PARTICIPATORY ERGONOMICS –AN AID TO EVALUATE AND CONQUER OCCUPATIONAL STRESS- SYSTEMATIC REVIEW

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ABSTRACT:

The purpose of the study is to articulate the conceptual frame work on the tools and interventions of the participatory Ergonomics (PE), that can assists to assess and conquer the adverse effects of occupational stress on employees working in modern corporate wok environment.

Background: As the occupational stress and its effects on employee health and well-being is increasingly reported among the employees of modern corporate wok environment. Thus the need for creating awareness on various ergonomics interventions among the individuals has become top priority as this can mitigate the adverse effects on occupational stress. In this context present article is an attempt to put forth the conceptual frame work of selective and specified stress assessment tools and interventions that helps to avert implications of occupational stress on employee health and productivity.

Methods: A meticulous review of the literature of more than 150 research articles are studied of which only selective and quality articles utilized in the present study. The study is based on systematic collection of research articles and evidences.

Results and Conclusions: Participatory ergonomics as pertinent concept to deal with most of the workplace issues. The stress at workplace is one of the most prevailing issues that needs to be addressed, while ergonomic has been emerged has whole concept to deal with Human Factors and undue issues at work place.

KEYWORDS: Participatory ergonomics, Macro Ergonomics, Perceived Stress Scale (PSS), Stress Arousal Checklist (SACL), Job Content Questionnaire (JCQ),Ergonomic interventions

INTODUCTION

The pervasive emergence of Information technologies into the offices has refurbished the work place to corporate hubs promoting agile work environment. These advancements in technological and workplace practices has incredibly reduced the physical strain of human work greatly(Grandjean, 2003); in spite of these prospective advancements in corporate work settings, the research evidence advocates that there still persists various occupational health and safety risks among the employees like both physical and psychosocial. Thus entails to the change in managerial requirements; in order to promote a safer, healthier and prospective work environment.

Researcher has attempted the "integrated approach", based on principle of "systematic Research review evidence" in reaching the target from different perspectives. Hence, the above mentioned approach has been applied in the current study to attain the Research objectives of the study.

OCCUPATIONAL STRESS

The word "Stress", was first coined by Hans Selye in the year of 1936, as "non-specific response of the body to any demand for change"[13] (SZABO, 1998).Stress, is defined as the subjective perception of the current situation as unpleasant or threatening[10] (Paul n. Duckro, 1989,).It is referred as "any kind of change that contributes physical, emotional, or psychological distress".

However, the depression/stress is a severe public health problem that has been predicted as leading cause of disease in high-income countries by 2030 [7](Colin D Mathers, 2006).Although, 80% of depression cases are precede due to traumatic negative life.[15] (Virtanen, 2010).

The intense technological advancements is one way making the work easy, while on the other edge corporates should ensure the work place to be free from physical and psychological stressors like job monotony, imbalances in job demands and outcomes(performance), lack of skillset, role clarity, social intimacy which can unquestionably elicits depression.

Basavakumar(2017) , "Stress acts in a synergistic manner with other Non-Communicable disease risk factors" (Basavakumar S. Anandi1*, 2017). Hence it is very much required to assess the occupational stress as the stress on individual leads to various health complications thereby affects the individual as well as organizational performance and productivity.

In this Context the Participatory Ergonomics has emerged as key approaches of macro ergonomics that involves employees' at all organizational levels in effectively dealing with individual and organisational problems. According to Noro (1999), the term "participatory ergonomics" was coined in 1984, however it's antecedents are found in the management practices of quality circles and industrial democracy [2](Brown, 1993)(Brown, 1993; Liker et al., 1989; Nagamachi, 1995; Noro, 1991).

Participatory Ergonomics is referred as a process that efficiently analyse risks and develop suitable controls or preventive measures to deal with workplace issues. While the Risk analysis, Development of suitable Controls and implementation of suggested controls appear to be vital components of successful participative ergonomic interventions[1][5][4] (ANDREW C. LAING, 2005,) (Carayon, 1998) (Burgess-Limerick, 2018).

Participatory ergonomic approaches include training of the workforce, enhanced information exchange and employee participation in decision-making, all of these serve to improve the psychosocial aspects of work and work environment thus, further reduces rate of occurrence the risk of stress and fatigue (Smith and Carayon, 1996).

Henceforth, the present monograph has emphasised on the following objectives:

(1) To create awareness on occupational stress, and its implications on human health, safety and productivity.

(2) To create awareness on the aids those assess occupational stress.

(3) To present cost – effective interventions that can promote safe and prospective work environment.

IMPLICATIONS OF OCCUPATIONAL STRESS AT MODERN WORK SETTINGS

According to Cartwright et al(2002) absenteeism, illness, alcoholism, "petty internal politics", bad or snap decisions, indifference and apathy, lack of motivation and lack of creativity are all by-products of an over stressed workplace. Employees who start to feel the "pressure to perform" can get caught in a downward spiral of increasing effort to meet rising expectations with no increase in job satisfaction. The relentless requirement to work with optimum performance takes its toll in job dissatisfaction, employee turnover, reduced efficiency, illness and even death. (K Cartwright, 2002) (Jakkula V. Rao, 2012 -)

The following are the intricacies faced by the employees working in modern work setting due to occupational stress:

• Emotional exhaustion: it is the state of emotional worn-out and results in accumulation of stress. The symptoms includes passivity, insomnia, fatigue, apathy etc. (Coffey and Coleman, 2001; and Imai et al., 2004) (Piko, 1999) (Cho et al., 2008);

• Lack of concentration: Concentration difficulties are caused due to cognitive or psychological complications leading to anxiety, impulsiveness, over attention, intrusive thoughts and concerns, inattention, emotional Trauma and stress etc.,(Bussing and Hoge, 2004); (Shapiro et al., 2005);

• Suicidal ideation (O'connor et al., 2000) - It is the 10th leading cause of death in United States. In general, it is an idea of taking off his/own life. The risk of suicidal ideation can be caused if a person undergoes grief, traumatic situation and depression etc. (Nock MK, 2008;)

The physical, mental and social illness associated with the Occupational Stress are chronic fatigue, headaches, high blood pressure, cardiovascular disease, diabetes, musculoskeletal disorders(MSDs), vision problems, insomnia etc.,(Mohammad Mosadeghrad, 2014).

ERGONOMIC AIDS TO ASSESS OCCUPATIONAL STRESS

After a meticulous research review, the researcher felt the need to expose the most significant, Cost effective and accessible Ergonomic tools to assess Occupational Stress among the employees. As both psychosocial and physiological stress impacts individual health, behaviours and also contributes to chronic diseases like musculoskeletal and visual disorders etc., as mention in the former section of the article.

The three most effective and accessible tools of occupational stress

1. Stress Arousal Check list (SACL)
2. Perceived Stress Scale (PSS)
3. Job Content Questionnaire (JCQ)

The first two SACL, PSS are measures the favourable or unfavourable appraisal of the arousal and stress while the later measures degree at which one's/individual life situations are appraised as stressful.

The third most Instrument JCQ deals with social and psychological characteristics of jobs that estimate the various levels of stress demands in a specific Job/Task.

1. Stress Arousal Check list (SACL)

The Stress-Arousal Checklist was developed as a self-report measure to gauge the favourable and unfavourable degree of arousal and stress.

Arousal can be referred as a generalized state of stimulated psychological/physiological awaked-ness without implication of positive or negative valuation of that state of perception.Mackay and others has developed from a reanalysis of an adjective checklist based on Thayer's Activation-Deactivation Adjective Checklist. The previous studies has reported that Stress was consistently more sensitive to the noise level, temperature etc(Colin Mackay,1978)[10] (PAUL N. DUCKRO, THE STRESS-AROUSAL CHECKLIST AS A MEASURE OFSITUATIONAL STRESS VERSUS SIMPLE AROUSAL, 1989).

The Stress Arousal Checklist is a self-reported tool which contains 45 adjectives, out of which 34 are scored. These 34 scored adjectives are emanated from arousal and Stress. In which 15 adjectives are derived from former and 19 from later respectively. The instrument is rated by subjects on a four point scale from "definitely feel" through "feel slightly" and "do not understand or cannot decide" to "definitely feel."[14] (TAYLOR, 1985).

Tense, Apprehensive, Bothered, Worried, Uneasy, Dejected, Nervous Distressed, Fearful, Up-tight, Jittery, Relaxed, Restful, Peaceful ,Cheerful ,Contented, Pleasant Comfortable, Calm, active, energetic, drowsy etc., are some of the significant adjectives of the tool [14] (TAYLOR, 1985).

Based up the above mentioned adjectives this scale can be fairly recommended to use to know the dimensions of stress that undermines the employee health, safety and performance.

Note: For more understanding and design of this instrument refer: (Self Understanding > Am I stressful?)https://www.csd.gov.hk/psy/staffpsy_eng/stress.html

2. Perceived Stress Scale (PSS)

The Perceived Stress Scale (PSS) is a psychological instrument which is extensively used to measure the perception of stress. It measures the degree at which individual life situations are appraised as stressful. The items in this instrument are designed to tap rate at which the lives of the respondents found to be unpredictable, uncontrollable, and overloaded. The scale also comprises of a series of direct queries on state and current level of stress being experienced by the respondents. (PERCEIVED STRESS SCALE, 1994)

The Perceived Stress Scale (PSS) is a conventional method for stress assessment that was first developed in 1983; Cohen et.al (1983) claimed stress as an undesirable attribute and developed PSS in response. PSS is referred to as a remnant opinion to

consider how diverse situations in life affect the feelings, emotions and perceive stress. This scale was built on the bases of Lazarus's transactional model of stress and coping. This model encompasses both cognitive and behavioral responses that individuals use to manage internal and/or external stressors perceived to exceed their personal resources (Gerald Goldstein, 2019).

The queries in this scale are designed to probe the feelings and thoughts of the respondents during the preceding month. Every instance of this instrument indicates how often the respondents feel in certain way. Even though some of the queries seem to be similar in the subject, yet there exists underpinned difference among each, so every single question should be treated separately. The best approach to answer the questions is fairly spontaneous.

The PSS is cost effective, easily administered in a very less time and is easy to score. It is noted that the levels of appraised stress is influenced by daily hassles, major events, and deviations in coping resources etc., hence the predictive validity of the PSS is expected to fall off rapidly after four to eight weeks [17] (Williamson, 1988).

Measure: PSS scores are obtained by reversing the scores on the seven positive items, e.g., 0=4, 1=3, 2=2, etc., and then summing across all 14 items. Items 4, 5, 6, 7, 9, 10, and 13 are the positively stated item [6] (Cohen, 1983).

3. Job Content Questionnaire (JCQ):

The JCQ is a psychosocial Job Assessment Instrument, which is self-administered to measure social and psychological characteristics of jobs. The psychologists argue that the structural characteristics of job as the primary determinant of job satisfaction. Hence the researcher felt desperate need to understand the job content as one of the stance of stress in modern corporate work settings. Therefore JCQ is chosen as most predominant tool to understand and measure the stressors in job content.

The following are the well-known scales on which JCQ is built:

(a) Decision latitude

(b) Psychological demands

(c) Social support

(d) Physical demands

(e) Job insecurity

The first three scales are intended to measure the job demand and controls model in job strain development like high-demand/low control/low-support. The instrument has a recommended stretch of 49 questions covering all the above mentioned scales. A brief

outline on each scale is presented to better understand the significance and utility of the instrument.

Scale 1: Decision latitude

Karasek (1979,pp. 289-290) defined 'decision latitude' has a potential control over 'the individual's work and conduct during the working day'. It refers to the range of competencies required to perform a job and the level of control over decisions that are essential for job (Bonsaksen T, 2019).This factor has noticed to have greater influence on physical and mental well-being of employee; (refer, reviews by Ganster and Fusilier (1989), Parkes (1989), and Warr (1987))[16](WARR, 1990).Besides the condition of high demands and high decision latitude develops good stress that envisages motivation, new learning behaviour, job contentment among individuals etc, while low demands coupled with low decision latitude leads to demotivation, resistance to learn new, and gradual loss of acquired skills(Robert Karasek, 1998).

Hence it is required to ensure both demand and decision latitude of job contents to be high for progressive worker behaviour.

Scale 2: psychological demands:

The psychological job demands refer to "work pressure and workload experienced in the job" (Bonsaksen T, 2019). This scale relates to "how hard workers work" by Table:1 explains the features of scale 2

Psychological job demands and worker decision latitude	Job types
High psychological demands and low decision latitude	High strain jobs
High psychological demands and high decision latitude	Active jobs
Low psychological demands and low decision latitude	Passive jobs
Low psychological demands and high decision latitude	Low strain jobs

Table-1 - Psychological job demands v/s Job Types, Source (Kionna Oliveira Bernardes Santos, 2017).(Note* Table 1 is created by own)

This scale is built on psychological demands and decision latitude as core aspects of the perceived work environment. Based on which the job types are classified as high strain jobs, active Jobs, Passive jobs, Low strain Jobs.

High-strain jobs are featured by high demands and low decision latitude among workmen, which contributes to most troublesome and problematical job type in relation to both health and outcome. This job type can lead to ill-defined health disorders like emotional disturbance, headache, adjustment disorders and employee burnout. In

contract to the above high strain job type the active job type is elucidated as positively contributing to the growth, health and involvement of employee in the workplace, pose both psychological demands and decision latitude as high and is said to be the most recommended job type.

(c) Scale 3: Social Support

The social support refers to psychological and material resources by a social network to cope up with the individual stress. This includes empathy, assistance, support and concern towards the employees. The social support can be in the form of emotional, instrumental and informational support.

Scale 4: Physical Demands

The Physical Demands refer to the level and duration of physical exertion generally required to perform job functions like sitting, standing, lifting, pulling, pushing etc.,. The physical demands of job are stated as essential dimension for prevention of musculoskeletal disorder development and management.

Thus the recommended form of the JCQ should include analysis of both static and dynamic physical demand of job.[12] (Robert Karasek, 1998).

From the demand/control model by Johnson, the social support has been added as a third dimension of JCQ. It identifies the job with high demand and low control & low social support may lead to highest risk of illness. (Johnson, 1989; Karasek & Theorell, 1990)[8] (JEFFREY V. JOHNSON, 1988).

Hence this is identified as a key component to promote good relationships, strong psychological health and harmonious work environment.

(e) Scale 5: JOB INSECURITY

"Job security was strongly related to the individuals psychological wellbeing"[3] (Burchell, 2005,November). Preuss and Lautsch (2002) elucidated, job insecurity minifies both job satisfaction and commitment.

It is considered as most important constraint that impacts the behavior of the individual at work.Hence, Job insecurity is considered as a vital concept that affects the employee behaviour and morale.

The questions in JCQ are the standardized and aims at casing the most imperative aspects of qualitative work situations using minimum number of scales.While interactions between the scales can be feasibly examined. (for JCQs question refer to Implication for Broad Interpretability of Psychosocial JCQs section)[12] (Robert Karasek, 1998).

Thus we can summarise that the "Occuational stress" has a harmful physical and emotional responses on individuals health and well-being.This happes when there is a conflict between job demands and the amount of control that an employee has on his/her job. In general, the combination of high demands in a job and a low amount of control over the situation can lead to stress etc. So it is very important to balance job demands and controls. As Different psychological work situations create different levels of stress. For this purpose the above proposed instrument JCQ better caters the need of analysing the job contents which is important for boosting up the employee health, wellness and productivity.

ERGONOMIC **INTERVENTIONS**

The Ergonomics refer to the interactions among the employee and other elements of the work environment includes physical, cognitive and organisational determinants. While, intervention is cited as an act of interfering with the outcome especially with the condition or process in order to prevent harm or improve functioning.

As ascribed in the former sections of the monograph about the Ergonomic aids like Perceived Stress Scale (PSS), Stress Arousal Checklist (SACL), Job Content Questionnaire (JCQ), those can effectively assist to analyse stress on individual and stress at job. However in the present section come with some of the most significant ergonomic interventions that can to be followed by the individuals and well as by the organisation for a flourishing work environment.

1) Training/Employee Education- Training the employee through animation graphics, pictures, demonstrations on basic ergonomic principles like:

a) Joints must be in a neutral position

b) Head and eyes to be in proper relationship with the monitor height

c) Keep the work close to the body

d) Avoid bending forward

e) A twisted trunk strains the back

f) Alternate postures as well as movements

2) Visit of physiotherapist and ergonomist to the workplace to discuss ergonomic changes and provide written instructions.

3) Interview of psychologist with the employees to develop a personal coping strategy.

4) Stretch and Flex Programs.

5) Stress Reduction Techniques/Stretching/Micro-breaks

6) Engaging with nature, either directly or indirectly, provides psychological re-habitation through restoration from fatigue or stress (Kaplan, 1995). (Andrew Thatcher, 2018).

7) Training by the physiotherapist on active, stretching and muscle relaxation exercises .

8) Evaluation of work site checklist and recommended guidance, instructions and adjustments at work by health professional and ergonomist.

9) Access to ergo-clinic website

10) A 70 minute meeting on job stress education, followed by email healthy computing tips every 2 weeks (Rempel, 2006).

10) Stress Management Programs periodically to identify the stress and can take corrective actions.

11) Posture correcting methods for 20 minutes sessions weekly.

12) Job rotation, Flexi shifts.

Conclusion

The study corroborates the descriptive analysis of selective participatory ergonomic tools and interventions that can identify assess and prevent the ill effects of occupational stress.From the meticulous and systematic literature review the researcher has chosen tools and techniques that are easily adoptable and cost effective such as SACL and PSS.These tools can help the employer/Management to understand and analyse the factors that exerts stress on employees.Besides, it is also important to understand and assess the degree of stress associated with job and job type; this is attained with the help of the most recommendable tool called “Job Content Questionnaire(JCQ)”. Hence the researcher has briefly ascribed the elements and contents of the instrument, so as to create awareness and promote the usability of these tools in corporate worksetting. The monograph issummarized by effective study of implications of occupational stress and ergonomic interventions with an intension to prevention of issues associated with employee health, well-being and productivity that are in high alert in the present corporate work environment.

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