postcode of the place of employment in your MAIN nursing job?

8. What type of workplace is your MAIN place of employment?

- | | |
|--|--|
| <input type="checkbox"/> Public Sector acute | <input type="checkbox"/> Public Sector aged care |
| <input type="checkbox"/> Private Sector acute | <input type="checkbox"/> Private Sector aged care |
| <input type="checkbox"/> Public Community health | <input type="checkbox"/> Nursing agency |
| <input type="checkbox"/> Private Community health | <input type="checkbox"/> Public Other (please specify)
_____ |
| <input type="checkbox"/> Private domiciliary nursing | <input type="checkbox"/> Private Other (please specify)
_____ |

For Questions 9 and 10 please indicate your classification level and NOT your position title.

9. If you are employed in the private sector, are you a/an....?

- Assistant in Nursing
- Enrolled Nurse
- Endorsed Enrolled Nurse
- Level 1 Registered Nurse
- Level 2 Registered Nurse
- Level 3 Registered Nurse
- Level 4 Registered Nurse
- Level 5 Registered Nurse
- Other (please specify)

10. If you are employed in the private sector, are you a/an....?

- Assistant in Nursing
- Enrolled Nurse
- Endorsed Enrolled Nurse
- Enrolled Nurse (Advance Practice)
- Nursing Officer Level 1
- Nursing Officer Level 2
- Nursing Officer Level 3

- Nursing Officer Level 4
 - Nursing Officer Level 5
 - Nursing Officer Level 6
 - Nursing Officer Level 7
 - Nursing Officer Level 8
 - Nursing Officer Level 9
 - Other (please specify)
-

11. Are you employed.....?

- Permanent full-time
- Permanent part-time
- Casual
- Temporary full-time
- Temporary part-time

12. If you are currently employed part-time or casually, would you prefer to work more shifts?

- No Yes

13. In the last FOUR weeks, were you employed.....?

- | | |
|---|---|
| <input type="checkbox"/> Working three shifts (am, pm, nights) | <input type="checkbox"/> Morning and evening shift worker |
| <input type="checkbox"/> Day shift worker (between 6 a.m. and 6 p.m.) | <input type="checkbox"/> Evening and night shift worker |
| <input type="checkbox"/> Evening shift worker only | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Night shift worker only | <input type="checkbox"/> |
-

14. Over the last four weeks of your employment, have you MAINLY worked.....?

- Weekends only
- Mon-Fri only
- Over all 7 days

15. In the last four weeks, how many extra hours (outside of your contracted employment) have you worked?

_____ Hours

1. Permanent full-time staff: an employee who is engaged in a permanent capacity for 38 hours per week

2. Permanent part-time: an employee who is engaged in a permanent capacity for less than 38 hours per week
3. Casual: an employee who is engaged on a daily engagement (i.e. should not appear on a roster)
4. Temporary full-time: an employee who is engaged on a fixed term contract for 38 hours per week
5. Temporary part-time: an employee who is engaged on a fixed term contract for less than 38 hours per week
16. Have changes in your health service meant there are less nurses employed on shifts?
 Yes No
17. If yes, what has been the effect of fewer nurses employed on shifts?
-
-

18. Are you able to complete your job to your satisfaction within the paid time available?
- Never or very seldom
 - Seldom
 - Sometimes
 - Mostly
 - Always or nearly always
19. In your professional opinion as a nurse, over the last 6 months (or less if you have been in your current job for less than 6 months), were sufficient staff employed in your work unit (e.g. ward) to meet patient/client/resident needs (including physical, social and mental health needs)?
- Never or very seldom
 - Seldom
 - Sometimes
 - Mostly
 - Always or nearly always (go to Q25)
20. In your professional opinion as a nurse, over the last 6 months (or less if you have been in your current job for less than 6 months), was the skill mix of nursing staff employed in your work unit adequate to meet the daily needs of patients/clients/residents?
- Never or very seldom
 - Seldom
 - Sometimes
 - Mostly (go to Q22)

- Always or nearly always (go to Q22)

21. If in Question 20, you indicated that the skill mix was never or very seldom, seldom or sometimes adequate, is this because of?

- Too many inexperienced staff
- Too few relief/agency staff available
- Too few experienced staff
- Lack of funding to employ appropriate staff
- Too many unlicensed care providers
- Employer policy on the minimum skill mix for the facility
- Too many agency staff used
- Not enough RNs
- Too many casual staff used
- Other (please specify)

22. Were the number and/or type of shifts and/or hours you worked over the last FOUR weeks of your employment affected by any of the following? (Please mark all responses that apply)

- Sporting commitments
- Not enough staff
- Other staff leave/absences
- Your health/illness
- Family responsibilities
- Planned leave
- Staff turnover
- Other (please specify)

- Study/education commitments

23. What family responsibilities do you have that may affect your capacity to work? (Please mark all responses that apply)

- None
- Dependant, disabled or ill family member(s)
- Dependent husband/wife/partner
- Dependant parent
- Dependent child or children
- Dependant other relative(s)
- Dependent grandchildren
- Other/s (please specify)

YOUR PROFESSIONAL DEVELOPMENT

24. If you are a registered or enrolled nurse, are you able to complete the 20 hours of continuing professional education per year that is now a requirement for your registration?

- Yes No

25. In your professional opinion, are new nursing graduates given adequate support at your workplace?

- Not applicable
- Yes
- No
- Don't know

26. In your professional opinion, do nurses, whether experienced or inexperienced, receive appropriate orientation when starting work in new clinical areas?

- Not applicable
- No
- Sometimes
- Yes
- Don't know

27. How satisfied are you with your career progression opportunities in nursing?

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very dissatisfied

28. In your professional opinion what are the current barriers to your career advancement in nursing? (Please mark all responses that apply)

- There are no opportunities for advancement within my clinical stream
- There is a cap (limitation) on the number of promotional positions available
- No other career opportunities within nursing interest me
- Restructuring has reduced the number of senior nursing positions
- Loss of earning (e.g. loss of shift penalties)
- My responsibilities outside of work prevent me from advancing
- None of the above
- Other (please specify) _____

29. How long have you worked in nursing overall? _____ years

30. How long do you expect to work in nursing in the future? _____ years

31. If you are contemplating leaving nursing in the next 12 months please provide us with the reasons for this decision. (Please mark all responses that apply)

- I want to retire

- I can earn more money elsewhere
- I dislike the shift work
- I feel disillusioned with nursing
- I feel I have nothing left to give
- Health concerns
- Family responsibilities
- I plan to start a family
- I see my career moving beyond nursing
- Other (please specify) _____

32. Are you currently employed as a midwife?

- Yes No

33. Are you?

- Male Female

34. How old are you? _____(in years)

35. Do you identify as a/an...(select more than one)?

- Aboriginal person
- Torres Strait Islander
- South Sea Islander

36. Are you from a non-English speaking background (Culturally and Linguistically Diverse)?

- No Yes

37. Are you?

- An Australian Citizen
- Permanent Resident
- Section 457/other visa holder

38. Do you identify as a person with a disability?

- No (go to Q40) Yes

39. If Yes, have you acquired a disability as a result of your nursing work?

- No Yes

Appendix E

Professional Quality of Life Scale

This scale measures compassion satisfaction and compassion fatigue (burnout and secondary traumatic stress). It has been used nationally and internationally to measure these constructs in nurses. It talks about being a helper. In this case, a helper is the nurse.

When you help people you have direct contact with their lives. As you may have found, your compassion for those you help can affect you in positive and negative ways. Below are some questions about your experiences, both positive and negative, as a helper. Consider each of the following questions about you and your current work situation. Circle the number that honestly reflects how frequently you experienced these things in **the last 30 days**.

Please circle **ONLY** one option in each of the following statements. Over the last 30 days.

	Never	Rarely	Sometimes	Often	Very often
1. I am happy.	1	2	3	4	5
2. I am preoccupied with more than one person I help.	1	2	3	4	5
3. I get satisfaction from being able to help people.	1	2	3	4	5
4. I feel connected to others.	1	2	3	4	5
5. I jump or am startled by unexpected sounds.	1	2	3	4	5
6. I feel invigorated after working with those I help.	1	2	3	4	5
7. I find it difficult to separate my personal life from my life as a helper.	1	2	3	4	5
8. I am not as productive at work because I am losing sleep over traumatic experiences of a person I help.	1	2	3	4	5
9. I think that I might have been affected by the stress of those I help.	1	2	3	4	5
10. I feel trapped by my job as a helper.	1	2	3	4	5
11. Because of my helping, I have felt "on edge" about various things.	1	2	3	4	5
12. I like my work as a helper.	1	2	3	4	5
13. I feel depressed because of the traumatic experiences of the people I help.	1	2	3	4	5
14. I feel as though I am experiencing the trauma of someone I have helped.	1	2	3	4	5
15. I have beliefs that sustain me.	1	2	3	4	5

	Never	Rarely	Sometimes	Often	Very often
16. I am pleased with how I am able to keep up with helping techniques and protocols.	1	2	3	4	5
17. I am the person I always wanted to be.	1	2	3	4	5
18. My work makes me feel satisfied.	1	2	3	4	5
19. I feel worn out because of my work as a helper.	1	2	3	4	5
20. I have happy thoughts and feelings about those I help and how I could help them.	1	2	3	4	5
21. I feel overwhelmed because my workload load seems endless.	1	2	3	4	5
22. I believe I can make a difference through my work.	1	2	3	4	5
23. I avoid certain activities or situations because they remind me of frightening experiences of the people I help.	1	2	3	4	5
24. I am proud of what I can do to help.	1	2	3	4	5
25. As a result of my helping, I have intrusive, frightening thoughts.	1	2	3	4	5
26. I feel "bogged down" by the system.	1	2	3	4	5
27. I have thoughts that I am a "success" as a helper.	1	2	3	4	5
28. I can't recall important parts of my work with trauma victims.	1	2	3	4	5
29. I am a very caring person.	1	2	3	4	5
30. I am happy that I chose to do this work.	1	2	3	4	5

1. What concerns you the most about the future of the nursing and midwifery professions?

2. What areas should the QNU be focusing on to address these concerns?

3. Thinking of yourself as a member of the community, from the following list, choose the three most important matters that you believe will affect yourself and the community into the future?

- Crime
- Cost of living
- Health and aged care
- Job security

- Adequacy of income in retirement
- Child care
- Terrorism
- Environmental degradation
- Other (please specify) _____

Appendix F
Three steps followed to score the ProQoL by SPSS

Step1: Recoding:

```
pq1 pq4 pq15 pq17 pq29 (1=5) (2=4) (3=3) (4=2) (5=1) INTO pq1R pq4R  
pq15R pq17R pq29r
```

```
COMPUTE CS = SUM (pq3, pq6, pq12, pq16, pq18, pq20, pq22, pq24,  
pq27, pq30).
```

```
COMPUTE Burnout = SUM (pq1r, pq4r, pq8, pq10, pq15r, pq17r, pq19,  
pq21, pq26, pq29r).
```

```
COMPUTE STS = SUM (pq2, pq5, pq7, pq9, pq11, pq13, pq14, pq23, pq25,  
pq28)
```

Step2: Converting raw score to Z score.

Step3: Converting Z score to a t-score

```
COMPUTE tCS = (ZCS*10) +50
```

```
COMPUTE tBO = (ZBO*10) +50
```

```
COMPUTE tSTS = (ZSTS*10) +50
```

Appendix G DASS 21

This scale is used to measure mood symptoms over the past week. It is not a diagnostic tool, rather it gives us an indication of the levels of stress, anxiety and depression at the time you complete the survey.

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

Please circle **ONLY** one option in each of the following statements

Over the last week

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (e.g. in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Appendix H Spielberger Trait Scale

This scale is a commonly used survey measure of trait anxiety.

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate value to the right of the statement to indicate how you generally feel. There are no right or wrong answers.

Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

Please circle **ONLY** one option in each of the following statements

	Almost never	Sometimes	Often	Almost always
I feel pleasant	1	2	3	4
I feel nervous and restless	1	2	3	4
I feel satisfied with myself	1	2	3	4
I wish I could be as happy as others seem to be	1	2	3	4
I feel like a failure	1	2	3	4
I feel rested	1	2	3	4
I am "calm, cool and collected"	1	2	3	4
I feel like difficulties are piling up so that I cannot overcome them	1	2	3	4
I worry too much over something that really	1	2	3	4
I am happy	1	2	3	4
I have disturbing thoughts	1	2	3	4
I lack self-confidence	1	2	3	4
I feel secure	1	2	3	4
I make decisions easily	1	2	3	4
I feel inadequate	1	2	3	4
I am content	1	2	3	4
Some unimportant thought runs through my mind and bothers me	1	2	3	4
I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
I am a steady person	1	2	3	4

I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4
---	---	---	---	---

Appendix I

Scoring of STAI

The scoring weights for the S-Anxiety and T-Anxiety scales were reversed for the anxiety absent. These items include: S-Anxiety: 1,2,5,10,11,15,16,19,20; T-Anxiety: 21,23,26,27,30,33,34,36,39. To score each respondent's answers, the total scoring weights on the stencil answer sheet was calculated (considering the reverse scoring), and then was interred and recoded to categories of either below or equal/above 50 in SPSS. The scores for both anxiety scales can be different from 20 to 80.

Appendix J Connor Davidson Resilience Scale

This scale has been developed to measure stress, coping, ability or resilience. It has previously been used to measure resilience in nursing populations in Australia and the USA.

Please circle **ONLY** one option in each of the following statements

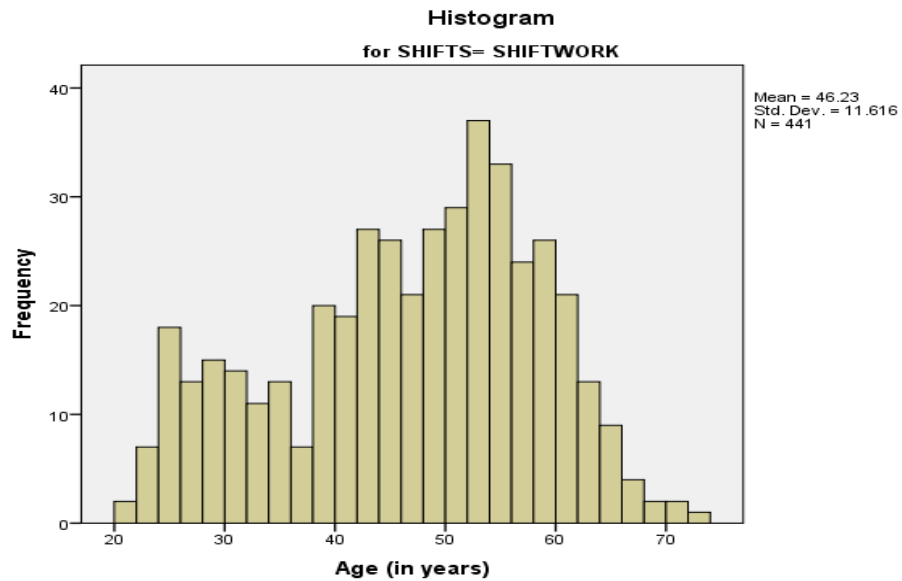
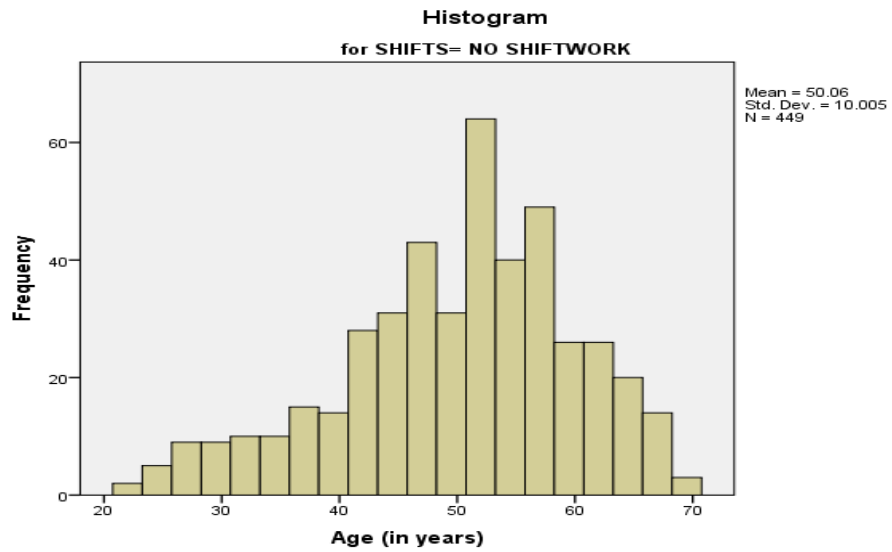
	Not at all true	Rarely true	Sometimes true	Often true	Nearly always true
I am able to adapt to change.	1	2	3	4	5
I form close and secure relationships.	1	2	3	4	5
Sometimes fate or god can help.	1	2	3	4	5
I can deal with whatever comes.	1	2	3	4	5
Past success give me confidence for new challenges.	1	2	3	4	5
I see the humorous side of things.	1	2	3	4	5
Coping with stress strengthens.	1	2	3	4	5
I tend to bounce back after illness or hardship.	1	2	3	4	5
Things happen for a reason.	1	2	3	4	5
I make the best effort, no matter what.	1	2	3	4	5
I can achieve my goals.	1	2	3	4	5
When things look hopeless I don't give up.	1	2	3	4	5
I know where to turn for help.	1	2	3	4	5
Under pressure, I am able to focus and think clearly.	1	2	3	4	5
I prefer to take the lead in problem-solving	1	2	3	4	5
I am not easily discouraged by failure	1	2	3	4	5
I think of myself as strong person	1	2	3	4	5

I sometimes have to make unpopular or difficult decisions	1	2	3	4	5
I can handle unpleasant feelings	1	2	3	4	5
I am able to act on a hunch	1	2	3	4	5
I have a strong sense of purpose	1	2	3	4	5
I am in control of my life	1	2	3	4	5
I like challenges	1	2	3	4	5
I work to attain my goals	1	2	3	4	5
I take pride in my achievements	1	2	3	4	5

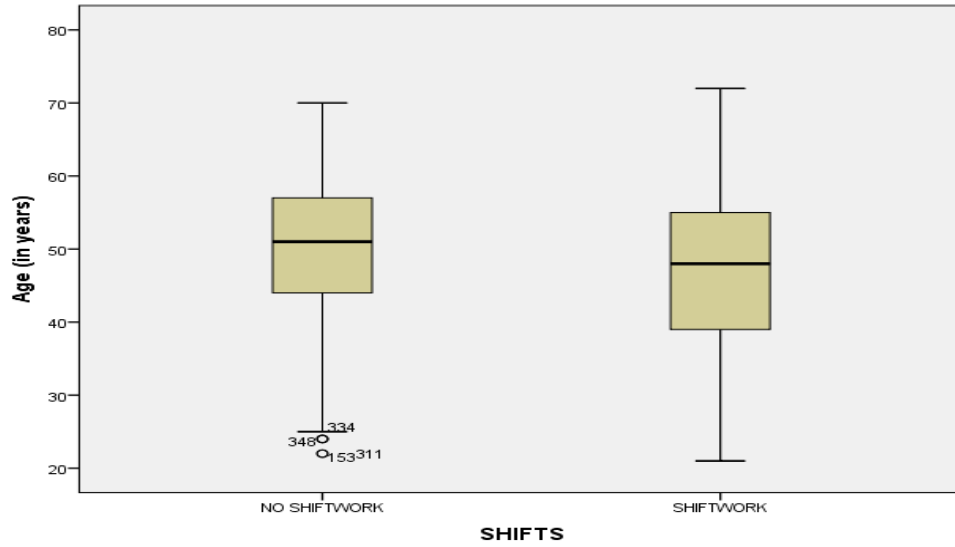
Appendix K

Histograms and boxplots of age, length of experience, anxiety, depression, stress, CS, burnout, resilience, and TNA among shift and non-shift workers

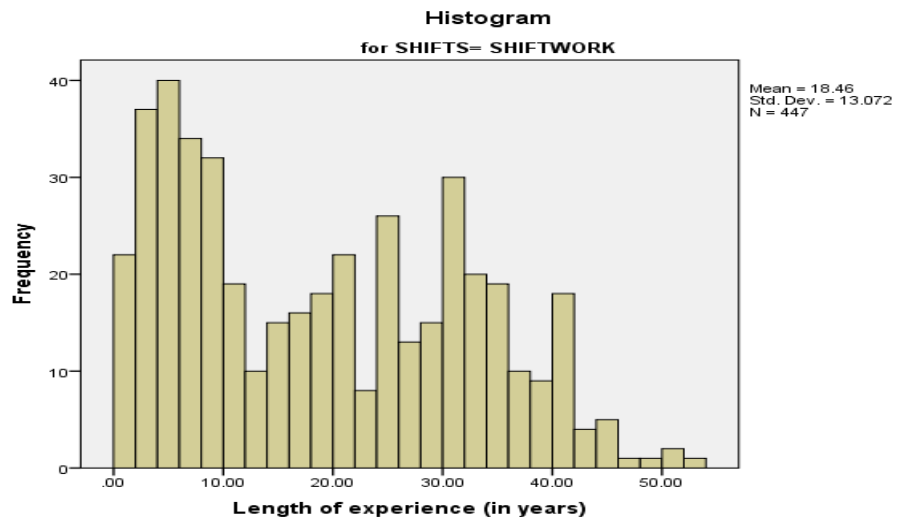
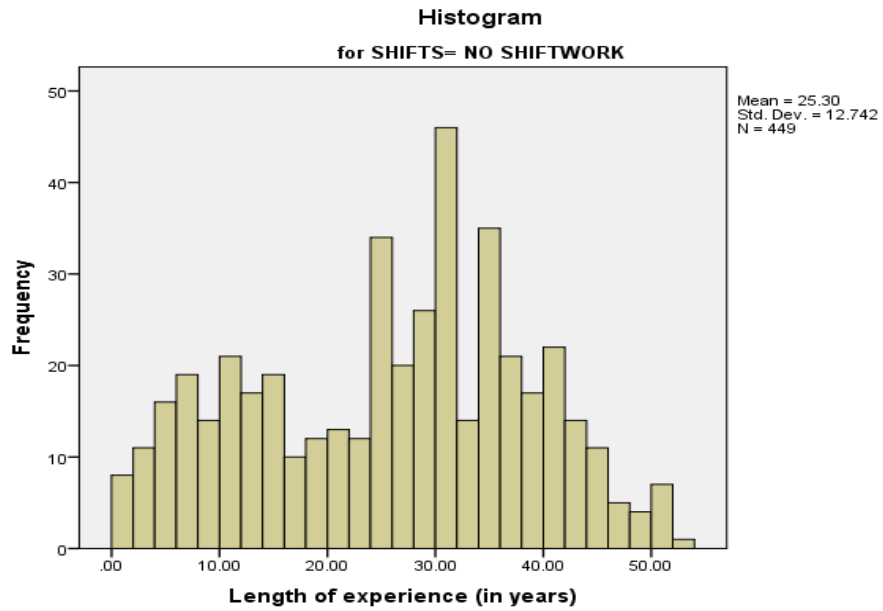
Appendix K: Age

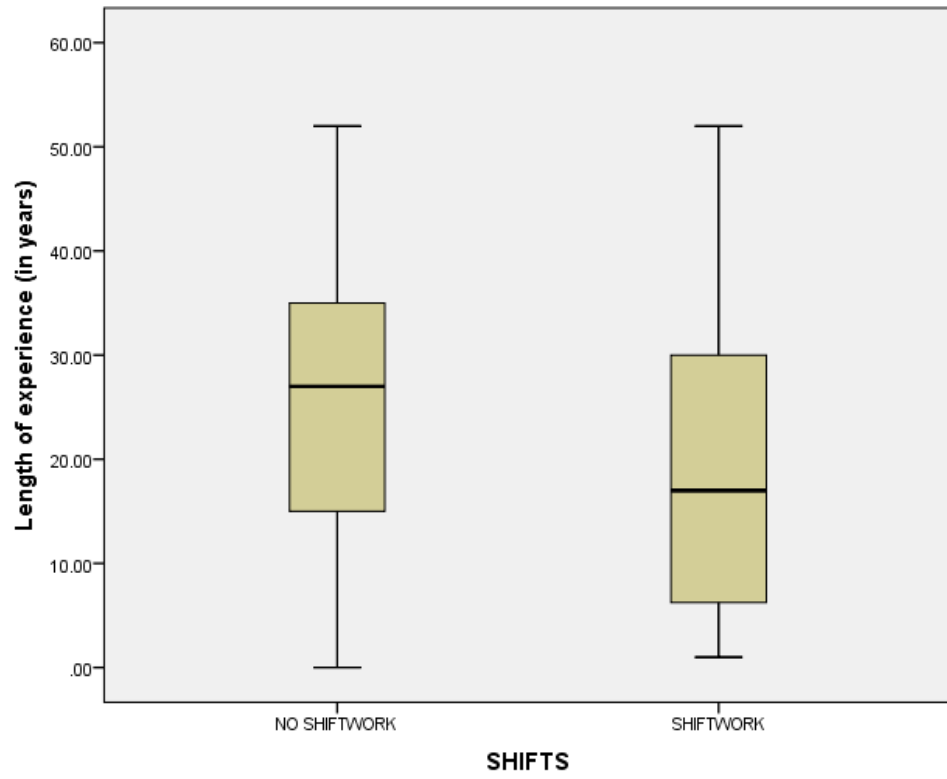


Appendix K: Shifts

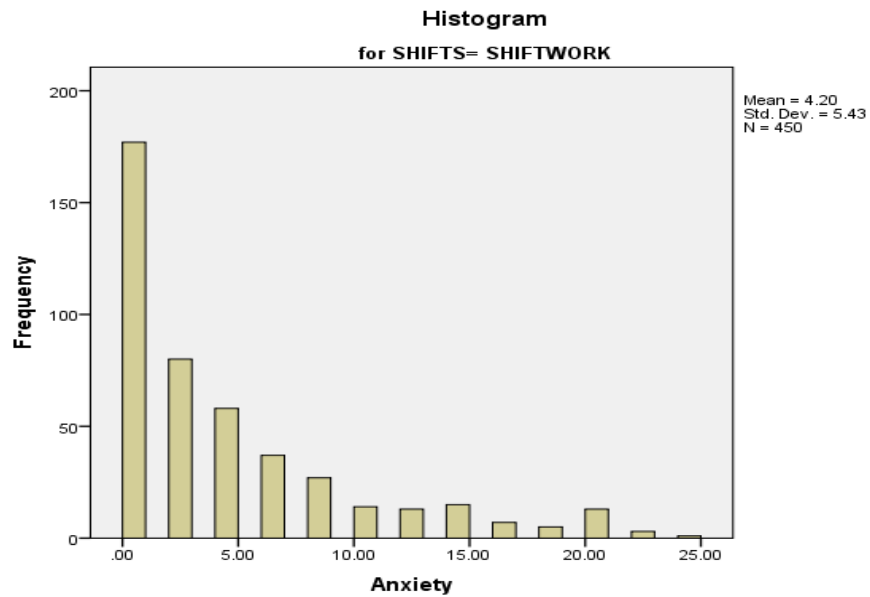
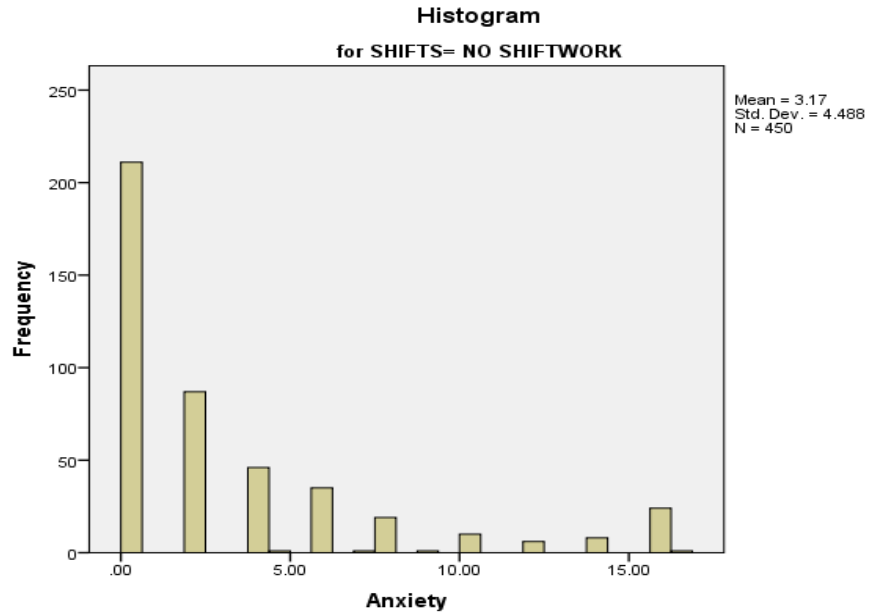


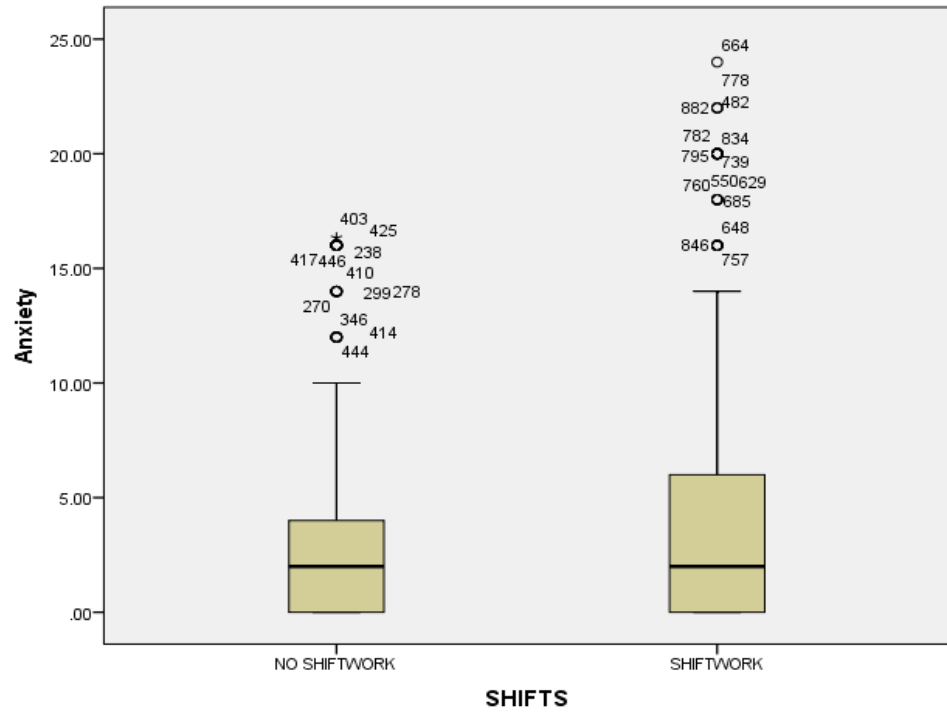
Appendix K: Length of experience among shift workers and non-shift workers



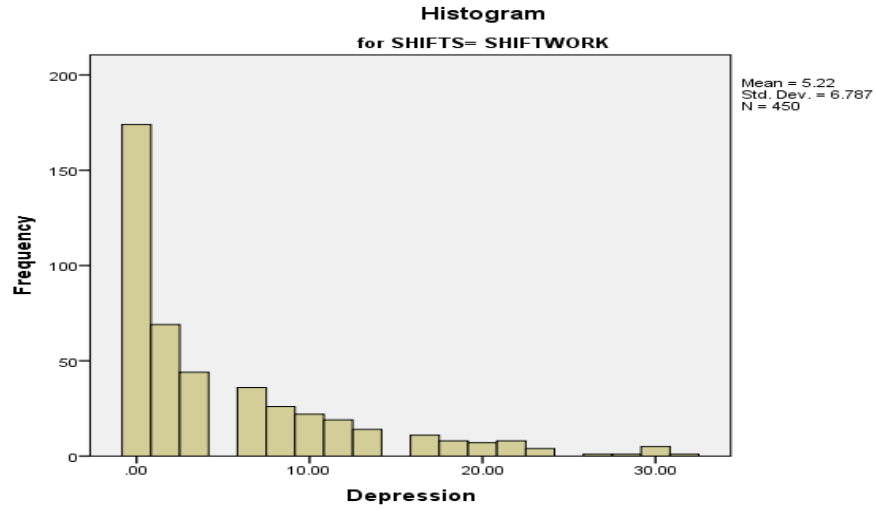
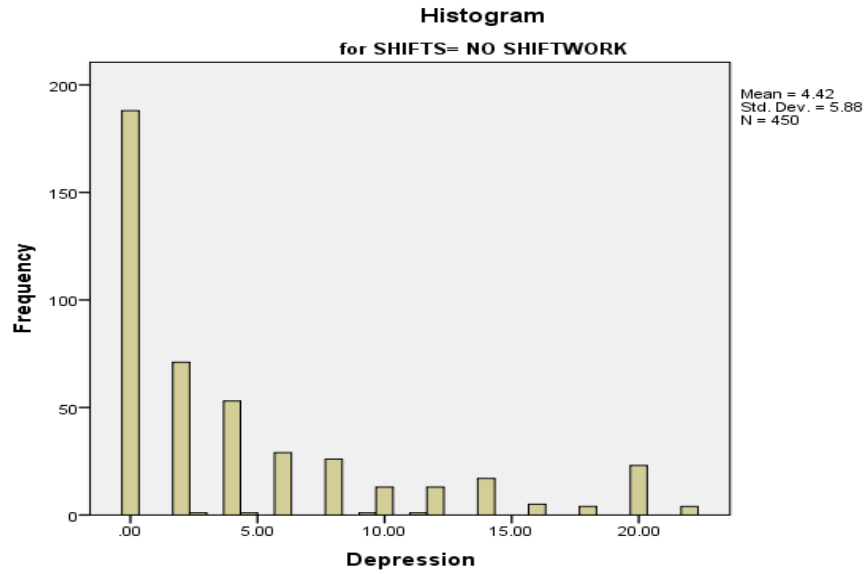


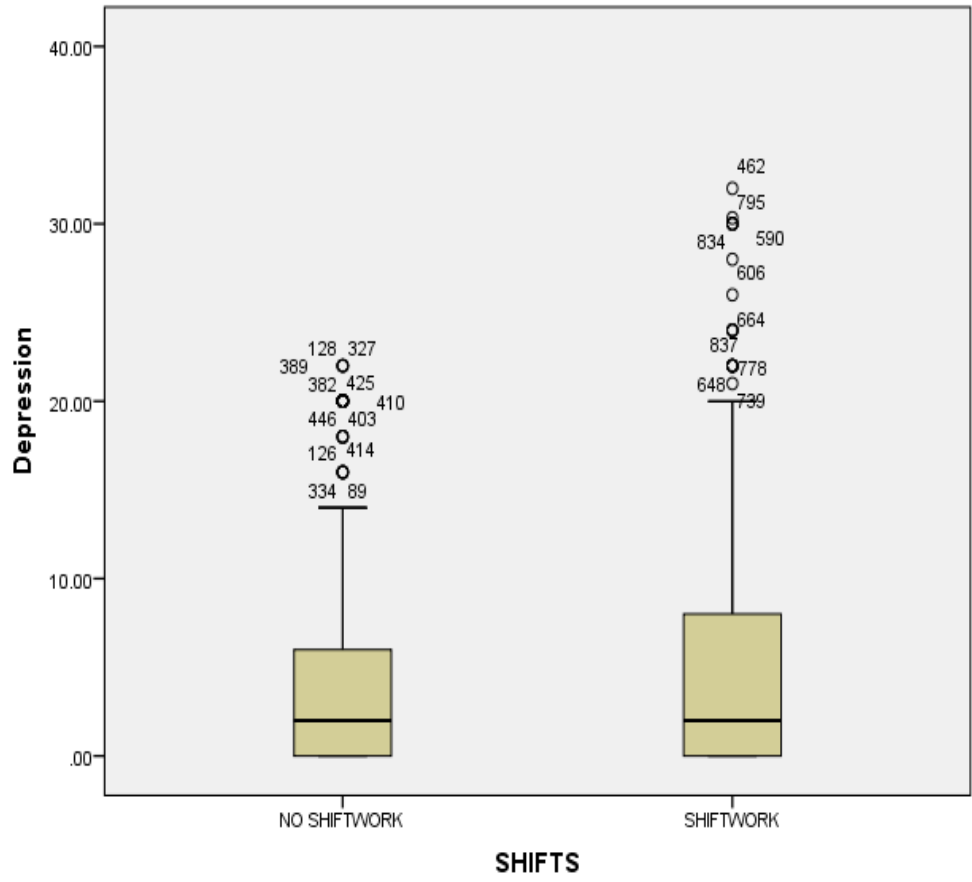
Appendix K: Anxiety among shift work and non-shift workers



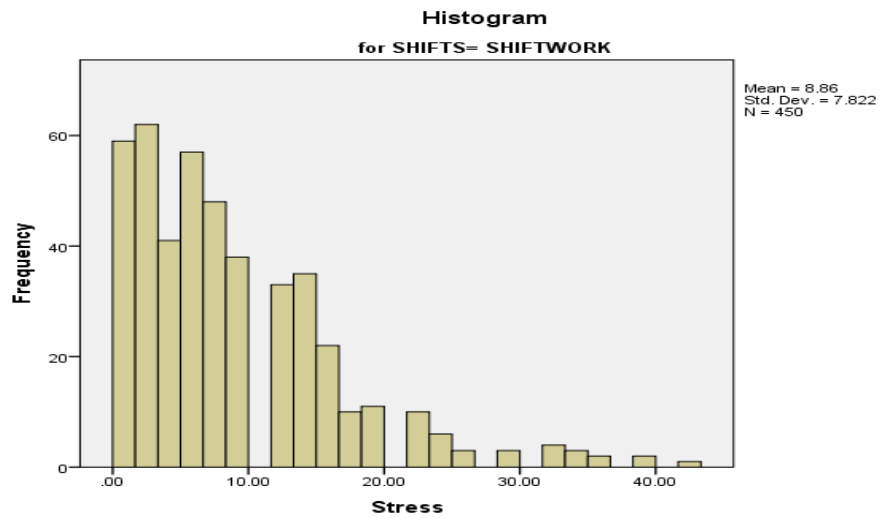
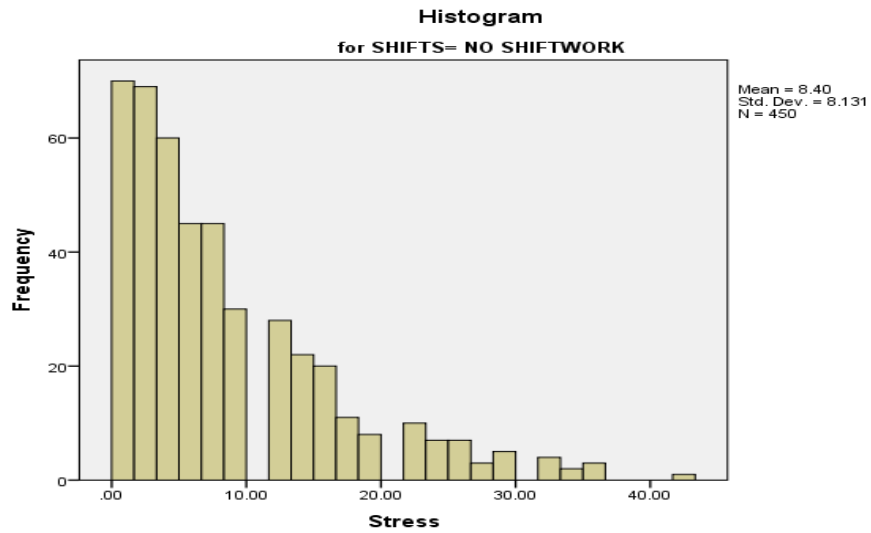


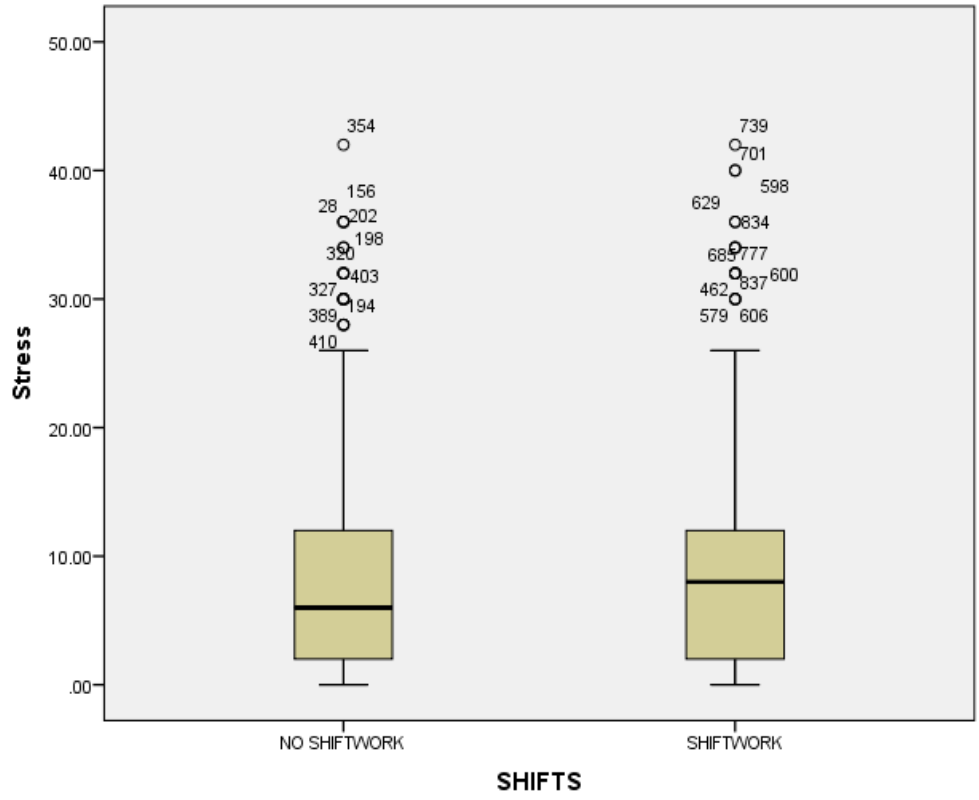
Appendix K: Depression among shift work and non-shift workers



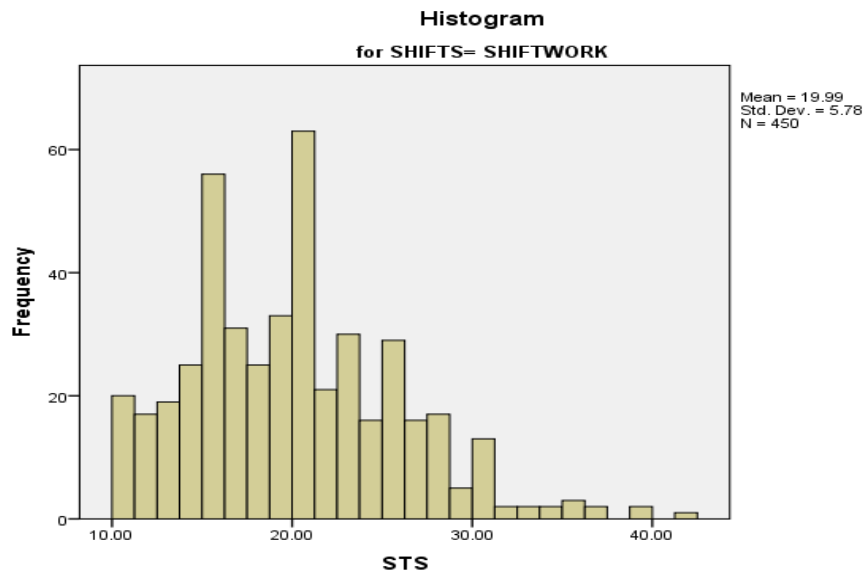
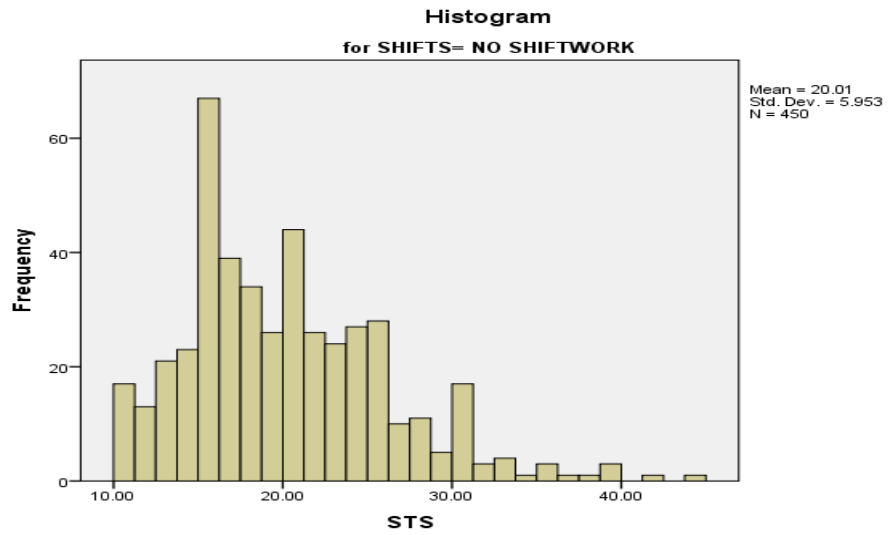


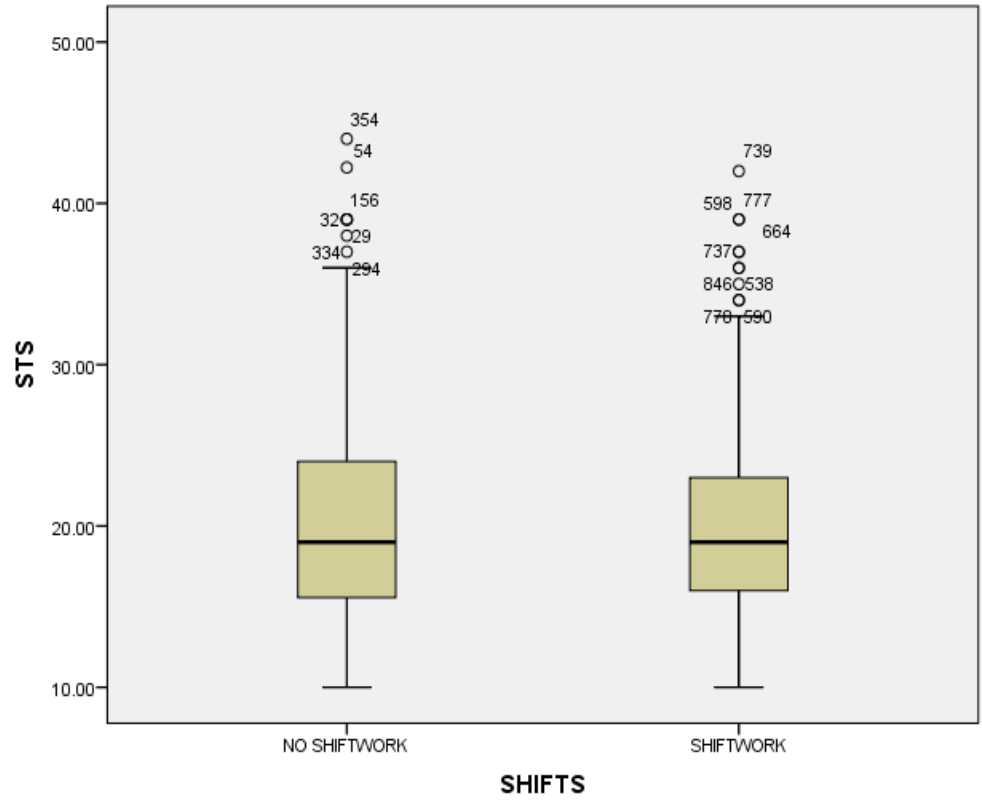
Appendix K: Stress among shift work and non-shift workers



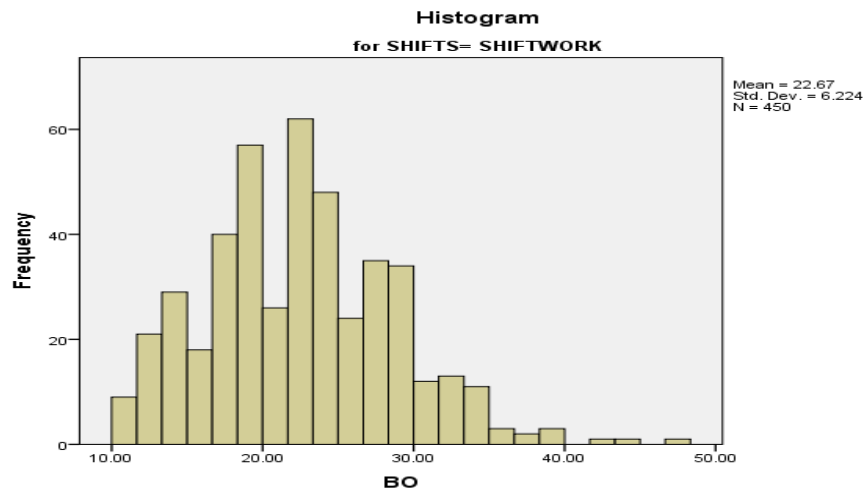
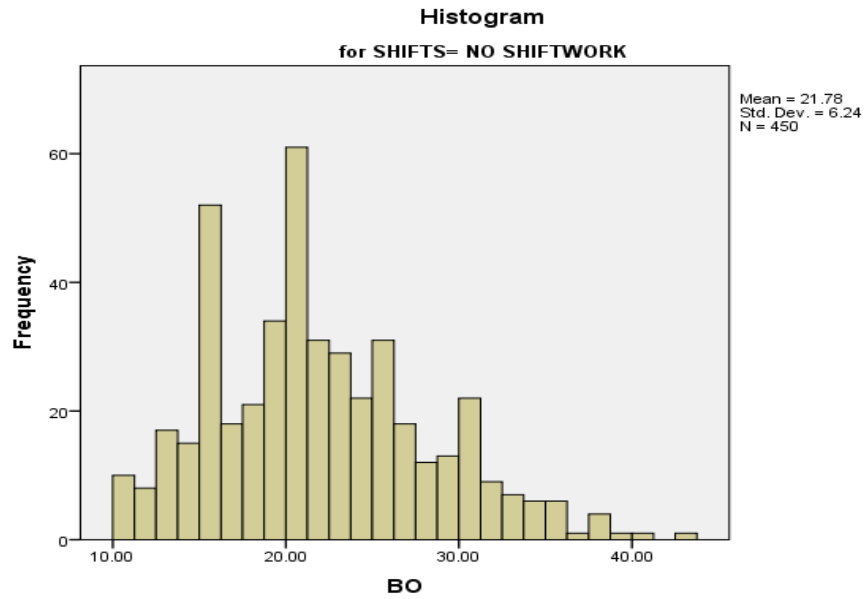


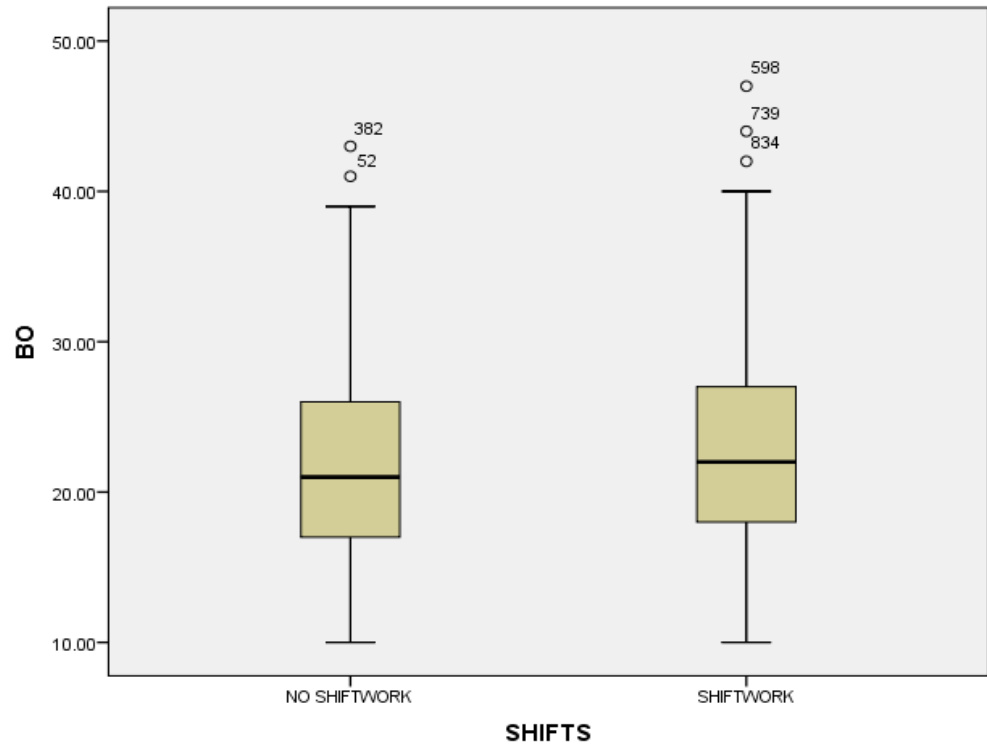
Appendix K: STS among shift work and non-shift workers



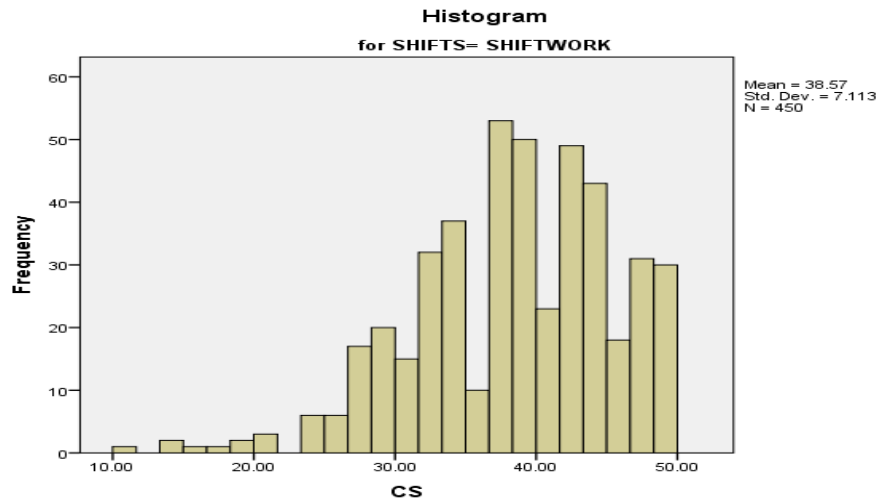
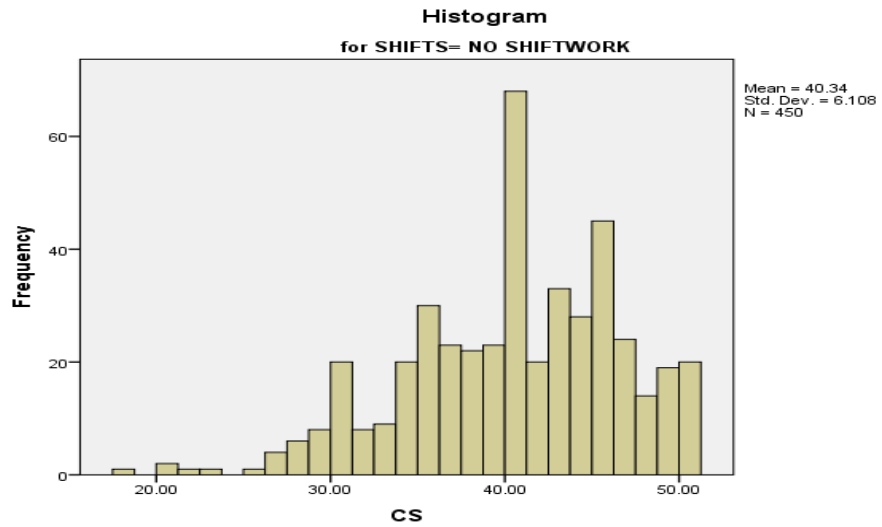


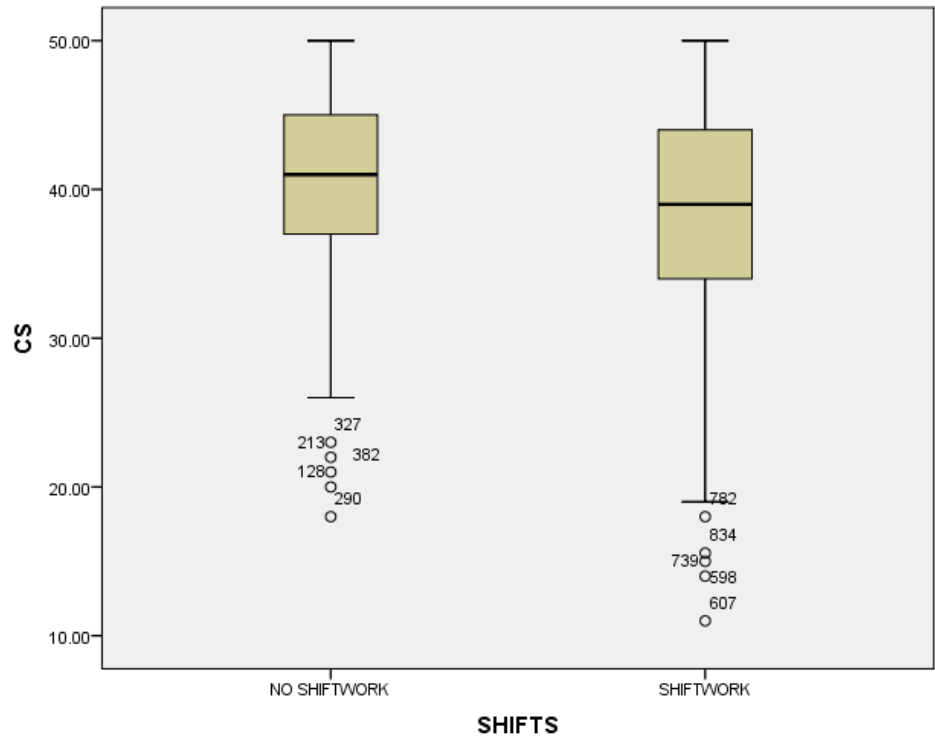
Appendix K: Burnout among shift work and non-shift workers



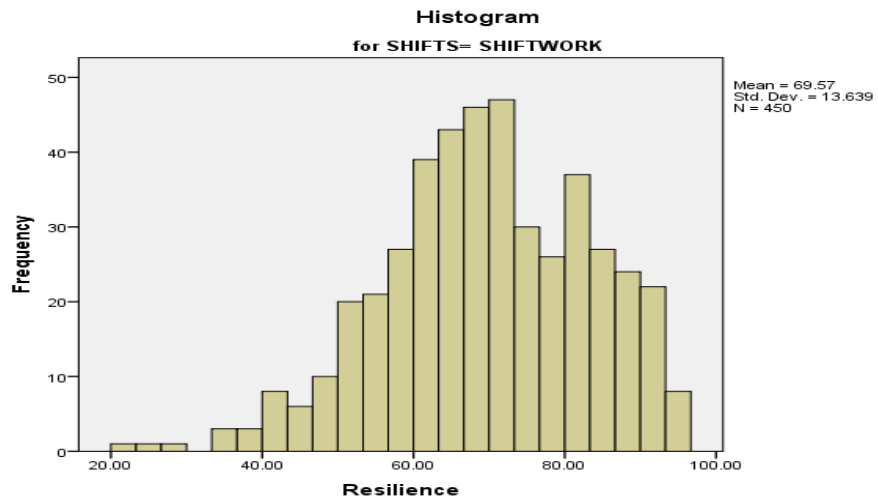
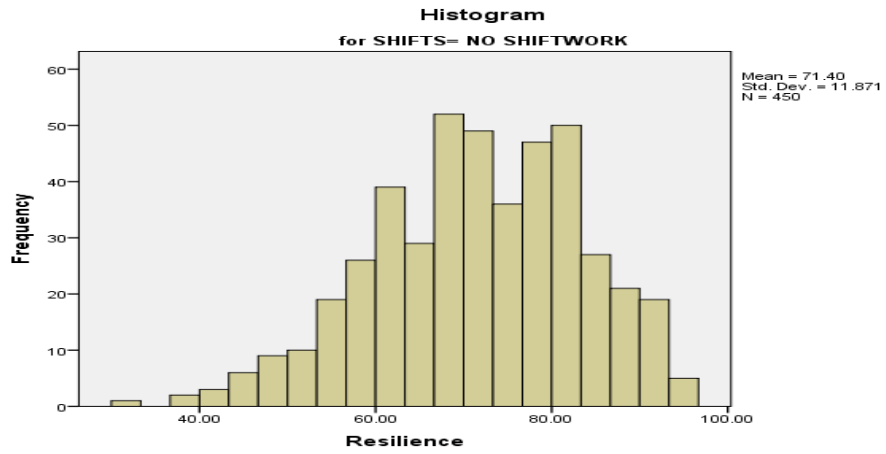


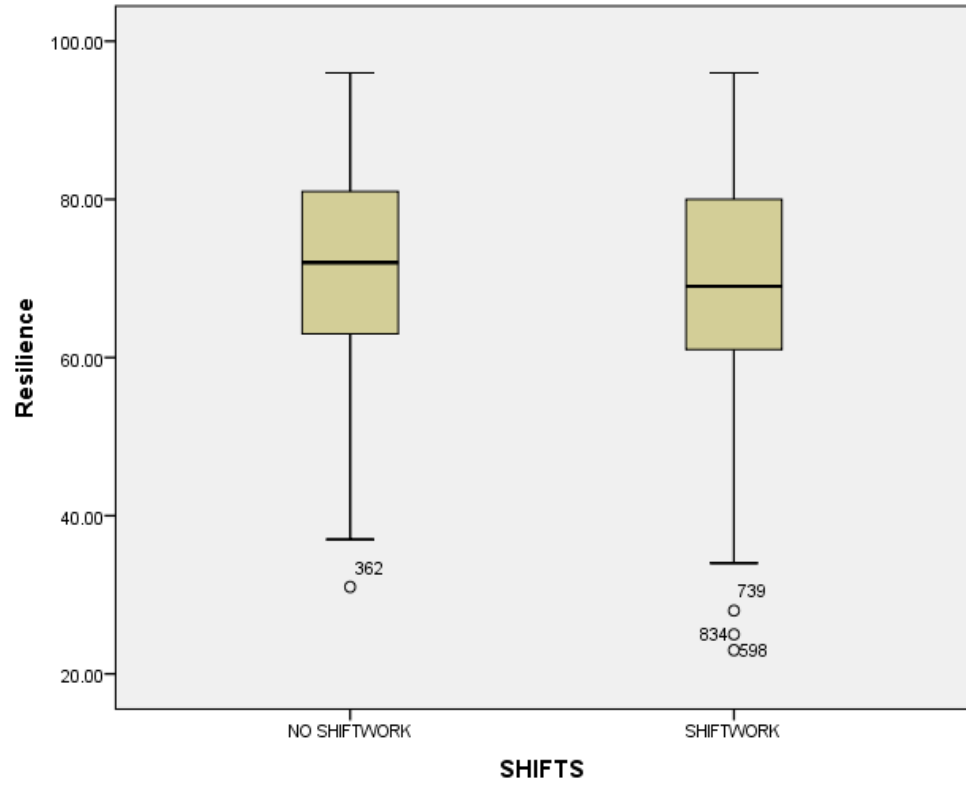
Appendix K: CS among shift work and non-shift workers



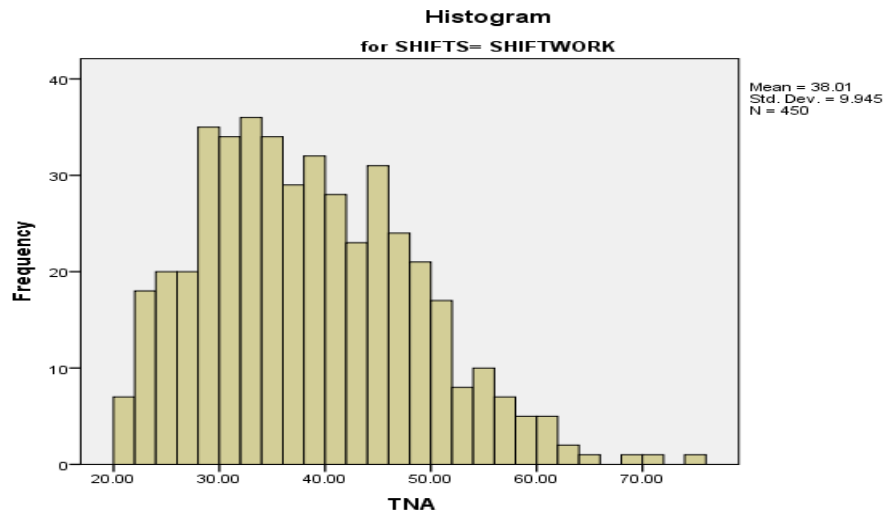
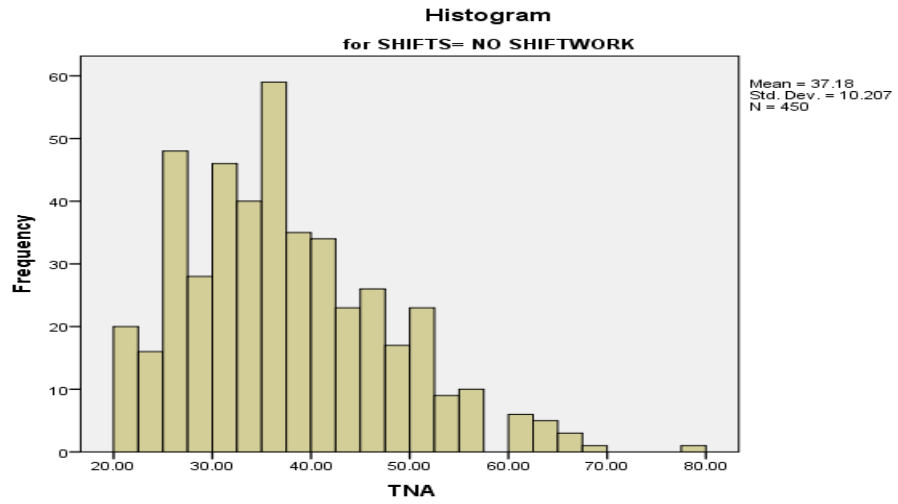


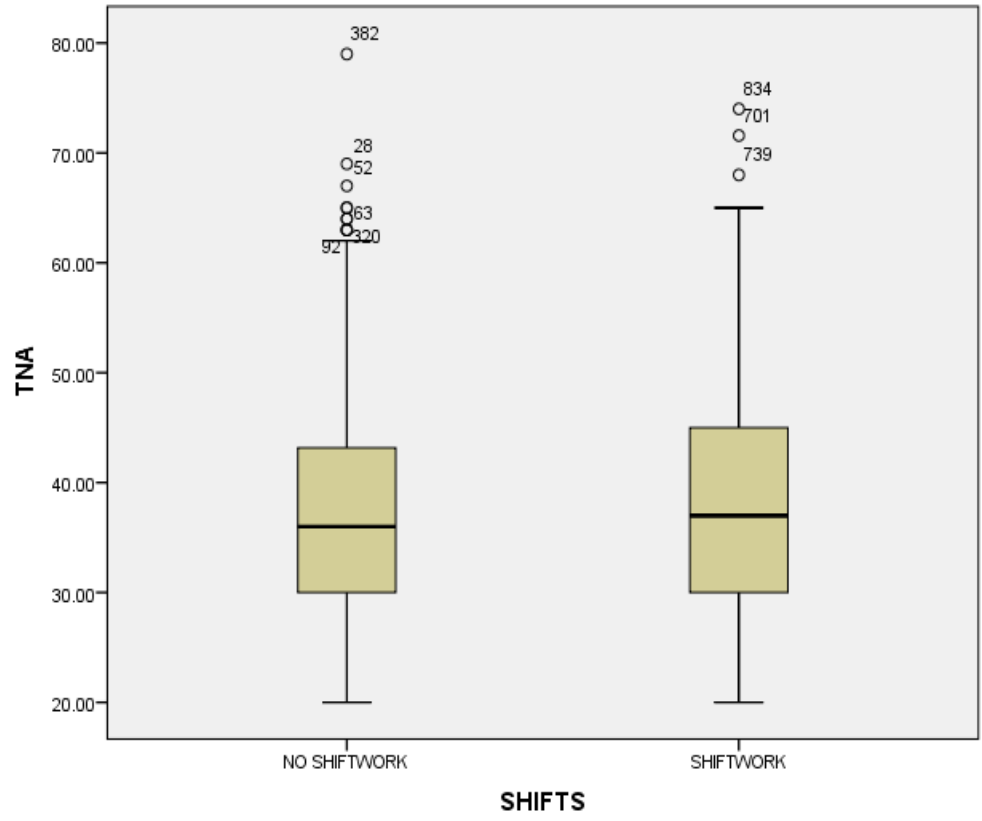
Appendix K: Resilience among shift work and non-shift workers



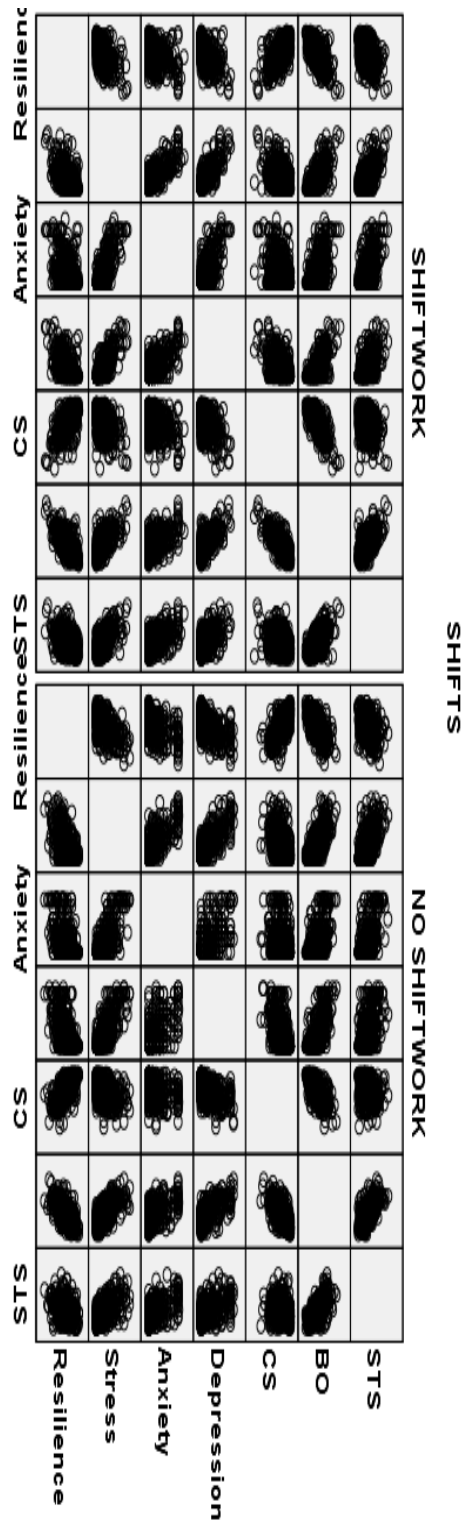


Appendix K: TNA among shift work and non-shift workers





Appendix L Scatterplot of variables



Appendix M

Manual coding process of extracts from nurse shift and non-shift workers

Number	Shift workers-Question 1
38	We are not valued. We are not supported. Experienced staff are leaving. Newer staff are unhappy. Work life balance is impossible. I no longer enjoy my job which has negative impacts for my patients. I fear for patient safety with all the cuts we have had added in our unit
39	Penalty rates being cancelled by new governments. Not enough time to care for Patients all task orientated care. 12 hr shifts have been cancelled at the royal. Work/ life ratio is not as good as it used to be, people are dropping hours and very unhappy.
40	Not being able to progress being in a highly specialised field with few high positions
41	I wish there is a legislation for nurse/carer and patient ration in aged care. I have been working long unpaid hours but the organization does not notice this. They say its time management but I feel like I'm always running. If there is a fixed ratio of staff to residents this will protect us nurses. I think the reason why aged care has high staff turnover is because staff can't have feeling of accomplishment when they can never get on top of their work.
42	
43	My future professional development as an aged care RN, am I going to stay on the same position for my rest of nursing career? I wanna know my career promotion, how am I gonna moving on?
44	Lack of Nurses employed, political/funding issues to the Healthcare System.
45	Lack of career progression and job security causing a massive gap in the experience levels available within workplaces.
46	Job security. Safe nursing and patient ratios with a good skill mix.
47	Nurses having less say regarding industry settings. e.g. shift times and shift flexibility

- | | | |
|-----------------------|--------------------------|--------------|
| ②③ lack of support | ⑩ Lack of time | ②① skill mix |
| ③② Burnout | ⑦ Patient/Staff ratio | |
| ②④ Dissatisfied | ②⑤ Career progression | |
| ①③ work/life conflict | ⑤ policies of Government | |
| ⑪ penalty rates | ⑨ Lack of job security | |
| ①⑥ shifts issues | | |

Number	Non-shift workers-Question 2
1050	⁽⁴⁶⁾ Decentralising some issues especially related to IT. Payroll & rostering should be back for managers to directly enter rosters to software program prevent triple handling & errors. Probably more time saving for managers. ⁽⁴⁰⁾
1051	⁽⁴⁷⁾ Looking into funding for clients in the community and staffing in the community, as the government reduces funds in the hospital more people will be shifted out into their homes.
1052	
1053	⁽¹⁷⁾ More money to facilities, more services available and more nursing hours (patient to nurse ratio) ⁽⁷⁾
1054	⁽⁴⁸⁾ ⁽¹⁹⁾ ⁽⁷⁾ funding, workloads, patient to staff ratios
1055	⁽⁴⁹⁾ Changing nursing work environment cultures from toxic to positive. Making nursing more appealing to stay in long term. The aging work force is a huge concern and I know that young people these days have far more options than the older nurses had. I know myself, I can now ⁽¹⁵⁾ find jobs that pay me the same wage, if not more, to not have the stresses ⁽²⁰⁾ of clinical nursing and shift work. There is no way I would go back to hospital nursing now. The sad thing is I enjoy the actual 'nursing' and looking after people and being busy. I just can't see how it is an appealing career long term. A lot of older nurses I know are burnt out, ⁽²²⁾ overweight, divorced and unhappy. I know that a lot of middle-aged people are like this, but it seems very common in nursing. In all of the using workplaces I've been in, the large majority of nurses were over 40/50 and the minority was in there 20's/30/s.
1056	⁽⁴¹⁾ ⁽¹⁹⁾ ⁽⁵¹⁾ ⁽⁵⁰⁾ Guidelines, workloads and supervision of staff numbers. Proper buddying of new graduate nurses.
1057	⁽⁵¹⁾ Skills and knowledge of under graduate nurses, including the level of education offered during clinical placement. Ensuring adequate remuneration for shift work. Ensuring adequate remuneration for post graduate education to encourage people to continue. ⁽⁴³⁾ ⁽⁴⁹⁾

(20) stress
 (7) patient / staff ratio
 (19) workload
 (40) rostering issues / payroll
 (41) Guidelines

(42) Inadequate penalty rates
 (43) low salary of post graduates
 (46) IT
 (47) Community
 (48) Funding

(49) work environment
 (22) Burnout
 (50) ageing nurses
 (15) ↓ salary
 (51) Graduate nurses

