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EFFECTS OF ALTERNATING SHIFT SCHEDULES ON NURSES WORKING IN SAIDU GROUP OF TEACHING HOSPITALS (SGTH) IN SWAT, PAKISTAN

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Abstract

The research study was conducted in Saidu Group of Teaching Hospitals (SGTH), Saidu Sharif, Swat District, Khyber Pakhtunkhwa, Pakistan. The major area of this research is to discover the effects of alternating shift schedules on the health and psycho-social aspects of nurses working in SGT hospitals. The purpose of the study is to appraise the degree of biological, psychological societal hazards forced on nurses by alternating shift schedules. Currently most of Pakistani nurses, offering their duties either in three shift basis or standard 12 hours shift in different hospitals in the country. The hypothesis is that long lasting and alternating shift schedules affect the nursing personnel both physiologically and psychosocially.

The SGT hospitals were marked to collect extra managerial information concerning alternating shift including night shift because it has parallel managerial processes to any private hospital in the province. 2 set of nurses were engaged in the study, Daytime shift and nighttime shift nurses. Daytime shift nurses were engaged as a set that is also allocated to work on nighttime shift when there is a need present for them, functioning as an alternating staff for a certain period. Seventy-two nurses contributed as respondents to a questionnaire. The results of this research study reported that alternating shift schedules cause psychological, communal and biological problems to nurses, particularly those doing the rapid alternations. Nurses articulated added complaints about alternating or night shift as in comparison to daytime shift. Few nurses give preference to do the alternative shift. The majority of those prefer night shift due to social problems such as transport.

Introduction

Shift-work is a word of veracity for approximately 25% of the North American bread-earning population. In Sweden 8% have been experienced by fixed hours other than their normal duty, and 27% have unbalanced functioning hours, 4% are working explicitly on shift schedules. The amount of all workers who are working in night or -any other irregular shift, have been increased by leaps and bounds in the last decade. In a number of countries, a 12- hour shift has been introduced as a part of contemporary approach; others are adopting more contemporary methods. These changes have been made either after legislation or mutual consensus. A trend of longer shifts of 12- hours or more has also been adopted by some countries (Åkerstedt, 1996). Surveys

have been conducted and have shown that about 60-65% of U.S. nurses work 12-hour shifts, while less than a third work 8-hour shifts and the remaining percentage work 10-hour shifts or a combination of shifts (''Love –Hate Relationship, 2021)

Health care service is among those organizations or industries that provide its services round the clock, for the welfare of its citizens or inhabitants in any country. Health service recruits or health care worker is accountable for provision of health care services by applying the knowledge of medical science, skills and expertise in meeting the basic health care needs of all citizens within every country. For that reason, it is expected that a healthy and psychologically well balanced staff provides health care to
the people. Pakistani nurses provide health care services in hospitals, clinics, homes, infirmaries and other health centers in meeting health care needs of community.

Health care providers are obligated to work for in shifts as a health care need of persons living in a country. Nurses as health care workers are indebted to work during the diurnal and during the nocturnal period to furnish for the needs of the ailing people. This can only be achievable if nurses work round the clock. Most nurses do not like the changes that are associated with alternating shifts, yet they have no control over it. Alternating shifts have been known to affect a person including nurses physically, psychologically and socially during their lifetime. The more hours they work in alternating shifts the merrier their health is affected. Alternating shift can be more devastating for especially female nurses as they might have some other household tasks for instance, being pregnant or rearing children. Research studies reported that alternating shift work might have negative effect on job presentation, sleep, physical and mental health, social circumstances, relations, drug usage and level of job stress. For nurses, particularly these pessimistic effects can have consequences not just on the individual level, but also for the work-place, as diminished watchfulness and abridged job proficiency might cause danger to individual lives as the nursing profession is all about dealing with human lives (Brown- DeGagne & Eskes, 1998).

Background

The spotlight of this study is intended towards the concern of human factors in the designation of night-shift schedules or roasters for nurses. The main assumption is that ergonomically designed shifts schedules will lend a hand in the reduction of physiological and psychosocial hazards in the work-place.

The study was conducted in a public-sector tertiary care hospital [Saidu Group of Teaching Hospitals]. It is currently the 5th largest hospital in Khyber Pakhtunkhwa. The hospital is located in the Saidu Sharif, Swat District, Khyber Pakhtunkhwa, Pakistan. This hospital (SGTH) provides health care needs for the population in and around the Swat district, including Shangla, Buneer, Dir, Malakand and parts of Kohistani districts. The major study implicated only one hospital (SGTH) whereby nursing personnel or staffs were mandatory to respond to a questionnaire aimed at the nurses working in night and day shifts. SGTH was also considered to discover further the macro-ergonomic aspect of this research since it has a good reputation in terms of administrative measures. This hospital is a public-sector hospital directed by the Government of Khyber Pakhtunkhwa established in 1927, with 497 beds strength. Hospital employees comprises of a multi-disciplinary therapeutic team, nurses with different credentials, administrative staff and housekeeping personnel. The services provided by this hospital include Medical, Surgical, Peadiatric, Dental, Obstetrical and Gynaelogical care and Operating Theatres including Orthopedic Operation Theatre. The nursing staff establishment comprises of 362 permanent nurses and 20 Nursing Internees.

For the purpose and aim of this study, only permanent Registered Nurses (R/N), Nursing Supervisors (N/S) and In-charge Nurses (I/Cs) were included in the sample. The sample was selected by using Quota Sampling and after the filters of inclusion and exclusion criteria, the final number (n) of nurses included in this study was 72 as finalized. The sample included 40% Female nurses and 60% Male nurses. Out of the total number of nurses, 40 nurses were on night shift. The three categories of nursing staff represent all the nurses of the hospital. The nursing internees (supportive staff) also work in two shifts, depending on the vacancy in the hospital.

The nurses are working in different departments of the hospital, as allocated according to hospital health care needs and their credentials. Nurses' duties rivet fulfilling of the medicinal and nursing health needs of all patients as they are bound to, they are assigned to work on day and night shifts basis as per pre-planned work schedule or staffing process. Some nurses do nighttime shift on a stable basis, a small number do an alternating shift and some do nighttime shift for a specific time each year, (usually 2 to 5 months).
In view of the aforementioned work-force and their obligation to diverse shift schedules within the health care delivery services, it was compulsory to carry out this research to find out the effects of alternating shift schedules on nurses. The study be supposed to be able to give direction as to what steps ought to be taken to shield nurses from the occupational stress caused by alternating shifts and also to provide awareness to the policy makers that they must consider the this issue before making policies regarding nurses' duty in the hospital.

The broad purpose of the study.
The broad aim of the study is to discover the effects of alternating shifts on the nurses and to appraise the effects of these on the health and well-being of the nurses, with the aim of designing the most appropriate alternating shift schedules by considering these factors.

Objectives.
To gain basic information about shifts work organization within the health care services firm.
To recognize factors which is known to have a direct effect on the health and well-being of nurses.
To appraise shift work schedules.
To advocate ergonomically designed shift work schedules based on these identified problems or factors
To provide awareness to the policy makers in terms of these findings in making policies that affect nurses.

Hypothesis.
Alternating shift schedules expose nurses to physiological problems and to psycho-social hazards in the work place or hospital.

Literature Review
Definitions of concepts.
Shift refers to how many hours in a day a worker or a cluster of workers is supposed to be in the workplace (Kogi, 2001). Definition of shift work varies, from place to place. The US Bureau of Labour Statistics (US-BLS) defines people as are on shift work if they start their work by 7:00 to 9:00 hrs (Konź, 1990). Kogi, (2001) describes shift employment as functioning other than day-time hours, and night shift means job done later than 18 hrs and earlier than 6 hrs the subsequently day.

Night work or shift in stipulations of section 17 (1) of the Basic Conditions of Employment Act, 1977, night work or shift means work performed after 18:00 hrs and before 06:00 hrs the next day (Watkins & Watkins, 2021).
Shift Organization refers to the allotment and arrangement of shifts to keep the manufacture or organization obtainable for 24 hours (Kroemer, 1992).
Shift schedules refer to the assignment of staff to a meticulous shift and time allotting to each of the shift patterns (Pierce et .al, 1989).
Public hospital refers to health care service institutions/facilities that belong to Government and the health care providers with major intervention by the state (Van Rensburg et, al. 1994).
Category of nurses In terms of the Pakistan Nursing Council (PNC) Act of 1973, nurses are categorized according to Registered nurses (a register is kept for the trained nurses), Enrolled nurses (Nursing students), Nurses Midvives and Enrolled Nursing Auxiliaries.

Circadian rhythm the word came from Latin "Circa dies" which means "about a day or about today". Circadian rhythms are to a degree determined by the interior body-artially coordinated to the outside world by signals recognized as zietgebers (German: ziet, time; Geber, giver (Pheasant, 1991).

Fatigue is the sensation of unusual tiredness, lethargy, loss of energy or drive. The word 'fatigue' is an expression applied to a spacious range of conditions. Fatigue overlaps into a number of other conditions, which are evenly complicated to define such as stress, anxiety, bore-dom, depression etc. These conditions are purely subjective, behavioral and physiological. The general state of bodily exhaustion/burned out which, results from extended heavy work, is the diminution of the body's energy assets. Fatigue, which results from most work-related tasks, is due to more hidden psycho-physiological processes (Pheasant, 1991).

Nursing Internees, for the intention of this study, Nursing Internees are those nurses who offer health care in the hospitals like Registered Nurses, but they have their tenure there for experience. It's a transition period for these personnel as it provides orientation of practical and clinical environment of the hospital. They are salaried by the provisional employment service.

Literature

Reasons for shift work

In the Digest summary for Conditions of Work, (1990) ILO describes the reasons for arrangements of working times. The primary causes of alterations in the working-time practices were the transformed interest in flexibility for working-time, drives from the cooperation from social and economic change. Normally, the contemporary work-force prefers amplified chances for choices about timing of work. Employees as consumers could prefer that services for them be available for longer periods of time. Juvenile employees on the other hand, the employees with family responsibilities and older employees may have different perceptions, but all give significant amount of interest in a number of forms of working-time flexibility. These could be educational run off, shorter or additional flexible hours or phase-retirement. They also can have novel needs for security, as in the case of a lot of part- time employees. At the similar time, sturdy spirited pressures have compelled employers to discover ways to run their enterprises for longer periods of time or enhanced adjustments to seasonal or other fluctuation or changes. Numerous developments concerning work and work-force, concerning shift and night shift work have been considered. In the health care services, medical services are required for an incessant period of time, which may extend to 24 hrs. In the contemporary industrial society, reasons for shift-work, is found to be similar in diverse countries (Kogi, 2001) .

The former reasons for stretching hours beyond the so called day - time shift work were, based on a necessity for constant service or timely sustained processes. For talk sake, these services are Police force, Fire brigade, Security department, Military personnel, and Hospital employees. These services are often on standby, with scheduled duties being done until an emergency arises. In a number of services, it used to be probable to take break between calls, but this is not the case any longer. Client demands can be met with over-time round the clock. Some tasks are cheaper and convenient during the night time, such as computer-based programs, telecommunication services. Society expectations, is one of the reasons for shift work for access of certain services round the clock. It is a general expectation that alternative shift workers perform their duty according to the same standards as day shift workers in those tasks that are done on both shifts. In other examples, the call for shift work is determined by the time of deliverance of the industry's or organization's services. Table 1 is showing some organizations with percentage of shift-workers (Rogers et al, 1986).

Table: 1 % of Total Workers in Shift Work by Organization Type United States, 1975

Organization type	Total workers in thousands	Percent shift workers
Hospital	1,117	36.9
Education	1,115	17.0
Transport	763	39.6

Food	593	42.7
Health	572	29.9
Postal	277	45.8
Other professional services	246	17.3
Printing and Publishing	327	28.8
Chemical and Alike Products	199	19.7
Welfare	221	21.8

Description of shift-work.

Shift-work schedule could be organized in a variety of ways. A shift system may include day work plus one or more shifts worked outside these normal day-work hours. Thus, the number of shifts per day may be two, three or more. These shifts may be shorter or longer, or the same as day-work hours. Major problems of shift systems arise from the extension of business hours that result in phase displacement of the sleep period and therefore considerable changes in the daily life of shift-workers. The number of shifts per day may be two or three in a typical shift system. Most discontinuous systems have two shifts; morning, afternoon shifts, or day and night shifts. Two twelve- hours shifts are often seen, whereas the two shifts may differ in length, for example, comprising an 8- hours shift and a 16-hours shift. Typical three shift systems have three 8 hours shifts, but may vary from place to place. Folkard, (1990) has overviewed the issues around extended work-shifts and their links to excessive fatigue (Kogi, 2001; Smith et. al., 1996).

Sergean, (1971), state that the widespread use of three shift rotation in organization has developed since the 1920's and represents about, one third of the shift work system in use today. Rotational shift-work covers a lot of tasks and run on a pre - scheduled pattern of duties and tasks. Night workers might work in the evening, in the middle of the night, overtime or extra long workdays. Estimates of numbers of shift workers vary with the definitions and from country to country. The Beareau of American Labour Statistics (BALS) reports that 5% of American adults work in the evening, 4% rotating shift -work, 4% permanent night workers with irregular schedule. Altogether 15.5 million people NIOSH Publication ("National Institute for Occupational Safety & Health | NIOSH | CDC", 2021)

Shift work in the health service

Nursing staff are prone to anxiety and other psychological problems such as stress; mood swings etc. as a result of shift - work alternation, extensive working hour schedules, and extended contact with ill-tempered, sad and depressed patients (Lewy, 1981). In addition, the nature of hospital work forces nurses to make important patient care decisions under conditions in which there is no certainty concerning events and outcomes. Nurses may manifest psychological stress by taking on extra work, showing emotional withdrawal, engaging in substance abuse, or exhibiting depression. Therefore, the nurse or case manager must monitor subordinates for these behaviours, confront impaired workers about declining productivity, and refer them to appropriate support groups and or medical care. Studies have been showing that nurses in certain specialties, such as intensive care nursing, are at special risk of psychological stress. Intensive care units are characterized by intricate machinery, high noise level, and physical contact with blood, vomitus, incessant time pressure and infection hazards, and unpredictable emergencies (Hay et al. 1972). To offset the effects of such stressors the nurse manager should facilitate peer support within each group of nurses by encouraging group social activities (Gillies, 1989).

Smith et al. (1996), state that much of the research comparing 8 and 12-hour systems has carried out in the health services, where the best type of shift system to promote the best patient care and staff satisfaction has been the subject of debate in health-care related shift-work literature. Some of the studies reported that 12 hours shift can be given preference over others because it can potentially improves the staff morale and reduces sicknesses among them. While alternatively, it can make unfavorable conditions in terms of patients,

for example it can reduce the quality of health care (Todd et al. 1991; Vik et al. 1982).
Makoweic-Dabroska, et al. (2000), evaluated whether nurses can do a 12 hours shift to check whether a 12 hours working system constituted an excessive physical workload and work stress for nurses. The study being conducted on 536 nurses working a 12 hours shift and 169 working in an 8 hours day shift. Their results concluded that the 12-hour system was, characterized by less significant physical workload but greater mental load. Nurses working on two-shift basis were more tired than those working on single shift basis. Their data suggested that there is no significant contradiction for nurses to work in a two-shift basis.
In Japan, the Health and Safety Association published the results of medical examinations of the country's salaried employees. This report includes the results of 600,000 employees in the health and hygiene sector. Nurses who work in alternating shifts had been complaining about fatigue and fatigue related illnesses and the night shift was among the topper followed by evening and in the last morning shift (Makino, 1995). The night shift nurses reported sleeplessness, depression, vogue fatigue, disturbed social circle and impaired concentration (Béhar et. al. 1999).

The effects of shift work on the worker.
The curiosity in the effects of working in shift schedule on individual has heightened because many experts have been blaming alternating shifts for increased human error proneness being linked to a number of happenings and chaos. Lushington and Dawson, (1997), conducted a research study on professed societal and conjugal consequences of shift work for female shift workers (nurses). A number of women working non-standard hours have increased over the past few years. The impact of shift works on the livelihood of female workers and their partners; this has less documentation. A standard shift work questionnaire was given to a group of women shift workers (nurses working a changeable shift work roster with a night work component), to address this drawback. The women who are shift workers and their allies were asked to give their views on the effects of shift work on societal and conjugal life and the perceived effects of working on a shift basis on their psychological, social and physiological well- being of the female shift-worker. Overall, a lofty level of similarity was, seen between the responses of female shift workers that is, nurses and their allies. Both groups of participants said that shift work had considerably negative effects on societal and conjugal life. Specifically, shift-work was perceived to disrupt the maintenance of joint social activity, increase interpersonal conflict, reduce the quality of interpersonal relationship, and reduce child contact- time for female shift-workers with children. As well, both groups of subjects indicated that shift-work had significant pessimistic effects on the mental and communal well-being of the female shift-worker.
Any occupational activity or work causes a certain amount of stress. Individuals and their environment constitute an inseparable unit. This relationship is necessary, permanent and mutual. The effects realized between this interconnection, independent of their nature, do cause changes to the environment as well as in the human organism. Changes occurring in the human organism may be significant from a biological point of view. The reduction of such changes to a minimum requires a continuous activity of adaptive mechanisms. It should be emphasized however, that whether it is the individual who influences the environment or the environment, which produces effects on the organism, in each case it is the human organism that suffers because of stress (Haslegrave et. al, 1990).
The causes of stress produced by working conditions may emanate from the environment, often qualified by standards. These effects caused by unfavourable social conditions that may prevail in the workplace are mostly within the control of management. Examples of these are work disorganization, unequal workloads, inadequate professional skills, low wages or salaries compared to workload and job demands. The stress factors associated with tasks are, to a certain extent, limited by labour safety regulations, the contract of labour and the prescriptions of work norms. These can be regular overtime, increased pace of work, heavy physical work, monotony, responsibility of own physical health,
responsibility of others' physical health, frequent adaptation to others, frequent dangerous situations (Haslegraves et. al, 1990).

The Ergonomical Dimension of Shift work schedules

Circadian rhythm

Åkerstedt, (1996) state that the circadian rhythm is determined by the nucleus suprachiasmaticus in the hypothalamus. This structure regulates the physiological and psychological role of the body for instance, body temperature. Body temperature is often used as an indicator for circadian rhythms, reaching its maximum at 17:00hrs and its minimum at 05:00hrs. Rhythm variations occurs because of the two sides of Metabolism; that is Catabolism which occurs during the day time and it is basically the breakdown of the molecules in our body and librates energy and gives us potential to do our daily work. One the other hand, Anabolism is the regeneration of molecules and it consumes energy and usually occurs at night time.

Pheasant, (1991), according to him, circadian the basic word came from old Latin "circa dies" which means "about a day". Circadian rhythms are to a degree determined by the interior body clocks and partially coordinated to the outside world by signals known as ziet-gebers (German: ziet = time; Geber = giver). The rhythms are designed to provide higher commotion during the day time and to provide lower activity during the night time. Usually our body utilizes certain signals or cues from the bodily internal processes and from the surrounding environment such as timepiece time, communal activities, the day/night cycle in terms of the amount of light, and feast times to maintain the body rhythms in harmony. Those who work in a shift work pattern, their temperature rhythm and other bodily rhythms can be disturbed by their activity in those times in which no other person usually do any activity. This can leads to fatigue and disorientation. 'Jet-lag' the term, people use to illustrate these kind of feelings ("Madide", 2021).

The circadian rhythms are major body rhythms with regular 'ups and downs' in the 24- hour day. Many systems in the body are very vigorous at definite times of the day and not active at all in other times of the day. The least activity usually occurs in the mid-night when most of the individuals sleep. The majority of people feel most active and alert between 16:00 -18:00 hrs and sleepiest at 04:00 – 06:00. There are personal differences in the circadian rhythms. People who show the peak in the bodily temperature state in mid-evening hours are known as "morning types" or "larks". Those who experience their peak later on in the evening and the bare minimum point in the morning are known as "evening" type or "owls". On average, the normal day work is the best schedule for performance, which means it is also best for safety. "Larks" have difficulty in adjusting to night shift work and are likely to experience more sleep and digestive problems than "owls" do (Froberg, 1981 in Rodgers et, al.1986).

Grandgean, (1995) states that human being comprises two states called Ergo-tropic state (Preoccupied to execute) in the daylight and Tropho-tropic state (occupied with recuperation and replacement of energy) during the night. The night worker therefore approaches his work, he cannot perform his work because he is in his night state or he is in relaxed state. So the Ergonomics is facing the problem of building and promoting those shift work schedules that will least likely to affect the social and biological rhythm of workers. Rodgers et al. (1986), describes the physiological tasks that occur within the human body as biological rhythms. Biological rhythm refers to any repeated variation in the intensity of a measure or chemical in the body. Adrenal corticoids or thyroid hormone, are examples of hormones that can cause changes in the body. These rhythms have an influence on the design of hours of work, especially the choice of shift schedules, and for determination of appropriate work and rest schedules.

Below is a list of body functions that augment by day and dwindle by night.

(i) Body temperature
(ii) Heart rate
(iii) Blood pressure
(iv) Respiratory volume
(v) Adrenaline production

(vi) Excretion of 17-Keto-steroids
(vii) Physical aptitude
Other time- cues are transitions from illumination to darkness and turn about, social associations, job and awareness of timepiece time. The most significant purpose of circadian cycle is to regulate sleep. It is often said that good sleep could lead to good health and well-being (Canadians Center for Occupational Health and Safety, 1998).

Physiological factors – sleep and performance.
Sleep is one of the main reasons why irregular hours cause ailments and disorders. Extended waking leads to tiredness and reduced functional capacity. The effects are initially noticeable mostly if the individual is exposed for longer periods to a monotonous situation. When a person does not sleep for 24 hours, his functional capabilities decline almost by 50pc and after 48 hours of sleeplessness, the functional capabilities is at its buck and the risk of Narcolepsy like symptoms is inevitable. With prolonged exposure, the individual cannot manage to keep awake. Another aspect of tiredness concerns the ability to make complex decisions, which require thinking (Åkerstedt, 1996).
Ohida et .al. (2001) conducted a research study on Alternative – Shift scheduled work associated troubles and job performance. It was investigated in juvenile female nurses in eleven hospitals in the country Japan. Subject strength (n) was selected to be six hundred and twenty female nurses (mean age: 23.89). A survey using a questionnaire comprising mostly of things pertaining to sleep abnormalities was used in the study. The results indicated significant associations between working on night shift and the use of alcoholic beverages to help induce sleep and between working on night shifts and tiredness in the day light. In terms of sleep quality, momentous differences were identified between single and multiple shifts. Furthermore, mean hours of sleep were considerably related with three interrelated terms used for sleep: sleep quality, intricacy in falling asleep and sleepiness in the daylight. Result suggested that in the Japanese shift-work system, sufficient sleep hours were wanted by nurses who are doing alternative shift to guarantee high-quality sleep and consequently better services for patients. In recent times in Japan, a few mortal accidents due to blunders in handling by hospital nurses have been reported. It was reported that such accidents tended to happen in the early morning. Of roughly Ten lacs, nurses working in Japan, it is projected that 75% have alternative shift work. The Japanese Ministry of Labour also estimates that among jobs that require night shift work, nursing is the one that involves the largest number of female workers in Japan (personal communication with the director of women's worker division, the Ministry of Labour, Japan). Therefore, considering the importance of the healthiness of the large number of nurses in Japan and the consequent impact on patient services, the study evaluated sleep abnormalities and subjective job performance. The results also indicated that there was no momentous association between the frequency of night shift and sleep disorders. This was attributed to age of the subjects. It is postulated that napping could be considered to resolve sleep disorders in nurses who do alternating shifts to some extent. This proposition warrants further investigation.

Health of the shift – worker
The interruption of circadian rhythms can have an effect on attentiveness, impetus, and response time, mainly at nighttime. This combination can result in an amplified possibility of accidents and injury. Studies show that shift-workers' accident rates are more than day workers, the same or less. Thus, the findings do not decisively show that alternative shift staffs are prone to have accidents. There are also discrepancies with research on this issue because of the fact that working conditions are not the same on different shifts. For example, the nature of workload, the backup system available and the amount of supervision can make comparisons inaccurate. However, insomnia increases the turning down in job performance. Despite insomnia, they do not aware that their job performance has been affected. Research studies have reported

that the optimum mental performance level for workers occurs between 2 and 4 p.m., maximum general awareness is between one, and 7 p.m. Activity proficiency levels are low between 3:00 and 6:00 a. m. (CCOHS, 2021)

Lipkin, et al. (1998), investigated the occurrence of unceasing fatigue syndrome amongst nurses. Their findings suggested that nurses could be on a higher risk group for this infirmity probably due to job related stressors such as contact with various germs and nerve-racking shift work that can interrupt with their biological rhythms. Shift workers are prone to suffer from cardiovascular and digestive disorders. Shift-workers also experience headaches that are fatigue that is more frequent, stress, muscle pain, respiratory infection, and general malaise. These, in turn, result in higher rates of absenteeism, employee turnover, and higher costs associated with recruiting and training replacement employees.

Costa, (2001) shows that woman could be further susceptible to shift work schedules and night shift work because both their more intricate circadian and hormonal (sexual cycle) rhythms and to extra demands related to family life and domestic commitments. Disorders of the menstrual cycle and reproductive system have been reported in many groups of women shift-workers. This includes disorders such as menstrual pains, abortion, interference with fetal development, premature and low birth weight. Besides, those with small children can have more intricacy in summing their asymmetrical work schedules with extra household duties thus, suffering extra amount of sleep troubles and chronic fatigue than the male colleagues. This supports the view that women shift-workers should have more protection, especially during pregnancy, and it is advisable to transfer these workers to day work during the first two to three years after delivery.

Davis et al, (2001) studied night shift, exposure to light at night, and potential of breast cancer. The results of the study state that contact to light at the night time may increase the potential of breast cancer. Light suppresses the normal nocturnal production of melatonin by pineal gland, which in turn could increase the release of oestrogen by the ovaries (the latter being, a known hormonal promoter of breast cancer). Melaton keeps oestrogen levels in check. Case patients were 813 aged 20-74 years, control group were 793. Information on sleep habits, bedroom lighting environment in the ten years previous to diagnosis and lifetime occupational history. The results indicated that the prevalence of breast cancer (CA) was high in those who were deprived of sleep as melatonin level is at peak in the sleep. The possibility was not amplified with intervallic sleep related to the 'turn on' of the daylight illuminator. There was an admonition of augmented breast cancer (OR=1.6; 95% CI= 1.0 TO 1.25), with the trend of increased risk with increasing years and with more hours worked at night. There was some indication although not statistically significant –of increased breast cancer risk among women who had brightest bedrooms. The study provided evidence that indicators of contact with light at the night may be associated with the risk of developing breast cancer ("Light at night and working the graveyard shift linked to increased risk of breast cancer", 2021).

The amount of grown-up shift workers is increasing in most developed countries due to general ageing of the working population. Collectively with the disquieting connection of shift work to tiredness, job performance, RTAs and CHDs, there are reasons to consider that shift-work may become a major challenge for the employer, employee and occupational health professionals. Even though, long-standing potential studies on ageing are little, those shift workers who ages between 40s – 50s, they have worse sleep after a night duty, but this is not a case in morning shifts. Drowsiness after consecutive alternative shifts are also decline by growing old though elder shift workers' capability to oppose acute sleep loss is good. The reasons for the altered sleep and wakefulness of older shift-workers believed to be related to changes in circadian rhythms, especially higher `morningness'. Sleep needs may also decrease with age, which could explain some of the differences found in sleep length. In shift workers, reasonable physical exercise has shown to augment sleep time and nighttime alertness. It has not been shown; however, that exercise would quicken the circadian adjustment to night work (Härmä, et al.1999).

Bohle and Tiley (1989) have shown a clear and significant increase in self-reported psychological symptoms (such as depression, loss of self-esteem, difficulty in concentrating, etc.) in a group of nurses. Morning types were more susceptible than the evening types. Åkerstedt and Torsval (1978) showed a clear decrease in sleep

disturbance, mood disorders, gastrointestinal complaints and sickness absence in a group of steelworkers who were transferred from shift work to day work. Frees and Semmer (1986) found a significant excess in psychological and gastrointestinal symptoms in both shift workers and former shift workers (who left for reasons of ill health) compared with day workers. The poorly adapted night worker often suffers from a advancing state of unceasing fatigue, which may be evident in episodes of irritability, loss of drive, depression, early satiety and other disturbances (Pheasant 1991).

Safety

Pheasant, (1991) states that the likelihood of error increases when the operator is under abnormal pressure of work, or when the working capacity is reduced because of fatigue. The accidents at Chernobyl and Three Mile Island occurred, around 01:00hrs and the Bhopal disaster also occurred during the hours of night shift. Further explanation is that time of the day may be regarded as a contributory factor which reduces the individual's ability to cope with abnormal circumstances as they arise. Working at night makes it difficult to get enough sleep. Brain and body functions slow down during the nighttime and early morning hours. The combination of sleep loss and working at the body's low point can cause excessive fatigue and sleepiness. This makes more difficult to perform well, which heightens the possibility of accidents (Rosa & Colligan, 1998, www.cdc.gov/niosh). In the Democratic Nursing Organization (DNO) of S.A Nursing Update (2001); Roger and Colligun in NIOSH Publication (1977) stated in their report that worker who are working in alternating shifts are facing those problems which are not faced by the day time workers. These problems often develop because the body has an internal clock (the circadian rhythms) that determine the central body temperature, alertness, cardiovascular system digestion and other systems in the body. In the normal day work, night sleep situation, people work when the circadian rhythm is high and sleep when it is low. On average, this schedule is best for performance, which means it is also best for safety. This means that shift-workers do not get enough quality sleep over long periods. It is possible that because shift-workers tend to be tired at work, they are more at risk to make more serious accidents than day workers do.

Rodgers et al. (1986), explains the error rate according to time of the day. The classic study of error rates by time of day was conducted in Sweden gasworks Bjerner, Holm, and Swensson, (1995). The number of errors made in over 175,000 recordings from 1921-1931, primarily between three men, was plotted against the time of the day. The highest number of errors occurred between 03:00 hrs within a second, lower peak occurring at 15:00 hrs. All three operators showed similar peaks in errors in the 01:00 to 04:00 a.m. periods. All the studies conducted under three continuous 3- shift schedules. In another study of the response time of tele-printer switchboard operators at different times of the day, a significant lengthening of the response time was noted in the sunrise occasion.

Employee quality of life

Koller, (1996), states that shift-work and night work have implications for the entire living sphere of mankind, thus health hazards and stresses of work itself, as well as intervening factors from outside the working life may influence and impair the state of health. There is an agreement that shift-workers are a population at risk, this is due to the fact that, they are exposed to psychobiological, desynchronisation and reduced coping linked to shift work scheduled. (Folkard et. al. 1985; Costa et. al.1989; ILO. 1986; 1990; Rutinfranz, 1982), describe the combined impact of shift work, the degree of abnormalities in circadian rhythms. They also stated that these effects are related to shifting states in between sleep/awake cycle and interruptions in daily life routines in family and social life. Studies have documented higher toll of divorce and suicide, as well as increased use of alcohol and drugs on the part of shift-workers. Frustration, low morale, and diminished job satisfaction are also common among shift-workers (Kogi, 1996).

Methods and Procedures

Subjects

The participants of this study consisted of 72 permanent nurses who were the respondents to a questionnaire, all working in a government hospital (SGTH). This group comprised of 29 female nurses (40pc) and 43 (60pc) male nurses. Thirty-two nurses worked on day shift (M & E) and 40 nurses worked on night shift. Daytime shift nurses formed part of the subjects since they rotate to work in both shifts, from time to time or when their turn comes to work on night shift. The subjects work in all units of the hospital, which are Intensive Care Unit (ICU), Operating Theatre (OT), Medical Unit, Surgical Unit, Obstetrical Unit, Paediatric Unit, Casualty Unit, and other smaller units attached to the main units. Only daytime nurses working in OT participated in the study, since theatre operates during the day and closed at night.

Sampling

The sampling for this study was done by using Quota Sampling technique. Largely, alternating shift staffs were targeted across the hospital for the reliability and validity in data collection process.

Observations

Observation of work processes and work environment conducted in different shifts and units of the hospital, over a period of 1 week (from 24th to 30th May, 2021). The researcher was also worked as a student nurse in the hospital and observed, changing over of nurses from one shift to another, work organization, available personnel resources, and programme of the shift system including Nursing Agency personnel, breaks, and facilities.

Questionnaire

A questionnaire comprising of 24 questions administered to permanent nurses working in different units and shifts of SGTH as shown in Appendix 1. The Nursing Internees were not included in this study since they rotate in different hospitals as assigned by the Nursing Agency and because their number in the hospital was not enough to be included in the study. The questionnaire contained questions relating to experience, attitude to the different shifts schedules, sleeping patterns, health issues and social interaction during night shift. Subjects were to fill in the questionnaires during their convenient time within a period of 5 days. Format attached as appendix 4. Google Forms platform was also used and online Questionnaire was used to collect the data from the subjects, because of COVID-19 situation in the area.

RESULTS

Questionnaire results.

A questionnaire was structured to explore the effects of alternating shift schedules on nursing personnel working in a Government hospital (SGTH) in Saidu Sharif, Swat District, Khyber Pakhtunkhwa, Pakistan. The results of the study are presented in the following section. It was preferable to use descriptive methods and graphics to illustrate responses of the nurses who participated in the survey. The private data showed in Figure 1 shows the variable age of nurse respondents. The younger population in the age range 21 to 30 years formed a larger proportion (61.5%) of the workforce, followed by the 31 to 40 year group (28.5%). There were 43 male respondents, 30 in the 21 to 30 year group and the 13 in 31-40 year group. Males formed only 60% of the nurses who participated in the survey. Very few nurses (2%) in the age range 50 years and above participated in the survey.

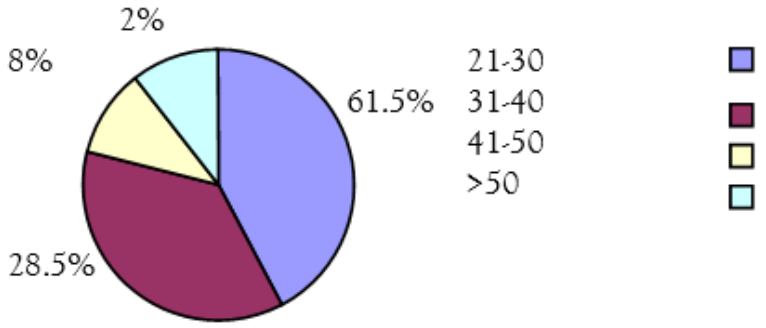

Figure 1 Variable-Age of nurses (years)

It was desirable to have a look at the matrimonial status of the respondents of this survey in order to be able to determine the relationships between status, age and response to work schedules. Figure 2 illustrates the matrimonial status of the respondents in relation to their age groups. The largest number of nurse respondents were single and in the in the age range 21 to 30 years followed by 31-40 years.

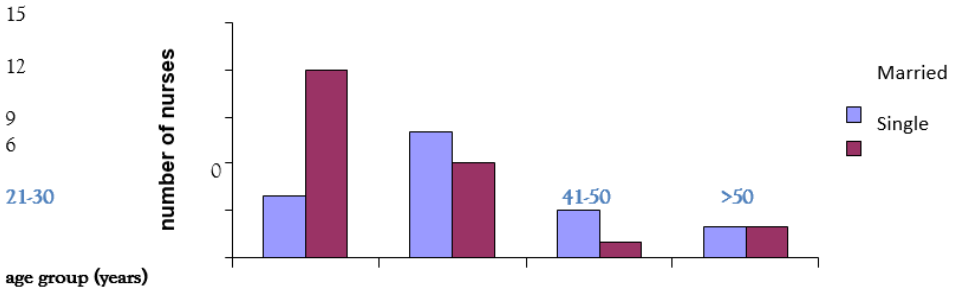

Figure 2 Matrimonial status of variable age groups

On the converse, as age range increased to 50 there were fewer single than married respondents do. Above 50 years of age, equal proportions of married and single respondents completed the questionnaire.

Out of the total respondents, 45% worked on a day shift (M & E) and 55% on night shift. A paired t-test was performed to test the difference between the two means of those who opted to work on the day or night shifts. The probability results were ($p = 0.040$) indicating that there was no momentous distinction between the numbers of respondents who opted to work on either shift ($p< 0.05$).

Figure 3 shows the allotment of nurses to day shift or night shift in relation to their different age groups. For the age ranges 21 to 30, 31 to 40, 41 to 50 and > 50 years there were 46, 42, 4 and 8 % of nurses who opted to work on day shift, for the same age ranges there were 36, 29, 21 and 14 % respectively who opted to work on night shift. In general, younger nurses preferred to work on a day shift than the older nurses. However, within the age range 41 to 55 years of age more nurses preferred to work on a night shift. Equal proportions of nurses aged 50 years and above preferred to either work on a day or night shift.

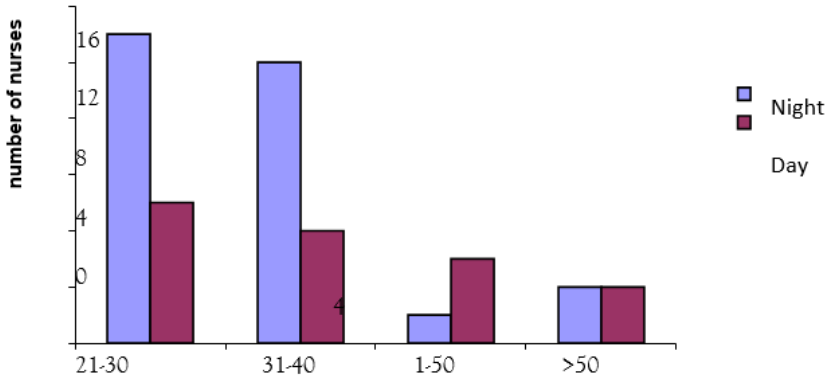

Figure 3 Shift pattern of variable age groups

The rating of work shift load carried on nighttime shift by all respondents is shown in Figure 4. The intensity of the rating was from strongly agreed to strongly disagree. 45% of the nurses who participated in this survey worked on a day shift, out of this 35% subscribed to the fact that nurses do carry a heavy workload on night shift than on day shift. Of the nurses who worked on a night shift 9% subscribed to the fact that nurses do carry a profound tension in terms of work on night shift than on day shift. Regardless of shift worked on, 40% of the respondents indicated that night shift carries a heavier workload than the day shift.

Figure 5 shows the responses of nurses as regards – Is nighttime shift work-load greater than daytime shift? These responses were provided by nurses who work either on a day shift (45% of respondents) or on night shift (55%). Of the respondents who work on a day shift, 13 and 27% respectively either strongly agree or disagree that nurses carry heavy loads on night shift. These proportions represent 8 and 11% of the total nurses who participated in the survey.

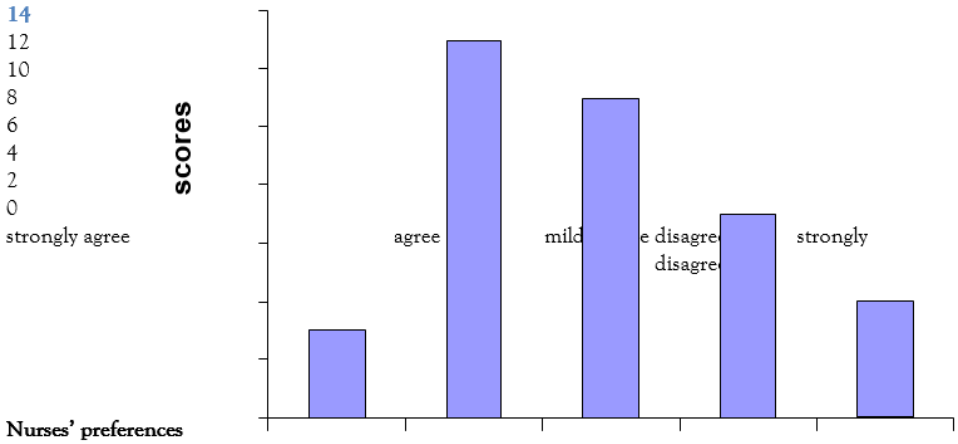

Figure 4 – Is nighttime shift work-load greater than daytime shift?

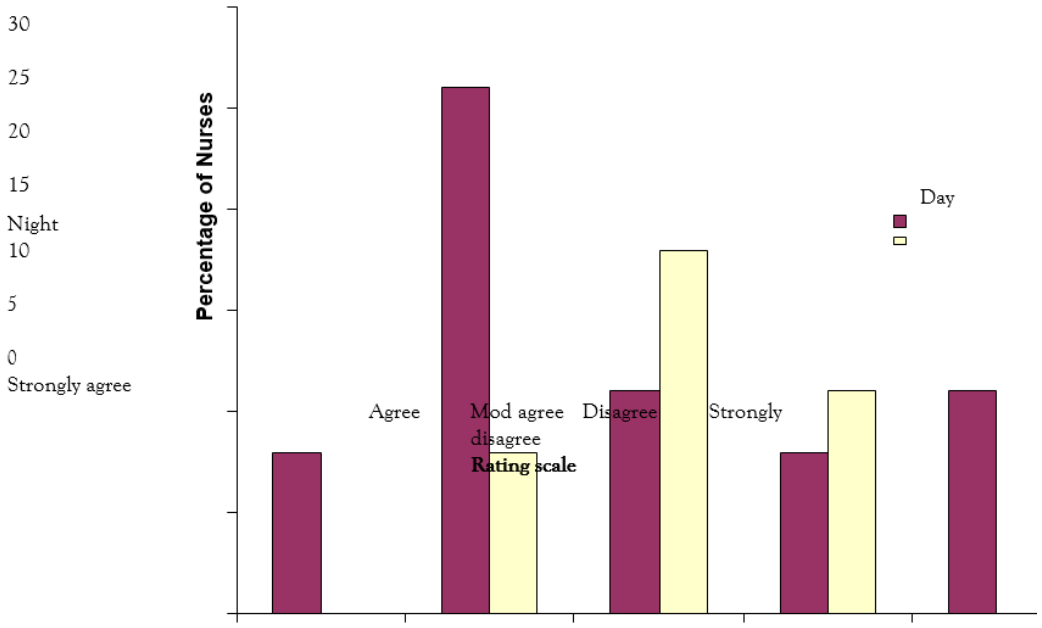

Figure 5: An evaluation of work shift load between day and night nurses

Surprisingly nurses who worked on a night shift did not provide any response indicating whether they strongly agreed or disagree. However, whilst 26% of nurse working on day shift agreed that workloads on night shift are heavy, only 8% of nurses on night shift agreed with this proposition. A t-test was done for choices made by nighttime and daytime shift nurses as regards the heaviness of night shift. A probability associated with the choices was ($p = 0.16$), indicating that there were no significant differences between the choices of day and night nurses.

Data depicting the various ways in which nurses either experience problems with sleeping and those who have no post night shift sleeping problems are shown in Table 2. The table illustrates that 19% of the nurses with sleep problems read books to induce sleep, whilst 15% of the nurses who do not experience sleeping problems listen to music to induce sleep. It is still interesting to note that 57% those with sleeping problems filled the others category in response to this question. Three percent of nurses with sleeping problems do take sedatives. This percentage forms 29% of the population of nurses who participated in the survey. Of the total number of respondents, 71% do induce sleep. Worthy of note is the fact that none of the respondents made use of alcohol to induce sleep.

Table: 2. % of nurses with sleep troubles and those without troubles and Strategies to stimulate sleep

Things used in stimulating sleep	Nurses with sleep troubles (%)	Nurses without sleep troubles (%)	Total (%)
Beverages	3.8	20.2	24
Alcohol	0	0	0
Sedative	3.8	12.2	16
Music	15.4	30	13
Reading	19.2	20	18
None of the above	57.7	40	29

Figure 6 shows the level of goings-on felt by all respondents about functioning on a nighttime shift. Generally, the 42% of the nurses who are on night shift feel more active than those on day shift. However, 25% of the nurses who work on night shift do experience tiredness whilst 42% of the nurses on day shift feel tired.

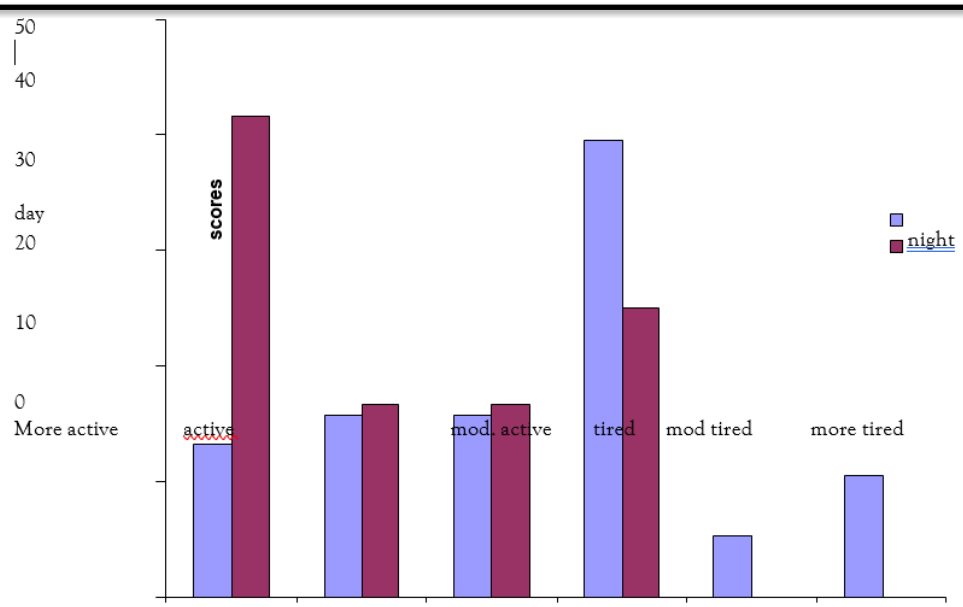

Figure 6 Endurance of activities on night shift.

Nurses' Endurance of activities

Nurses' mind-set about nighttime shift is illustrated in Figure 7. The intensity of the rating scale was from score 1 to 5, with one indicating dislike, and 5 indicating like. Of all the respondents, 34% indicated a score of 1 (dislike) and 11% of respondents chose a score of 5 (like) along the continuum of the scale. Only 7% (scoring of 3) of the nurses were indifferent to working on a night shift.

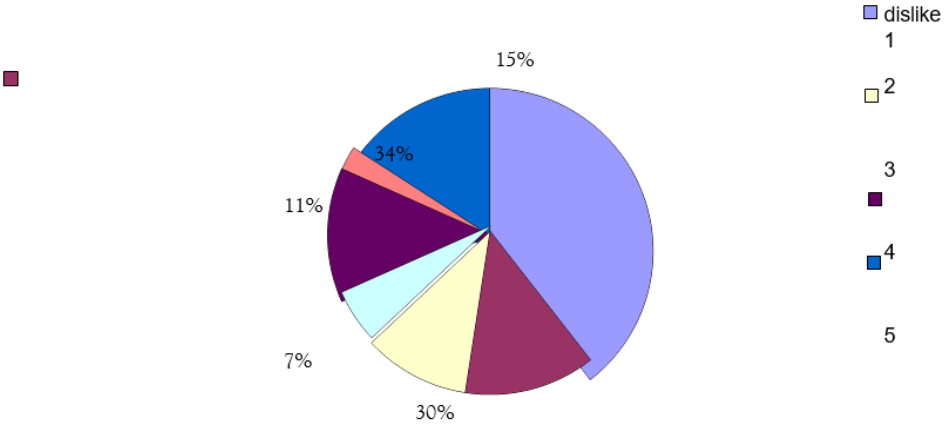

Figure 7 Nurses' mind-set about nighttime shift.

Figure 7 shows percentage of the schema of nurses regarding night shift.

The Impact of nighttime shift on attentiveness is showed in Figure 8. 63% of respondents indicated that their level of concentration when working on night shift is normal, whilst only 3% were not sure of the effect of night shift.

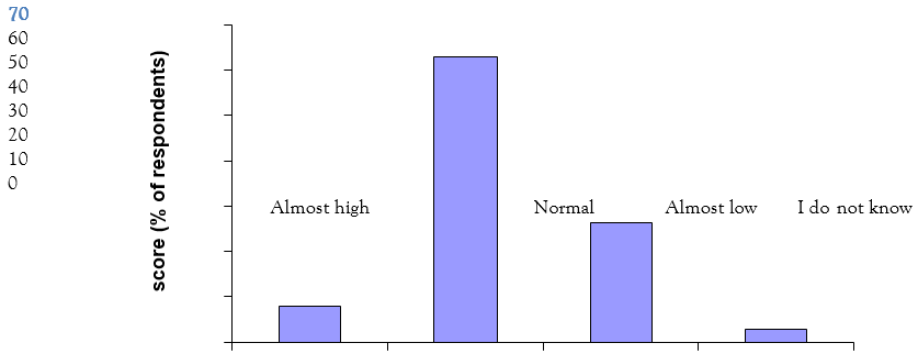

Figure 8 Impact of nighttime shift on attentiveness.

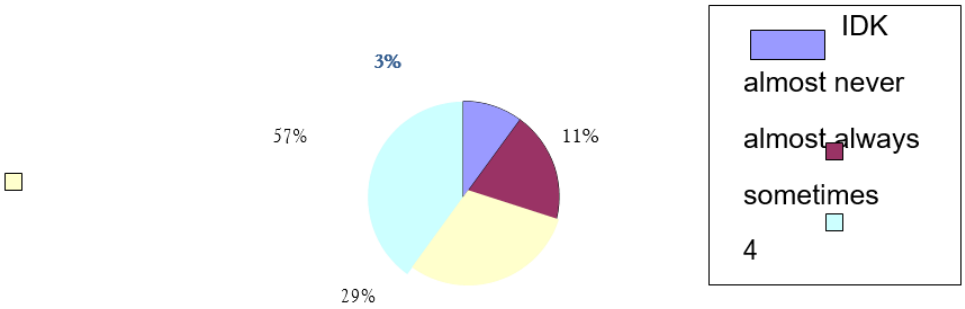

Figure 9 Does nighttime shift has impact on attitude?

Figure 9 illustrates that the nighttime shift has an impact on attitude in any away, 57% of the respondents said that night shift affects their attitude sometimes.

Regarding health, responses were considered on a three-point scale as shown in the pie chart below Figure 10. The results showed that night shift affected 50% of the respondent's health.

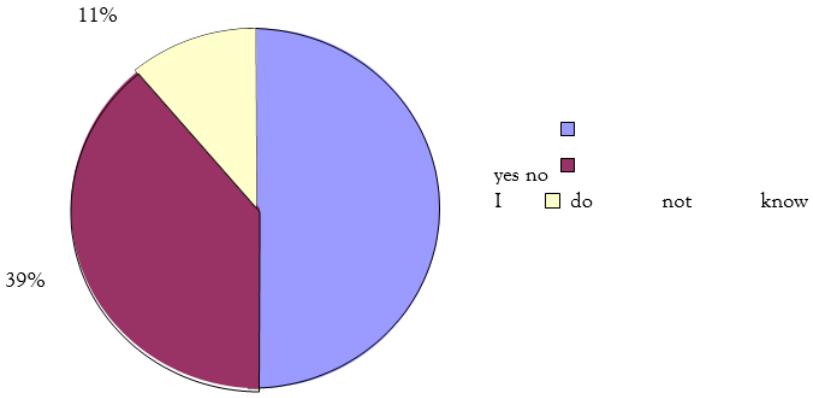

Figure 10 Does nighttime shift influence nurses' well-bieng?

Figure 11 showing illnesses happened to nurses on nighttime shift in order of diminishing magnitude are loss of sleep or insomnia (38%) > persistent tiredness (38%) >backache (11%) > frequent headaches (34%) > feet ailments (7%). Several of the illnesses happened to nurses on nighttime shift. are shown in Figure 11.

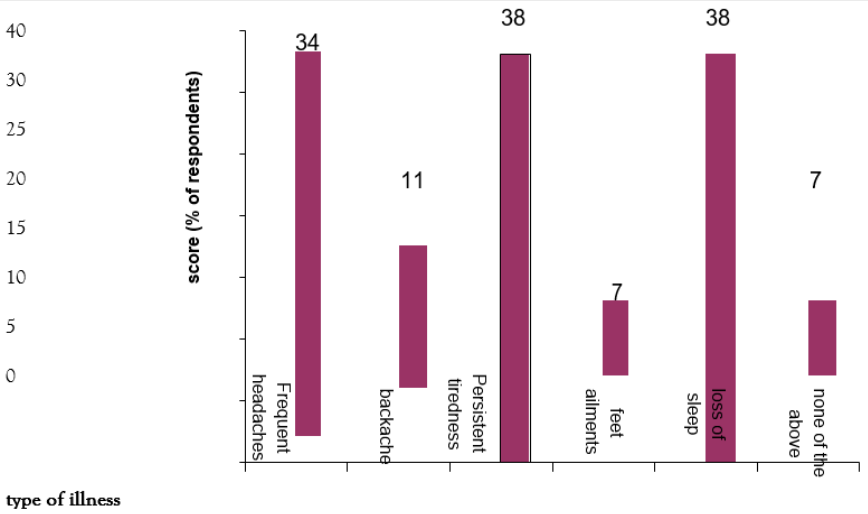

Figure 11 illnesses happened to nurses on nighttime shift.

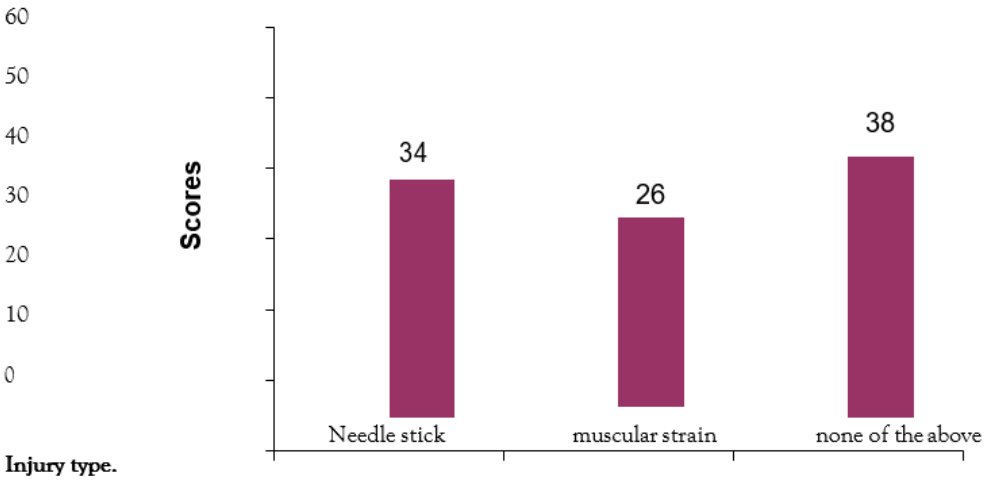

Figure 12 Variable of work-related injuries

The most commonly sustained injury was needle stick injuries (34) (Figure 12), muscular strain with accounting for only 26% of the occupational injuries.

DISCUSSION

In order to meet the demand for an improved efficiency of dealing with the extended hours of work in some industries, there has been an increasing drive towards the use of shift-workers. The present study illustrates the need for a continuous service delivery in the Health Care Industry. This makes it necessary for workers to work on different shift schedules.

Shift schedules.

Nurses work in a health delivery system that operates on a 24-hour basis in administering health care for sick individuals. Governmental Institutional efforts are complimented by the Private hospitals in Pakistan. Results showed that all categories of nurses do work on a night shift schedule, whether by request or officially allocated.

Nurse Managers allocate nurses to work in different sections of both hospitals. Priority in the planning for staffing and scheduling of nurses is done according to the specific requirements of the hospital. There is no

written policy or guideline for both scheduling and staffing. Indications from the Nurses Unions are that nurses have forwarded complaints of unfair distribution of night schedules, which are attributable to the lack of guidelines to be used by schedule planners. It is noted that hospitals allow for flexibility towards arrangement of shifts whenever the need arises. Nurses on both shifts undertake overtime duties, depending on the number of hours they are off duty and in agreement with hospital managerial requirements.

The pattern of shift schedules is similar to the schedules described in the reviewed literature. Nurse's work on long 12-hour shifts on both day and night shifts. The arrangement differs between hospitals. Some hospitals have adopted the pattern of 7 days in a stretch whereas others break up the week into two working sessions. Out of the total respondents, 63% of the nurses requested to be in their respective shifts; 58% of the nurses requested to be in the day shift and 42% requested to be in the night shift. Amongst the respondents, 66% do not prefer night shift and 32% say it suits their lifestyle. Only 3% indicated that it is financially rewarding. Even though nurses opt to work on night shift, they do encounter some difficulties with this shift.

Problems of night shift.

There is a diversity of problems encountered by nurses in a normal working situation. Some of these may be physical, physiological, psychosocial, socio-economic, and cultural or health related. Night shift causes problems because naturally the body wants to rest at the night time. Problems vary with each individual since the biological structure is different.

The influence of circadian rhythms on the night worker.

Experiences of nurses regarding night activity were explored using a rating scale. The range of the rating scale was a 6 - point scale, 1 scoring more active to 6 scoring more tired. It is noted that the more active score (1-3) is dominated by nurses on night shift and the more tired score (from 4-6) is dominated by the nurses on day shift. This confirms the truth that some nurses prefer to work on night shift since they are comfortable with it. As previously, mentioned differences in the circadian rhythm make other people to be at their peak in the evening and some to reach their peak in the morning (Rogers et al. 1986). The 'night owls' prefer night shift and the 'morning larks' prefer day shift, hence 42% of respondents requested night shift and 32% prefer day shift.

Circadian rhythms can get out of phase with an abrupt change in an individual's activity pattern. Certain people take a long time to adjust to changes due to the internal clock rhythm. The inability to keep track with the time cues results in a person being frustrated and this affects ones attitudes towards work and interaction with other people. Change in ones psychological processes could affect the ability to concentrate as reported by Bohle and Tiley, (1989) and Pheasant, (1991). The study revealed a number of self-reported psychological symptoms affecting the shift workers such as frequent headaches and the subjective responses to irritability noted.

The survey also investigated if nurses felt extra vigorous when working on night shift. The results showed that 56% of the nurses did not feel energetic, 18% were neither energetic nor less energetic, 26% felt energetic. The focus group also felt tired on the night shift, especially the group without rest periods. Tiredness may be due to insomnia, changes in sleeping patterns, variations in length of shift periods, and circadian rhythms. Nurses also felt that there is a sleep deficit and as such, they tend to spend their first night-off hours in bed. The fact that about 38% of the respondents experienced persistent tiredness implies that their performance could be impaired. This inefficiency in performance could have deleterious consequences on the health care of patients. Other effects of a poor health delivery system will be the dwindling attendance and the loss of valuable income.

Insomnia.

Another problem faced by night shift workers is the lack of sleep or insomnia. 53% of the respondents

working on day shift indicated that they do not get enough sleep when on night shift, whilst only 18% of night nurses complain of a lack of sleep after working on night shift. Among the whole group of respondents, 66% sleep for less than 5hrs, another 34% of respondents sleep for 6hrs to 7hrs. Amongst day and night nurses of all age groups, no one sleeps for eight hours or more, after night shift. The results reveal that forty six percent of the nurses who opted to work on night shift sleep for less than 5 hours, whilst 56% slept for 6 to 8 hours after the shift. The data obtained from the survey showed that 74% of the nurses have a problem with falling asleep after night shift, implying that 26% did not have a problem. Insomnia is a common ailment that affects all categories of nurses who participated in this survey. Rodgers et al., 1986, have noted differences in the biological make-up of individuals. These differences can create difficulties for some people when they are expected to adjust from a diurnal working schedule to working on a night schedule. This is in line with suggestions by some nurses who comprise no troubles with working on a night shift. They indicated that they were more energetic when they work on night shift. This evidence collaborates that of Rodgers et al., 1986 who pointed out that some people are 'evening types' whereas others are 'morning types'. Preference of the shifts has an effect on each person towards adjustment to night shift.

Other problems associated with night shift included drowsiness, loss of sleep, tiredness, backache, low concentration, and social problems. Sleep is a major concern since it affects the health and the performance of nurses who are dealing with human lives. The health care workers in this survey have indicated that they are prone to such hazards and mistakes. These nurses are responsible not only for their lives but for the life of others and for the patients under their care. Nurses functioning in the children's units, intensive care units, operating theatres, obstetrical units have more responsibilities, and are required to be more alert, to formulate fast decisions about lives of these people. Any mistake or accident resulting from fatigue or stress can cost a life of the next person, resulting in law suits and claims from patients. In cases where incidents end up with a disciplinary action by the authorities, the nurse's life becomes, affected psychologically, socially and physiologically due to stress.

In spite of the above problems associated with working on a night shift, there are some benefits gained from such a working schedule. Nurses are paid various night shift allowances depending on the number of hours worked and rank. The cumulative benefit exceeds that of working on a day shift. They have more free time to work overtime, thus increasing their income over and above that of their colleagues. This shift also allows nurses to engage in professional academic development programs. Some nurses prefer to be on night shift to have some time for their studies during the long hours of rest.

Strategies to induce sleep.

An important factor to note is that 71% of respondents use some form of strategy to induce sleep. The respondents, who indicated that they have no sleeping problems when on night shift, have to use some form of strategy to induce sleep as well. Several options to induce sleep were mentioned and these included the use of beverages, essential oils, reading and music. Twenty one percent of nurses with sleep problems take tablets to sedate themselves. Some nurses who have a sleeping problem, as indicated in the results take some form of medication to induce sleep. From the medical point of view, continued intake of medication or sleeping tablets affects the physiological and psychosocial well- being of the individual. It is not worthwhile to take medication without consultation with the medical doctor. An important fact to remember is that induced sleep is not restful and tablets can be habit forming.

Work performance

Nurses regarded the time of 12 hours allocated for either the day shift or night shift as too long. The nurses feel that night shift has a heavier workload than the daytime shift. They attribute this to the fact that there are fewer nurses working at night. The provisional Nursing Internees of the night shift not as experienced as Registered Nursing staff to deal with strange situations that often occur in specialized wards. So they have to

work hard to fulfill the needs of the patients and keep their unit according to the health care standards. On the contrary, it has been assumed that there are limited health care activities that require attention by night nurses, making the workload on this shift to be lighter and less strenuous. The workload of the night nurses is dependent on the intake of patients during a particular day. Management is facing a problem of an unpredictable patient influx on each day. A nurse who is reporting late that she is booked sick or not feeling well disrupts the system of calling the agency nurses. The accessibility of the support staff also influences the amount of work carried out by the night nurses. In general, 8% of day shift respondents strongly agree that night shift carries a heavy workload and 11% strongly disagree to it being a heavy load.

To find out about attitudes and preferences of nurses towards night shift their opinion was sort using a rating scale. The intensity of the rating scale was a 5- point scale, with 1 scoring 'dislike' and 5 scoring 'like'. The overall score for dislike rated at 63%, sixteen percent of nurses liked the shift and those who neither liked nor disliked night shift formed 7%. The results revealed that nurses who liked night shift reported minimum problems with this shift. The dislike of night shift could be attributable to the truth that they experience sleeping problems along with other ailments. Poor attitudes could irritate patients, lead to conflicts between staff and patients and even amongst staff. There will also be a low motivation towards work and errors in administering health care. Performance goes along with motivation, which is the drive towards productivity. Efficiency is crucial to save human lives in health care.

Psychosocial problems.

It is imperative to consider that albeit nurses request for a alternating or night shift, they still gaze at it as being exhausting. Some of the nurses in the focus group stated that they opted to work on a night shift because of problems associated with securing the required safe transport back home after working on the daytime shift. .For instance, a respondent indicated that handing over of reports to the next nurse after working on a day shift implies that she will get to the taxi rank after 7 pm. The implication is that she will have to use an expensive means of transportation back home (i.e. metered taxi) which is more than she can comfortably afford. There are also risks associated with waiting for a metered taxi at the rank at night due to frequent muggings, rapes and theft.

This survey examined concentration as one of the psychological concepts in the study of alternating or night shift. Subjective information gathered from the subjects, working day and night shifts revealed that 26% of respondent felt that their concentration is low, 63% felt that their concentration is normal, and 8% felt that is almost high even on night shift. The focus group stated that sometimes the hospital, is too busy, and they get too tired and have difficulty to fall asleep. The nurses experience physical and mental workload since their job involves standing, walking, bending, lifting and making decisions about patient care and other administrative work. All this leads to exhaustion, which disturbs concentration. Åkerstedt, (1996), state that another aspect of tiredness concerns the ability to make complex decisions, which require thinking. This means that a tired person is unable to think clearly. The study by Makowiec-Dabrowska, et al. (2000), investigated that can the nursing personnel work on a 12 hours shift basis it revealed that nurses can carry heavy mental workload than the physical workload at the night shift.

Effect of nightshift on social life.

Some of the problems of night shift and the dislike of this shift emanate from the social difficulties encountered by nurses in the descriptive questions in the questionnaire. For example, nurses who constantly work on night shift on weekends and public holidays develop a negative attitude towards the shift. Adjustment to night shift could be influenced by the social status of the individual within the community. For instance, the marital status, family needs, societal values and the lifestyle of the individual within the community influence the nurse's attitude towards night shift. Night shift causes an imbalance between desired lifestyle and work. Women have a foremost responsibility to play in the domestic life and they compromise their sleep to undertake the domestic chores such as care to their children and family chores.

To find out whether night shift affects the social aspect of nurses or not a 5-point scale, rating from 1as agree

to 5 rating as disagree was used. Fifty seven percent of respondents stated that their social life is affected, 3.8% disagreed and the rest was in between the extremes. On rating the whole scale, 70% of the nurses are affected and 30% not affected. The aspect of social life discussed in the descriptive questions in the questionnaire, where they say their social life involves their families, work relationships and other social groups. Seventy five percent of the responses to the descriptive questions in the questionnaire, say the social life is affected. Nurses are concerned about leaving their spouses every evening; some do not see them until they are off due to work. They are unable to help children with schoolwork, and loose social contact with friends and important others. Managers state that nurses feel that they are in isolation when on night shift, especially the permanent night shift nurses. There is another concern raised by the Nurses Union that there is exposure of nurses to psychosocial hazards due to unfair distribution of schedules. Conflicts do arise if unfair labour practises exist in the workplace as stated by the union. Exposure to disciplinary actions (pointed out by Nurses Union), responsibilities, and liabilities of the nurses is another factor, which have an effect on social aspect at work. Low concentration levels, attitudes towards work relationships can cause mistakes that put nurses in disciplinary procedures.

Some other factors outside the individual can affect sleep in these workers. The nurses pointed out that the home environment can contribute to sleep problems. In Pakistan, many people live in areas where there is a lot of noise from cars, machinery, people and noisy music systems from especially Pakhtuns's cars. All this noise is experienced during the day and the noise level has a huge impact on the sleeping time of the night worker. Another factor is that the country is very hot in summer and these environmental and climatic conditions have a direct bearing on the night worker when the temperature range is from 30°C and above by 11:00hrs.. The housing structure is not conducive to good sleep, overcrowding, houses built to close to each other and the material used to build the houses is of poor material. Ditsele, (1999) described housing, noise and climatic conditions as factors affecting the performance of the night worker in South Africa.

The health status of the night worker.

Regarding health status of the respondents during night shift, 50% of the nurses felt that their health is affected, 39% had no health problem and 11% did not know whether night shift affect them or not. Amongst the respondents, 34% are troubled by frequent headaches, 11% by backache, 38% by persistent tiredness, and 38% by insomnia and the rest suffered from feet ailments. The prevalence of these ailments indicates that health risks exist with shift work and night shift as stated in literature. Sleep problem dominated in ailments of all age groups of the respondents. To note was that 40% between ages from 21-30 had sleeping problem, 31-40 formed 29% and the older 41 to above 50 groups were 25% respectively.

Another health related problem was that of contact to occupational injuries and diseases. The results show that 60% of the respondents sustained either a needle stick injury or a back injury. Twenty percent of respondents indicate that the incidents occur on night shift. The management records in hospital (SGTH) show that needle stick injuries (NSIs) are increasing day by day. Taking into consideration that a standardized procedure does not exist, some of the statistics for occupational injuries could be inaccurate. NSI can occur if the nurse is too busy, drowsy or tired where she is likely to loose concentration and cause an accident. NSI predisposes nurses to infections such as Human Immuno Virus (HIV), Acquired Immuno Deficiency Syndrome (AIDS), Hepatitis B, and other viral infections. Lack of knowledge and skill exposes nurses to such harmful conditions and other hazards such as back injury. Back injury can occur due to lifting sustained or prolonged awkward postures in the case of nurses. In general, backache can occur can result from exposure to psychological hazards. According to previous studies stress is a psychological problem which manifests itself with aches and pains of neck or back pain depending on the biological structure of the person. Some of the respondents indicated that their existing ailment was backache from unknown origin. The assumption for such muscular skeletal disorder is its relation to stress. Orientation of newly employed nurses and in-service training, and procedure manuals are tools that assist managers in educating and development of staff thus reducing hazards. According to Lipkin et al. (1998), nurses form a potential group for the chronic fatigue

syndrome possibly due to exposure to job-related stressors, such as contact with viruses and stressful shift work that interfere with their biological rhythms.

The impact of gender.

The impact of gender has its own highlights in this study. Male respondents in the survey had worked for a period exceeding 5 years in the hospital. Regardless of marital status respondents requested to work on a day shift. This is probably due to fact that they need to be with their families or their young age.

The unmarried respondent requested to work on a day shift. The married male nurse said that the night shift is exhausting; this was in disparity to the proposition made by the single male nurse. This nurse regarded night shift as relaxing and had sufficient energy to do his duties, but not having sufficient sleep when on night shift. They needed to induce sleep by reading. Night shift was regarded as having a heavy load by 60% of male nurses when interviewed. 34% male nurses said that they have more energy to perform during the night shift. All male nurses had normal level of concentration during the night shift, with the shift not having an effect on their general attitudes. Night shift affected the social life of male nurses but did not seriously affect their health. However, they complained about feet ailments. This could be associated with theatre work, where there is a lot of static standing.

Some aspects of shift scheduling may not be feasible, especially because health industry has more female shift-workers than in other industries. For example working three rotating shifts can be very strenuous for a female nurse with children and other family responsibilities. For these nurses other patterns of shift schedules are not only strenuous but also dangerous since they involve transport problems. Travelling or driving at night for female people in Pakistan is dangerous (95% of respondents comprises of female nurses). Street et al. (1997), in their study they strongly endorsed the need to take into consideration nurses scheduled for shift work. They argue that the personal, socio- cultural and environmental perspective of the nurse need to be given attention by the various stakeholders involved with rostering.

Recommendations

The recommended shift-work schedules according to ergonomic design.

Within the health care system, a number of working schedules have been adopted in an effort to improve work schedules and align these with the International Labour Office (ILO) 1990 recommendations for shift work. Since shift-work is unavoidable, governments, employers and employee representatives work on the problems of working time arrangements for the benefit of the employer and employee and the survival of industry or service. For industries there is global competition for economy, and for health industry, patient care cannot be compromised. Looking at these circumstances all stake - holders should come to an agreement to formulate working time that will offer advantages to the employer and employee (Åkerstedt 1996).

Assessment of advantages and drawbacks of shift system should be done based on objective criteria. Adjustment of physiological functions to night work, level of well being, health problems, and disturbances in personal life, accident rates and performance efficiency are all taken into consideration in shift-work design. If a product, environment or a system is intended for human use, its design should be based on the characteristics of its 'human users'. Ergonomics provides the scientific foundation and research techniques that could be found satisfactory, as it has been in the past although some had problems (Pheasant 1991).

ILO, (1990) adopted a Nighttime labor Convention, which was represented by a large number of countries. Some of these are points related to occupational health services. The recommendations are in accordance with ILO Convention 171, Article ILO (1990a). The convention stated that stable and alternating night workers are generally the people at risk and they should be included in health checkups, and should be given special attention as they are exposed to work load and extended working hours. Night workers may suffer from psychobiological desynchronisation.

The recommendations that should apply to all states and industries are in agreement with the ILO Night Work Convention, (1990a). Recommendations include; Appropriate health services for night and shift-

workers, First aid facilities, Option to relocate to day time work for health reasons, measures for females on nighttime shifts, particularly they should be awarded with unique motherhood security (relocate to daytime work, social sanctuary reimbursements, or an expansion of motherhood leave), the right of consultation on details of work schedule (Koller, 1996).

Knauth, (2001) also state that the most important ergonomic recommendation is that night work should be reduced as much as possible and permanent night shift is not recommended. Schedule planners should avoid quick change over from night to day on the same day or from morning to night. The amount of successive functioning days should be restricted to five to seven. Each shift work system ought to incorporate some gratis weekend with at least 3 consecutive full holidays. Time of recovery, and rest breaks must be considered. Schedule to be regular and predictable.

It has been proven that clockwise direction of schedule is easier on circadian rhythm. These involve rotation from day to evening then to night shift. The shorter shift of 8 hours is much easy to apply but the present choice is the 12-hour shift (Malicki, 2021).

Specific recommendations.

Based on the findings of this research, it is imperative to consider that scheduling of shifts differ in style and arrangement according to needs of each institution. However, managers have stated that nurses have a freedom of choice regarding shifts. This is not forever the case since the number of those who prefer night shift is lesser than those who dislike night shift. Some nurses have to work shift work regardless of whether night shift suits them or not. Nursing Managers have a responsibility to formulate strategies to assist those who find it difficult to work at night.

The findings of this research show that there are strengths and some shortcomings in hospital management systems. Management can use these as a point of departure to plan the administrative processes for hospitals. Managers need to realize this managerial strategy, and bring about change based on the situational analysis of all processes within each institution. Recording and trail of good and bad incidents will be the foundation for planning.

A situational analysis will assist managers to identify the existing occupational hazards affecting the nurses, and they will be able to forecast on possible strategies that can help reduce hazards in hospitals. It will be possible to follow certain trends that can disturb the smooth running of the organization. Hospital management as well as the Board of Governors should be aware of the relevant programmes to assist in future plans, which will benefit all the stakeholders (employers, employees, health care receivers/patients) under their jurisdiction.

Flexibility towards shift schedules is one of the strengths of the hospitals in this survey. Unit managers are encouraged to identify those nurses who prefer to work on particular shifts, especially the night shift. This survey revealed that most of nurses who like the shift suggested that they had minimum or no problems with night shift..

Links with other health related structures such as Occupational Well-being and Security organizations or societies can be of assistance to management. Occupational Health service provides guidance towards identification of all types of occupational hazards and remedial actions to hazards in the workplace. It is cost effective to develop the programme within the institution depending on the availability of personnel resources. Management has the final control over work organization and professional requirement within the organization.

Introduction of an occupational health service could assist management in the creation of awareness about occupational health problems such as stress, injuries and diseases. The service is responsible for approved periodical examinations, for keeping of records and plan the educational programmes based on the available statistics. Night and day nurse's benefit from programmes designed for reduction of tress in the workplace. This could function on a smaller scale and contribute towards health and safety of personnel.

Sleep evaluation programme is recommended as a strategy to identify those nurses with major problems. This

survey was not conclusive. towards the sleep problem. Specific indicators can reveal more.

Management to ensure that recruiting and training of supportive nursing personnel is according to expected standards of nursing practice. The agency or temporary nurses have a contribution to the service of the hospitals and their participation in the organization has an influence on the delivery of health care. The Nursing Agencies have a accountability to allocate competent personnel to hospitals, ensuring that they are of benefit to all stakeholders within the service.

Planning of shift schedules is based on the inputs of all the people involved. The employers, supervisors and the employees contribute towards planning and implementation of shift schedules for the nurses. Consideration of nurses' needs for a particular shift and involvement is important for motivation and acceptance of shift

It cannot be possible to meet all the needs of different nurses when planning schedules. On the converse, it is probable to make adjustments that can lessen the damage of the extended hours work in alternative or night shift. Considering problems facing the hospital management, a complete change is not possible.

Introduction of certain adjustments such as stipulating official rest periods for the night nurses in an attempt to reduce some of the ill effects of night shift. The important factor to be recognised is that the 12-hour night shift is too long and the absence of variations in activities makes it more monotonous and strenuous. This makes the body to be unable to adjust and perform as expected without rest.

Management need to take into consideration the lack of transport for other nurses, it is necessary to continue with the 12-hour shift instead of a rotation shift of 8-hour shift as pointed out by some nurses. It may not be possible to make arrangements for transporting nurses, as this require further research and budget from management. Nurses come from different areas of the city and outside the city of Mingora, Swat District. There is therefore a need for adjustment from the management in meeting needs of the whole people.

Management is encouraged to provide a psychologically supportive environment to the nurses. Rest rooms should provide tranquility and be conducive to contemplation in an attempt to relieve psychological stressors. Music, reading materials, games provide relaxation to many in the workplace. The comfort of the environment and the furniture used for resting is essential and conducive to complete rest. Those who feel tired can benefit from a separate resting area from the cafeteria or the work area.

Patient low intake could be a loss of income to the organization. This is also an indicator for underlying problems affecting nurses such as bad attitudes due to stress of work. Nurses are means towards good patient care, if they are frustrated they will lower their performance thus the service will not be a service of choice and desire for the recipient and will not be cost effective to the provider. A healthy, comfortable workforce is the one that is productive and satisfied with their output or product.

Recommendations directed to nurses attached as appendix 5

Conclusion

This study shows that all age groups are subject to exposure to physiological and psychosocial hazards carried by night shift as reported in their stative responses. The findings of this research reveal that Government hospitals recruit and employ younger population of nurses, still there are significant amount of nurses aging between 30-50s and there are very few nurses over the age of fifty. Regardless of the fact that the younger group of nurses dominated in the survey, it is noted that all age groups of nurses employed in these hospital do have complaints about night shift. Few nurses have not experienced problems from the night shift; as a result, they preferred to be placed permanently on night shift. The majority of the nurses complained of a number of problems when working on night shift. Other nurses could not cope with night shift schedules as such they negotiated for a change to day shift.

The recent developments regarding shift-work, is aimed towards improvement of health of the shift-workers, the physical, and psychosocial well being as stated by ILO. ILO has highlighted that recommendations should be relevant to the specific groups and work systems. Noted is that each sector has its own specific needs, especially health sector as it deals with patient care. 'The night shift worker is a man at odds with his own

body rhythms' as stated in Pheasant, (1991). When managers are planning shift schedules should be aware of these biological rhythms as explained by other researchers. Literature has explained that there is no perfect schedule; the main factor is the consideration of the inputs from the participants in shift work.

The working environment has adequate space, clean, well ventilated with good lighting. Provision of resting time and facilities is still a problem in hospitals. In some wards, facilities have been provided but time is not adequate to provide recovery and strength to go back to work. The body needs to recover from the physical, physiological and psychological strains of working against the body clock. Rest periods allows for replenishing and refreshing of the body for further performance with minimal or no errors. Errors are the cause of accidents as noted in literature. Accidents are costly in terms of the Compensation of Occupational Injuries and Diseases Act, (1993).

The Ergonomist and management have a responsibility to design a work schedule that will suite health industry without compromising the life of the employee, employer and the society served by the nurses. Shift-work environment should be comfortable, safe, and free from hazards such long hours at work. Additional studies are necessary to find out the extent of present demands from nurses. Management will benefit with further research in this area. The aim of this research was to identify hazards affecting nurses working on night shift and to make recommendations based on the findings.

The present recommendations represent only the immediate problems examined on a smaller scale involving only the SGT hospitals. Comparisons between the public and the private sector can reveal more problems thus helping the whole health industry.

REFERENCES

Åkerstedt, T. 1996. Wide Awake at odd hours. Shift work, time zones and burning the midnight oil. Swedish Council for Working Life. Stockholm. Pages; 10-11.

Basic Conditions of Employment Act (75 of1997) (www.workinfo.com/Manual/Retrenchment/beac1998.htm), 02/12/10.

Béhar, M. R. E. 1989. Work Schedule and Night work in Health Care. International Encyclopedia of Ergonomics. Fourth Edition. Volume 3. Pages 97.22- 99.25

Bridger, R. S. 1995. Introduction to Ergonomics. McGraw-Hill. U.S.A. pages 279-282.

Brown-DeGgne, A. M. and Eskes, G. A. Turning bodytimes to shift time. Health Sciences Centre. Volume 94, no. 98 Sept. 1998 pp 51-52.

Canadian Centre for Occupational Health and Safety. 1998. Rotational Shift- work. (http://www.ccohs.ca/oshanswers.schedules/shiftwrk.html).

Costa, G. 2001. Shift-work Health Consequences. International Encyclopaedia of Ergonomics and Human Factors. Volume 2. Taylor Francis. London. pages 1359- 1361

Davis, S; Mirick, D.K; Stevens, R.G. 2001. Night- shift work, light at night and risk breast cancer. Journal of the National Cancer Institute. Volume 93, No. 20 October 17, 2001.

Denosa Nursing Update. Protect Your Health at Work. WHO (S.A.Technical Cooperation Programme). Pretoria. S. A. Vol. 23, NO. 3 March 1999.

Ditsele, T. 1999. Human Factors Consideration in the Design of Nightshift Schedules. Master's Thesis. Luleå University Sweden. Pp 2, 8.

Erasmus, K.1997. Shift Work focus on Night Duty. Nursing News. South Africa.Volume 21, Number 8. Pages 9-13.

Geyer, N. 2001. Ethics and Law on Moonlighting. Labour Issues. Nursing Update South Africa. Pp30.

Gillies, D A. 1989.NURSING MANAGEMENT: a Systems Approach. Second Edition. W.B. Saunders Company Philadelphia. London. Pp 389

Grandjean, E. 1995. Fitting the task to a Man. A textbook of Occupational Ergonomics. Fourth Edition. Taylor Francis. London. Pages 217-230.

Grossman, V. G. A. 1997. Defying Circadian Rhythm: The Emergency Nurse and the Night Shift. Journal of Emergency Nursing. Volume. 23, No. 6. Pp602-607.

Hargrieves, C. M; Corlett, E. N. and Maneca, I. 1990. Work Design in Practice. Proceedings of the Third Ergonomic Symposium. Zadar, Yugoslavia.Taylor

Francis London. Pp74.

Härmä, M. I. 1996. Ageing. Applied Ergonomics. Volume 27, No. 1 February 1996. pp25-29

Knauth, P. 2001. Design of systems for shift-work. International Encyclopaedia of Ergonomics and Human Factors. Volume 2. Taylor Francis London. Pp 1210.

Kogi, K. 1996. Improving shift-workers health and tolerance to shift-work: recent advances. Applied Ergonomics. Volume 27. No. 1, pp.5-8.

Kogi, K, 2001. Shift-work. International Encyclopaedia of Ergonomics and Human Factors. Volume 2. pp 1350-1353.

Koller, M. 1996. Occupational health services for shift and night workers. Applied Ergonomics Vol 27, No. 1, pp. 31-37.

Lipkin, J; Papernik, D; Plioplys, S; Plioplys, A. V. Chronic Fatigue Syndrome. The American Journal of Medicine. Volume 105, issue 3A, September 28, 1998. Pages 91s-93s.

Lushington, W; Lushington, K. & Dawson, D. The Perceived Social and Domestic Consequences of Shift work for female shiftwokers and their partners. Australian Journal of Occupational Health and Safety Volume 13 No. 5, October 1997. Pages 461-470.

Mackowiek-Dabrowska, T; Krawczyk-Adamus, P; Sprusiń ska, E; JÓ ź wiak, Z.W. Can Nurses Work in 12-Hour Shift system. Department of Work Physiology and Ergonomics. Nofer Institute of Occupational Medicine. Poland. International Journal of Safety and Ergonomics Vol. 6, No. 3, 2000 pages 393-403.

Morehouse, R. L. The Special Challenges for Women. Official Journal of the American Association of Occupational Health Nurses. Volume 43 no. 10 October 1995. Pages 532-535.

Nursing Act No. 50 of 1978. Government Gazzette. Volume 154, No. 5986. Republic of South Africa. Section 1. Ohida, T; Kammal A Sone, T; Ishii, T; Uchiyama, M; Minowa, M. and Nozaki, S. Night- shift Work Related Problems in Young Female Nurses in Japan. Journal of Occupational Health. 2001 no. 43 pp150-156.

Pheasant, S. T. 1991. ERGONOMICS, WORK AND HEALTH.MACMILLAN PRESS. London. Pp 3-4, 156-157, 171-172, 185-188.

Rodgers, S. H; Kiser, D. M; Murphy, T.J; Nielsen, W. J. 1986. Ergonomics for people at work. Volume 2. Eastman Kodak Co. U.S.A.pp72-73.

Rosa, R. R. and Colligan, M. J. 1977. Plain Language about shift-work. Public Health Service, National Institute for occupational Safety and Health. NIOSH publication No. 97-145. (www.cdc.gov/niosh).

Smith, L; Hammond, T; Mcdonald T; Folkard S. 1998. Shifts are popular. International Journal of Industrial Ergonomics Volume 21 no. 3-4 pp 323-324.

The South African Nursing Council. 2001. Statistics: Information Booklet. South Africa pp 20.

Thurman, J. 1990. The hours we work: New work schedules in policy and practice Conditions of work digest. ILO: Geneva. Volume 9, no.2 pp 3-6.van Rensburg, H.C.A., Fourie, A. and Pretrius, E. 1994. Health care in South Africa: Structure and Dynamics. Acardia Pretoria. Pp81-82.