Towards evidence based psychosocial interventions to support workers in reducing the health and wellbeing impacts of working shifts

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Contents

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ABSTRACT

Background: Shift work is becoming more prevalent as a working pattern, with current literature suggesting that working shifts may negatively impact on many aspects of health and wellbeing. A systematic review was conducted by the researcher to identify psychosocial interventions that may support shift workers. The results of the systematic review highlighted a paucity of psychosocial interventions, with only three quality studies identified, two relating to sleep and one related to weight management interventions. The results of the systematic review led to the development of the current research study. The study was conducted to ascertain the health and wellbeing impacts of shift working within one aeronautical organisation and what psychosocial interventions could be developed to support them.

Methods: A qualitative research design, using semi-structured interviews, investigated the challenges of shift work and the effects on health and wellbeing for 13 shift workers and 7 managers working within a male dominated UK aeronautical organisation. Interviews were audio recorded, transcribed verbatim and analysed using Thematic Analysis.

Findings: Three themes and five sub-themes were identified. The themes explored issues around isolation, gendered health norms and who is taking responsibility for the health of the shift workers. The findings build on existing stress and coping models and have implications for the development of potential psychosocial interventions that may support shift workers which are explored from a health psychology perspective.

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Discussion: As the research took place within one organisation the results from this study may not be generalisable to other shift working populations or other organisations. However, the research highlights the wider health and wellbeing impacts that shift workers face and the effects on their social and family relationships. Recovery time between shift patterns exacerbated these impacts, along with male gendered health norms and maladaptive coping strategies, particularly around mental health issues. The conflict between the needs of the employees and the organisational objectives is also explored, with suggestions for the development of potential psychosocial interventions that may support this population.

INTRODUCTION

Increasingly over recent years the potential negative health and wellbeing effects of shift working have been acknowledged. As shift working is becoming more prevalent as a work pattern this has become an important topic to research. The researcher in the current study completed a systematic review to ascertain what psychosocial interventions may support shift workers to improve their health and wellbeing (Appendix A and discussed below). The systematic review found little evidence and a dearth of studies which led to the formulation of this exploratory qualitative research study within a private sector aeronautical organisation.

The following chapters aim to explore the topics under investigation, explain how this study was carried out and then look at the themes that emerged from the research and how these fit with the wider picture. The Introduction first looks at defining shift work, why this type of work is expanding and what aspects of shift work can lead to poorer health outcomes, in particular sleep and circadian rhythm disruption. The physical and mental health implications of working shifts are then discussed, which leads to looking at stress in particular, and how theories and models of stress and coping may provide insights into the complex relationship between shift working and other aspects of employees' lives. The current research was conducted within a male dominated workplace setting, therefore aspects of workplace health and men's health and wellbeing in general are also explored. Then follow details of a systematic review conducted by the researcher in 2014/15 to ascertain which psychosocial interventions may support the health and

wellbeing of shift workers (Appendix A), which led to the formulation of the current study. The Introduction concludes with the aims of the current study and the research questions.

The Methodology for this study is explained in Chapter 2, including the rationale for a qualitative design, why a thematic analysis approach was adopted and how the study was conducted.

Chapter 3 explores the data and the Results of the analysis, through the themes which have emerged from the data. This is followed by a Discussion of the study in Chapter 4, including insights into the strengths and limitations of the study and possible directions for future research.

This study explores the psychosocial effects of working shift patterns. Psychosocial can be defined as the psychological processes and meanings by which individuals interact with their social environments that may influence their health either through biological responses, such as stress responses, or through their health behaviours. As this research focuses on shift working, there is an emphasis on psychosocial risk factors in the workplace. Cox and Griffiths (1995) describe these as "those aspects of work design and the organisation and management of work, and their social and environmental contexts, which have the potential for causing psychological, social or physical harm". These risk factors can often affect psychological and physical health through individuals experiencing stress. The current study explores the interaction between work and non-work stressors and how one can affect the other.

It should be noted that throughout this study a broad definition of health and wellbeing is adopted emphasising the importance of social and personal resources. A widely used definition of health comes from the World Health Organisation (1948) which states that "Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" (*p. 100).* In an evidence review of workplace health and wellbeing Waddell and Burton (2006) defined wellbeing as "the subjective state of being healthy, happy, contented, comfortable, and satisfied with one's life". *(p.4).* They highlight that along with the physical, mental and social aspects of health, the material, emotional, development and activity aspects of health also play an important part.

Shift Work

Shift work and the effects it has on individuals, workplaces and the wider community has become an important research topic as it is becoming more prevalent as a working pattern. In an increasingly twenty four-hour society and flexible work culture it is estimated that around 13-20% (IARC, 2007) of the working population in Europe and North America work shifts. It is predicted that this will continue to rise due to products and services being required to meet round-the-clock demands on a global basis. Shift workers are an important component of the workforce to address customer needs in a modern economic climate (Harrington, 2001). Many professions employ shift workers with the main occupations being the uniformed services, food service industries, healthcare, transportation and production industries, with

approximately one third of families having a member who works shifts (McMenamin, 2007).

Although no one official definition of shift working exists, it has been described as work that differs from the traditional eight hour daytime working period and involves unusual working hours (Costa, 2003; IARC, 2011). Early research in shift work tended to concentrate on night shift workers, but over time this has extended to include other shift work patterns such as working evenings and weekends. Workplaces operate different types of shift work schedules which can include a permanent night shift; backward rotation (e.g. night shifts, evening shifts, morning shifts); or fast forward rotation (e.g. 2 days morning shifts, 2 days evening shifts, 2 days night shifts). Forward rotating shift schedules may support faster recovery as they give more recovery time between the individual spells of shifts (IARC, 2011).
Similar numbers of men and women work shifts with a major study in the UK estimating that 16% of men compared to 13% of women worked shift patterns (McOrmond, 2004).

The ability to adapt to shift work without adverse effects is commonly known in the literature as Shift Work Tolerance (SWT). A systematic review of SWT, which included 60 studies (10 of which were longitudinal), concluded that there was conflicting evidence in this topic area, partly due to respondents working different shift patterns, which made analysis problematic. They also found few studies that focused on individual differences, particularly personality characteristics, or studies that investigated social factors, such as Work Family Conflict (WFC) as indicators of shift work tolerance (Saksvik et

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al., 2011). The majority of studies found that men have a greater tolerance for shift work than women (Saksvik et al., 2011). One explanation for this may be that women tend to have more domestic and child care responsibilities at home (Beermann & Nachreiner, 1995; Morehouse, 1995). Some other factors that improved Shift Work Tolerance in this Systematic Review were young age, low scores on morningness (see the sleep and circadian rhythm section below) and having an internal locus of control, which have been confirmed by other studies (Smith et al., 2001). Rotter (1966) described Locus of Control as the extent to which individuals perceive events in their lives as dependent on their own actions (i.e. internal) or dependent upon fate, chance, or powerful others (i.e. external). Research examining locus of control indicates that individuals with a higher internal locus of control will have lower job stress levels, as they are more able to cope with stressful events (as they believe their experiences are as a result of their own behavior and attributes) as opposed to individuals with an external locus of control, who believe that fate, chance or powerful others control their life events (Gray-Stanley et al., 2010). Individuals with an internal locus of control are more likely to exhibit problem-focused solutions (Lazarus & Folkman, 1984), have improved shift work tolerance and more effective coping with sleepiness and fatigue due to shift work (Smith L. et al., 2005).

Shift work has become one of the fastest growing research topics in the last few years. Previous research tends to focus on predominantly female staff working in health care (McOrmond, 2004), or public sector uniformed services such as police and fire fighters (Han et al., 2017). The current study

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focuses on a private sector organisation which predominantly employs men, which is a sector that has had less research focus.

Sleep and Circadian Rhythm Disruption

Some of the main impacts associated with shift work have been identified as being related to reduced sleep quality and quantity, excessive sleepiness and fatigue and insomnia. Drake et al. (2004) compared telephone questionnaire responses between shift workers (174 night shift workers and 360 rotating shift workers) and a general population in Detroit (2036 participants in total).They concluded that the prevalence of insomnia or excessive sleepiness in the night and rotating shift samples were 14.1% and 8.1% higher than day workers. These effects can be related to misalignment between the circadian clock and sleep / wake schedules disrupting the biological sleep processes known as circadian rhythms. The circadian "clock" is a process whereby the brain aligns with a 24-hour day of light and dark, promoting sleep at night, and arousal and wakefulness during daylight hours (Dijk, 1995). These biological patterns are known as circadian rhythms which have an impact on various physiological and psychological functions including body temperature, respiratory rate, wakefulness, heart rate and blood pressure, the digestive system, appetite, and hormone production (Harrington, 2001).

Although individuals can adjust to a different pattern, known as circadian realignment, circadian misalignment can occur, which is particularly challenging for night shift workers who may have difficulty falling asleep and

staying asleep (Epstein & Mardon, 2007). Night shift workers can also sleep two to four hours less during the day than at night (Akerstedt, 1995) and from a study of 120 shift rotas of the police in Germany, Knauth et al. (1980) concluded that 50% of night shift workers have extended wakefulness at the start of their night shift schedule.

Shift work can result in a circadian rhythm sleep disorder which is often described as Shift Work Disorder (SWD) with some shift workers experiencing excessive fatigue and insomnia. There are considerable individual differences in how shift work is tolerated and which individuals will exhibit symptoms of SWD (Drake & Wright, 2011). Each individual has a genetically determined internal clock that determines how likely an individual is to experience sleep disruption and fatigue, with two main types of patterns that individuals exhibit. "Morningness" is where an individual's circadian rhythm peaks in the morning and as a result they will be more awake and alert earlier in the day, "eveningness" is where circadian rhythms peak later in the day (Costa, 1999). A review of the evidence shows that on average individuals become more morning orientated as they age and individuals who exhibit "morningness" have more difficulty coping with night shift work than those who exhibit "eveningness" (Costa, 1999). Circadian realignment becomes more problematic with increasing age, with older workers having less tolerance to shift work and more trouble sleeping, as illustrated in a literature review by Harrington (2001).

In recent years the importance of sleep for overall health and wellbeing has generated much public interest with self-help books on sleep management

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top of the best-selling lists. Rasch and Born (2013) and Walker (2009) in reviews of the literature conclude that the function of sleep is linked to the ability to learn and memorise, make logical decisions and choices, and supports individuals dealing with social and psychological challenges. Sleep has also been shown to have a number of health benefits including restoring immune function, balancing insulin and glucose, balancing gut bacteria, and lowering blood pressure (Calhoun & Harding, 2010; Spiegel et al., 1999). An evidence briefing in the USA links poor sleep patterns to seven of the top fifteen leading causes of death such as cardiovascular disease, accidents, diabetes and hypertension (Kochanek et al., 2013).

Professor Harrington from the University of Birmingham (2001) reported that 20-30% of individuals quit shift working as a consequence of experiencing circadian disruption, with only 10% reporting few adjustment difficulties to shift work. An important factor is the type of shift work pattern or rotation, particularly in relation to circadian realignment but there is conflicting evidence in the literature. Brooks (1997) when exploring different shift patterns for nursing staff suggests that permanent shift patterns, particularly night shifts, are preferable as shift workers can adjust more readily, although many night shift workers return to a day time schedule on their days off and therefore do not maintain true circadian realignment.

However, many researchers believe that purely focusing on circadian disruption, i.e. a biological approach, is too narrow and limited as shift working patterns can be very varied and there are also impacts on psychosocial processes through disruptions to social and leisure rhythms, as

discussed in a paper by Taylor et al. (1997). It is thought that social and family life can suffer as a result of shift working patterns and the resultant stress and behaviours (for example poor eating habits out of sync with other family members) may negatively impact on health outcomes (Taylor et al., 1997).

Physical Health Effects from Working Shifts

There is a large body of evidence to suggest that working shifts can be detrimental to health and well-being and long term shift working may lead to a greater incidence of various diseases and ailments in comparison to workers who do not work shifts (Harrington, 2001).

There are no simple causal factors between shift work and poor health. Many of the health effects that shift workers experience may be explained by lifestyle and behavioural factors such as smoking, diet, alcohol use and less physical activity (Boggild & Knutsson, 1999) along with stress levels, increased blood pressure and body weight (Barton et al., 1995). Irregular working hours, leading to circadian disruption and less sleep, are thought to be factors that contribute to poor dietary habits and an increased incidence of body weight gain and obesity as evidenced by Di Lorenzo et al., (2003) in a study of 319 male shift workers working in the chemical industry in Italy. Some individuals who have worked shifts for a long time may underestimate their problems because they have become accustomed to a lower level of wellbeing as evidenced by Totterdale et al.(1995) in a study of 61 female nurses working in England and Wales who completed self-rating scales on a pocket computer measuring a number of wellbeing factors.

Studies have shown increased risks of certain cancers. During 10 years of follow-up in 78,562 women from the USA Nurses' Health Study women had a moderately increased risk of breast cancer from working night shifts (Schernhammer et al., 2001). Similarly in a large population based case-control study in Spain of over 2,000 men a significant association was found between night shift work and prostate cancer (Papantoniou, 2015). Other cancers such as stomach, skin and colon/rectum cancers have also shown an association with shift working as discussed by Costa (2010) in a review of the evidence. In fact in 2007 shift work that involves circadian disruption was classified as a possible carcinogen by the International Agency for Research on Cancer (IARC) and may be partly explained by the lack of the hormone melatonin which is influenced by artificial light. Melatonin is thought to inhibit malignancy in cells and have an effect on the function of the immune system (Schernhammer et al., 2001).

Risk factors for cardiovascular disorders are also increased in shift workers as shown in a review of the evidence by Esquirol et al. (2011) which included 74 studies, as are metabolic syndrome and diabetes (Harrington et al., 2001; Li et al., 2011; Pan et al., 2011; Puttonen et al., 2010; Van Drongelen et al., 2011). Night shift work in particular is estimated to increase coronary heart disease risk by 40% (Thomas & Power, 2010).

Shift workers are also more prone to musculoskeletal disorders (MSD) than non-shift workers (Lipscomb et al., 2002). In the UK MSDs cause high rates of work-related ill-health with the average length of certified sick leave being 10 weeks. Evidence-based approaches to the management of back pain are

based on early intervention by healthcare practitioners such as physiotherapists and lifestyle factors to minimize sickness absence (Hanson et al., 2006).

Mental Health Effects from Working Shifts

A definition from NICE states that "Mental well-being is a dynamic state in which the individual is able to develop their potential, work productively and creatively, build strong and positive relationships with others and contribute to their community. It is enhanced when an individual is able to fulfill their personal and social goals to achieve a sense of purpose in society" (*p.2,* Foresight Mental Capital and Well-being Project, 2008).

One in four people in the general UK population experience some form of mental health issue in any given year (NHS England, 2016), and one in six working age adults have symptoms associated with mental ill health which do not meet the criteria for diagnosis, such as sleep problems or fatigue (Royal College of Psychiatrists, 2008). These are key issues that may be exacerbated by working shifts. The Chief Medical Officer estimated the cost of mental ill health to the UK economy to be between £70-£100 billion per year, with 75% of people with diagnosable mental illness receiving no treatment at all (Davies, 2013). In the workplace, stress, anxiety and depression are responsible for 15 million working days lost (ONS, 2014) which is estimated to cost workplaces £30 billion a year (ACAS, 2014).

Bara & Arber (2009) examined the impact of shift work on mental health at a population level by analysing longitudinal data (1995-2005) from the British Household Panel Survey and concluded that shift work increases the risk of depression and anxiety. It is difficult to establish causality between shift work and mental health issues but shift work can lead to sleep problems, which in themselves are associated with depression (Walsh, 2004). From a social perspective, shift workers are also more likely to be affected by work-family conflict (WFC) and which can lead to depression, anxiety, burnout and physical ill health such as hypertension, as illustrated in a study of 434 participants in dual-earner families in Turkey (Aycan & Eskin, 2005).

As illustrated shift work can have a negative impact on mental health and wellbeing, which is a cause for concern, especially considering the increasing number of people working shifts. It is therefore important to find ways to protect shift workers from these negative impacts. The current study looks to explore some of these aspects in more depth.

Stress

Following the mental health section we will now look at stress in particular and models of stress and coping. As discussed above, shift workers can experience disruption to circadian rhythms which affects the quality and quantity of their sleep, increasing fatigue levels. This can lead to an increase in stressors and a decrease in coping skills to deal with those stressors leading to a rise in stress-related disorders (Haines et al., 2008). We will start by exploring workplace stress in general and then how psychosocial risk

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factors for stress in the workplace may impact on shift workers in particular. The integration of workplace and shift work literature is then explored.

Stress and workplace stress are well-researched but it is still problematic to find one accepted definition. There is a general perception that stress levels are increasing, but there may be less stigma around stress than diagnosable mental ill-health conditions and it therefore has become a more acceptable term to use. Sarafino (2012) defines stress as the discrepancy between the physical or psychological demands of a situation and the individual's biological, psychological or social system resources. Workplaces are affected by stress through costs and resources associated with staff turnover, absenteeism, presenteeism and productivity levels with stress ranking in fourth place in the main causes for short-term absence and second place for long term absence in the workplace (CIPD, 2015).

A meta-analysis (Nixon et al., 2011) found a number of workplace psychosocial risk factors that increase stressors including work hours, workload, interpersonal conflict, lack of control, role ambiguity and role conflict which in turn predicted physical symptoms such as backache, headache, sleep disturbances, dizziness, fatigue and gastrointestinal problems.

Moderators of Stress

Different individuals will perceive and evaluate stressors in different ways and through a number of factors including personality traits such as self-esteem, coping behaviours, locus of control, hardiness, negative affectivity

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and through previous experiences and coping behaviours, with some stressors only affecting individuals with some of these specific traits (Mark & Smith, 2008).

Another moderator of stress can be the level and availability of social support to individuals. Social support can mitigate the effects of stressors by changing a situation through advice, guidance or material support, or by changing perceptions and can also provide individuals with the opportunity to express their emotions which can help with managing the stressors and strains (Lehrer, 2005). A meta-analysis (Viswesvaran et al.,1999) confirms that social support affects workplace stress by modifying and reducing the perception of stressors and their effects on strain. Shift work tolerance has been shown to be improved through social support in the workplace and in the home environment. A study analysing survey data from 530 Australian nursing staff (93% female) found that social support from family and co-workers improved shift workers' psychological and physical functioning (Pisarski et al., 2008). However, shift working patterns may result in less access to support and guidance from managers and supervisors which can increase role ambiguity and conflict leading to less perceived control which can mitigate the buffering effects of social support as supported by Touringny et al., (2010) from survey data obtained from 485 employees of a major airline in China.

Models of Stress and Coping

There are a number of models of stress and coping that may be relevant to the current study. However, two models were particularly relevant and are explored

below. A transactional model of stress and coping by Lazarus and Folkman (1984) relates to different aspects of an individual's life and a workplace specific interactional model, the Job Demand- Control Support model (Karasek & Theorell,1990), focusing specifically on work related stress are described below Insights from the application of these models are expanded on further in the Discussion. Transactional theories of stress focus on an individual's cognitive processes and emotional reactions when they interact with their environment. Lazarus and Folkman's (1984) transactional model of stress and coping (TMSC) has been widely applied and adapted over the years to a range of health conditions (Figure 1) It suggests that stress can be caused by the transaction between an individual's appraisal of a situation and their environment which can result in a threat to their wellbeing. They described psychological stress as having three processes. An individual initially makes a primary appraisal that identifies a potential stressor as a threat or having a risk of harm or loss. A secondary appraisal then assesses whether it is possible to avoid, alter or cope with the stressor. Individuals then apply different cognitive or behavioural coping styles to cope with the threat or stressor which can be problem-focused or emotion-focused. A failure to cope or stress response occurs when there is a discrepancy between the demands of the situation and the resources of the individual, which can lead to stress and negative health and organisational outcomes (Cox et al., 2000). Coping is the process by which the individual tries to manage that discrepancy (Sarafino, 1994). Evidence suggests that the type of coping employed by an individual is a factor in health outcomes (Billings et al., 2000), with avoidance coping predicting higher levels of physical symptoms in carergivers.

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Figure 1: Transactional Model of Stress and Coping based on Lazarus and Folkman (1984)
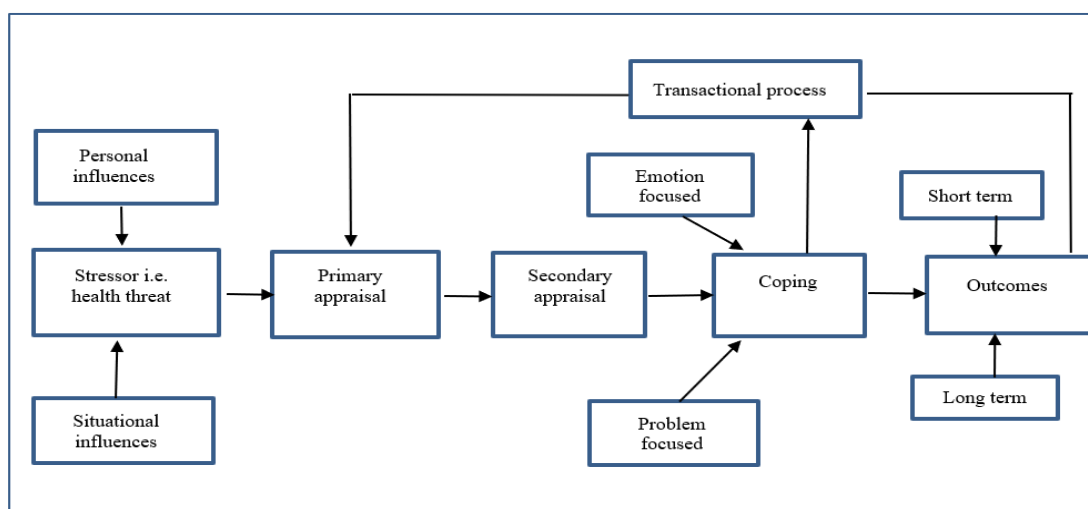
Shift work models tend to mirror transactional workplace stress models and the relationships between stressors and strains, with shift work often seen as a workplace stressor in itself. However, it may be more appropriate to see shift work as a context in which stressors occur (Taylor et al., 1997) which would enable the design of shift work specific interventions. The type and number of workplace stressors and coping resources may be different with

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different shifts worked. Pisarski et al. (2002) found that shift workers are more likely to experience work / life conflict and fatigue when they lack control over their work scheduling.

Problem-focused coping (Lazarus & Folkman, 1984) is aimed at controlling the causes of stress in practical ways by managing the problem or problems that are causing the distress, or by the individual increasing their resources. This form of coping may therefore be more likely to be used when individuals feel they have some control over the stressor. Examples of problem-focused coping to reduce or eliminate the stressor/s would be using problem-solving techniques to plan solutions such as seeking out information or utilising time-management techniques

Emotion-focused coping is aimed at controlling the emotional response to the stressor and may be more common when the individual feels they have no control over the source of the stress. It can lead to negative emotional and psychological responses such as depression, anxiety, anger and embarrassment. Examples of emotion-focused coping include distraction or procrastination behaviour, drug and alcohol misuse, comfort eating, emotional disclosure and seeking social support (Folkman & Moskowitz, 2004; Penley et al., 2012).

No single coping mechanism is necessarily better than another and most stressors require both types of coping. Problem-focused coping may be preferable if the stressor is more controllable and emotion-focused coping preferable in uncontrollable conditions (Folkman & Moskowitz, 2004) .

However, problem-focused coping strategies may be more effective when applied to health outcomes, particularly as some emotion-focused strategies can negatively affect healthy lifestyle choices, as reported from a meta-analysis of the evidence by Penley et al. (2012).

From a gender perspective, many studies have shown women to use more emotion-focused coping, with men using more problem-focused coping, as evidenced by Matud (2004) in a convenience sample of 2816 people in the Canary Islands, Spain who completed a battery of questionnaires concerned with stress and coping. Lengua & Stormshak, (2000) found similar differences in a questionnaire study completed by 250 undergraduates in the USA. In contrast these findings have not been upheld in other studies where no gender differences in coping focus were found (Hamilton & Fagot, 1988). It should be noted that much of the research in this area is conducted with adolescents or student populations (Hamilton & Fagot, 1988; Lengua & Stormshak, 2000; Wilson et al., 2005) and there is little evidence around gendered coping styles in workplaces, particularly in relation to shift work.

Another transaction model is Siegrist's (1990) Effort-Reward Imbalance Model where stress results from a mismatch between high costs or effort spent and low gains or reward received. This model is not being applied in the current study as it may be too limited in its' focus and would not incorporate the wider social contexts that are involved in shift working.

Interactional theories of stress focus on the structural elements of the individuals' interaction with their environment. An influential model for

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studying psychosocial work conditions and stress is Karasek's (1979) Job Demands-Control Model (JDC), which suggests that work-related stress can result from the interaction of job demands and job control. The job demands can be quantitative demands like workload and time pressure and qualitative demands like the effort required. These interact with the amount of control an individual has over their job, which includes being able to make decisions about the content of the job and how the work is performed as well as having the opportunities to develop and utilise their skills. The JDC model assumes that workers who experience high job demands with low job control are likely to experience the most strain which is hypothesised as the combination most related to harmful coping behaviour, e.g. smoking, and will have the most severe effects on a worker's health. Also, when individuals feel unable to control a stressful workplace situation they can exhibit signs of passive and helpless behaviour which lead to negative thinking patterns and poor mental health consistent with Seligman's (1972) theory of learned helplessness.

Figure 2: The Job-Demands Control Model based on Karasek (1979)
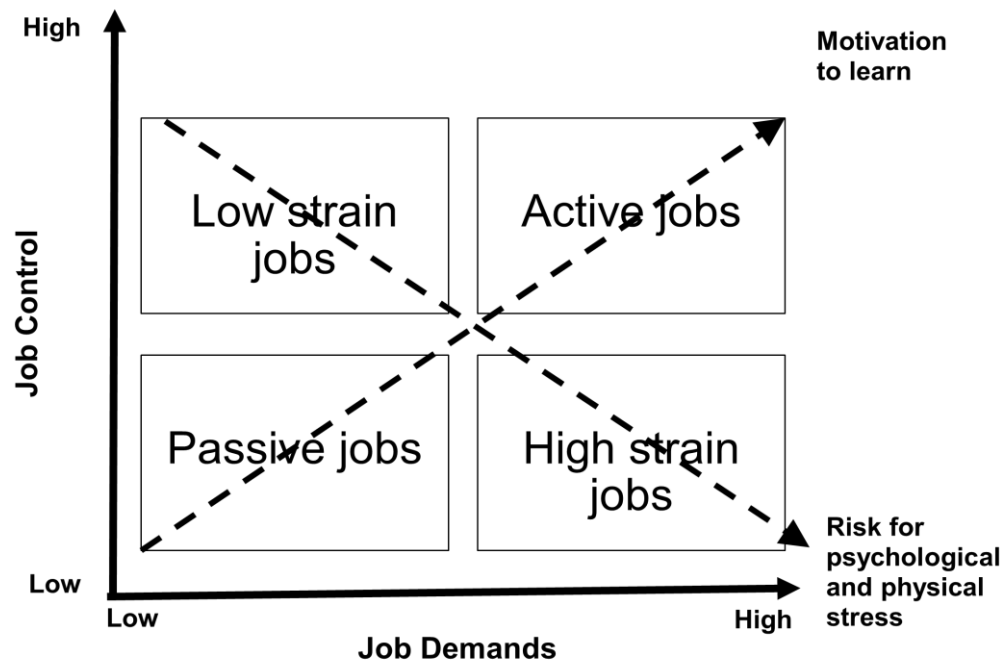
There has been some criticism of the JDC model as it can oversimplify complex aspects of organisational life and purely focus on control as the moderator of the stressor-strain relationship, with Johnson and Hall (1988), in a large scale cross-sectional study of Swedish workers, arguing that social support from colleagues and managers, such as emotional support or help with work tasks, has effects similar to job control. As a result the JDC model was expanded to include social support as a third predictor of well-being and strain to show how social support could act as a buffer and coping mechanism in high demand situations. This is known as the Job Demand-Control Support (JDCS) model (Karasek & Theorell, 1990). Likewise if workplace support is perceived to be low or the individual feels socially isolated the effects of high strain (high demands and low control) can be exaggerated and these conditions are known as iso-strain jobs (Karasek & Theorell, 1990). A review of studies (Hausser et al., 2010) found that social

support can directly reduce job strain and can buffer individuals from the effects of high job demands.

A review of the JDCS model by Kain and Jex (2010) showed inconsistencies in how the three domains are measured, a lack of objective longitudinal studies and a lack of consideration of individual difference variables, however the JCDS model continues to be widely applied in the workplace.

Another interactional work related stress model is the Person-Environment Fit theory of French et al. (1982), which argues that stress occurs and has a negative effect on wellbeing when there is a lack of fit between an employee's ability to meet the demands of a job along with the extent to which an employee is allowed and encouraged to use their knowledge and skills in their job. Distinctions are made between objective reality and subjective perceptions. Although this model can be very useful in assessing various aspects of workplace based stress, it was not appropriate for the current study as the research focus is less on the work itself and more around the working of shift patterns.

The evidence above and the models of stress and coping will help to inform the current study.

Men's Health and Wellbeing

The current study takes place within a male dominated workplace and may therefore only be applicable to similar male dominated shift working fields as

some health and wellbeing issues are more associated with males. Males in the UK have a lower life expectancy compared to females of 3.8 years (ONS, 2016) with the Global Burden of Disease Study (2013) predicting that by 2030 males will have a decreased life expectancy of 7.2 years compared with females. The focus on men's health from a clinical perspective has been to look at male specific diseases such as prostate and testicular cancer but men are more likely to have a higher incidence of life limiting diseases and conditions such as lung cancer, skin cancer, heart disease, liver disease, respiratory disease and stroke compared to women *(White, 2011).* In the UK men also represent a large majority of those with major addictions (Department of Health, 2012).

Mahalik et al. (2007) described masculine traits and norms, such as competitiveness, displaying "risky" lifestyle behaviours, suppression of emotion, self-reliance and stoicism, as culturally accepted rules and standards that guide and constrain masculine behaviours. Masculine norms can sometimes result in men thinking they have to be emotionally strong and stoic which influence how individuals experience and react to stress, depression and anxiety. In the longer term this can lead to men being more likely to externalise their feelings and more likely to exhibit substance use disorders, aggressive behaviour and suicide (Wilkins, 2010; McManus et al, 2007). Courtenay (2000) suggests that these masculinity characteristics lead to men engaging in over 30 behaviours, such as smoking, drinking, poor diet and lack of physical activity, that increase the risk of disease, injury and death and are reflected in men's health being worse than women's.

Masculine gender norms can also affect health seeking behaviours, as identified by Pirkis et al. (2017) in an Australian longitudinal study on male health involving a cohort of 15,988 males. These male gender norms can be particularly influential in reflecting poorer health outcomes in male dominated occupations (Mahalik et al., 2007).

Workplace Health and Wellbeing

This section sets out some of the issues around health and wellbeing that are linked to work and the workplace. The evidence points to reasons why the workplace provides an ideal opportunity, from a health psychology perspective, to engage with and support populations who may not be reached through traditional services. The importance of workplace health to employers is also demonstrated by focusing on the costs and effects of ill-health in the workplace, the business case for workplace interventions and the potential role for health psychology and psychosocial interventions in workplace settings.

In a Department of Work and Pensions (DWP) commissioned scientific evidence review of the links between health, work and well-being Waddell and Burton (2006) concluded that work is generally good for physical and mental health but that it has to be "good work" which is healthy, safe and offers the individual some control over how the work is done. Work can be seen as an important social determinant of health in itself, with workplace interventions improving health and wellbeing and reducing health inequalities by impacting on employees and their wider family and community (Acheson, 1998; Waddell & Burton, 2006).

Most people in employment spend 60% of their waking hours in work. There is an acknowledgement from the Chartered Institute of Personnel and Development (CIPD) that there has been a move in the last few years from a health and safety approach in the workplace, focused on the risk of injury and ill-health associated with work, to a broader approach to also address the psychosocial aspects of working life (CIPD, 2018).

In 2008 Dame Carol Black published a review of Britain's working age population "Working for a Healthier Tomorrow", which looked at the prevention of illness and promotion of health and well-being in the workplace, along with early intervention for those who develop a health condition. The costs to UK businesses due to sickness absence and presenteeism (i.e. employees at work while not physically or mentally well and working at a reduced level of performance) are considerable, with the British Heart Foundation (2009) estimating it at £29bn and £15.1bn respectively. It is estimated in the UK that reduced productivity due to mental health conditions account for 1.5 times as much working time lost as sickness absence (The Sainsbury Centre for Mental Health, 2009). Male-dominated occupations have an elevated disease burden which is thought to be influenced by harmful physical and psychological working conditions such as job overload and job demands (Battams et al., 2014).

The CIPD (2014) strengthens the business case for organisations by highlighting that health and wellbeing does not have to be treated as an "add-on" or "nice-to-have" activity and if employers place employee well-

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being at the centre of their business model the dividends for organisational health can be significant. An evidence review by Price Waterhouse Coopers (PwC) found that health and wellbeing programmes have a number of benefits to organisations including reduced sickness absence, higher productivity, reduced staff turnover and increased employee satisfaction (PwC, 2008) and when individuals feel supported to improve their health and wellbeing in the workplace their motivation and engagement are likely to increase (Black, 2008).

This section has looked at health and wellbeing in the workplace for the general working population. The added poor health outcomes that can arise as a result of working shifts (as evidenced in previous sections) supports the role of a health psychology approach within occupational settings to promote the adoption of psychosocial interventions.

Systematic Review

A systematic review, completed by the researcher in 2015, reinforced why this is an important topic to investigate and is described in this section. The systematic review also informed the topic and design of the current study, which is explored in the sections that follow.

To ascertain whether there was an evidence base for psychosocial interventions which improve the health of shift workers the researcher carried out a systematic review entitled "Psychosocial interventions which improve the health of shift workers". This formed part of the assessment for the professional doctorate in health psychology and is attached as Appendix A.

Although there were previous systematic reviews s looking at various aspects of shift working (Canuto et al., 2013; De Cordova et al., 2012; Esquirol et al., 2011; Saksvik et al., 2011; Wright et al., 2013) there did not appear to have been a review which looks at psychosocial interventions to improve health in this population. Psychosocial interventions can be defined as any intervention that emphasises psychological or social factors rather than biological, chemical or environmental factors (Ruddy & House, 2005). A broad range of interventions for groups or individuals were considered appropriate such as psychological interventions, health education or promotion and healthy lifestyle behaviour change interventions such as dietary change, physical activity promotion, improved sleep quality / quantity or smoking cessation etc.

The search initially identified 7,606 studies but after applying inclusion and exclusion criteria only four psychosocial studies were identified for inclusion in the systematic review, with one of those studies being of poor quality, demonstrating that despite much shift work data which identifies the possible harmful effects to health, very few psychosocial interventions have been evaluated with shift workers. It is also difficult to compare the studies due to the heterogeneity of the interventions and study designs. Apart from the fact that they are looking at different aspects of health related to shift work (two related to sleep - Jarnefelt et al., 2012; Lee et al., 2014; one related to weight management - Morgan et al., 2011), they also used different tools for data collection and different definitions (or none at all) of shift working schedules, which also limits the extent to which the studies can be synthesised. Different working patterns may have different impacts on the health risk factors.

Without more information on the shift work patterns and the participants themselves it is difficult to determine if the interventions would be effective if repeated with other shift work populations.

The systemic review highlighted some positive results which may indicate a trend in supporting shift workers' sleep patterns through the use of Cognitive Behavioural Therapy (CBT). Two of the studies were similar to each other in that they both used CBT for insomnia as their intervention to improve sleep quality and quantity in shift workers. However one was concerned with participants who had reported suffering from insomnia (Jarnefelt et al., 2012) whereas the other study (Lee et al., 2014) did not define whether the shift workers had problems or not with sleeping. Another study investigated a weight management intervention for male shift workers (Morgan et al., 2011). With so few studies identified, limited conclusions can be made.

The systematic review illustrated that the evidence base for the negative effects on health of shift-working is growing and although there has been some success in changing shift working schedules to optimise beneficial sleep patterns, controlled light exposure interventions and the use of pharmacological interventions, there have been very few psychosocial interventions and the evidence base is poor. Therefore the findings from the systematic review identified that future research is required to assess the needs of this population and what interventions may be beneficial, which is the focus of this research study.

Systematic Review Update

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As the systematic review was undertaken in 2014/2015, a further literature search was carried out for the years 2015 to 2018, utilising the same search parameters as the original review, to ascertain if there had been any further psychosocial interventions reported. No additional papers were found to have been published during this period which met the previous search criteria. This indicates that most of the research around shift working has been looking at the harms caused to health and wellbeing rather than looking at psychosocial interventions that may mitigate them.

The systematic review and update to the systematic review highlighted the need to explore this issue further, which became the basis for the current study and is explored in the following section.

The Current Study

As is illustrated by the presented evidence, working shifts can potentially cause risks to health and wellbeing. The systematic review, conducted by the researcher, identified that previous shift work research has looked at practical interventions, often workplace based, to improve or mitigate some of these effects. These include improving sleep quantity and quality by changing night shift patterns and schedules (Knauth et al, 1983), incorporating planned naps into the work schedule (Howard et al, 2010), controlled use of bright light and darkness to mimic daytime and night time (Eastman, 1990) and the use of melatonin medication and other hypnotic pharmacological interventions to facilitate sleep, or drugs such as caffeine to improve alertness (Walsh et al, 1995). However, there was a paucity of evidence around what psychosocial interventions may be applied to address

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the health and wellbeing impacts of shift working and it is the potential
contribution of health psychology approaches that underpin the aims,
research questions and focus of the current study, as explored below.

Aims of the Research

The rationale for this study is to explore the experiences of shift workers and
their employers to identify what the key health and wellbeing challenges are
for shift workers. To then start exploring, from the perspective of the shift-
workers and their workplaces, what potential psychosocial interventions may
address these health and wellbeing issues.

The systematic review suggested that interventions should be tailor-made for
this population and asking the shift workers themselves to assess what their
main issues are around health and wellbeing and working shift patterns may
make the development of interventions more relevant to this population.
Given the lack of research around psychosocial interventions for shift
workers as identified in the systematic review, the current study will explore
some of these aspects.

To identify the psychological variables that predict the health related
behaviours of this population in more detail, a qualitative approach will be
used to generate key themes. Given the complexities of the factors which
may affect shift work, the Social Ecological Model developed by
Brofenbrenner (1977) will be utilised to inform a framework for this study

which encompasses a health psychology approach within a workplace

environment (Figure 2).
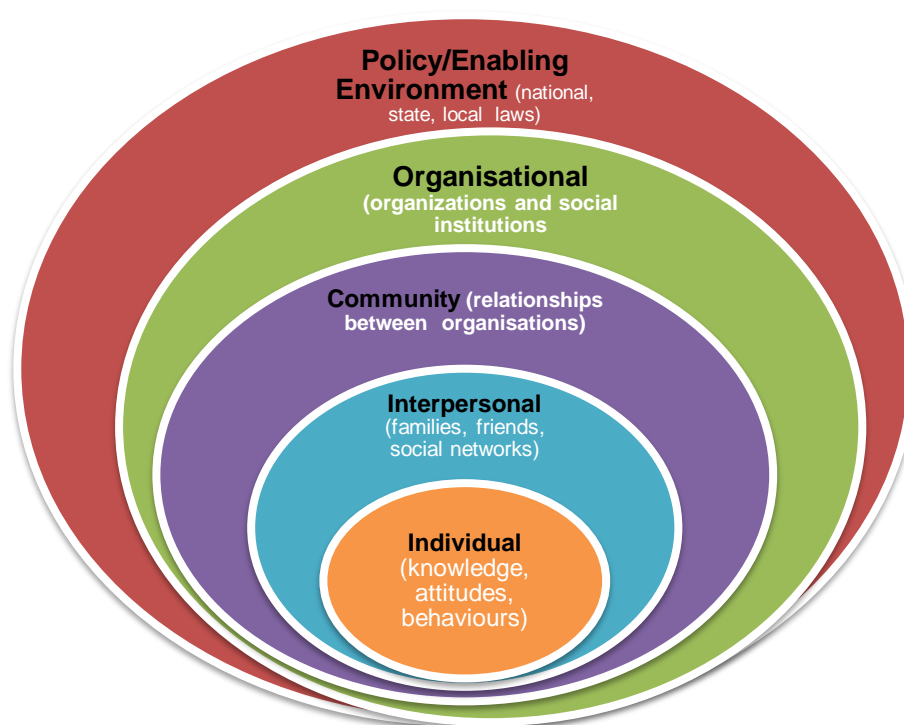
Figure 3: The Social Ecological Model (SEM)
Source: Adapted from the Centers for Disease Control and Prevention
(CDC), The Social Ecological Model: A Framework for Prevention (with
permission)

The Social Ecological Model is a theory based framework which provides a

settings approach for understanding the interactions between and the

interdependence of five interrelated layers i.e. individual, interpersonal,

community, organisational and policy / enabling factors that determine health

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behaviours. The model was originally developed by Urie Brofenbrenner (1977) exploring human development and further developed by McLeroy et al, (1988) in investigating health promotion programmes and was advocated in the Ottawa Charter for Health Promotion (WHO, 1986). The association between factors at different nested levels of the model may interact illustrating how each level influences and is influenced by each of the other levels. Multiple factors and wider contexts may influence perspectives of shift working and health and wellbeing from a health psychology perspective. The SEM model informed the semi-structured interview schedule as described in the Methodology section.

It is hoped that the current research will inform future studies to support the design and implementation of psychosocial interventions with shift workers.

Research Questions

Three main research questions were developed to answer some of the issues that have been raised above. These formed the first steps to developing a semi-structured interview schedule which is discussed in the next section.

1. What are the main challenges for the individuals and the organisation regarding working shifts?
2. How does working shifts affect health and wellbeing?
3. What psychosocial interventions might support the health and wellbeing of shift workers and how could these be implemented?

METHOD

Background to Research and Researcher

The researcher has several years' experience working in the private, public and third sectors in various capacities, including 15 years working within a Public Health environment where part of their role was to support organisations around staff health and wellbeing.

An issue of concern, which was raised on several occasions, was how to support shift workers in the workplace, mainly as they did not have the same access to health improvement activities such as stop smoking services, health checks, physical activity initiatives etc. as their non-shift working colleagues. This sparked an interest in shift work from an applied health psychology perspective.

The researcher currently works in a self-employed capacity as a trainer / facilitator and also has a part-time role within the NHS as a Health Adviser. Although experienced in one-to-one interviewing and facilitating focus groups, this will be the first formal research project they have undertaken using a qualitative approach and should increase their skill set.

Research Methods Rationale and Design

The design of the study was based on using the most appropriate methods to provide insights to the research questions.

To explore the complexity and contexts that relate to shift working a qualitative methodology approach was chosen. Barker et al. (2002) said when you want to know something about a person, the most natural thing is to ask and this forms the basis for this study. Qualitative research can be particularly valuable when aiming to gain an insight into the views and range of experiences held by the participants. Ferner (1997) also argues that a qualitative approach is the most appropriate for research within organisations to gain an insight into the internal politics and the constraints the business operates within. The researcher is also actively engaged in the data collection and research, rather than being a passive impartial observer. A quantitative approach, purely using questionnaires or surveys, would not give the richness of data required for this study and would restrict responses within set criteria.

Focus groups were considered for the participants but the most effective way to engage with the participants is to conduct face-to-face interviews as participants are more likely to give honest responses, without peer pressure, which within a focus group setting may be more problematic (Creswell, 2007). Direct interviewing allows the researcher to explore the participants' social reality, particularly if the participants have a personal stake in the topic (Braun & Clarke, 2014). One-to-one interviews also enable the researcher to build a rapport with the participants and for them to feel more comfortable to discuss more sensitive subjects that are less likely to be disclosed through a more quantitative approach (Creswell, 2007). Also, from a practical point of view, one-to-one interviews do not involve employees being taken away from

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their workplace at the same time, which could cause disruption to the workplace.

In considering whether to use structured or semi-structured interviews it is important to ensure that the method of data collection generates data that helps answer the research questions and also supports the chosen method of data analysis (Willig, 2013). In the current study the research questions drive the semi-structured interviews approach as they are designed to enable the researcher to explore and probe the issues that emerge. Using semi-structured interviews allows the researcher to gain novel insights into individual experiences and meanings (Braun & Clarke, 2014). Topics can be defined through semi-structured interviews which also allow a flexible approach to be adopted. This approach strikes a balance between a fixed list of structured pre-formulated questions in a specific order to allow comparable answers from each interviewee that would be less collaborative and may limit the topics that could be explored, and an unstructured interviewing approach, which may stray away from addressing the research questions. A structured interview approach may also restrict participants in discussing their experiences of shift working in their own words, particularly aspects they find difficult to discuss, as they may be constrained by the classifications imposed by the interviewer. A structured interview schedule may therefore result in interviewees giving socially desirable responses if there is no opportunity to expand on their responses. The semi-structured open-ended interview approach allows scope for participants to raise unanticipated topics and express their thoughts and experiences in a more natural conversational manner (Braun & Clarke, 2014). Semi-structured

interviews are the most widely used data collection method in qualitative research in psychology (Willig, 2013) and the transcripts allow comprehensive data analysis, particularly from a thematic analysis perspective as explored in the section Rationale for using Thematic Analysis.

Alongside interviews with the shift workers, interviews also took place with representatives from the management side of the organisation, including Human Resources, Occupational Health personnel and line managers to ask them about shift working to gain a greater understanding of the issues from an individual and an organisational perspective, which may have an impact on future workplace based interventions.

Demographic and shift working information was collected from the shift workers through the use of an abridged version of the Survey of Shiftworkers (Folkard et al., 1995), which is described below. Following this is a description of the construction of the semi-structured interview schedules.

Measures

Abridged Survey of Shiftworkers

 The shift working participants completed a paper copy of an abridged version of the Survey of Shiftworkers (SOS) as shown in Appendix B. The abridged SOS provides a straightforward tool to generate demographic information, baseline understanding of shift patterns alongside responses relating to the sleep habits and energy levels. The survey therefore provides supplementary information but the qualitative interview data holds the main body of empirical evidence.

The SOS was developed by the Shiftwork Research Team at the MRC/ESCRC Social and Applied Psychology Unit (Folkard et al., 1995) and is an abridged version of the full Standard Shiftworker Index questionnaire (Barton et al, 1995). The Standard Shiftworker Index was originally developed to provide a standardised battery of questionnaires for use in shift work research to assess the impact of working shifts on large groups of individuals and consists of 200 questions.

The abridged SOS consists of 24 questions that include one item questions that ask respondents to rate their workload on the shift they work, the pacing of the job they do (scored on 5-point Likert scales) and the flexibility of sleeping habits (scored on a 9-point Likert scale). Questions then ask about sleep quality associated with the shifts worked and rest days (5 items on each, scored on a 5-point Likert scale). All responses are added together (with one question reverse coded), with higher scores associated with greater sleep disturbance. Finally, there is 3 item "chronic fatigue" scale which in this survey relates to how tired or energetic the respondent generally feels, irrespective of whether they have not had enough sleep or have been working hard, which persists even on rest days and holidays. Chronic fatigue should not be confused with Chronic Fatigue Syndrome, which is a specific medical condition that requires an in depth clinical investigation and diagnosis. In the SOS scale the 3 items are scored on a 5-point Likert scale, (2 items being the opposite of fatigue and reverse coded), with a higher total score indicating more fatigue.

The abridged SOS also contains one question on morningness scored on a 9-point Likert scale, from the Morningness-Eveningness Questionnaire (Horne & Ostberg, 1976). It is suggested that morning types (high scorers) may be sleepier during night shifts than evening types and illustrates how individual differences can play a part in adaptation to shift working (Hilliker et al., 1992). More recently the terms "larks" or "owls" have become common terminology in the chronotype literature (Zavada et al., 2005).

Sensitive questions on neuroticism, digestive and cardiovascular health, and the General Health Questionnaire (GHQ) were omitted from the SOS in the current study, as were two-hourly alertness ratings. The omitted questions would be better utilised in large scale studies where different shift patterns can be compared (Folkard et al., 1995). An evaluation study conducted by Kaliterna and Zvjezdana (1998) concluded that the SOS scales provided good validity and internal consistency, apart from two scales which were not included in the current study.

The information from the completed surveys for each of the participants was inserted into an Excel spreadsheet and provided a score for each of the responses on the above scales (Appendix J).

Semi-structured interview schedule

Semi-structured face to face interviews in this study allowed the researcher to be flexible and responsive to the participants and to allow the interviews to flow. They also enable probing of various interesting topics that arose.

To incorporate broad psychosocial aspects of health and wellbeing that may be affected by shift working, the Social Ecological Model (Figure 1) was utilised to inform the design of two semi-structured interview schedules (Appendix C) and provided a framework for exploring the research questions and the different contexts that are involved in shift working. One interview schedule was designed for the shift workers and one for their managers. The interviews aimed to identify the most salient health and wellbeing related issues connected with shift working and explore what potential psychosocial interventions might be appropriate to support these. Within the context of the current study, brief descriptions of each level of the Social Ecological Model and the interview questions and probes that were developed to map onto relevant aspects of the different levels are illustrated in the interview schedules in Appendix C. The Social Ecological Model is shown again below.
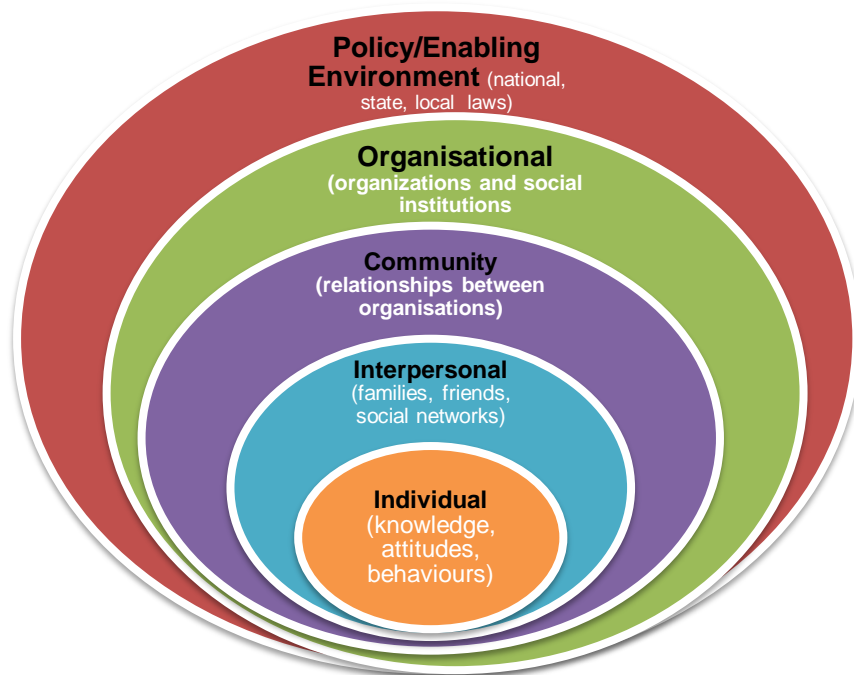
Figure 2. The Social Ecological Model (SEM)

Source: Adapted from the Centers for Disease Control and Prevention (CDC), The Social Ecological Model: A Framework for Prevention (with permission)

This approach aimed to explore the issues generated from the interviews by incorporating individuals' accounts in the context of their interpersonal, community and organisational perspectives to gain a broad understanding of the effects of shift working and to better understand the interviewees' own frameworks of meaning, particularly when communicating about health topics (Britten, 1995).

The different levels of the Social Ecological Model also informed the discussion around appropriate psychosocial interventions.

The first part of the interviews was an introduction to the researcher and the research to start building a rapport with the participant. Initially completing the Abridged Survey of Shiftwork presented a non-threatening, straight forward information gathering exercise to gain demographic and shift working information whilst also introducing the subject matter. This allowed the participants to familarise themselves with answering questions, many of which then flowed naturally from the survey to the semi-structured interview schedule.

Sample size

In quantitative research there are set criteria for determining the appropriate sample size for a piece of research taking into account generalisability and power. In qualitative research the sample size will depend on the research questions, the theoretical approach taken and the quality and extent of the data. Braun and Clarke (2014) have produced guidelines for one-to-one interviews which suggest that between ten and twenty interviews are sufficient for a study such as the current one. Braun and Clarke (2019) have also questioned whether data saturation is appropriate in thematic analysis research. Data saturation is known as the point where no new themes or codes emerge from the data. However, Braun and Clarke (2019) suggest that as meaning is generated through the interpretation of data, data saturation is a subjective judgement and therefore cannot be determined in advance of the analysis. From a pragmatic point of view, with a larger research team, it may be possible to conduct the analysis alongside the data collection to inform data saturation issues.

A total of 20 participants were interviewed in the study, 13 shift workers and seven managers. This sample size is appropriate for the research question and should provide an adequate amount of data to enable analysis of the topic (Braun & Clarke, 2014).

Inclusion and exclusion criteria

The participants were required to be 18 years of age or over, English speaking and either working shift patterns or working for the organisation as a Line Manager, Human Resource Professional, Occupational Health Professional or as part of the Employee Assistance Programme.

Ethical Approval

The research was conducted in accordance with the British Psychological Society Code of Ethics and Conduct (2009). Permission was sought and approval obtained for this research project from the Faculty of Health and Applied Sciences Research Degrees Committee of the University of the West of England on 15 April 2016 (Appendix D) and the study obtained approval from the University of the West of England's Ethics committee on 26 July 2016 (Appendix E).

Method of Data Analysis

Theoretical standpoint

Before engaging in this study the researcher reflected on their theoretical standpoint from an ontology and epistemology perspective and the method of enquiry adopted. As this research aims to explore individuals' experiences of shift working this qualitative study was underpinned by a critical realist ontology and contextualist epistemological approach.

Ontology can be seen as the perception of reality and the nature of the world i.e. how the world is constructed. A realist approach would ascertain that reality is set and knowable and is independent of human experience, with a relativist approach ascertaining that it is human interpretation that completely constructs that reality.

In this study the researcher is taking a critical realism approach in acknowledging that there is a world that exists independent of the human mind but it cannot be accessed in its entirety (Letourneau & Allen (2006),. Rich data can be built from "glimpses or partial fragments" gleamed from the individual participants (Bergen et al., 2010), which may be subjective and influenced by culture, history and social factors (Braun & Clarke, 2013). Interviewing participants therefore allows insights into the effects of shift working which would not be achieved using a realist ontological approach. Epistemology is concerned with how this reality can be accessed and how knowledge is constructed and is a way of understanding and explaining how we know what we know and how we make meaningful sense of the world (Crotty, 1998). Epistemological perspectives vary from positivism whereby researchers would say that knowledge is based on objective and unbiased data and there is only one truth, with constructionism ascertaining that

knowledge is subjective and different people will construct different meanings depending on their social and cultural contexts. This is an example of how individuals might reflect on their "Frame of Reference" or "Window on the World" (Jacqui & Aaron Schiff, 1975) to refer to our individual filter on reality. They defined the Frame of Reference as a framework which is used to define the self, other people and the world and is influenced by a range of factors from their upbringing and experiences.

In this research study the researcher is taking a contextualist perspective, a form of constructionalism, i.e. there is not one single reality in different contexts. The researcher is therefore interpreting the participants' interpretations (Braun & Clarke, 2014; Madill, Jordan & Shirley, 2000) and the influence of the researcher's own "window on the world" is acknowledged. To establish rigour in the study the researcher reflected on their role throughout the process to support the understanding of how the research was shaped and to reflect on their own assumptions and viewpoints in each stage of the study (Appendix G).

Rationale for using Thematic Analysis (TA)

There are a number of data analysis methodologies that can be utilised in qualitative research. At an early stage in the design of the current study two research methodologies in particular were considered for the analysis of the interview transcripts, Grounded Theory and Thematic Analysis. Grounded Theory is often chosen as a qualitative data analysis methodology in under researched areas, as it aims to construct new theory from the data itself (Glaser & Strauss, 1967). Although the current study aims to explore the

psychosocial aspects of shift working which, as the Systematic Review highlighted, is an under researched area, Grounded Theory was considered not to be appropriate for the current research as shift working generally has been informed by a large body of previous research. The current study also utilises existing theoretical frameworks which would limit a Grounded Theory approach.

Thematic analysis (TA) was therefore selected as the most appropriate method for analysing the data as the research was designed to support the understanding and interpretation of rich meanings (Braun & Clarke, 2014) and TA provides flexibility in exploring participants' experiences and thinking about working shifts, in ways that may not have been previously considered. TA looks to identify and make sense of themes and patterns of meaning that emerge from the data through a detailed analysis of the participants' perspectives and experiences and within their social and cultural arena. This enables the researcher to get closer to the processes and patterns of meaning that participants place on their experiences of working shifts which flow from the research questions and the data provided by the semi-structured interviews. Thematic analysis therefore provides appropriate flexibility, particularly as the data analysis is so closely aligned with to the data itself, rather than using previously formed set criteria or checklists that may be more appropriate in other qualitative data analysis techniques (Braun & Clarke, 2014).

There are many ways of analysing with TA but the two main forms of TA are known as theoretical TA and inductive TA (Braun & Clarke, 2013).

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Theoretical TA is where existing theory is used in the analysis and inductive TA where the analysis is focused on the data without the framework of existing theories. Although many investigations have shown how shift work impacts on health, the systematic review previously conducted by the researcher highlighted the paucity of research into interventions from a psychosocial perspective. Therefore a theoretical TA was not deemed to be appropriate in this study due to a lack of pre-existing theory and a primarily inductive approach to TA was thought to be most applicable. An inductive approach to TA fits well with a critical realist perspective and allows a broader interpretation and analysis of the data to explore emerging insights and themes. This "bottom-up" approach to the coding allows themes to arise from the data rather than through a theoretical coding template. However it is acknowledged that a level of theory was applied by the use of the Social Ecological Model to construct different layers of questions in the semi-structured interviewing process. Also the research questions were based on a certain level of prior knowledge and theory around the health and wellbeing impacts of shift working.

Quality and rigour in qualitative research

There has in the past been a greater emphasis on quantitative research in psychology and the rigour of this approach as regards measurement and experimentation (Danziger, 1990). However, it is now acknowledged that qualitative research has such an important place to enrich our knowledge,

particularly in the field of health psychology (Murray & Chamberlain, 1998). The nature of qualitative research is not necessarily to replicate studies to show reliability, but to explore context and individual differences (Yardley, 2008). In the current research the findings may not be replicable to the shift working population generally but may provide insights that can be explored in the future.

Due to the subjective nature of qualitative research ensuring quality can be challenging. Tracy (2010) sets out eight "big-tent" criteria for excellent qualitative research:

1. Worthy Topic : relevant, timely, significant, interesting

2. Rich Rigour : theoretical constructors, data and time in field, sample, context, data collection and analysis

3. Sincerity : self-reflexivity, transparency

4. Credibility : thick description, tacit knowledge, triangulation, member reflections

5. Resonance : evocative representations, naturalistic generalisations, transferrable findings

6. Significant contribution : conceptually / theoretically, practicality, morality, methodologically, heuristically

7. Ethical : procedural, situational, cultural, relational, existing ethics

8. Meaningful coherence : achieves what it purports to be about, uses appropriate methods, meaningfully interconnects literature, research questions, findings and interpretations with each other.

Meyrick (2006) sets out an approach to judge rigour and quality in qualitative research, with two core principles of quality – transparency and systematicity and linking these to the techniques used in the research process. In the current study it is hoped to adopt a "good enough" standard. As a result the researcher is aware that they are an integral part of the qualitative research design, analysis and interpretation and bring their own "window on the world" (Schiff & Schiff ,1975) to the process. The role as the researcher is acknowledged and reflected on throughout this research (Appendix G).

Reflective Practice

The researcher kept a reflective journal throughout the Doctorate and the research. Appendix G is a reflective chapter completed for a Professional Skills module reflecting on the Professional Doctorate overall. Appendix F contains a reflective narrative relating to the different stages and aspects of the current study. Part of the function of the research reflection was to allow the researcher to shape and interpret the data while being aware of their role as part of the research and to establish some distance between the researcher and the data. This also allowed the researcher to acknowledge their personal biases and assumptions made during the interviewing and analysis stages, but without eliminating them. This process helped to increase methodological rigour and analytical decision making and comes with the understanding that the researcher is an important part of this qualitative process and it differentiates qualitative from quantitative data.

Procedure

Research setting

In the initial planning stage it was anticipated that the study would be conducted with shift workers from a range of organisations based at London Luton Airport and the Airport Authority gave permission for this to take place. This became problematic due to airport expansion, organisational and restructuring constraints at London Luton Airport. However, a private sector organisation expressed an interest in the study, particularly if it could be conducted solely within their organisation. The researcher met with senior directors and presented a summary of the proposed research, which was well received. A brief summary of the research was then sent to the organisation's parent company, who then gave their permission for the research to be conducted.

The organisation agreed to take part in the study on the understanding that they remain anonymous in any write up of the research and that any information about the organisation remain confidential. The Results and Discussion sections of this thesis and transcripts therefore remain confidential within the University of the West of England (UWE). If the research is published it is on the understanding that individual members of staff cannot be identified. An interim report was provided to the organisation disseminating some key findings and practical steps that could be put in place to address some of the issues raised before the main qualitative analysis was completed.

The organisation employs around 250 people, with around 75% being male. Around 60% of the employees work shift patterns.

Recruitment of Participants

The researcher discussed the range of participants they hoped to access with the health and safety manager at the organisation, who was the main contact. The aim was to interview a range of shift workers of different ages and genders but who, generally speaking, reflected the mix of people and occupations employed by the organisation, as well as the different shift patterns worked. This could therefore be seen as a purposive sample to ensure a wide range of accounts are included. Likewise, for the participants from the managers group it was important to interview those people who had direct experience of supporting people who worked shifts i.e. occupational health and human resources, as well as direct line managers of the shift working staff. It was therefore hoped to gain an overall reflection of shift working within the organisation from different perspectives. The researcher relied on the health and safety manager to ensure that these sampling criteria were met as they did not have direct access to recruit participants themselves.

Details of the research were disseminated to managers in the organisation, at staff meetings and by email, asking them to support their staff to take part. Permission was given for staff to be interviewed on site during work time usually at the start or end of their shift. Information about the research was then shared with the shift working staff and the managers.

The researcher's availability was given to the health and safety manager who then arranged interview slots with the staff who had come forward. The health and safety manager assured the researcher that the participants were thought to be a representative cross section of the shift working staff and the managers. Recruitment of participants took place between June 2017 and January 2018.

Although initially the aim was to interview ten shift workers and ten managers, as the interviews progressed it became apparent that the views of those participants currently working shift patterns should take prominence in the research and would provide the most useful insights into the broader health and wellbeing aspects of working shifts. Although it was important to investigate the organisational perspective from the managers' point of view, many of them had not worked shifts themselves and as a result may not have had such a broad focus. Therefore, the pragmatic decision was made by the researcher to interview thirteen participants who worked shift patterns and seven participants who represented the managers. This number is deemed to be an appropriate sample size by Braun and Clarke (2014), who produced guidelines for one-to-one interviews and suggest that between ten and twenty interviews are sufficient for a qualitative study, such as the current study, to enable themes and patterns to be explored.

Information given to participants / informed consent

Before each interview the researcher introduced themselves and explained the study to individual participants. The participants were provided with a research participation / information sheet (Appendix H) which gave details of the research, confidentiality and anonymity, the researcher's contact details and informed participants of their right to withdraw from the study. Each participant signed a consent form (Appendix I) before the interview began.

After the interviews participants had one month to withdraw their data if they no longer wanted their details to be used in the study, with their information destroyed. All interviews were anonymised and data stored under a pseudonym.

The interviews took place in a confidential room at the workplace. Although it was often necessary to conduct interviews outside of normal working hours, to fit with the shift working patterns, the researcher was never working alone within the workplace as there were other employees in the vicinity due to the nature of the 24 hour work.

Data collection and transcription

Twenty semi-structured interviews were conducted in total, 13 with shift workers and seven with managers. Eighteen interviews were conducted face-to-face with two interviews conducted on the telephone with the organisation's occupational health provider and another external organisation who had provided workshops and physiotherapy support in the past. The interviews ranged between 26 minutes and one hour fifteen minutes, with the majority lasting approximately an hour.

The interviews were recorded onto a digital Olympus DSS borrowed from UWE. The interviews were then saved to Olympus transcription software and downloaded onto the researcher's private laptop and password protected. The researcher transcribed the interviews verbatim into Microsoft Word documents, again using Olympus transcription equipment borrowed from UWE. After each interview was transcribed the researcher went back through it to blank out any names of individuals or organisations that the participant had mentioned to ensure confidentiality or anonymity. The researcher attempted to remain as true to the data as possible and asked a fellow student to run through one of the transcripts to assess accuracy.

Any paper based data with participant identifiable information, including completed surveys and completed consent forms, collected during the research were stored in a locked filing cabinet at the researcher's home. Other physical data, such as interview transcripts, write-up, reflections and analysis, were handled with care. The researcher was the sole person to have access to any person identifiable data. After analysis and reporting the digital recordings will be destroyed and the transcripts held for 5 years (in line with British Psychological Society regulations and the Data Protection Act, 2018).

Generating codes and themes

Codes and themes were developed using NVivo, a Computer-Assisted Qualitative Data AnalysiS (CAQDAS) software package. Although the researcher completed the analysis, NVivo is a convenient way to organise

and represent the data. The researcher attended a two day NVivo 11 software for qualitative data analysis course in May 2016 and a follow up course in November 2017, both facilitated by UWE. It took a while to get familiar with and understand NVivo which presented a challenge at first with so much data to analyse.

Braun and Clarke (2006) proposed a six phase TA approach (as set out below) which was adopted to analyse the data:

1. Familiarisation with the data

2. Generating initial codes

3. Searching for themes

4. Reviewing themes

5. Defining and naming themes

6. Producing the report

However in analysing the data the researcher did not necessarily proceed through these stages in a linear fashion from one to six but in a more iterative way, going backwards and forwards through these analytical steps.

Reading and re-reading of the interview transcriptions was the first phase to become familiar with the data. The researcher then went through and looked for patterns in the data as well as things that resonated and made initial codes (called "nodes" in NVivo). Some of the data was initially coded under more than one code. The use of NVivo made the process more systematic and neat, although initially it meant over 250 separate codes were formed. If codes had been developed through a pen and paper exercise it would likely

have produced fewer codes. By identifying relationships or similarities between different codes some could be merged, while others were discarded. Through revisiting the data merged codes were reorganised into clusters which were then developed into the emerging themes. This process was reviewed and refined several times.

The advantage of using NVivo was that all of the data was covered (Basit, 2003) although difficult decisions had to then be made as to what should be discarded from this study as it was not directly relevant to the research questions or the research aims. The analysis was initially quite descriptive but the researcher started to interpret the data to explore how the different codes and meanings could be grouped into higher level themes by interpreting meanings and patterns across the data.

These emerging themes were related to the initial research questions (Braun & Clarke, 2014) and were then reviewed by going back to the data. Once main themes were established they were transferred to a Word document to look at the data again and merge themes to form four. Going back and forward from the themes to the data allowed further insights which sometimes involved re-coding.

Initially the interview data from the shift workers and the managers was analysed and coded separately but as the themes emerged it became clear that there were similar threads and topics resonating with both the shift workers and the managers. Therefore some of this data was triangulated, described by O'Donoghue and Punch (2003) as a "method of cross-checking

data from multiple sources to search for regularities in the research data".
This involved incorporating similar codes from the shift workers and
managers into the emerging themes.

One of the criticisms of qualitative research is the subjective nature of the
data analysis, particularly if this is completed by one researcher (Braun &
Clarke, 2013). In order to mitigate against this a fellow doctoral student
cross-checked some of the initial analysis and coding to assess the validity
of the researcher's emerging themes. Feedback was also sought from the
researcher's supervisory team who agreed that two of the themes should be
combined. Through discussion the final themes were then refined by the
researcher to form a total of three themes with sub-themes (Figure 3 in
Results section).

RESULTS

This section has been redacted to ensure confidentiality for the organisation and participants.

DISCUSSION

This section has been redacted to ensure confidentiality for the organisation and participants.

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APPENDICES

Towards evidence based psychosocial interventions to support workers in reducing the health and wellbeing impacts of working shifts

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Psychosocial interventions that improve the health of shift workers: A systematic review

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Abstract

Aims and Objectives The aim of this review was to answer the question "What psychosocial interventions improve the health of shift workers?"

Methodology A systematic review was conducted through a search within electronic databases. Reference lists of relevant studies were scanned for other articles and "grey" literature was searched.

Results After applying inclusion and exclusion criteria, four studies were identified for inclusion and data was extracted for analysis. Due to the heterogeneity of the interventions and study designs it was not possible to conduct a meta-analysis and a narrative synthesis was completed. Two studies designed interventions using Cognitive Behavioural Therapy for Insomnia (CBT-I), one had an education session intervention to improve dietary knowledge and attitudes and one was based on a weight management programme for men. The methodological quality of the studies was mixed, with one study rated as weak.

Conclusions There are some positive results which may indicate a trend in supporting shift workers sleep patterns through the use of CBT and in implementing a weight management programme for men. The future direction of intervention design and research in this area is discussed including the need for larger scale research on the effectiveness of psychosocial interventions with shift workers which have longer term follow up.

Introduction

In an increasingly twenty four hour society and flexible work culture it is estimated that around 13-20%; (IARC, 2007) of the working population in Europe and North America work shifts that involve working nights and shift workers can be seen as an important component of the workforce to address the economic climate of modern society (Harrington, 2001). Many professions employ shift workers with the main occupations being the uniformed services, food service industries, healthcare, transportation and production industries (McMenamin, 2007).

Although no official definition of shift working exists, it has been described as work that occurs between 7pm and 6am (Monk et al.,1992) and work that differs from the traditional diurnal work period and involves unusual working hours (Costa, 2003 ; IARC, 2011). Workplaces operate different types of shift work schedules which can include a permanent night shift; backward rotation e.g. 7 days night shifts, 7 days evening shifts, 7 days morning shifts; or fast forward rotation e.g. 2 days morning shifts, 2 days evening shifts, 2 days night shifts. Forward rotating shift schedules may support faster recovery as they give more recovery time between the individual spells of shifts (IARC, 2011).

Shift workers tend to have reduced sleep quality and quantity due to the misalignment between the circadian clock and their sleep / wake schedules disrupting the circadian rhythm. Put simply the circadian system in the brain causes arousal of the brain during the day and promotes sleep during the night (Dijk,1995). A circadian rhythm sleep disorder is often described as

SWD or shift work disorder (Sack et al, 2007). The effect on sleep patterns can place workers at risk of chronic health problems. Research has shown that shift workers sleep two to four hours less during the day than at night (Akerstedt, 1995) and 50% of night shift workers have extended wakefulness at the start of their night shift schedule (Knauth et al, 1980).

Irregular working hours, leading to circadian disruption and less sleep, are thought to be factors that contribute to poor dietary habits and an increased incidence of body weight gain and obesity (Atkinson et al. 2008; Di Lorenzo et al, 2003). Long term shift working may also lead to a greater incidence of various diseases in comparison to workers who do not work shifts, such as cardiovascular and gastrointestinal disorders (Esquirol et al, 2011; Knutsson, 2003), cancer (Hansen, 2006; Viswanathan et al. 2007) metabolic syndrome and diabetes (Kolstad et al, 2008; Harrington et al, 2001; Puttonen et al, 2010; Pan et al, 2011; Li et al, 2011; Van Drongelen et al, 2011).

Over the last few years, as it has been acknowledged that shift working can lead to poorer health outcomes. Research has looked at interventions to improve the health and wellbeing of shift workers, which often involve improving sleep quantity and quality. These include changing night shift patterns and schedules (Knauth et al, 1983), incorporating planned naps into the work schedule (Howard et al, 2010), controlled use of bright light and darkness to mimic daytime and night time (Eastman, 1990) and the use of melatonin medication and other hypnotic pharmacological interventions to facilitate sleep, or Modafinil and / or caffeine to improve alertness (Walsh et al, 1995). This systematic review does not look at these types of interventions which are more biologically or environmentally focussed.

Therefore it has been proposed that certain healthy lifestyle interventions that focus on the risk factors for ill-health and chronic diseases in shift workers can be supportive and improve health and wellbeing. These interventions could focus on primary disease prevention, but with an ageing workforce and for workers who already have ill-health a secondary prevention focus will also have an impact. Interventions related to improving sleep quality and timing, improved nutrition and dietary behaviour and physical activity may have a positive impact on the health and wellbeing of shift workers.

There have been a number of systematic reviews looking at various aspects of shift working (Canuto et al, 2013; De Cordova et al, 2012; Esquirol et al, 2011; Saksvik et al, 2011; Wright et al, 2013) but there does not appear to have been a review which looks at psychosocial interventions to improve health in this population.

Aims and Objectives
The aim and objectives of this SR are to identify the characteristics of potentially effective psychosocial interventions that have taken place with shift-workers to improve their health and wellbeing, to then synthesise the studies and to critically review the quality of these studies. Any conclusions drawn can then inform future implementation of interventions and future research opportunities.

A broad definition of health had been taken in this review to enable as many studies to be identified and to be as inclusive as possible. A general definition of health, which although it was first cited in 1948 is still widely used today, is taken from the World Health Organisation (WHO) and states that "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948). Psychosocial interventions can be defined as any intervention that emphasizes psychological or social factors rather than biological, chemical or environmental factors (Ruddy & House, 2005). A broad range of interventions for groups or individuals would be considered appropriate such as psychological

interventions, health education or promotion and healthy lifestyle behaviour change interventions such as dietary change, physical activity promotion, improved sleep quality / quantity or smoking cessation etc.

Methodology

Systematic Search

Appropriate electronic databases were identified that provided studies from peer-reviewed journals.

The initial search was completed through the EBSCO platform within the following computerised databases – AMED, Business Source Premier, CINAHL Plus, Soc INDEX, PsyARTICLES, Regional Business News, PsychINFO, MEDLINE. Similar searches were conducted in other electronic databases i.e. EMBASE through the OVID platform and Science Direct but they were adapted to include the particular MeSH search terms and methodology appropriate to those databases.

The searches were limited to human only studies in the English language between the years 1999-2014.

Medical Subject Headings (MeSH) terms were identified to develop search words and phrases relating to shift working and health related interventions. The individual search platforms thesaurus' were used to identify key words and terms and these were increased (exp) where appropriate. These were combined to:

1) identify shift workers: (shiftworker* OR nightworker*); (shift OR shifts); (work* OR pattern*); night*

2) identify psychosocial interventions: behavio*; "quality of life"; (psycho* OR social* OR psychosocial* OR psycho-social* OR "psycho social"); (educat* OR teach* OR inform*); ("health promot*" OR "promot* health");

(therap* OR CBT OR mindfulness OR counsel* OR social OR lifestyle* OR wellbeing OR well-being OR "wellbeing" OR "self manag*" OR relax* OR medit* OR yoga OR cope* OR coping OR resilien*); stress AND (mange* OR relief OR reliev*);

An electronic search was also made for unpublished and "grey" literature for minimizing the potential effects of publication bias as studies that show statistically significant, "positive" results are more likely to be published than those that do not. Zetoc was searched for conference proceedings and Google Scholar to attempt to identify any relevant unpublished research reports. However, it is acknowledged that "grey literature" may lack formal evaluation or scientific design rigour.

No experts in the field were identified that could be contacted to give advice about any potential unpublished studies. Reference lists from relevant articles identified in the initial literature search were hand searched to identify other possible studies not identified in the electronic searches.

The search initially identified 7,606 studies (see Figure 1). All potential studies were imported into Refworks, a bibliographic capture and management database for data gathering purposes.

Study Selection

After duplicates were taken out, relevant studies that appeared to meet the inclusion criteria were selected independently by the two reviewers from their title and abstracts. Eligibility criteria included studies that involved people who worked a shift pattern and the implementation of a health related intervention. Any type of study design would be considered including randomised and non-randomised, cohort and case-control studies (Figure 1).

Full text articles were obtained from all the studies that met the initial inclusion criteria (n=22). These were reviewed independently by the two reviewers and any disparities were resolved by consensus. A brief form was designed which listed inclusion criteria i.e. the studies had to include interventions aimed at shift workers, even as a subset of the population studied, and include an intervention relevant to the health risks associated with shift working. Exclusion criteria included: no shift workers involved in the study; no intervention, interventions which looked at improving the physical workplace environment with no implications for health behaviour change, such as changing light patterns; interventions which did not have a psychosocial aspect but were organisational changes, for example changing shift work rostas or opportunities for napping breaks; interventions that involved the use of drugs or pharmacology; interventions that purely focused on work/life balance or accidents or productivity, unless they had a specific emphasis on health. See Figure 1 and excluded papers reference list.

Data Extraction
A total of four studies met the inclusion criteria and contributed to the formal analysis (Figure 1). Two studies were concerned with Cognitive Behavioural Therapy (CBT) for improving sleep, and two were concerned with diet or weight management.

A data extraction form was designed and adapted from The Cochrane Collaboration data collection designed for intervention reviews for Randomised Controlled Trials (RCTs) and non RCTs. Both reviewers independently pre-tested the data extraction form on a sample of excluded studies to assess its reliability, as a result of which the form was amended. The final data extraction form was used to extract full data from the studies included in the review. Data extracted included participant characteristics, study design details, the outcome measures and statistical analysis, and the outcome results with the key conclusions of the study authors.

Data was extracted from the papers that fulfilled the inclusion criteria by the first reviewer and these were then checked by the second reviewer to compare judgements.

This data was summarised in tabula form (Tables 1, 2 and 3).

Quality Assessment
To assess the methodological quality of the studies a quality assessment form was adapted from the EPHH (Effective Public Health Practice Project) Quality Assessment Tool for Quantitative Studies (Deeks et al, 2003) which shows content validity and test-retest reliability (Thomas et al, 2004). The form included questions and component ratings to assess the internal and external validity of studies for: selection bias (representation of population, participation rates), study design (randomised?), confounders (e.g. SES, gender, age, ethnicity etc.), blinding, (of participants and outcome assessor), data collection methods (validity and reliability), withdrawals and drop-outs (attrition rates), intervention integrity (consistency and unintended intervention) and analyses (appropriate statistical methods and analysis). An overall rating is assigned for each question and the quality for each section is rated as strong, moderate or weak. No weak ratings would indicate a methodologically strong study, two or more weak ratings a moderate study and two or more weak ratings a weak study.

Quality assessments on the above criteria were made independently by the two reviewers and discrepancies were discussed and resolved by consensus. The quality ratings were then illustrated in Table 4.

Figure 1 The search and selection process in the systematic review

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┌─────────────────────────┐      ┌─────────────────────────┐
│ Records identified      │      │ Records identified      │
│ through database search │      │ through other sources   │
│ n=7603                  │      │ n=3                     │
└─────────────────────────┘      └─────────────────────────┘
            │                                │
            ▼                                ▼
      ┌───────────────────────────────────────────┐
      │ Records after duplicates removed           │
      │ n=5422                                      │
      └───────────────────────────────────────────┘
                          │
                          ▼
      ┌─────────────────────────────────────┐        ┌──────────────────────┐
      │ Records screened on title and       │───────▶│ Records excluded     │
      │ abstract n=869                      │        │ n=846                │
      └─────────────────────────────────────┘        └──────────────────────┘
                          │
                          ▼
      ┌─────────────────────────────────────┐        ┌──────────────────────┐
      │ Full text articles assessed for     │───────▶│ Full text articles   │
      │ eligibility n=22                    │        │ excluded with reason  │
      │                                     │        │ n=18                  │
      └─────────────────────────────────────┘        └──────────────────────┘
                          │
                          ▼
      ┌─────────────────────────────────────┐
      │ Studies included in narrative       │
      │ synthesis n=4                       │
      └─────────────────────────────────────┘
```
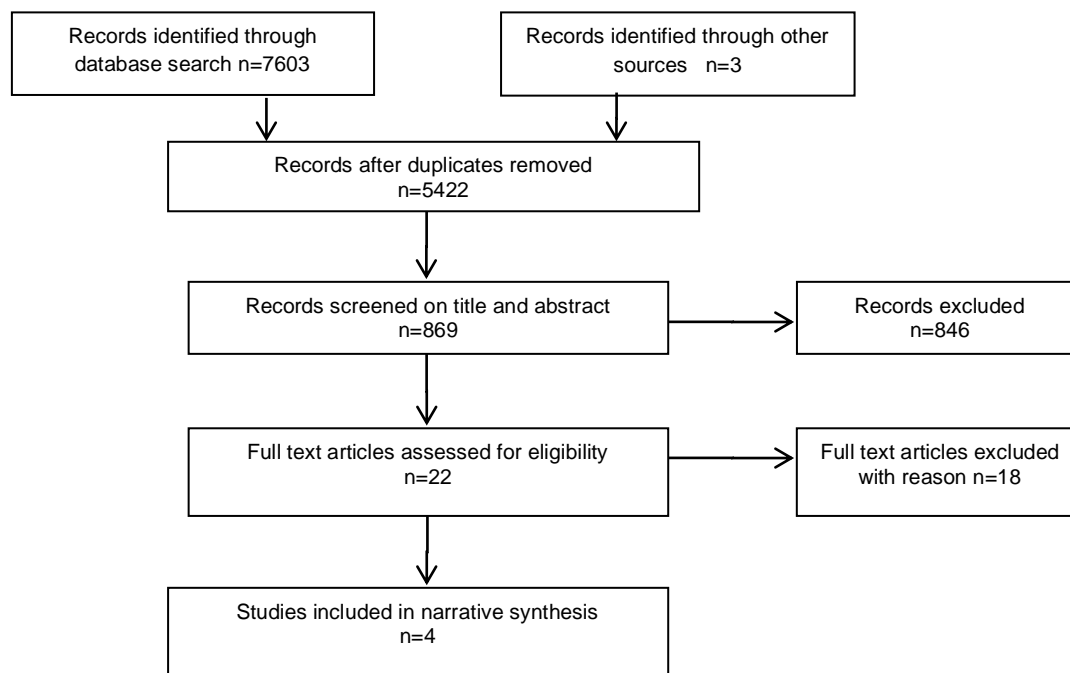
Results

Summary of results

The search initially generated 7,606 studies. After removal of duplicates, and those that were clearly not relevant to work or health, 869 titles and abstracts were screened for inclusion. Twenty two full text articles were screened for eligibility and a total of four studies met the inclusion criteria and contributed to the formal analysis (Figure 1). Two studies were concerned with Cognitive Behavioural Therapy for Insomnia (CBT-I) for improving sleep, and two were concerned with improving dietary knowledge and attitudes or weight management.

Summary tables give the key data from the data extraction process for analysis and discussion. These tables are Table 1 : Methodological Quality; Table 2 : Study Design; Table 3 : Participant Characteristics; Table 4 : Selected Outcome Results.

No UK based studies were found for this review. Jarnefelt et al (2012) was conducted in Finland, Lee et al (2014)in the USA, MacDonald et al (2013) in Canada and Morgan et al (2011) in Australia.

Two of the studies were similar to each other in that they both used CBT for Insomnia as their intervention to improve sleep quality and quantity in shift workers. However one was concerned with participants who had reported suffering from insomnia (Jarnefelt et al, 2012) whereas the other study (Lee et al, 2014) did not define whether the shift workers had problems or not with sleeping, but it can be assumed that participants would not have come forward to take part in the study unless this was the case.

The other two studies, although one was looking at a weight management intervention (Morgan et al, 2011) and the other a nutrition intervention, were very diverse studies. One study was a randomised control trial (Morgan et al, 2011) with 110 participants and the other

was a cohort study (MacDonald et al, 2013) with 29 participants.

Quality of studies

Specific methodological and bias quality assessments, after consensus from the two reviewers, are shown in Table 1. Only one study was identified as methodologically strong overall (Morgan et al, 2011) this was the randomised control trial, with two studies rated as moderate (Jarnefelt et al, 2012; Lee et al, 2014) and one study identified as methodologically weak (MacDonald et al, 2013) due to a weak study design and poor methodology (Table 4) and in this instance it is questionable whether the quality was adequate to trust the results.

The design, methods and results for the studies are set out below.

Table 1: Methodological Quality

	Jarnefelt H et al (2012)	Lee K A et al (2013)	Macdonald A B et al (2013)	Morgan P J et al (2011)
Selection bias	Moderate	Moderate	Moderate	Strong
Study design	Moderate	Moderate	Weak	Strong
Confounders	Moderate	Moderate	Moderate	Moderate
Blinding	Weak	Weak	Weak	Moderate
Data collection methods	Moderate	Moderate	Weak	Strong
Withdrawals and drop-outs	Moderate	Moderate	Weak	Strong
Intervention integrity	Moderate	Moderate	Weak	Strong
Analyses	Strong	Strong	Weak	Strong

Study design

Only one study was designed as a randomised control trial (Morgan et al, 2011). The participants were randomly allocated to the Workplace POWER (Preventing Obesity Without Eating like a Rabbit) programme or a 14-week wait-list control group). The men worked in crews (n=15) and were randomly allocated in four crew clusters. Participants and assessors were blind to group allocation at the baseline assessment.

The other studies had un-randomised study designs (something

acknowledged as an issue by Jarnefelt et al, 2012). The only other study that had a control group was Lee et al (2014) through an active control intervention, whereby the control group did take part in the first part of the intervention but not the CBT element

Three of the studies gave a clear definition of the aims of the intervention which led to the use of appropriate outcome measurements (Jarnefelt et al, 2012; Lee et al, 2014; Morgan et al, 2011). In the same studies detailed descriptions of the intervention and research methods provided enough information to allow for replication. It is unclear from the MacDonald et al (2013) study how the survey questions were related to the dietary education session.

The same data and measurements were collected pre and post the intervention in all of the studies.

One study did not state participant exclusion criteria and it was unclear what shift patterns the included participants worked (MacDonald et al, 2013). The other studies all stated their inclusion and exclusion criteria.

It is difficult to say if the sample sizes were sufficient to show meaningful results. Only one of the studies had carried out a power calculation to gauge the number of participants required (Morgan et al, 2011), the other three studies had small sample sizes, something that was acknowledged by Jarnefelt et al (2012), so it was not possible to ascertain if they had necessary sample sizes to detect statistically significant differences.

Only one study (Morgan et al, 2011) was based on a psychological theory (Bandura's Social Cognitive Theory, Bandura 1986). The lack of the use of theories or models may suggest there was no theoretical basis to the studies, although CBT is widely used.

The fidelity of the intervention in the case of MacDonald et al (2013) is difficult to ascertain and may result in the findings being non-significant due to the design and implementation. Little detail is given of the healthy eating education sessions and there is therefore limited generalisability.

Study methods and settings
In the CBT interventions, one was self-administered and home-based using a previously developed programme (Lee et al, 2014) and the other was implemented through workshops by Occupational Health Nurses within the workplace, again using a previously designed CBT intervention. The delivery formats were tailored to the target groups.

Both the CBT interventions used Cognitive Behavioural Therapy for Insomnia, (CBT-I) although one study was targeting shift workers with insomnia (Jarnefelt et al, 2012) and the other was targeting nurse shift workers who had rated their sleep as poor for the past month (Lee et al, 2014) and they used slightly different measures for data collection (See Table 1). In both of these studies the data collection outcome measures were valid and reliable.

Morgan et al's (2011)study was based on a previously validated weight management programme and this study was designed to test it's feasibility with a male shift working population. The intervention comprised of an education and introduction session carried out by one of the researchers in the workplace, followed by web and paper based activities. The outcome measures used were valid and reliable. (See Table 1) and were carried out by Occupational Health staff.

The study by MacDonald et al (2013) evaluated an oral education session, carried out by the researcher, for new paramedic employees using a survey which was not properly validated and was also implemented by the researcher.

Table 2: Study Design

Authors / date / country / where published	Study design	Theoretical basis	Focus of intervention/s	Description of intervention/s	Duration of study	Outcome measure/s	Characteristics of measures (validated?)	Follow up after study
Jarnefelt H et al (2012) Finland	Non-randomised group intervention	None stated	CBT-I for Shift workers with chronic insomnia	CBT-I (Cognitive Behaviour Therapy for insomnia) incl. Sleep hygiene, relaxation, stimulus control, sleep restriction, cognitive restructuring plus shift work related strategies. 7 group sessions & 1 individual session. Ind session held between 6th & 7th group sessions. Group sessions 90-120 mins, ind session 50 mins. Each group had 4-9 participants & held in OHS unit.	10 weeks	Insomnia Severity Index (ISI) questionnaire Dysfunctional Beliefs and Attitudes about Sleep (DBAS) questionnaire Symptom Checklist 90 – the Global Severity Index (SCL-90 GSI) RAND 36 - health-related quality of life Sleep diary – completed via internet For 2 weeks at T0, T1& T2. Kept for 1 week at T3 & T4 Contained questions from validated measures Wrist Actigraphy completed for 2 weeks at same time as sleep diary at T0, T1 & T2	Scale 0-28 (validated) Scale 1-10 (validated) Scale 1-4 (validated) Scale 0-100 (validated) AW7 CamNtech, Cambridge, UK	After 6 months
Lee K A et al (2013) USA	Prospective longitudinal within-subjects design	None stated	Home-based CBT-I sleep training for shift workers	2 home based cognitive behavioural interventions: 4 week active control intervention – sleep diary & reading from book developed by National Institute for Occupational Safety & Health re shift	8 weeks	Pittsburgh Sleep Quality Index General Sleep Disturbance Scale	7component scale 0-21 (validated) 21 items, scale 0-7 (validated)	None stated

				work including individual coping strategies; followed by a 4-week Sleep Enhancement training System for Shift Workers (SETS-SW) including guidebook, reading, auditory programme (15 mins before sleep in 1st week then 45 mins)		Center for Epidemiologic Studies – Depression scale (CES-D) Standard Shiftwork Index (SSI) One question from the Morningness-Eveningness Scale Wrist actigraphy worn for 7 days for each of 3 assessments	20 items (validated) validated validated Ambula-tory Monitoring Ardsley NY	
Macdonald A B et al (2013) Canada	Matched cohort study	None stated	The effect of oral educ. on nutrition and shiftwork knowledge and attitudes	15 mins oral presentation on nutrition management during paramedic orientation session. Devised by lead author from materials by Dieticians of Canada, Health Canada and academic literature.	One month	Self-administered surveys before education (1), immediately after education (2) & one month after education 1 & 2 surveys paper based, 3 email based. Lead author devised survey questions to test attitudes with answers on a 5 point Likert scale (5 strongly agree, 1 strongly disagree):	Face validity – survey tested by 11members of staff. No content validity.	None stated
Morgan P J et al (2011) Australia	Prospective 2-armed RCT	Bandura's SCT SCT constructs mapped to intervention component	Evaluate feasibility & efficacy of a workplace-based weight loss program	110 participants randomised to i) WP programme or ii) 14 week wait list control group. 3 month WP programme included 1 info session, booklets, group based financial incentive & an online component (based on previous successful internet based weight loss programme for men – the SHED-IT programme) but other elements of the	3 months	Body weight (kg) at 14 week follow-up Waist circumference BMI Blood pressure and Resting Heart Rate (RHR)		None stated

				intervention were modified to be more relevant to shift workers.		Self reported questionnaire – included leisure time & workplace based physical activity, some dietary variables & beverages, key physical activity (self-efficacy, pros & cons, behavioural intention) & dietary cognitions (attitudes, stage of change).		

Study populations

All the studies involved voluntary participation in the interventions. However it is not clear from the studies what the initial participation rates were as a percentage of the whole shift-working population within those particular workplaces.

The two CBT studies give a description of the shift work patterns that the participants worked which all included working at night, although they used different definitions. The other two studies say the participants are shift workers but do not give a definition.

The majority of the study participants, across all the studies, were well educated or from higher socioeconomic groups. The mean age of participants in the MacDonald et al (2013) study was 28.3 years which reflects the fact that the participants were new paramedic staff. The mean ages of the other three studies were very similar, ranging from 43.5 to 45.5 years. Between the three smaller studies (Jarnefelt et al, 2012; Lee et al, 2014; and MacDonald et al, 2013) there were a total of 39 females and 27 males, which reflects their occupations and workplace settings. The largest study which had 110 participants

(Morgan et al, 2011) was designed around males only.

Ethnicity data was only available for one study (Lee et al, 2014) which showed that the largest ethnic group of nurses was Asian (38%). This may suggest that the participants in the other studies where white Caucasian, but should not be assumed.

The attrition rates in the CBT studies were relatively low. In the Jarnefelt et al (2012) study data was received from all measurement points for 73% of the original sample of participants. Lee et al (2014) reported the majority of participants completing the intervention although not all completed every aspect of the programme, ranging from 19 out of an initial sample of 21 participants reading the active control intervention booklet to 13 participants using the daily audio programme.

Attrition rates may have an effect on the studies since the participants leaving the study may have different characteristics to those completing the intervention and this can compromise the external validity of the study. Intention to treat analysis (ITT) was carried out by one study (Morgan et al, 2011) to assess the clinical effectiveness of the study. Morgan

et al (2011) found that measurements were obtained for 81% of the sample at 14 week follow up.

MacDonald et al (2013) reported that from an initial sample of 29 participants only 13 (43.3%) completed survey 3 which was sent by email 30 days after the intervention.

Table 3: Participant Characteristics

Authors / date / title	Workplace setting / occupation	Shift pattern – permanent nights / rotating	Recruitment method	Inclusion criteria	Exclusion criteria	No. of partici-pants	Mean age	Demographics Gender Ethnicity Socioeconomic group
Jarnefelt H et al (2012)	Finnish Broadcasting Company	Full time shift work – at least 2 hours work between 9pm & 7am for at least six shifts in a period of 3 weeks	Volunteers with insomnia	Non-organic insomnia with features of psycho-physiological insomnia & motivation to treat with non-pharmacological methods	Secondary insomnia through non-assessed or untreated illness; no behavioural or psychological factors known to perpetuate insomnia; those due to retire during study	N =26	43.5	13 male 13 female Educational level: Graduate 31%, Higher secondary 46%, lower secondary 23% Married / cohabiting 77%, non-married / cohabiting 23% Mean insomnia duration 5.2 years
Lee K A et al (2013)	Nurses at San Francisco Medical Center	Night shift Usual shift length: 8 hr 38% 10 hr 5% 12 hr 52% Varies 5%	Convenience sample – flyers distributed	Nurses working full time for at least 6 months Working night shift at least 2 consecutive nights per week over the next 3 months Rate sleep as poor	Current diagnosis of sleep disorder (e.g. apnea, narcolepsy, restless legs) or mood disorder	N=21	45.5	20 female 1 male 38% Asian 9% Black/African American 10% White / Caucasian 5% Hawaiian Completed college 76%
Macdonald A B et al (2013)	New Paramedics (26 in primary care, 2 in advanced care, 1 in	"Shiftwork" but shift work pattern not stated	Convenience sample – but not stated how	New paramedic employees attending a mandatory orientation programm	Not stated	N=29	28.3	17 male 12 female

	critical care)				e			
Morgan P J et al (2011)	Aluminium producing company	"shift workers" but no breakdown of shift patterns	Via staff email & through promotion at crew meetings	Male; overweight or obese BMI between 25 & 40; aged 18-65;	History of major medical problems in last 5 years. recent weight loss of $\geq$ 4.5kg, or taking medication that might affect body weight.	N=110 attended baseline assessments & randomised into intervention (n=65) or control group (n=45)	44.4	Male SES: 1-2 (lowest) – n=7 (7.9%) 3-4 n=16 (18%) 5-6 n= 47 (52.8%) 7-8 n=16 (18%)

Study outcome measures

Jarnefelt et al (2012) looked at CBT for shift workers with chronic insomnia. They used a number of outcome measures to evaluate the effect of the CBT on insomnia and the main results are reported in Table 1. The proportion of the participants with a Sleep Onset Latency of more than 30 minutes decreased significantly (p<.038) from the first measurements to 6 month follow up; The changes in proportions of the participants with a Wake After Sleep Onset of over 30 minutes and users of Sleep Promoting Medication for over 3 nights per week remained non-significant. The percentage of participants with an insomnia Severity Index of over 8 points decreased significantly from 95 to 37 (P<.001).

In the other CBT study Lee et al (2014) found participants reporting significantly less sleep disturbance following the intervention which was found on all three self-report measures of sleep. The Pittsburgh Sleep Quality Index indicated that the intervention had its greatest impact on the quality of sleep. As with the Jarnefelt et al (2012) study Lee et al (2014) found that there were reductions in early awakening and sleep onset latency scores, but it should be remembered that this was a shorter study with no longer term follow up.

Morgan et al (2011) found there was a significant treatment effect for change in weight at 14 week follow-up (p<.001) with a mean difference between groups of 4.3kg. There was also a significant difference in percentage weight loss between groups (p<.001). At follow-up, significantly more participants in the intervention group had lost more than 5% of their baseline weight compared t the control group (p<.001). Significant treatment effects were found for waist circumference, BMI, systolic blood pressure, resting heart rate and physical activity. There was a significant intervention effect for physical activity cons and behavioural intention but not for self-efficacy or physical activity pros (see Table 1).

MacDonald et al (2013) did not use validated measures to test the results for the survey scores (although it is reported that there was a significant difference in the knowledge scores at all three survey points). Caution should be used when interpreting these results.

Table 4: Selected Outcome Results

Study	No. in intervention / No. in control	Outcome measure	Results					Key conclusions of study authors
Jarnefelt H et al (2012)	26 / n/a		Means and standard deviations					Non-pharmacological treatment of insomnia can be implemented among shift workers with chronic insomnia, and delivery of the treatment by trained OHS nurses yields promising results.
				T1	T2	T3	T4	
		Insomnia severity	ISI	14.8+4.3	10.2+4.2	8.3+4.0 P<.001	8.4+6.5 p<.002	
		Sleep related dysfunctional cognitions	DBAS	6.1+1.6	4.5+1.5 P<.001	4.6+1.7 p<.001	4.7+2.0 p<.015	
		Psychiatric & somatic symptoms	SCLGSI 1.8+ 0.5 SCLDEP 2.2+0.9 SCLANX 1.6+0.5	1.6+0.5 1.9+0.7 1.4+0.4	1.5+0.4 1.7+0.5 1.4+0.4	1.5+0.4 1.7+0.6 1.4+0.4		
			Across all 3:		p<.001	p<.021	p<.001	
		Health related quality of life	RAND-PCS 76.9+23.2 79.0+18.1 79.6+18.0 83.2+18.0 No significant changes RAND-MCS 69.3+17.2 76.3+17.1 80.3+11.7 77.1+15.2 Across all measurement points p<.004					
		Sleep diary	Total sleep time at follow up T3 and T4 not significantly different to T1					
		Wrist Actigraphy	Did not show significant improvement in insomnia symptoms					
Lee K A et al (2013)	21 / n/a		Means and standard deviations					Home-based cognitive-behavioural interventions may have the potential to address the needs of shift workers struggling with sleep disturbance & may help improve their tolerance for shift work.
				T1	T2	T3		
		Sleep quality	PSQI p<.001	8 .10+2.32	7.14+2.74	5.48+3.34		
		Sleep Distrubance	GSDS p<.001	47.7+11.2	45.5+12.8	35.8+13.5		
		I mpact of shift work on sleep (between night shifts)	SSI	21.2+3.3	19.1+2.9	17.3+3.0 p<.001		
		Wrist Actigraphy	No change in participants total sleep quantity (average 7					

93

			hr + additional hour of napping) or any circadian rhythm variables	
Macdonald A B et al (2013)	29 / n/a	Knowledge of nutrition management	Mean knowledge scores increased significantly from survey 1 to survey 2 but decreased from survey 2 to survey 3, with scores in survey 3 remaining higher than those in survey 1. P<.05	The education session was successful in improving shift work nutrition knowledge among paramedics. Paramedics' attitudes toward proper nutrition practices were positive before the education intervention.

		Attitudes towards nutrition management	No significant difference between surveys 1, 2 & 3 for questions except for question "I had time to purchase food on days I didn't pack a lunch" :
			
			Survey Median Mean rank H(df)
			   1 2.0 34.3
			   2 2.0 29.3 15.16 (2) p<.001
			   3 4.0 54.7	

Morgan P J et al (2011)	49 / 37	**Changes between control & treatment group**		A programme targeting an at-risk group of the population, overweight male shift workers, was effective in achieving statistically significant & clinically important weight loss & positively impacted on a number of health-related behaviours.
		Change in weight at 14 week follow-up	d = .34 p<.001	
		Mean weight loss	3.7% p<.001	
		14 week follow-up participants losing more than 5% of baseline weight	33.3% x2=13.6 df=1 p<.001	
		Waist circumference, BMI, systolic blood pressure, resting heart rate & physical activity	Medium to large treatment effect sizes (range from d=.41-.81) p<.001	
		Diastolic BP	No treatment effect	
		Dietary variables – intake of fruit, veg, bread, milk, diet drinks	No treatment effect	
		Cola / soda / soft drinks	Significant treatment effect p<.02	
		Physical activity cons & behavioural intentions	Significant treatment effect p<0.01	
		Self efficacy & physical activity pros	No significant treatment effect	
		Dietary attitudes &	Only significant intervention effects for 'eating	

		stages of change variables	breakfast' & 'balancing food intake & physical activity'	
		Weight change & no. of days of diet entries	Significant correlations r=0.52	
		Weight change & exercise entries	No significant correlation r=0.26	

Effectiveness of studies

Both of the CBT for Insomnia studies demonstrated some effectiveness. Interestingly both the CBT / sleep studies used wrist atrigraphy as a way to measure sleep length and quality but in both studies the results from the atrigraphy did not match the participants own self-report feedback through the questionnaires and diary entries. The research was only carried out with small sample sizes but the studies may indicate a trend in supporting shift workers sleep patterns through the use of CBT. However, no firm

Discussion and Implications for Further Research

It is disappointing that so few studies were identified for inclusion in this review, demonstrating that despite much research in the area of shift work which identifies the possible harmful effects to health, it would appear that very few research based psychosocial interventions have been conducted with shift workers. It is also difficult to compare the studies due to the heterogeneity of the interventions and study designs, therefore it was not possible to conduct a meta-analysis. Apart from the fact that they are looking at different aspects of health related to shift work (two related to sleep, one related to weight management, one related to improving dietary knowledge and attitudes), they also use different tools for data collection and use different definitions (or none at all) of shift working schedules, which also limits the extent to which the studies can be compared.

conclusions can be drawn from just two studies to draw on.

Likewise, the weight management intervention by Morgan et al (2011) shows promising results with male shift workers, especially as this was a larger sample size. Longer term follow up studies would be able to ascertain if this delivery approach is effective for shift workers.

The MacDonald et al (2013) study could not show effectiveness for the reasons already discussed above and the findings could be seen as being inconclusive.

There is also heterogeneity in the definition of shift work schedules and descriptions of the specific shift system people are working. Different working patterns may have different impacts on the health risk factors. Without more information on the shift work patterns and the participants themselves it is difficult to determine if the interventions would be effective if repeated with other shift work populations.

In all of the studies in this review it is problematic to ascertain if the most appropriate participants have taken part in the interventions and whether they are characteristic of the shift working population, or whether the participants are those most likely to benefit from the intervention as they are more highly motivated. There is also the issue of whether the interventions can be generalised to a UK population.

The ideal study design would be a randomised control trial, as they provide a strong design to measure whether the outcomes can be attributed to the

intervention or whether there are confounders. However they can be very difficult to implement in workplaces. It is also difficult to measure the impact of the interventions without a control group. Where the researchers were not blind to the intervention status of the participants they may have a vested interest to get favourable results.

This systematic review highlights the importance of using standardised and validated measurements and statistical methods to enable the research base for interventions to be built upon. It also enables studies to be replicated with other shift work populations. Although short term studies do provide valuable insight, more longitudinal studies with adequate control group would inform practitioners as to the best way to support shift workers with their health.

The workplace does provide an ideal opportunity to access populations that that are less likely to access health interventions, such as male populations. There may be higher rates of participation if interventions take place in the workplace and some may even be part of a mandatory training programme. Interventions are also likely to have an impact on the wider family and community. The lack of socioeconomic data in the studies may point to the need to think about health inequalities within the shift working population and the barriers that might exist for taking part in studies, which might mean there are confounding factors. For example participants may not have English as their first language which would mean that any written material may be problematic, the financial resources to take part or buy healthy food, or access to computers etc.

The lack of theoretical models in the design of interventions could be a concern as they would offer more robust frameworks for interventions which could help our understanding of why certain interventions may work with certain populations while others do not.

Robust economic evaluations were not made in the studies included in this review i.e. how much do the interventions cost and are they cost effective. However Lee et al (2014) make a good point about their study being based on home-based CBT which may be more convenient, have a lower cost and be more accessible compared to group-based or professionally administered CBT interventions. Interventions for practitioners and shift-workers themselves need to be accessible especially during times of economic restrictions when it can be difficult to make staff health and wellbeing a priority for the organisation. Ideally organisations would like something off the shelf that can be implemented without disruption to the workplace itself. This is especially the case in smaller organisations who do not have their own occupational health departments, human resource departments or other support systems in place and so would not necessarily have the expertise available in-house.

Involving the shift workers themselves in the design and development of the interventions through a needs assessment and through piloting may have made them more relevant and would have ensured that the content and delivery is appropriate and can be comprehensively evaluated. Interventions should be tailor-made for this population, although it may be useful to look at insomnia interventions in other populations to see if they are also applicable for shift workers. As with health related interventions in other population groups it is important to look at the wider social context involving families and their work-life balance to understand lifestyle behaviour outside of the workplace and it's impact. Work should not be separated from the other aspects of peoples lives.

It would also be useful to see if there are what could be classed as psychosocial interventions taking place within workplaces where shift workers are employed which are not being formally

evaluated. Publication bias tends to lead towards positive results but it would also be useful to know of interventions where there was a negative or neutral effect.

In future a feasibility study looking at what interventions management would find acceptable and employees would engage with would be useful, perhaps with a focus on sleep management or healthy eating which appear to be the two main priorities for improving the health of shift workers. Qualitative research would support the understanding of what interventions would be most appropriate for shift workers and what would promote engagement.

Conclusion

The evidence base for effects on health of shift-working is growing and although there has been some success in changing shift working schedules to optimise beneficial sleep patterns, controlled light exposure interventions and the use of pharmacological interventions, there have been very few psychosocial interventions More research needs to be undertaken to assess the needs of this population and what interventions might be beneficial.

The majority of studies found while conducting this review were discussing the need for more interventions with this group but did not include an intervention element themselves. Highlights how few interventions have been carried out with this participant group.

There are some positive results which may indicate a trend in supporting shift workers sleep patterns through the use of CBT and in implementing a weight management programme for men. However, with so few studies reviewed limited conclusions can be made on the impact of the research and recommendations for implementing interventions in the future. There is a need to develop rigorous study designs that include valid and reliable measurements of sufficient size, so that appropriate interventions can be extrapolated to other workplaces that employ shift workers.

References for studies included in review:

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SURVEY OF SHIFTWORKERS (Abridged)

Please note that any information you provide in the questionnaire will be treated in the strictest confidence, no individual will be identified in connection with any of the research findings.

Name: Role within the Organisation:

Age:_____   Your ethnic group:

_____

Are you: *(tick one)*   Living with a partner   _____

                                Single   _____

                                Separated/Divorced/Widowed _____

How many dependants live with you (e.g. children)?   _____

How long have you worked altogether?   _____

How long have you worked on your **present** shift system?   _____ years   _____ months

How long **altogether** have you been working shifts?   _____ years   _____ months

How many hours are you **contracted** to work for each week? _____ hours   _____ minutes

How many hours do you **actually** work each week?   _____ hours   _____ minutes
(including overtime)

On average, how long does it take you to travel to and from work?

                        TO WORK   **FROM WORK**

                _____mins   _____ mins

Please rate your workload on the shift that you work:

Extremely Light	Quite Light	Average	Quite Heavy	Extremely Heavy
1	2	3	4	5

	Entirely outside my control	Somewhat outside my control	In between	Somewhat under my control	Entirely under my control
The pacing of the job I do is:	1	2	3	4	5

	Definitely not		Probably not		In between		Probably yes		Definitely yes
Are you the sort of person who feels at their best early in the morning, and who tends to feel tired earlier than most people in the evening?	1	2	3	4	5	6	7	8	9
Are you the sort of person who finds it very easy to sleep at unusual times or in unusual places?	1	2	3	4	5	6	7	8	9

How many hours sleep do you feel you usually need per day, irrespective of which shift you are on?

_____ hours   _____ minutes

How do you feel about the amount of sleep you normally get? *(Circle one number for each)*

	Nowhere near enough	Could do with a lot more	Could do with a bit more	Get the right amount	Get plenty
Between successive shifts	1	2	3	4	5
Between successive days off	1	2	3	4	5

How well do you normally sleep? *(Circle one number for each)*

	Extremely badly	Quite badly	Moderately well	Quite well	Extremely well
Between successive shifts	1	2	3	4	5
Between successive days off	1	2	3	4	5

How rested do you normally feel after sleep? *(Circle one number for each)*

	Definitely not rested	Not very rested	Moderately rested	Quite rested	Extremely rested
Between successive shifts	1	2	3	4	5
Between successive days off	1	2	3	4	5

Do you ever wake up earlier than you intended? *(Circle one number for each)*

	Almost never	Rarely	Sometimes	Frequently	Almost always
Between successive shifts	1	2	3	4	5
Between successive days off	1	2	3	4	5

Do you have difficulty in falling asleep? *(Circle one number for each)*

	Almost never	Rarely	Sometimes	Frequently	Almost always
Between successive shifts	1	2	3	4	5
Between successive days off	1	2	3	4	5

The following items relate to how tired or energetic **you generally feel**, irrespective of whether you have had enough sleep or have been working very hard. Some people appear to "suffer" from permanent tiredness, even on rest days and holidays, while others seem to have limitless energy. Please indicate the degree to which the following statements apply to your own normal feelings. *(Circle one number for each).*

	Not at all		Some-what		Very much so
I generally feel I have plenty of energy	1	2	3	4	5
I feel tired most of the time	1	2	3	4	5
I usually feel lively	1	2	3	4	5

Thank you for filling in this questionnaire

Appendix C - Semi Structured Interview Schedule

Semi-structured interview schedule

As discussed in the Methodology section, the interview questions and probes were developed to map onto the five levels of the Social Ecological Model (Brofenbrenner, 1977). A brief description of each level of the Social Ecological Model is shown below, followed by the interview questions that cover relevant aspects of that particular level.

Two different semi-structured interview schedules were developed, one for shift workers and one for managers as shown below. (7)

Individual
The first level identifies characteristics of an individual such as age, gender, knowledge, attitudes, beliefs, self-efficacy, financial resources, goals etc. etc.

SW: Can you tell me about your job role within .....?

Can you tell me about your experience of working shifts?

People who work shifts sometimes report having poorer health – why do you think that is?

What aspects of your health and wellbeing do you find difficult as a result of working shifts? (probe: sleep, stress, healthy eating, physical activity)

Why do you think that is?

In your opinion how could these be improved?

What things have you put in place to help you manage working shifts? (probe: stress management techniques etc.)

M: Can you tell me about your job role within .....?

Can you tell me about the shift working patterns within your organisation?

Do you ever have to adapt your working pattern to fit in with shift workers?

People who work shifts sometimes report having poorer health – why do you think that is?

What aspects of health and wellbeing do you think your shift workers find difficult as a result of working shifts? (probe: sleep, stress, healthy eating, physical activity)

In your opinion how could these be improved?

Interpersonal
This level examines close social networks and social support including partners, family, friends, co-workers, etc. and how they influence an individual's behaviour.

SW: How does working shifts affect your home life? (probe: family, friends, social networks)

What do your family and friends think about you working shifts?

How do you think you manage a work / life balance?

Have you put any steps in place to improve this?

Is there anything else you could do?

M: Do you provide any social activities / networks for shift workers within your organisation?

Are their families involved?

Community
The third level explores the setting and the relationships between networks, which in the current study would be the workplace and the relationships between organisations based at Luton Airport.

SW: Do you have contact with shift workers from other organisations at the airport?

Is this helpful?　　　How?

M: Do you have contact with other organisations at the airport to discuss working patterns?

How does this work?

Organisational
This level would involve factors such as social and cultural norms and organisational culture along with the rules and regulations and informal structures that affect how services are provided to an individual or group. These organisational rules factors may encourage or discourage health behaviours.

SW: How has your organisation supported you with working shifts?

In your opinion is there anything else your organisation could do to support your health and wellbeing around working shifts?

Where would you like this support to be held?

Have you had contact with Occupational Health / EAP / HR connected to you working shifts?

M: Does your organisation currently provide any interventions to support the health of shift workers?

Are there any interventions that you would consider putting in place in the future?

Are there organisational constraints that might prevent these from happening?

Policy / Enabling Environment
This level involves local, national and global laws and policies, which in this study would be associated with workplace health and wellbeing and shift working.

SW: Does your organisation have any specific policies in place around shift working?

Are there any others you would like to see put in place?

M: Does your organisation have any specific policies in place around shift working?

Are there any others you would like to see put in place?

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15 April 2016

Dear

RESEARCH DEGREE REGISTRATION: TITLE – *Towards evidence based psychosocial interventions to support workers in reducing the health and wellbeing impacts of working shifts*

On the basis of careful consideration of reviews of your application carried out by subject experts in the faculty, I am pleased to inform you that the Faculty Research Degrees Committee has approved your application for your Research Project as part of your part-time Professional Doctorate registration.

The Committee noted that this was an interesting project with the potential to make a contribution to Health Psychology. The FRDC agreed that the following points should be fed back to you for consideration in the development of the project and at Progression stage:

- Given that the interviews will take place outside of normal working hours, you will need to consider this further in the ethics process. The proposal mentions that it will follow BPS ethical guidelines, but full ethical approval is needed before the research takes place. This should also have been included in the GANTT chart.

- Section 4.2 could summarise what the positive results were from the limited available research found in the systematic review.

- You may wish to reflect on existing behaviour change material, eg. insomnia/CBT, and good sleep behaviour/sleep hygiene information.

- The Design section could consider existing shift work problems identified from the literature and possible practical interventions (eg. Smith et al 2009).

- You may wish to include current shift work advice in the information given to participants at the end of the study.

The most up-to-date Regulations, the Graduate School Handbook and other useful information for your studies can be found on the following website:

http://www1.uwe.ac.uk/research/postgraduateresearchstudy/studysupport.aspx

University of the West of England, Bristol
Vice-Chancellor Professor Steven West

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Please feel free to get in touch with me if there are any matters on which you require more clarification.

Yours sincerely

graduateschool@uwe.ac.uk
Tel: 0117 328 8568

cc:

Appendix E - UWE Ethics Approval

University of the
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BRISTOL

**Faculty of Health &
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Tel: 0117 328 1170

UWE REC REF No: HAS.16.06.166

26th July 2016

Dear

Application title: Towards evidence based psychosocial interventions to support workers in reducing the health and wellbeing impacts of working shifts

Your ethics application was considered by the Faculty Research Ethics Committee and, based on the information provided, has been given ethical approval to proceed with the following conditions:

1. In the withdraw statement it would be prudent to add that withdrawal can take place one month after the interview has been conducted, just to clarify ambiguity.

You must not proceed with your research until you have responded to these conditions and have received full unconditional approval from the committee.

You must notify the committee in advance if you wish to make any significant amendments to the original application using the amendment form at http://www1.uwe.ac.uk/research/researchethics/applyingforapproval.aspx.

Please note that any information sheets and consent forms should have the UWE logo. Further guidance is available on the web: http://www1.uwe.ac.uk/aboutus/departmentsandservices/professionalservices/marketingandcommunications/resources.aspx

The following standard conditions also apply to all research given ethical approval by a UWE Research Ethics Committee:

1. You must notify the relevant UWE Research Ethics Committee in advance if you wish to make significant amendments to the original application: these include any changes to the study protocol which have an ethical dimension. Please note that any changes approved by an external research ethics committee must also be communicated to the relevant UWE committee.
2. You must notify the University Research Ethics Committee if you terminate your research before completion;
3. You must notify the University Research Ethics Committee if there are any serious events or developments in the research that have an ethical dimension.

Please note: The UREC is required to monitor and audit the ethical conduct of research involving human participants, data and tissue conducted by academic staff, students and researchers. Your project may be selected for audit from the research projects submitted to and approved by the UREC and its committees.

Please remember to populate the HAS Research Governance Record with your ethics outcome.

We wish you well with your research.

Yours sincerely

Faculty Research Ethics Committee

c.c

Appendix F - Researcher Extracts from Reflections on Research

Reflections on finding participants

I had been warned that finding suitable participants would be problematic and time consuming - I didn't believe that as I had already established contact and gained trust with the person who would be able to find me participants "easily". How wrong I was! Having given them my timetable of availability, they appeared very keen and enthusiastic and then there was then radio silence. Tried calling several times, then spoke to colleagues, then turned up unannounced, but to no avail. It appears a major reorganization was taking place and this research just didn't take priorty.

Was discussing my frustration with my workplace supervisor he advised me to cut my losses and find another avenue or organisation. I went back to my contacts and was approached by one organisation who were keen to work with me.

Reflections on organisation

I had to jump many hoops to get the senior management team on board, including a brief report and two presentations. They then had to get permission from their wider management company. Again, it has slowed everything down. I'll have to be sensitive to their organisational values and structure it feels old school with a male dominated structure, but I've worked with males in workplaces in past - construction, stop smoking drop in etc.

Reflections on participants / interviews

I had to rely on my contact to send out information to managers and shift workers and engage them to take part in the research. But it is finally starting to happen and interview slots are getting booked - at all times of day and night!

Before the first interview I felt quite nervous – I wanted the interview to flow like a conversation without constantly referring to my semi-structured interview schedule and adapting the questions and probes as the interview developed to make them more relevant. At first I was concerned about mechanics of the interviews, such as ensuring the recording equipment was working properly and the ability to build a rapid rapport with the participants. It actually went very well. I also realised after the event that it's useful to switch on the recording device as soon as the participant has signed the consent form, as there can be useful discourse as they are completing the shift survey. One of the key things I took away is the lack of social life and how everything is centred around wife and children.

The second interview was with a female shift worker. Only a short interview but interesting in that a theme that is emerging is the connections with others (her partner also works shifts there and they've managed to get shifts to suit their relationship).

My first interview with a manager was strangely disappointing. He was very much promoting the company line – felt like a positive PR job. Saying he's a good manager and the organisation listen to their employees and promote positive engagement etc. If all the managers take this line I'm not sure I'll get much out of it.

I was wrong! Such a useful interview to get an overview of the organisation as a whole as this manager has worked in so many roles. for 28 years. Felt they were being very upfront and honest.

Some interviews in now and how the roles have reversed! I now feel comfortable asking appropriate questions but I felt the last participant was nervous. When he was completing the survey he appeared to really take his time and want to get the questions correct. The interview again showed it is useful to ask about previous shift patterns to ascertain if these had a more detrimental effect on health and wellbeing.

A nightshift worker – how exciting! Appeared throughout the interview as if he was really happy with his working pattern and then went on to say how detrimental his working pattern was! Initially he was a bit reticent and didn't give me eye contact, but over the course of the interview he relaxed and it became more conversational. After the recorder was switched off he said he found it interesting that he could concentrate on mathematical stuff much more easily at night that he could during the day – which to him highlighted the fact that he was better suited to working nights.

Surprised mainly white British workforce. Well! A lot of rich data from interviewing two of the managers, but will have to be careful how I feed back to the organisation as there was some difficult material in there which at times made me feel a bit uncomfortable - but I didn't show it!

It was also important to quickly establish a rapport with participants by initially engaging in everyday conversation around common interests, such as the weather. This was more difficult with the two telephone interviews but common interests were established early on in the conversation.

Reflections on SOS

Having decided to use the SOS I have to go with it now, but hindsight is a wonderful thing! Any in-depth analysis would be more appropriate with a larger sample size and I'm not sure how much useful information I'm going to gain by using the survey. However, it did help with getting demographic data and starting conversations around shift work patterns. The full survey might be useful for a larger cohort but is restrictive in that it takes at least an hour to complete - I'm not sure that's feasible.

Reflections on transcription process

Painful! Taking sooo long! I've got a short attention span and keep taking a break! But the audio / foot pedal / transcription equipment borrowed from

UWE is brilliant – it reminds me of when I was 18 and did audio typing for my boss. After each interview was transcribed I went back through it to blank out any names of individuals or organisations that the participant had mentioned to ensure confidentiality or anonymity. I've really tried to remain as true to the data as possible and asked M to run through one of the transcripts to assess accuracy, which she did and we are thankfully in agreement.

Reflections on coding in Nvivio

Although I've never done a qualitative study before it highlights the range of opinions and discussion that can come from asking similar questions to participants and how this complexity would be lost if conducting a quantative study.

It took a while to get familiar with and understand NVivo which presented a challenge at first with so much data to analyse but it is neat and portable. Using a computer programme it's almost too easy to create codes, I'm sure I would be more succinct if I was coding by hand. However, it's very neat and easy to access (I also get to use my dining room table as a table!)

After initial coding I've ended up with about 200 codes! But it's obvious already where there is repetition and where I can now merge codes and re-categorise others. This is where the thinking and reflection has really come into it's own and takes much longer than I had anticipated.

Files corrupted on my external hard disk drive!

There were many times in the analytic process when my brain became full and I was overwhelmed by everything. Unsure which way to turn or what to do next. Had to take a break and come back to it. Not a smooth journey, but much tooing and frooing which sometimes led to some disorientation.

I didn't use NVivo to it's full extent, but mainly as an alternative to pen and paper methods, which I reverted to later down the line.

Theme Development

Part of the analytic process was writing down thoughts etc. as things occurred to tme which involved an overlap of data collection and analysis, and by referring back to the research questions to ensure that I kept on track. Throughout the whole process I've been trying very hard to bring my own assumptions and biases to the fore and to acknowledge them.

The shaping and interpretation of the data again took much longer than anticipated and changed a great deal over time. I was so busy constantly reflecting that I found it difficult to complete my reflective diary! But every time an idea or thought came into my head I tried to write it down to come back to later.

Laptop has completely frozen and has to be sent off for repair!

Write Up

So much longer to do than anticipated (the story of the whole qualitative experience) but so interesting. It highlights the gap between research and practice as organizations want almost instant results and feedback, and to ensure this research is done "properly" and evidence based takes time. Back and forward to supervisor - I'm nearly there now. My personal life has really impacted on how long this has taken with several close bereavements and family illnesses. It just highlights how you can't control many factors.

Appendix G - Professional Skills Reflective Chapter

PROFESSIONAL SKILLS REFLECTION

Before starting my Professional Doctorate reflection was an activity that I didn't have time for. In fact (on reflection!) I kept myself so busy that I went from one activity or project to another, in my working life and my personal life, and did not see the need for it. One of the major insights from studying for the professional doctorate has been how valuable reflection is and why, from a time management point of view, it is important to schedule time for reflection.

After I completed my masters in health psychology I dithered about doing stage 2 for a number of years. The catalyst for me was meeting M who worked in a different public health department. She had completed her masters a year before me at the same university and her manager, the Director of Public Health (DPH) was supporting her to study for her Professional Doctorate at UWE. For the previous few years, in my role in public health in …. and prior to that public health in ….., I had ensured that I had mentioned that I intended at some point to study to become a qualified health psychologist on my annual personal development plans.

For the first two and a bit years of the professional doctorate I was employed full-time as a public health programme manager at …. I led on mental health, workplace health, a new social prescription programme and various health inequality work streams and budget lines. I also line managed three members of staff. I hope I have given a flavour of this work in the professional log. Prior to this job (which I started in January 2012) I worked in public health in …. and have also previously worked in the construction industry, for a newspaper (I used to be an agony aunt!), the voluntary sector in a drug and alcohol agency, in further education as a psychology tutor, in the outreach department of a special needs school and as an events co-ordinator for the grocery industry. So quite a varied career, which in hindsight has given me insight into how different sectors operate and I have developed the ability to communicate at many different levels.

In late 2014 I decided it was now or never, so I put a case together to ask my DPH and my line manager to support my studies to become a health psychologist. They agreed to fund two thirds of my course fees and to allow me to attend teaching days at UWE during work time. I suspect this was partly due to the fact they were going to have an end of year budget underspend and there had been a high turnover of staff within the public health department and this was a way to keep me happy. It became apparent that the senior management team had no interest in having a health psychologist in the team and I found myself often trying to justify the relevance of health psychology to the public health agenda. My greatest support actually came from the DPH in …. One of the most important aspects of completing my professional skills log has been to appreciate that I

applied more health psychology principles and competencies in my role than maybe even I had realised.

As a result of registering for the professional doctorate I have assessed different frameworks and theories around reflection and find Gibbs' reflective cycle (1988) to be both straightforward and practical to utilise and it has enabled me to relate my experiences to health psychology theory and practice. Gibbs (1988) *Reflective Cycle is adapted from Kolb's Learning Cycle (1984) but includes feelings and emotions.* Gibbs has six components or stages to his reflective cycle: Description (what happened?), Feelings (What were you thinking and feeling?), Evaluation (What was good and bad about the experience?), Analysis (What sense can you make of the situation?), Conclusion (What conclusions can you draw and what else could you have done?), Action Plan (if it arose again what would you do?). So in this way it is possible to look at the event or experience and through reflection consider future events. It is also important to be able to learn from and generalise from one situation to another.

Schön's (1991) *Reflection in action / Reflection on action* provides an additional element by making a distinction between reflection *during* the event and acting immediately compared to reflection *after* the event by thinking about what you might do differently if it happened again. These models enable a greater depth of reflection.

Reflecting on my Professional Skills Log, I was feeling a bit overwhelmed at one stage but I wanted to showcase all the work and projects I was involved in. I felt I was constrained in some of my reflection within the log as I could not always express my feelings or thoughts as I was aware my line manager would be reading it and ultimately signing it off.   Some reflections may have shown my department in a negative light which did restrict me in what I was able to write. The experience of putting together the log was very beneficial as it highlighted the most important aspects of my work. However, if I got behind (which I did on several occasions) it turned into an onerous task to remember what had happened and to find the relevant evidence. I have tried to incorporate a range of different types of evidence including photos and more visual approaches, otherwise it's very dry and boring!   I do appreciate that it is far too long and complex and contains too much evidence and with hindsight I should have been more concise, even though I did take a lot of evidence out. It has made me realise that most of what I did in my work demonstrated the relevance to health psychology and the competencies, which in one way is reassuring. It has also made me realise just how much work I did within my public health role and how many priorities I was leading on. I do intend to continue to keep a log of my practice (but with less paper evidence!) because it is so useful to reflect back on to see how I would approach situations and challenges in a different way should they arise in my future practice.

I often complete pieces of work at the last minute which might be considered a weakness. I have and do intend to change this practice in the future as it can cause a great deal of stress, not only to me but to my friends and family. However, although I complete the work at the last minute, it does allow me

time to think about the issues, maybe doing background reading and analysis and structuring in my mind how it will be achieved. I do appear to work well under pressure, but I have to be more aware of the effects on other people, particularly in the workplace, who may not have the same approach. In a team situation there may be team members who cannot get on with their own project or piece of work until I have completed my part, and I need to be more mindful of this in the future.

One aspect that kept being mentioned from my work with some of the organizations, was the difficulties for the organisations and employees around working shifts. This led to my systematic review which was looking at what psychosocial interventions would support shift workers. I found working on the systematic review very demanding and challenging and found myself outside of my comfort zone. I spent a lot of time on my question, going backwards and forwards which was very frustrating, especially as I ended up with my original question. I then spent weeks trying different search criteria and terms to bring up appropriate results. Then I started again from scratch by getting advice from a librarian and simplifying the search terms. But I demonstrated that I can overcome these issues and learn from them and I'm now taking this forward onto my research project. Looking back on the experience I should have listened to and taken on board the advice of Jane, my UWE supervisor. I now appreciate that she is always two steps ahead of me and I have to listen to her advice and trust her as she has a depth of experience in the academic world that is so valuable to learn from.

My research topic has developed from the systematic review and is looking at the health and wellbeing of shift workers which reflects my interest in this area. This research also highlights my beliefs in the importance of putting theory into practice. My research is qualitative, which is a new area for me, as I want to try to explore the complexities of shift working by using a semi-structured interview technique. My RD1 and Ethics submissions allowed me to focus on the ethical and professional principles that apply to me as a professional and to the organisations I will be working with. Feedback from my Progression Viva included advice to adjust my timeline as it would take me much longer to recruit participants, which has in fact come true. I thought I would be much further forward than I am at the moment and realistically this has put me back a few months.

I really enjoyed the teaching and training module and although I was already delivering a great deal of training within my public health role, I learnt a great deal which I have now incorporated into my future deliveries.

The behaviour change module was more problematic. I was disappointed to have put so much work into developing a new stop smoking group with the commissioned healthy lifestyle service only to see it not working out as there were not enough participants to get it off the ground. However, I then went on to work on a one to one basis with clients, which I really enjoyed and found stimulating.

Over the period covered by my log I have developed my communication and team-working skills, particularly when working with GPs and other senior

health professionals. This was highlighted in my consultancy project, where I worked closely with the Chief Executive and senior clinicians of the Clinical Commissioning Group. I was called upon to provide advice, guidance and feedback which utilised different skill sets.   I also planned and contributed to significant projects, such as the Social Prescription programme, where I delivered on my priority areas, on time and within budgets in conjunction with a number of GPs who I built up close working relationships with.

I successfully developed and facilitated the Self-Harm and Suicide Reduction Group.
The most challenging aspect of the project for me personally was bringing together very diverse people from different bodies and organisations, with different values and codes of behaviour, to work together collaboratively. We did however produce a useful action plan which was acknowledged as good practice nationally and could be implemented and measured satisfactorily. The importance of confidentiality and setting up appropriate systems for storing information was highlighted by this work and by working on the annual suicide audit. It was vital that individuals could not be identified in any of the reports generated from this work.

One of my main strengths has being able to work independently, without much supervision, but this is linked to one of my weaknesses which is acknowledging that sometimes I need to seek out support and supervision, which will either confirm my approach or thinking, or will give me insights as to how to change a situation. I had built up a good working relationship with my line manager in the workplace but our one to one sessions really involved an exchange of information rather than "supervision". I supervised three members of staff, one of whom was quite challenging. It became apparent that he was seeing his role as a stepping stone onto bigger and better things (and this turned out to be the case) and was not particularly engaged in his work. I find it difficult to give more negative or critical feedback and if I did this over again I would have used my own supervision opportunities to discuss the issues to improve the situation. I did however feel that I gave valuable support and feedback to my two other members of staff, especially during the reorganisation period. They acknowledged this after I had left public health.

Linked to this was the awareness that I was approached by several external organisations and individuals outside of my geographical area to share documents etc. around the workplace "offer" that I had put together in …. Examples were the workplace brochure I had written, role descriptions for volunteer health champions, policies and procedures etc. (as evidence in the professional log). I shared these without hesitation but was then disappointed to see other people taking credit for these. In the future I would ensure that the original author or contributor was acknowledged. However, one of the organisations I worked with in public health where this occurred turned out to be my conduit into much of my private training work when I went freelance as they acknowledged my competence and expertise.

From a personal point of view I have met people through the various opportunities that have arisen as a result of the professional doctorate who

have become friends for life. In particular, M, who has been a tremendous support to me when times have been tough and has encouraged me to carry on when I felt like giving up. Likewise the peer support network that has been built up with my fellow students has been very reassuring. There have been moments when health issues have highlighted how important my friends and family are to me. I had my own cancer scare this year and made light of it at the time but later appreciated that the health care professionals were trying to prepare me for bad news. I suppose it puts things in perspective.

In April 2016 I left public health to set up as a self-employed trainer / facilitator. This was in response to a major reorganisation of the department whereby my new role would have been very strategic with no direct provision of services or training. Developing my skills as a health psychologist helped me to recognise that I enjoy working with individuals and groups who might need a bit of support or awareness raising to benefit their own health and wellbeing and the communities they are a part of. It became the catalyst for me personally to leave public health and set up on my own. It was a very risky thing to do, but I have no regrets as I have reaped the rewards and benefits. They say a picture paints a thousand words. The photo below sums that up. It was taken at a volunteer health champion networking event that I organised for public health, which engendered a fabulous exchange of ideas across communities. If I had stayed within public health I would have been quite remote from these activities and communities.

The whole experience has been a roller coaster ride and has changed my life. The journey has helped me to focus on my personal priorities and as a result look to the future and realise the kind of work I enjoy, even though at times it may be stressful and challenging. Looking back and reflecting on how my approach has changed, I was so busy "doing" I couldn't appreciate that I was stuck in a cycle that was turning so fast that I didn't have the insight to stop and appreciate what I had to do to change things for the better. I need to be stretched to develop professionally, but to work within my capabilities. What was missing was one-to-one work with clients. I recently applied for a job as a part-time sexual health adviser working at the local NHS sexual health clinics. I was interviewed and was offered the position. I have just started the role and believe I am really going to enjoy it. It utilises

all the skills I have developed since I have been working on the professional doctorate and fits in well with my private training work. In my new job I will have regular supervision with a clinical supervisor. Something I have not experienced before but I now feel more confident to engage in a useful two-way exchange that will benefit my future practice. I'm still very busy, but feel I now have more control and do intend to achieve that elusive work / life balance that we all crave. I intend to plan the private work I take on, rather than saying yes to every opportunity.

And just a minor thought in conclusion - I was going to index my professional log using coloured stickers, with a different colour for each competency heading. I thought this would make the log easier to understand (and would give it a visual appeal!) However, I soon realised I required too many colours, so it was not practical. I only appreciated this after I had bought several packets of coloured stickers. Hopefully I'll find another use for them! There are always lessons to be learned but it's important to not stress about the little things!

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University of the
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BRISTOL

Research Information Sheet

Working Shifts at Luton Airport

I am a doctoral student at the University of the West of England, Bristol and I am conducting a study to explore views on the possible health and wellbeing effects of working shifts. Please take some time to read this information about the study and then decide whether you would like to take part. If you have any questions about it, please don't hesitate to contact me. Thank you for reading this.

What is the purpose of this study?
The purpose of this study is to explore any possible health and wellbeing effects of working shifts and potential interventions that may address some of these.

Why have I been invited to take part?
People who work shifts at Luton Airport are eligible to take part in this study, as well as managers or support staff that manage or work with shift workers. A total of 20 participants will take part in the interviews.

What will happen if I choose to take part?
If you work shifts you will be asked to complete a brief questionnaire about you and your shift working patterns. Then a face-to-face interview will take place, focusing on shift working and how it might affect health and wellbeing and those around you. The interview will last up to 60 minutes and will be recorded with your permission. You will be able to choose a time that suits you and your employer for the interview. If you need to have a break the interview can be stopped and restarted when you are ready. The information will be saved, analysed later and a report will be produced.

Do I have to take part in the study?
Participation is completely voluntary and you are under no obligation to take part.

What will happen if I do not want to carry on with the study?
You may decide to withdraw from the study. If you take part in the interview, you will have one month to withdraw your data after the interview has been conducted if you no longer want your details to be used in the study. If you decide to withdraw from the study please e-mail the researcher at the email address shown below. In this case, your information will be destroyed. If you

have any questions from reading this information you can ask me before the study begins.

What are the potential benefits or risks involved in taking part in the study? You will be asked to answer questions related to shift working and health and wellbeing and this study may inform the provision of information to support shift workers in the future. There should be no risks involved in taking part in the study.

Will all information be kept confidential?
Yes. You will not be identifiable in any report produced. The information you give will be stored securely and will only be accessible by the researcher.

What will happen at the end of the research?
Once the study is complete, the findings will be submitted as the researcher's thesis to the University of the West of England. It may also be presented in a publication and shared with health professionals but you will never be named or identified in any reports.

Where do I get further information?
If you want further information regarding the results of the study, you will be able to email the researcher and request this information.

What if I have any problems or concerns?
If you have any questions or want to know more about the research you can contact the researchers or supervisors by emailing them, all the contact information you need is seen below, they will be more than happy to answer your queries

Contact Information:
, Researcher,
, Supervisor,

Thank you for your time and for reading the above information

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West of England
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Research Participant Consent Form
Working Shifts at Luton Airport

Researcher's name –

1. I have read and fully understand the information sheet

2. I understand that my participation in the research is voluntary and that I can withdraw at any time, without giving a reason

3. I agree to have the interview recorded, on the understanding that the information I give will be treated as confidential material and the data collected during the research will be kept anonymous

4. I understand that the information I provide will be stored securely by the researcher and that I will not be identified in any report

5. I understand that the researcher may wish to publish the anonymous data and I give my permission for this

6. I agree to take part in this research

Name	Date	Signature

Thank you for taking part in this study. If you wish to know more about the study or would like to discuss any concerns you may have please do not hesitate to contact us:

Researcher:

Supervisor:

Appendix J - Individual responses to Abridged Survey of Shiftwork

Participant Number	Travel time to and from work	Rate your workload on the shifts worked	Pacing of job I do is	Are you the sort of person who feels at their best early in the morning and who tends to feel tired earlier than most people in the evening?	Are you the sort of person who finds it very easy to sleep at unusual times or in unusal places?	How many hours & minutes sleep do you feel you need each day, irrespective of shift	How do you feel about the amount of sleep you normally get? Between Shifts	How do you feel about the amount of sleep you normally get? Between successive days off	How well do you normally sleep? Between shifts
1	35 mins	Quite Heavy 4	Somewhat under my control 4	Probably yes 4	Probably yes 4	7 hours	Could do with a bit more 3	Get the right amount 4	Quite well 4
2	45 mins	Average 3	Somewhat under my control 4	In between 3	Probably yes 4	7 hours	Could do with a bit more 3	Get the right amount 4	Quite well 4
3	40 mins	Quite Heavy 4	Somewhat outside my control 2	Probably yes 4	Probably yes 4	8 hours	Could do with a bit more 3	Get the right amount 4	Quite well 4
5	25 mins	Quite Heavy 4	In between 3	In between 3	Probably yes 4	7 hours	Could do with a bit more 3	Get the right amount 4	Quite well 4
9	20 mins	Average 3	Somewhat under my control 4	Probably yes 4	Probably not 2	7 hours	Get the right amount 4	Could do with a bit more 3	Moderately well 3
10	15 mins	Average 3	Entirely under my control 5	In between 3	Probably yes 4	6-8 hours	Could do with a bit more 3	Quite well 4	Moderately well 3
11	25 mins	Average 3	In between 3	Definitely not 1	Definitely yes 5	8 hours	Could do with a bit more 3	Get the right amount 4	Quite well 4
12	30 mins	Average 3	In between 3	Probably not 2	Probably yes 4	6.5 hours	Could do with a bit more 3	Could do with a lot more 2	Moderately well 3
13	20 mins	Quite Heavy 4	Somewhat outside my control 2	In between 3	Definitely yes 5	4-6 hours	Get the right amount 4	Get the right amount 4	Extremely well 5

Participant Number	Travel time to and from work	Rate your workload on the shifts worked	Pacing of job I do is	Are you the sort of person who feels at their best early in the morning and who tends to feel tired earlier than most people in the evening?	Are you the sort of person who finds it very easy to sleep at unusual times or in unusal places?	How many hours & minutes sleep do you feel you need each day, irrespective of shift	How do you feel about the amount of sleep you normally get? Between Shifts	How do you feel about the amount of sleep you normally get? Between successive days off	How well do you normally sleep? Between shifts
14	10 mins	Average 3	Entirely under my control 5	Definitely not 1	Definitely not 1	6 hours	Get the right amount 4	Get the right amount 4	Extremely well 5
15	15 mins	Average 3	Entirely under my control 5	In between 3	Probably not 2	6.5 hours	Could do with a bit more 3	Get plenty 5	Extremely well 5
16	25 mins	Quite Light 2	In between 3	In between 3	Definitely not 1	8 hours	Could do with a bit more 3	Get the right amount 4	Quite badly 2
17	50 mins	Quite Light 2	In between 3	Probably not 2	Definitely yes 5	7.5 hours	Get the right amount 4	Get the right amount 4	Quite well 4

Participant Number	How well do you normally sleep? Between successive days off	How rested do you normally feel after sleep? Between successive shifts	How rested do you normally feel after sleep? Between successive days off	Do you ever wake up earlier than you intended? Between successive shifts	Do you ever wake up earlier than you intended? Between successive days off	Do you have difficulty in falling asleep? Between successive shifts	Do you have difficulty in falling asleep? Between successive days off	I generally feel I have plenty of energy	I feel tired most of the time	I usually feel lively
1	Quite well 4	Moderately rested 3	Quite rested 4	Sometimes 3	Almost never 1	Sometimes 3	Almost never 1	Somewhat 2	Somewhat 2	Somewhat 2
2	Moderately well 3	Moderately rested 3	Quite rested 4	Rarely 2	Rarely 2	Rarely 2	Rarely 2	Somewhat 2	Somewhat 2	Not at all 1
3	Moderately well 3	Moderately rested 3	Moderately rested 3	Sometimes 3	Rarely 2	Sometimes 3	Sometimes 3	Somewhat 2	Somewhat 2	Somewhat 2
5	Quite well 4	Moderately rested 3	Extremely rested 5	Almost never 1	Sometimes 3	Rarely 2	Rarely 2	Very much so 3	Somewhat 2	Very much so 3
9	Moderately well 3	Not very rested 2	Not very rested 2	Frequently 4	Frequently 4	Frequently 4	Frequently 4	Somewhat 2	Somewhat 2	Somewhat 2
10	Moderately well 3	Moderately rested 3	Moderately rested 3	Frequently 4	Frequently 4	Rarely 2	Sometimes 3	Somewhat 2	Very much so 3	Not at all 1
11	Quite well 4	Moderately rested 3	Quite rested 4	Almost never 1	Almost never 1	Sometimes 3	Almost never 1	Somewhat 2	Not at all 1	Somewhat 2
12	Moderately well 3	Moderately rested 3	Moderately rested 3	Frequently 4	Frequently 4	Sometimes 3	Sometimes 3	Somewhat 2	Somewhat 2	Very much so 3

Participant Number	How well do you normally sleep? Between successive days off	How rested do you normally feel after sleep? Between successive shifts	How rested do you normally feel after sleep? Between successive days off	Do you ever wake up earlier than you intended? Between successive shifts	Do you ever wake up earlier than you intended? Between successive days off	Do you have difficulty in falling asleep? Between successive shifts	Do you have difficulty in falling asleep? Between successive days off	I generally feel I have plenty of energy	I feel tired most of the time	I usually feel lively
13	Extremely well 5	Moderately rested 3	Quite rested 4	Rarely 2	Sometimes 3	Sometimes 3	Sometimes 3	Very much so 3	Very much so 3	Very much so 3
14	Extremely well 5	Quite rested 4	Quite rested 4	Sometimes 3	Sometimes 3	Almost never 1	Almost never 1	Very much so 3	Not at all 1	Not at all 1
15	Extremely well 5	Moderately rested 3	Quite rested 4	Rarely 2	Rarely 2	Rarely 2	Rarely 2	Somewhat 2	Somewhat 2	Very much so 3
16	Moderately well 3	Moderately rested 3	Quite rested 4	Frequently 4	Frequently 4	Sometimes 3	Sometimes 3	Somewhat 2	Very much so 3	Somewhat 2
17	Quite well 4	Moderately rested 3	Quite rested 4	Sometimes 3	Rarely 2	Almost never 1	Almost never 1	Very much so 3	Not at all 1	Very much so 3