

Cheptar-2

REVIEW OF LITERATURE

Analyses of existing literature are a very important in the research process. It will give insight and a depth of understanding about the existing knowledge about a new research work. The literature review is a course of work which familiarise oneself with the facts collected and integrated about the research area, which will produce an image of what is known and what is unknown (Polit D F, 2004).

It is now known that suppressed emotions can lead to bodily or and mental symptoms that arise from mental conflict or internal stress. Emotions such as anger, rage, grief, anxiety from unfulfilled deadlines, or fear of failure can manifest themselves in the form of a psychosomatic illness. Our minds influence our bodies and our bodies influence our minds. It becomes more complex when several psychological & physical strains, became accustomed or conditioned, deeply ingrained in the nervous systems which results in activation of autonomic nervous system and the endocrine system. This makes changes in physiology of body temporary and if these strains not resolves than the physiological changes becomes permanent. These changes are seen through psychological and physiological sign and symptoms which need to be quantified and develop strategies to prevent and manage them effectively for better workout, job satisfaction and to maintain quality of life at optimal level (Essay, 2017).

In the present research an in-depth literatures were searched, from research and non-research literature related to the study was commenced to develop a profounder understanding into the problem and to construct the base of the study and is elaborated under following headings:

I. Psycho-behavioral determinants

II. Quality of life of nurses

I. Psycho-behavioral determinants:

Psycho-behavioral determinants are the assessment regarding psycho-behavioral response of Staff Nurses to their work environment (critical and non-critical units) which results into psychological and physiological response. Psychological response results into burnout and physiological response results into variation in heart rate, GSR and skin temperature. To study in detail, this section, is further classifies into-

- a. Psychological response -Burnout among nurses
- b. Physiological response to stress – heart rate, GSR and skin temperature

a. Psychological response: Burnout among nurses

The psychosocial factors at work and health are closely related to each other. An individual is hardly exposed to psychosocial influences from the working environment in isolation. Previous experiences, hereditary factors, and existing general life situations form a basis for an individual's own perception and interpretation of the influences from the working atmosphere. Accordingly, reactions to perceived situations and the capacity to cope with, and recover from, periods of stress, are to a certain extent individually determined (Kalimo et al., 1987).

In the context of stress at work, psychosocial stimuli originate in a social process within a social structure (e.g., Family, community, institutions) and affects the organism through the mediation of perception and experience the higher nervous processes-and may be suspected, under certain circumstances and in certain individuals, of causing disease. Psychosocial stimuli operate on man, and man is characterized by an individual psychobiological programme, a tendency to respond in a certain pattern, e.g., when resolving a problematic issue or familiarising to a situation. This tendency is, sequentially, habituated by genetic factors and previous experiences of an individual. The interaction between, or misfit of, environmental opportunities and demands, and individual needs, abilities, and expectations, elicit reactions. When the fit is bad, when needs are not being met, or when abilities are over- or undertaxed, the organism reacts with various pathogenic mechanisms. These are cognitive, emotional, behavioral, and/or physiological and, under some conditions of intensity, frequency, or duration, and in the presence or absence of certain interacting variables, they may lead to precursors of disease (Kalimo et al., 1987).

The cognitive pathogenic development occurs in certain circumstances, such as tunnel vision, where an individual feel limit on the scope or a reduced capacity to focus, be imaginative, or take judgments. Instances of emotional pathogenic mechanisms are feelings of anxiety, depression, or alienation, mental fatigue, apathy, and hypochondriasis. Few physiological pathogenic mechanisms are associated with a particular circumstance, individual, or illness. Others are nonspecific and these Selye termed stress (Selye, 1980).

The term stress usually gives different meaning, being used to signify stereotype physiological "strain" reactions in the organism when it is experienced to

several environmental stimuli stressors, such as, to deviations in, or forces and requirement for adjustment from, the environment (Levi, 1972; Selye, 1970). Precursors of illness are imbalances in mental or physical systems that have not yet resulted in infirmity, but that, if these stressors remain with individual, will do so. Health is not merely an "absence of disease or infirmity" but also "a state of physical, mental, and social wellbeing" (WHO, 1995).

Discussions of work-related stress frequently tend to omit physical stimuli in the work place, in spite of the fact that they can affect the employee not only physically or chemically, like a direct effect on the brain from an organic solvent-but also psychosocially. The psychosocial factors such as smell, shine, sound, excesses of temperature and moisture, etc., which can produce distress. The level of stress increases when workers are alert, doubt, or fright that she/he is exposed to a fatal chemical risk or to the threat of injury. Thus, exposure to an organic solvent can affect the human brain directly, whatever the workers' state of awareness, or his feelings and beliefs; it can also impact him circuitously, secondary to the nasty smell; and it can affect him because he is aware or doubtful that it may be harmful (Levi, 1981).

Health and wellbeing, or lack of them, therefore depend to a large degree on the characteristics like : working conditions, salary and wages, cultural factors strongly condition attitudes towards organization, co-workers, subordinates, and every other aspect of the working atmosphere and the work itself. They also influence gender roles and relationships at work and outside it, the age of entry into working life, and whether conditions are accepted passively as they are, or efforts to improve them are actively pursued (Kalimo et al., 1987).

In the field of occupational health, psycho-social and environmental condition of the work have been a theme of studies that revealed the existence of factors at work that generate suffering and illness. In the present era, everyone needs a job and want to progress in their professions. Any occupation provides a source of income and help in achieving personal aims, makes social network and also help our profession and society. In the same time they are the main cause of emotional stress.

The word "burnout" invented in the year of 1940s as it was to define the point at which a jet or rocket engine develop some issues and stops working (Felton, 1998). The term "burnout" was used on humans in the 1970s by a psychiatrist Herbert Freudenberger, he used this word to explain the condition of over loaded volunteers in free mental health clinics (Freudenberger, 1974). He analysed the loss of optimism and enthusiasm among volunteers to work- that had burned out.

The term burnout was defined as the "progressive loss of idealism, energy, and purpose experienced by people in the helping professions as a result of the condition of their work" (Edelwich & Brodsky, 1980).

In order to study burnout, a number of researchers developed more focused conceptualizations of burnout. In one conceptualization, job-related burnout is characterized by emotional exhaustion, depersonalization (treating clients/students and colleagues in a cynical way), and reduced feelings of work-related personal accomplishment (Maslach, Jackson, & Leiter, January 1997; Ruotsalainen, Verbeek, Mariné, & Serra, 2016).

Globally, researches have been conducted among all the categories of health care personnel, which includes nurses, allied health care works, medical, dentists and students. (Blau, Surges Tatum, & Ward-Cook, 2003; Cimiotti, Aiken, Sloane, & Wu,

2012; IsHak et al., 2013; Painter, Akroyd, Elliot, & Adams, 2003; Rada & Johnson-Leong, 2004; Shanafelt, Bradley, Wipf, & Back, 2002).

The proportion of burnout among nursing profession is higher than the other health care professionals. It has been studied that the overall rate of burnout among nurses was 34% to 43%, this range differs based on multiple factors. (McHugh, Kutney-Lee, Cimiotti, Sloane, & Aiken, 2011; McHugh & Ma, 2014; Neff, Cimiotti, Heusinger, & Aiken, 2011).

Nurses work with human beings, hence they comes under human services professionals, which makes them susceptible to develop burnout. The psychological strain of handling and caring of patient who are very sick, with lots of pain or in dying stage, physical incapability are not only the factors, but also the development in health care facilities and evolving new technologies has created additional factors to produce burnout and stress for nurses. The financial limitations associated with health care reform frequently obstruct the capability of nurses to give high-quality of nursing care as per standards (H. Laschinger & Montgomery, 2014).

It was found in a review paper that job related stress was significantly related to job satisfaction, and high degree of stress was associated with low degree of job satisfaction. Also, lower level of job satisfaction was associated with burnout levels. (Khamisa, Peltzer, & Oldenburg, 2013).

It is an important facts to explore the prevalence rate and causes of work unhappiness in nurses can aid to define the root cause of stress and burnout. Various researches have shown that the main factors of stress are within the working place. These factors are superior predictors of job frustration than factors related to the patient

care. Given these facts, an understanding of the prevalence and causes of job dissatisfaction among nurses can help to define the sources of stress and burnout. (Aiken et al., 2001).

It was also identified that the work place factors are the primary causes of work frustration, stress, and burnout than the personal factors, such as age, gender, family, etc. (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Aiken et al., 2001; Coomber & Barriball, 2007).

To measure burnout, MBI is the standard, a self-rated questionnaire primarily evolved and published by Maslach and Jackson (1981). At the beginning, the MBI was prepared for the human service professionals, later on, two more varieties have been developed; general survey and an educator-specific survey (Maslachi, Jackson, & Leiter, 1996). The MBI questionnaire was found to be reliable, valid and simple to measure and gradually developed in many languages to use globally. To find the associated factors related to institutional policies, social factors and work outcome, MBI tool was administered with other assessment tools.

A cross sectional survey was done to assess the relationship between nurses' workplace and burnout, level of patient satisfaction and burnout. A survey was conducted in 20 urban hospitals, a total 820 nurses and 621 patients from 40 units were selected. Nurses were given Nursing Work Index (NWI-R) Maslach Burnout Inventory (MBI) and intentions to leave. Patient satisfaction was measured with the La Monica- Oberst Patient Satisfaction Scale (LOPSS). Results have shown that a healthy and effective work environment helps in reducing in burnout and turnover and improves in patients' satisfaction. The study was concluded that improvements in nurses' work environments in hospitals have the potential to simultaneously reduce

nurses' high levels of job burnout and risk of turnover and increase patients' satisfaction with their care (Vahey, Aiken, Sloane, Clarke, & Vargas, 2004).

An exploratory study was conducted to assess the degree of job related stress (burnout) and institutional commitment (intent to stay), their interrelationships, and their relationships to personal and organizational factors in nurse administrators. A total 78 Nurse administrators were asked to fill the MBI, the Organizational Commitment Questionnaire, and an individual information sheet. Results showed that half of the participants experienced low levels of burnout while 1/3 had high levels of burnout. Most nurse executives scored high in the commitment questionnaire which were negatively correlated with burnout scores. Nurses who had less chances to meet with their colleagues were more burnout. A high score in commitment scale was found positive correlation with perceived organizational support and to religiosity. Study results proposed to provide social support, suitable employee who fits with organizational, and different training programmes on the using of old institutional development techniques to the administrative role. (V. Lee & Henderson, 1996).

A research was conducted to assess the degree of burnout and factors that add to burnout among nurses in the People's Republic of China. To assess burnout among 249 nurses working in different wards of large teaching hospital in Beijing, a chine version of MBI questionnaire was distributed. Out of 249 nurses, 128 returned filled questionnaire. The nurses responded that they were burnout at a moderate level with moderate scores in EE and PA, and low level of DP. The burnout has shown a positive relationship with age, number of years of experience and nurse's designation. Higher age, higher responsibility and seniority had higher level of EE. (Lin, St John, & Mcveigh, 2009).

Another study was conducted to assess prevalence of burnout syndrome among nurses working in Saudi Arabia. Out of 510 nurses, 250 nurses were given Maslach Burnout Inventory (MBI) individual-based questionnaires were distributed after modification to include the age, sex, marital status, nationality, unit working and number of years on the job. The response rate was (77.2%). The mean age of nurses was 34.46 ± 5.36 years. High level of EE was among 89 (45%) nurses, and 28.9% nurses had moderate level. Among 42% nurses DP was at high level, whereas 30.8% with moderate level. The PA was moderate to high among 71.5% of nurses. The nurses those were married, were more prone to develop EE than unmarried. Nurses working in general units were with higher level of EE then working in more activities units. ($P < 0.001$, OR -11.1; and $P < 0.001$, CI 95% and OR 9.65). Nurses from other than Saudi have shown significantly higher scores of EE 27.3 ± 12.1 versus 21.6 ± 2.9) than non-Saudi country. Nurse's age and a non-Saudi resident were significant factors to develop burnout among nurses. It was found that work place environment has to be healthy to manage stress and alleviate stressful situations for better nursing care (Al-Turki et al., 2010).

To test an expanded model of Kanter (1977) work empowerment theory, a longitudinal study was conducted among 192 randomly selected staff nurses. Kanter stated in his theory that work place helps employee to give information, upkeep them, facilitate resources, provide chances to improve skill and professional development and also empower, inspiration to employee work attitude and work culture with and executive efficiency. Nurses were tested about burnout after 3 years of a model linking the effects of structural and psychological empowerment. They were assessed with the

Conditions of Work Effectiveness Questionnaire-II, Spreitzer's Psychological Empowerment Scale and the Emotional Exhaustion subscale of the MBI-GS. There was a positive relationship between perceptions of structural empowerment and psychological empowerment (.435), and had an impact on the feeling of EE (-.28). Results had shown that providing a structured empowered workplace helps in improving psychological empowerment. It was concluded that empowering nurses at work place helps in prevention of burnout. (H. K. S. Laschinger, Finegan, Shamian, & Wilk, 2003).

To find the degree of and the correlation among work satisfaction and work stress and symptoms of burnout, a cross sectional study was conducted among employee working in ICU at Oslo University Hospital. The response rate was 74% (196), which included 16 doctors and 129 nurses. They were asked to fill job satisfaction scale, modified Cooper's job stress questionnaire, and Maslach burnout inventory. Type of personality assessment was done with the basic character inventory. The job stress and burnout were same among doctors and nurses. Females and less years of experience were more prone to develop work stress. Emotional exhaustion was correlated with job satisfaction, job stress, and vulnerability. The study was concluded that the nurses were less satisfied with the work they performed than doctors. Also burnout was correlated with vulnerable personality, reduced work satisfaction and a high level of work stress. (Myhren, Ekeberg, & Stokland, 2013).

To assess burnout among nursing professionals posted in the medical and educational centre in Shahrekord, a descriptive study was conducted. With the simple random sampling study participants were selected and asked to fill demographic data and MBI questionnaire. The findings of the study have shown that 34.6, 28.8, and 95.7%

nurses scored high EE, DP, and high reduced PA respectively. It was concluded that the imbalance between nurses, work demand and salary were the most important factors for burnout. (Moghaddasi, Mehralian, Aslani, Masoodi, & Amiri, 2013).

In an investigation, to assess the effects of job satisfaction and burnout among nurses, MBI and job satisfaction scale was used. The researcher was hypothesized that higher job satisfaction will reduce the degree of burnout. The study findings revealed that job satisfaction had significant negative effects on EE, while EE had a positive effect on DP. The path coefficient demonstrated that job satisfaction had both direct and indirect impacts on burnout, confirming job satisfaction as a significant predictor of burnout (Kalliath & Morris, 2002).

In a study at Kyoto Prefectural University of Medicine, Japan. The level of burnout was assessed among student nurses. It was found that the type of personality was associated with burnout. MBI and Wada's Big Five personality traits questionnaire was distributed among 205 student nurses. A positive relationship was seen among burnout scores and Neuroticism and personality. Also, there was a negative relationship was observed between burnout and extraversion, agreeableness, and conscientiousness. It was found that the students with higher marks and academic performance have shown a higher risk to develop burnout. (Takemura et al., 2015).

A study was to assess levels of burnout in nurses and to ascertain if there were individual or work characteristics that were associated with this syndrome. A survey was done among 574 Victorian ANF nurse, they were selected with random sampling technique. There were lower DP and higher PA among Victorian ANF nurse than medical. Older employee and less working duration were with low level of EE and DP. Whereas, the factor as working after duty hours, was associated with EE.

But, those working extra with voluntarily had low EE. The study was concluded that the nurses were not feeling burnout at a high level, but it is important to organise proper working hours and to balance job pressures. (Lavery & Patrick, 2007).

Another study was conducted to compare the levels of burnout and causes of stress among nurses (qualified) and non-registered caregivers (NRC) posted in acute mental health care, one hundred and ninety six nurses (124 qualified and 72 NRC). Data were collected with MBI, the Mental Health Professional Scale and the Psychosocial Work Environment and Stress Questionnaire. Results showed that, the qualified nurses had more work demand than NRC, but NRCs were less satisfied. Finding of multivariate analysis revealed that there were three categories one with unqualified staff with high DP; second qualified staff with lower DP and high job demand; and third, a small NRC staff group with low DP and low job demand and higher scores in professional self doubt. There were less difference in burnout among two groups. The main difference was heavy work demand, which was characterised primarily in qualified staff. The results also suggest that centre-specific problems may cause more stress among N-R Cs compared to the qualified staff e.g. professional self-doubt (Sorgaard, Ryan, & Dawson, 2010).

A descriptive survey study was investigated to find the correlation among critical unit nurses' perceptions of futile care and its effect on burnout. A total sixty nurses working in critical units with 1 year of experience at two big hospitals with 350-470 beds capacity, were given demographic proforma, Moral Distress scale and MBI to fill. The findings shows that there was a positive relationship between EE and moral distress scale. It was concluded that there was a significant relationship between moral

distress situations that were perceived as futile to care delivered to their patients and feeling of EE. (Meltzer & Huckabay, 2004).

An explorative study was conducted to find the burnout among health care personnel providing care to patients with head injury and recovering from coma state in neuro-rehabilitation centres. To collect the data, demographic proforma and MBI questionnaire was distributed in 40 centres. The response rate was 53% and 45 were removed due to incomplete informations. Of 523, 93 (18%) had expressed of feeling burnout. The nursing personnel, who spent more time in patient care were found associate with burnout. It was concluded that the prevention from burnout among nurses is very important as they are the direct care giver and handling critically ill patient which a very challenging job. (Gosseries et al., 2012).

A study was conducted to examine whether job stress, as indicated by burnout and psychological distress, explains turnover among acute care registered nurses. Cross-sectional survey data from 522 acute care registered nurses in British Columbia was computed. Burnout, specifically emotional exhaustion, was consistently predictive of both intent and likelihood to leave the profession and the position. Emotionally exhausted nurses are two times more likely to have intent to leave the profession and 1.5 times more likely to do so. The other factors played a minimal role in explaining turnover (Klassen, 2013).

A cross sectional study on determinants of burnout in acute and critical care military nursing personnel was conducted in 93 nursing personnel working in the acute and critical care units of a large, military hospital in Lima, Peru. Data were collected with socio-demographic profile proforma and Spanish translated MBI. The associations of the burnout dimensions were heterogeneous for the different socio-

demographic and occupational factors. Participant with children, being single, divorced, separated / widowed, performing duty in emergency/intensive unit had high EE scores, whereas EE was inversely related with the time working in the current department. It was also found that higher PA scores were associated with having children. (Ayala & Carnero, 2013).

Another exploratory research survey was done to find the relationships among environmental uncertainty, social environment, and burnout among staff nurses. Study results with the multiple regression analysis showed that the Perceived environmental uncertainty was expected cause for burnout. There was no significant correlation found among burnout and objective measures of unit activity. Social environment of work area was found negatively associated with burnout. Study findings shows that social environment is an important aspect, hence it was concluded that a supportive workplace can shield from burnout (Garrett & McDaniel, 2001).

To find the prevalence rate of burnout among nurses posted in trauma and acute medicine unit, a study with triangulated research design was conducted. Nurses were asked to complete the MBI questionnaire. Findings of the study have shown that acute medicine nurses were feeling higher level of burnout than trauma unit. The DP score was low level among both group of nurses. A high level of PA score was found among junior nurses. Researcher have suggested to develop some kind of strategy to prevent burnout among nurses (Gillespie & Melby, 2003).

b. Physiological response to stress: heart rate, GSR and skin temperature:

Cannon's famous "flight or fight" hypothesis pertains to man reacting to a threat just as it does to the presence of a physical agent causing pain (Cannon, 1929). Simply stated, the hypothesis is that the stressor activates all the physiological systems that have the function of sustaining maximum strength, speed of response, and endurance in the skeletal musculature. This includes a rise in isometric muscle tension, a rise in cardiac output by means of increased myocardial strength and frequency of contraction, the contracture of arterioles in the cutaneous and mesenteric vascular beds, with redistribution of the blood flow in favour of the muscles, and the neurohumoral mobilization of hepatic glucose and free fatty acids and glycerol from the adipose tissue. Though not known to Cannon, this general activation perpetuates the brain's own state of arousal through a direct positive-feedback loop involving the adrenal medullary release of adrenaline which stimulates receptor sites in the posterior hypothalamus (Kalimo et al., 1987).

Evidently, this is a useful response in a short-lasting emergency when physical exertion is essential to overcome the threat. But regularly repetitive episodes of this sort, or prolonged activation of the autonomic nervous system and several neuroendocrine systems, create disturbance in homeostasis (Kalimo et al., 1987).

Selye identified this in the late 1930s, mainly in relation to a particular component of general activation, specifically the sustained high production of glucocorticoids (cortisol in man) from the adrenal cortex in response to adrenocorticotrophic hormone from the adeno-hypophysis (anterior pituitary). The adaptive functions of cortisol include: inhibition of the spread of the inflammatory reaction that accompanies physical trauma; when the body is not getting sufficient

nourishment, transformation of protein breakdown from anabolism to catabolism, thereby ensuring blood glucose homeostasis through hepatic gluconeogenesis. In speculating on the other useful effects of elevated glucocorticoid production, Selye saw few that were maladaptive. Following research, however, has failed to confirm the beneficial effects, and has indeed revealed maladaptive effects. Non-stop or episodic measures of physiological reactions that reflect cardiovascular, musculoskeletal, gastrointestinal, or central nervous system functions (Selye, 1980).

Acute stage of stress: the moment a person feels stressed, there are many changes start taking place in the body, which include nervous, endocrine, cardiovascular, and immune systems. All these system together prepares a stress response which are commonly adaptive, in the short duration (Selye, 1956).

There are two stages to create adaptive stress response. First, during the stress event, there are few hormones are produced to make energy for the body' immediate use, and secondly; changes in energy distribution. Energy is supplied to the organs, mainly skeletal muscles and the brain. Stress situation activates sympathetic nervous system which helps in production of catecholamines from adrenal gland. Energy distribution is regulated by increasing blood pressure to the organ which requires intent energy and dilating other blood vessels to reduce the blood supply to the organs which does not require. Chronic stage of stress: when acute stress remain for the longer duration that becomes maladaptive behaviour of the body (Selye, 1956).

During chronic stress, the sympathetic nervous system remains continue activates and produce various hormones which results into constant high in blood pressure and develops vascular hypertrophy (Henry, Stephens, & Santisteban, 1975).

In chronic state the blood pressure remains elevated and increases workload on the heart to pump harder, that lead to left ventricular hypertrophy. Over a period, the elevated blood pressure can damages arteries and forms a plaque at that site. (Schneiderman, Ironson, & Siegel, 2005).

The most commonly used physiological markers of stress are as follows:

- Electrical activity of the heart: the most commonly used stress marker parameters derived from the electrocardiograph (ECG) are the heart rate (HR) and the heart rate variability (HRV) (Taelman, Vandeput, Spaepen, & Huffel, 2009).
- Galvanic skin response (GSR): using changes in skin conductivity. During stress, resistance of skin drops due to increased secretion in sweating glands (Shi, Ruiz, Taib, Choi, & Chen, 2007).
- Skin temperature: changes in temperature of the skin are related to the stress level (Yamakoshi et al., 2008).

Heart rate

To identify stress a mechanism is evolved to monitor physiological signal with the help of non-invasive and non-intrusive sensors. This system recognise the emotional state in three phases- physiological sensing, processing signal for the extraction of information and identifying the information. There are 4 signals which are monitors and analysed to differentiate affective states in a computer users, which are Galvanic Skin Response, Blood Volume heart, Pupil Diameter and Skin Temperature. Study finding have shown that the physiological signals monitored and, have a positive relationship with the variations in emotional state of experimental participants when stress stimuli were created to the interaction environment. Among

all the parameters, the pupil diameter was most affective state indicator (Zhai & Barreto, 2006).

A study was conducted to examine the effects of nursing tasks (including their physiological and psychological demands, and the moderating effects of reward and control) on distress and job performance in real time. Hundred nurses were selected from a teaching hospital and different tasks were given. The proposed research design was repeated measures. All the actions or activities were repeated in two working shifts. The study was proposed to study the correlation among nursing activities, self-reported stress and physiological measures of stress and to evaluate the impact of job stress on different work outcomes. Also, to design a framework to understand the stress among nurses, its cases and possible interventions to reduce the stress. (Farquharson et al., 2013).

To assess and correlate noise as a stressor among nurses, a cohort observational study was conducted. The tools to assess stress among nurses were questionnaire, salivary amylase, audiogram and heart rate. With the help of non-probability technique, 11 nurses were selected from PICU working in tertiary care centre hospital. For a three hours, each nurses was observed during patient care. Level of sound and heart rate were recorded constantly, every 30 min., saliva was collected and stress rating were collected. High volume sound was significantly predicted increased heart rates. Other factors for tachycardia were less experience, caffeine intake, and day time shift. Furthermore, amylase level was not found significant effects of noise level. But, there was a significant effects of noise on subjective stress. It was concluded that there is a need of interventions to reduce noise in the health care setting (Busch-Vishniac et al., 2005; Morrison, Haas, Shaffner, Garrett, & Fackler, 2003).

The objective of the study was to investigate the unique and interactive effects of the controllability of the task and mental effort required by the task on cardiovascular and endocrine reactivity, when both were manipulated independently. A 2x2 factorial design was used, with two levels of control. In each group 24 males were included for experimental condition, all the participants were healthy, without any disease conditions. To measure the effects of each activities, BP, HR, cortisol responses and catecholamine responses were determined. It was found that the increase in BP, HR and norepinephrine levels with the effects of high effort. While, high BP, cortisol and norepinephrine response was seen from uncontrollability. It was concluded that the efforts activates SNS, whereas control stimulates both SNS and production of cortisol, hence control is helpful during efforts situation (Peters et al., 1998).

A pilot study was conducted, in which nursing students were monitored between training programme on a high reliability simulator in the Real-time Physiological Monitoring Lab. A total 14 nursing students were selected, the mean age was 32.8 years. The following physiological parameters were recorded: respiration, heart rate, HRV, and physical activity. In results, a significant raise in heart rate was observed during simulation activity. During training session also, the heart rate got increased but less than simulation. It was found that the breath rate was increased during simulation (from 16.9 to 17.7). There was increased in heart rate when distraction by telephone was created while performing nursing activities. The raise in heart rate was more prominent during patient crisis phase. (Mladen Milosevic, Jovanov, Frith, Vincent, & Zaluzec, 2012).

To assess the effects of stress on physiology and psychology among 100 nurses, a study was investigated. Nurses were asked to rate feeling and experience of stress, affect, tiredness, theory-based measures of work stress and nursing activities in electronic diaries every 90 minutes. There was a continuous recording of heart rate and nursing activities. It was found that the heart rate was associated with work demand and work efforts. Also, perceived stress was associated to demand, effort, control, and reward. The predicted of stress were effort and reward. Also, there was no change in the results when nurses were paid extra after some duration for the work task. (D. Johnston et al., 2016).

A non-nursing study was conducted among 12 female student. The aim of the study was to assess effects of physical, mental workload and rest period on cardiovascular and perceived stress. Study participants were selected only to without having any health problem. Blood pressure and ECG were recorded and perceived stress was recorded by participant on 11 point scale prior and at the completion of task. There was an increase in BP during task related stressor compared with baseline. The diastolic BP was found high during control phase. It was found that HRV was more sensitive and selective measure of mental stress. During rest, HRV and BP were relatively normalised. (Hjortskov et al., 2004).

In another non-nursing study was investigated to examine among thirty one female workers from supermarket with high prevalence of neck and shoulder complaints. The following parameters were collected form the participants: heart rate, salivary cortisol, surface trapezius electromyographic (sEMG) activity, blood pressure, and levels of urinary catecholamines. It was found that during work the psychophysiological arousal was high. Results were indicated that there was a

correlation between negative stress and sEMG during work, while no relationship during positive stress and sEMG. There was no relation seen among pain or negative stress rating with sEMG. Physiological stress response and objectively recorded workload had no relationship. It was concluded that the perceived stress have influence on muscle which can develop muscle disorders in job (Rissen, Melin, Sandsjö, Dohns, & Lundberg, 2000).

Galvanic skin response (GSR)

Galvanic skin response (GSR), is an electrical activities of skin in the human body. It is known by many names like skin conductance, electrodermal response (EDR), psychogalvanic reflex (PGR), skin conductance response (SCR), sympathetic skin response (SSR) and skin conductance level (SCL) (Boucsein, 2012; Critchley, 2002).

Skin conductance changes with the state of sweat glands in the skin, and sweating is regulated by the sympathetic nervous system. The skin conductance is a sign of physiological or psychological arousal. Whenever the sympathetic nervous system is stimulated or aroused, then sweat gland activity also increases, which in turn increases skin conductance. Hence, skin conductance can be a measure of emotional and sympathetic responses. The skin conductance or GSR helps to identify emotional and sympathetic response in a person (Vetrugno, Liguori, Cortelli, & Montagna, 2003).

There are two types of sweat glands in human body apocrine and eccrine. The eccrine gland consists of a closely spiral secretory coil, which produces an isotonic primary liquid, and a tube which by reabsorbing NaCl, secrete a hypotonic perspiration onto the skin surface (Collins, 1989).

The apocrine gland comes from hair follicle, whereas the eccrine gland arise from epidermis proper. Similarly, there are two types of sweating occurs from the body thermoregulatory and emotional sweating. Thermoregulatory sweating releases sweat whole over the body in response to changes in environment. The principle organ for thermo regulation are tiny glands, which are known as eccrine sweat glands. These glands are influenced by the central autonomic network. The human body temperature is controlled by the hypothalamus. Emotional or mental sweating is limited to the specific body part situated in palms, axillae and soles of the feet. This is separate from thermoregulatory sweating, which is controlled by emotional, cognitive and neuroendocrine functions and regulated at multiple levels inside the CNS (Bini, Hagbarth, Hynninen, & Wallin, 1980; OGAWA, 1975; Vetrugno et al., 2003).

Effects of pranayama on pulmonary, cardiovascular functions and galvanic skin resistance was evaluated. A total 11 subjects without and health problems were randomly selected and divided into two group. One group with 6 participants were pranayama group and reaming were in non- pranayama control group. Pranayama group were taught with, anulom-viloma and Kumbhak techniques. All the participants were set every day for 20 minutes, while pranayama group practiced accordingly, rest were using simple breath respiration. Before and after the programme with 7 days gap, Heart rate, BP, GSR and pulmonary test were recorded. In results, there was no significant changes were observed in BP and PFT. But there was a reduction in heart rate in both group participants, this was because of relaxed and comfortable environment. In pranayama group there was a significant reduction in GSR scores. Study was concluded that regular practice of pranayama could help in reduction of SNS tone (Turankar et al., 2013).

In a study stress among soldiers were measured with three methods by the help of survey, salivary amylase and GSR. In this paper only GSR findings were discussed. GSR values were recorded by a head tracked sensor suit. Results showed that GSR scores were less during the movement trials than during the MOUT (military operations on urbanized terrain) (Perala & Sterling, 2007).

To measure physiological reaction to stress, an experimental was done among 30 participants. The parameters used in the study were GSR, heart rate, and respiratory rate, which were recorded before and during experiment. There were two sets of questions, 10 baseline (control) and 10 experimental. The experimental questions includes, personal and possibly can cause stress, but not to the extreme situation which could harm the participants. It was found that there was a significant increase in GSR ($p=0.002$) and reduction in respiration ($p=0.0002$), while heart rate ($p=0.6$) had not been found significant change in the scores. Study was concluded that, to overcome emotional stress, respiration was reduced to increase the expiration time and raise in acetylcholine production on heart muscles, hence reducing excessive cardiac output (Civitello et al.).

Study on human physiology to assess cognitive load during task performance was conducted. For the experiment, eleven male students and working persons between 24 - 49 year of age were included, they participated voluntarily in this study. All the participants were screened with Kessler K-10 Psychological Distress Scale, those who scored less than 19 were included in the study. Results have shown a significant difference between cognitive load and no stress condition. But, in both the situation there was a consistent behaviour in GSR signal (Conway, Dick, Li, Wang, & Chen, 2013).

In another study mental stress was measured to find the changes in cardiovascular due to emotional stress. Skin conductance was measured among healthy and hypertensive patients. Patients were on both placebo and Nadolol drug. Among healthy participants there was a significant difference in the score of skin conductance, during mental stress the skin conductance score was increased. Whereas, among hypertensive patient with placebo and Nadolol drug, skin conductance was elevated during mental stress, hence drug and placebo did not affect the skin conductance scores. (Jacobs et al., 1994).

In a review article studies have reported an association between physiological changes and emotions. In many studies various physiological markers used to measure emotions, such as sweat level, muscle tension, heart rate, facial expression, electrical activity in the brain, and breathing rate. It was assumed that in future to prepare a computer which can identify emotions by sensing the signals from physiological response. (Healey, 2014).

All the participants were exposed to different noises from nature or noisy environments after a stressful mental arithmetic task. Skin conductance level was used to index sympathetic activation, and high frequency heart rate variability was used to index parasympathetic activation. Though, high frequency heart rate variability found no effects, skin conductance level recovery tended to be quicker during natural sound than noisy environments. It was recommended that nature sounds help in recovery from sympathetic activation after a psychological stressor (Alvarsson, Wiens, & Nilsson, 2010).

Skin Temperature

A study was conducted to find the changes in skin temperature in response to stress. A total 60 volunteer (30 men & 30 women), without any health problem were selected. The participants were selected from three different races including Indian, Chinese and Malay. Stroop color word test was used. Study findings shown that 80% participants had skin test score was normal to high state. Also, among three race, Malay participants were more sensitive to stress in skin temperature. Hence, it was concluded the skin temperature was a reliable measure to measure stress (Karthikeyan, Murugappan, & Yaacob, 2012).

A study was conducted to find the correlation among skin temperature and physiological changes related to emotional reaction. Results were shown a significant increase during resting phase, and pulse rate and skin conductance also changed significantly. Study was concluded that, emotional reaction can changes in skin temperature which can be a promising index of emotional response and may find uses comparable to those for GSR and BP (Baker & Taylor, 1954)

Study among animal to assess the effects of stress was conducted. A total nine male rats with the 160-260 gm weight, pathogen free were selected. They were kept in cage (size L33xW20xH18 cm), the room temperature was maintained at 24.7°C. Rates were kept in light (photoperiod) for 12 hrs. and in dark for 12 hrs. Temperature of body were recorded by biotelemetry device which was kept in intraperitoneal before 4 days of experimentation. Temperature was monitored with an antenna kept under cage of rates. During experiment, stress was induced by changing cage among rates for 60 min of duration. Followed by this, room temperature was reduced to 11.1°C for 4 days. Further, rates were shifted to another cage at the same temperature. After 4 days, the

room temperature was kept at 24.7 °C and again cage were changed for 3rd time. Results revealed that, a raise in skin temperature during shift of cage for first 30 min, but did not show any significant result. Similarly, there was no significant different in the temperature in all three steps of experiment. However, on each change either in cage or room temperature there was raise in skin temperature for short duration. Once the body exposed to psychological stress, there are many physiological system start involving to cope that stressor and try to adopt accordingly. Hence, for short duration fall in skin temperature happen, but as body adopt to the stressor, it comes to the normal level. (Long, Vander, & Kluger, 1990)

A review study was conducted to identify the effects of psychological stress on body's core temperature. The literatures were searched on psychological stress–induced rise in core temperature among animals which can help to identify the mechanism of psychogenic fever among human. Results revealed that psychological stress–induced rise in core temperature was not due to increase in movement activity in stress, also it was constant in hot and cold climate. Henceforth, it was indicated that the raise in core temperature was due to increase in thermoregulatory “set point”. It was concluded that raise in core temperature is a fever which is regulated by thermoregulatory set point. Certain chemicals (eg prostaglandin E2–dependent & independent and 5-HT– mediated mechanisms) also responsible in raise of core temperature. Hence, these physiological process may be responsible in psychogenic fever in humans (Oka, Oka, & Hori, 2001).

To identify stress a mechanism is evolved to monitor physiological signal with the help of non-invasive and non-intrusive sensors. This system recognise the emotional state in three phases- physiological sensing, processing signal for the extraction of information and identifying the information. There are 4 signals which are monitors and analysed to differentiate affective states in a computer users, which are Galvanic Skin Response, Blood Volume heart, Pupil Diameter and Skin Temperature. Study finding have shown that the physiological signals monitored and, have a positive relationship with the variations in emotional state of experimental participants when stress stimuli were created to the interaction environment (Zhai & Barreto, 2006).

A study was conducted to find the effects of long-term monotonous job and stress among drivers. Investigation was consisted of 25 healthy persons (18 male, 7 female). To measure level of stress among drivers, skin temperature was used as a possible stress maker. All the subjects were exposed to monotonous simulation under controlled environment. Peripheral skin temperature was recoded, also BP, total peripheral resistance, cardiac output and normalise pulse volume were recorded. Study results revealed that there was a significant reduction in skin temperature during monotonous driving simulation. With the interpretation of other parameters, peripheral sympathetic stimulation could be possible (Yamakoshi et al., 2008).

II. Quality of life of nurses in critical and non-critical units

A study to assess job related stress, quality of life along with to explore the factors associated with job related stress was conducted among 181 psychiatric nurses at Jordan. Nurses expressed of having high level of job related stress due to heavy workload, client-related difficulties and lack of resources. They revealed that, highest social support was from their spouse and then co-workers. In QOL, physical health was better than psychological health. Job related stress was significantly inversely correlated with physical health, psychological, social health. Furthermore, job stress was found positive correlation with physical, verbal assault. It was concluded that, nurses working in mental health centres had a significantly high job related stress, hence a multiple method of intervention was required to reduce stress and that helps in improvement in QOL of nurses (Hamaideh, 2011).

A correlational study was conducted to compare burnout, job satisfaction and QOL in nurses working in clinical areas (staff nurses) and teaching institutes (nurse educator). A total 100 nurses, 50 from hospital and 50 from teaching institute were selected randomly. Data were collected with demographic profile, Shirom Melamed Burnout Inventory, job satisfaction inventory and world health organisation-quality of life-BREF. Results showed that the nurses from teaching institute had higher burnout then from hospital. While, nurses working in hospital had low level of QOL than the nurses educators. Regarding job satisfaction, a significant difference was found among both types of nurses. in conclusion, nurses has to be provided a supportive working environment and also stress management strategies has to be implemented at work place to reduce stress and to improve QOL of nurses (Abraham & D'silva, 2013).

Another cross-sectional study was investigated in Iran to examine the quality of life of nurses for the policy makers to improve the condition of the nursing profession. A total eight hundred and fifty nurses were recruited randomly from seventeen provinces of Iran. Data were collected by using WHOQOL-BREF tool. In the results, it was found that the physical health scores high, but environmental health score was low significantly. More than 50% nurses expressed of having moderate level of quality of life. The quality of life not found any association with confounding factors, but found associated with current position, shift work and overall quality of life. Results were recommended to the policy makers to support and facilitate in work environment that will help in improving quality of life of nurses (Aalaa, Sanjari, Tootee, Mirzabeigi, & Salemi, 2012).

To explore the perception of QOL among student nurses, a cross-sectional study was conducted. Total 56 student nurses were selected and questionnaires were distributed, which includes personal profile proforma and world health organisation quality of life-BREF. Results of the study shows that the psychological health score was at high level, whereas, environmental health was at lowest level. Areas such as learning, memory and concentration, thinking, sleep and rest, activities of daily living, energy and fatigue, work capacity, financial resources and negative feelings and participation in and opportunities for recreation/leisure activities, were affected. (Bampi, Baraldi, Guilhem, Pompeu, & Campos, 2013).

A survey was conducted in Taiwan to assess work ability, quality of life and their relationship among nurses. Study was investigated the work ability and its relationship with quality of life for the clinical nurses in Taiwan. A total 1534 nurses were chosen with the stratified sampling technique from eight hospital. The nurses

were posted in different areas of hospital such as medical ward, surgical ward, emergency dept., ICU, OPDs, operation theatres, and supply rooms. Data collection instruments were, work ability index and World Health Organization Quality of Life – BREF. In the results, nurses' work ability was increased upto the age of 45 years. Among senior nurses, the main causes of reduced work ability were physical work pressure and their personal health. While, in junior nurses the work ability was affected by mental workload. It was found that different hospitals and departments had different work ability among nurses. Also, free time for leisure and work environment was associated with work ability of clinical nurses. The quality of life was reported by nurses working in outpatient dept., and supply rooms were better than emergency and ICU nurses. Study was concluded with the recommendation to improve the work environment and job design (Chiu et al., 2007).

A cross-sectional study was investigated to assess nurses' quality of life. From different health centres from Neyshabur, 522 nurses were surveyed with World Health Organization Quality of Life – BREF. Nurses rated a high score (Mean = 15.26) in physical health and lowest (Mean = 13.09) in environmental health. Results showed that the chronic illness was associated with all the domains of QOL, whereas psychological and environmental health were associated with years of education. Study was concluded that nurses in Neyshabur had moderate level of QOL (Gholami, Jahromi, Zarei, & Dehghan, 2013).

In another cross-sectional study, QOL of staff nurses was assessed from multiple department of two hospitals in Karnataka. A total 501 staff nurses were given World Health Organization Quality of Life – BREF questionnaire. Nurses from both the hospitals were scored poor level in overall physical health which was found to be

significant. While, the psychological domain was with lowest mean score (41.83). It was suggested to improve better working environment to improve QOL of nurses. There should be a proper work rest schedule to reduce, physical and mental load (Jathanna & D'Silva, 2014).

A study, to measure QOL of staff nurses and to check the associated factors among QOL and personal variables was conducted in Karnataka. A total 1040 staff nurses were selected with Purposive sampling method from govt. and private hospitals located in Mangalore and Udupi. The data regarding QOL was collected using WHO QOL-BREF scale. Overall QOL and health was similar. The factors such as marital status, working area, income, job hours, years of experience were associated with QOL of staff nurses were (Jose & Bhat, 2014).

A study was conducted to find the relationship between QOL, burnout and work satisfaction among nurses working Turkey. To collect data, 439 nurses were given personal proforma, WHO QOL-BREF, MSQ, MBI tools. The domains of QOL were found positive and significantly correlated with job work satisfaction. In burnout, the mean score of desensitization and personal achievement were 17.2 and 24.1, respectively. Regarding domains of QOL, physical health score was highest (14.2) and social health score was lowest (12.53). The domains of QOL were found negative relationship with sub scales of exhaustion and desensitization scores, while personal achievement scores had shown positive relationship with domains of QOL. Nurses scored above average scores in all the domains of QOL. (Kelleci, Gölbaşı, Doğan, Ata, & Koçak, 2011).

A cross sectional research was performed to find work ability and quality of life among nurses. Data were collected with the help of Work Ability Index, and WHOQL-BREF from 1212 staff nurses which were selected from six randomly selected hospital in Croatia. The response rate was 67.3%. The odd ratio (OR) was computed between work ability index and domains of QOL and the scores of odds ratio was 6.8 with physical domain, 2.3 with psychological domain, 1.7 with social domain and 1.7 with environmental domain. The major determinant of QOL was satisfactory work ability. It was concluded that the ability of nurse to work in clinical setting has to be maintained, as it is an important aspect for QOL (Milan Milosevic et al., 2011).

To assess the QOL of assistance nurses (NA) and licenced practice nurse (LPN), a cross sectional study was conducted in 9 ICUs from a teaching hospital, Brazil. Data were collected by distributing personal profile proforma and the world health organisation quality of life-BREF questionnaire. A total 126 nursing personnel were included in the study. The mean score in physical, psychological, social, and environmental domains of QOL were 53.1, 60.8, 66.3 and 49.4 respectively. It was found that, the age have shown a positive relationship with physical domain, whereas physical, social and psychological domains were negatively correlated with number of employment (Paschoa, Zanei, & Whitaker, 2007).

Another study was conducted to examine the depression, QOL and to relate with personal characteristics among different nursing cadres (technician, assistance) working in a private health care centre. The world health organisation quality of life-BREF questionnaire and Beck Depression Inventory were distributed among 266 nursing personnel. Result shows, in both the cadres, an equal number of subject were

suffering from chronic diseases. It participants with the presence of illness have shown relationship with depression and reduced level of QOL. The depression was associated with the night shift. Factors, which triggers the health issues need to be taken care properly as they produce effect on QOL (Rios, Barbosa, & Belasco, 2010).

Another study was conducted to find the effects of shift duty on ability to work and QOL. A list of 70 hospitals were made from which seven hospitals were selected randomly. The Work Ability Index Questionnaire, and WHOQOL-BREF scale were distributed to all the 70 hospital nurses, the response rate was 65% (1124 nurse). It was found that the cause for reduced work ability and reduced physical health was less educational status. Nurses with higher age and unmarried were found statistically significant with less social interaction. The causes for less score in environmental health were less education and shift duty. There were no association found between shift duty and QOL or ability of work. Hence, education was an important factor for better work ability and QOL among nurses. (Sorić, Golubić, Milošević, Juras, & Mustajbegović, 2013).

A multi-centre study was conducted to find the association between QOL, job stress and psychological morbidity in health care personnel employed in 3 military hospitals, Taiwan. Study participants were enrolled with purposive sampling method. To collect data, a set of questionnaires which includes General Health Questionnaire, WHOQOL-BREF and Effort-Reward Imbalance, were posted to 1269 health care personnel. The health care personnel were medical and nursing professionals and others (e.g., executive officers, laboratory employees, pharmacologists, psychologists and social workers). Out of 1269, 791 participants accepted to participate in study and returned filled forms. The young age, poor physical and psychological domain of QOL

and high psychological morbidity were associated with high Effort-Reward Imbalance. Among both the genders, poor QOL and psychological morbidity were associated with high effort reward ratio. While, social quality of life domain was not significantly associated with high effort reward ratio in either gender. It was found that the quality of life score was associated with effort reward imbalance among all the employees (Tzeng, Chung, Lin, & Yang, 2012).