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Management

"A STUDY ON OCCUPATIONAL ERGONOMICS AND ITS IMPACT ON EMPLOYEES PERFORMANCE IN OPTICAL INDUSTRY"

N.Arunfred Asst Prof, Dept of Management Studies, NMCC Marthandam

Benila Pearl Scholar Dept of Management Studies, NMCC Marthandam

ABSTRACT Ergonomics act as a tool to improve employee's performance and productivity of the organization. Even simple ergonomic changes in workplace will have profound effects. In manufacturing industries the workers are facing severe stress and strain resulting in Musculoskeletal Disorders, Repetitive Strain Injury, and Carpal Tunnel Syndrome. The study investigated occupational ergonomics factors which have a high impact over employee's performance in optical industry in Kanyakumari district. For the study both primary and secondary data was used. The well structured questionnaire has been used for the collection of primary data from the respondents for the purpose of understanding the existing ergonomics in the organizations This study used descriptive analysis technique to analyze the data. The study reveals that work posture and work environment does not satisfy the employees completely. The organizations has to concentrate on reducing the repetitive motion task causing awkward posture and should provide proper working condition with good illumination and reduced noise.

KEYWORDS : ergonomics, employees, performance, musculoskeletal disorders

1.1 Background of the study Ergonomics have multi faceted, far reaching effects on all phases of business. Even simple ergonomic changes in workplace will have profound effects. By implementing ergonomic principle in the organization the management will be rewarded with High productivity, Lower abseentism, high performance of employees, Decrease musculoskeletal disorder, greater quality of work life. Ergonomics is a science concerned with the 'fit' between people and their work. It's concerned with the fit between the user, equipment and the environments it puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that tasks, equipment, information and the environment fit each worker.

In manufacturing industries the workers are mainly suffered with Musculoskeletal Disorders, Repetitive Strain Injury, Carpal Tunnel Syndrome. In USA, 1.8 billion workers experience WRMDS and nearly 600,0000 of injuries cause serious loss to workers even resulting in work loss. In organization where there is lack of proper ergonomics a number of employees malpractices are likely to occur. The abseentism and turnover rates amongst employees are usually high. These circumstances are affecting the performance of the employees greatly in the form of delay in work completion, frustration and effect on personal growth.

1.2 Statement of the problem

Most of the organization faces the problem of directing the energies of their employees to the task of achieving business goals and objectives. Nowadays lot of problems is associated with the employee abseentism and injuries. Mental stress among employee increases when organizations do not provide good working environment and when employees have undefined job description. The impact of mental stress in the workplace has serious consequences not only for the individual but also for the productivity of the enterprise.

In manufacturing industries the workers are mainly suffered with Musculoskeletal Disorders, Repetitive Strain Injury, Carpal Tunnel Syndrome. Musculoskeletal disorders (abbreviation: MSD) is a term that refers to soft tissue injuries that occur gradually over time and can affect muscles, tendons, ligaments, joints and nerves. These injuries can develop when the same muscles are used over long periods without adequate rest. Working for long periods in a standing position can cause sore feet, general muscular fatigue, and low back pain. In addition, improper layout of work areas, and certain tasks can make workers use unnatural standing positions. Repetitive strain injury (RSI) is a general term used to describe the pain felt in muscles, nerves and tendons caused by repetitive movement and overuse. It's also called work-related upper limb disorder or non-specific upper limb pain. The condition mostly affects parts of the upper body, such as the forearm, elbow, wrist, hands, neck and shoulders. Carpal tunnel syndrome is a hand and arm condition that causes numbness, tingling and other symptoms. Carpal tunnel syndrome is caused by a pinched nerve in your wrist. A number of factors can contribute to carpal tunnel syndrome, including the anatomy of your wrist, certain underlying health problems and possibly patterns of hand use.

This study aims at analyzing factors influencing ergonomics in optical industry in kanyakumari district and to find out level of satisfaction of ergonomics among the employee in the organizations. Accessing and improving the work place ergonomics could increase employee performance and productivity while reducing burnout, absenteeism and turnover rates in optical industry in kanyakumari district

1.3 Research objective

Primary objective

To study the occupational ergonomics and its effect on employee

Secondary objective

A) To determine the influence of work environment on employees performance
B) To determine the impact of equipment design on employees performance
C) To analyze the influence of work organization on employees performance
D) To analyze the influence of task and mental demand on employees performance
E) To determine the impact of work posture on employees performance

2 LITERATURE REVIEW

K. Daniels et al(2000) Conducted a study which has been concerned with work well-being and performance. There have been two approaches to the research was developed. One approach is characterized by that they have examined the direct role of psychological well being in work performance. The other approach is characterized by studies that have examined performance as a consequence of those job conditions or job stressors assumed to be associated with poor well-being. The research was conducted at individual level. The research result shows that job satisfactions with organizations have produced the strongest evidence of a link between well-being and performance Demet leblebice (2012)

According to the researcher the quality of environment in work place determines the employee's motivation subsequent performance and productivity. People working with inconvenient conditions may end up with low performance and occupational health disease causing absteesim and turn over. The objective of the research to investigate if there exists any relation between work place conditions. The survey was conducted. The final outcome of the survey suggested that business can enhance employee productivity by improving work place design.Gurunath V Shinde , Prof.V.S.Jadhav (2012) Ergonomics plays an important role in workers' productivity. Workstation layout and work design are two major factors of ergonomics of worker's efficiency. Now, manufacturers found that instead of investing lots of money on man, machine, material, method (4m),improving ergonomics of workplaces is cost saving. Ergonomics found great need when market demand is high and manufacturers need more output within short period. This study was conducted on assembly workstation of welding shop. Ergonomic study of this assembly workstation was done by using motion study. Observations were made by studying each element of motion film recorded by video recorder. Results from this study reveal that there is need to modify workstation layout according to ergonomic principles.Evelyn wanjjiru kahare (2012) The objective of the research is to assess the role of strategic ergonomics on employee performance. The researcher had used descriptive research design with the objectives of gathering data on workplace ergonomics. The study concluded that physical, behavioural, management support and management awareness on ergonomics as critical components of performance .Behavioural and management support on implementation of ergonomics in the workplace having strongest influence

3 RESEARCH METHODOLOGY

3.1Research design

A Research Design is considered as the plan for a study that guides as well as helps the data collection and analysis of data. The research design used for this study is of the descriptive type.

3.2 Descriptive research

The descriptive method used for this study is survey method.

3.3 Source of data

Primary data

The well structured questionnaire has been used for the collection of primary data from the respondents for the purpose of knowing the existing ergonomics in the organizations

Secondary data

Secondary data for the study is collected from the organisations records, journals, and various magazines and from various websites.

3.4 Research Instruments

Questionnaire

The questionnaire for the study has total 25 questions and likert scaling techniques has been used for each question.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

3.5 Sampling technique

The sampling technique used for the study is simple random which comes under probability sampling.

4.1 Theoritical framework

Ergonomics is a science concerned with the 'fit' between people and their work. It's concerned with the fit between the user, equipment and the environments it puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that tasks, equipment, information and the environment fit each worker. By assessing peoples abilities and limitations it is possible to design safe, effective and productive work system.

4.2 Conceptual framework

The conceptualized framework defines the set ergonomics factors that have an impact on employees performance. The factors such as work environment, equipment design, work organization, work posture, task and mental demand which are essentially independent variables impacting on employees performance, dependent variable.

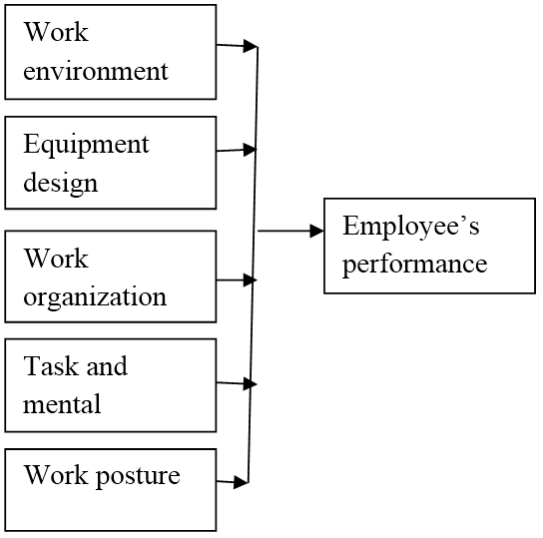

Fig 1 Conceptual diagram

5. RESULTS AND DISCUSSIONS

The factors such as work environment, equipment design, work organization, work posture, task and mental demand which are essentially independent variables impacting on employees performance, dependent variable.

Table 1 Working environment factors affecting the employees performance

	Weighted mean	Rank
Sufficient illumination in workplace	25.2	5
Noise free workplace	26.4	3
No restrictions of entrance, exit routes	26.2	4
Comfortable climatic condition	28.3	1
Dust toxic free working environment	27	2

The table revealed that the employees attitude towards the working environment factors like lighting, noise, work space/ area, climatic condition and environmental condition. The majority of the respondents ensure that they had been in a good climatic condition with weighted mean 28.3, ranks 1. The second rank goes to dust and toxic environment with weighted mean 27. Noise in the work place rank 3 with the weighted mean of 26.4. The majority of the respondents were agreed that no restriction of entrance, exit routes in their workplace ranks 4 with weighted mean 26.2. The majority of the respondents agree that illumination in the workplace is not suitable to do work which ranks least 5 with weighted mean 25.2

Table 2 Impact of equipment/tools design on employees performance

	Weighted mean	rank
Availability of right tools	**24.4**	**5**
More gloves and footwear provided	**26.3**	**3**
Proper guarded machine	**27.1**	**2**
Demand of awkward posture in hand/foot holds	**28.2**	**1**
Maintenance of machine	**25.1**	**4**

The above table interpreted that satisfaction of employees about equipment design reveals that Demand of awkward posture in hand/foot holds ranks 1 with weighted mean 28.2 and it is followed

by unguarded machine with weighted mean 27.1. the employees ensures that their more tools and gloves are provided with weighted mean 26.3, ranks 3.the proper maintance of machine ranks 4 with weighted mean 25.1 followed by availability of right tools with weighted mean 24.4

Table:3 Impact of Task and mental demand on employees performance

	Weighted mean	Rank
High duration of work	24.9	4
Job involves variety of task	25.5	3
Job requires large amount of thinking	12.5	5
Reasonable amount of work	26.9	1
Prepositioned of tools /equipments	26.2	2

The table revealed that the employees attitude towards task and mental demand. The majority of the employees ensures that they are ask to do reasonable amount of work with weighted mean 26.9, ranks 1, followed by tools/equipment is prepositioned to avoid mental delay with weighted mean 26.2. They need to performing variety of task in their job with weighted mean 25.2, ranks 3. The fourth rank goes to high duration of work with weighted mean 24.9 and followed by large amount of thinking involve in their job with weighted mean 12.51

Table:4 satisfaction of employees towards their work posture

	Weighted mean	Rank
No Demand of awkward postures such as bending and twisting	14.86	4
No transmission of vibration	21.8	3
Work in unsymmetrical body moment	12.93	5
Hyperextension of wrist is not needed	25.46	2
Hips and legs are well supported	27	1

The table revealed the agreement of the respondents regarding work posture condition as follows. The majority of the employees ensure that their hips and legs are well supported to seated position with weighted mean value 27, ranks 1. It is followed by most of them were agreed there is no demand of high strength of wrist while working with weighted mean 25.46. No transmission of vibration through hand arm system third given as third rank with weighted mean 21.8. The employees are ensures they have to work in awkward posture with weighted mean 14.86, ranks 4. Unsymmetrical movement of the body has given lowest rank with weighted mean 12.93.

Table:5 Satisfaction of employees towards work organization

	Weighted mean	rank
Adequate training received	28.2	3
Proper communication from leader	28.8	1
Fair payment	21.6	5
Overtime/ extra time work	25	4
Work is recognized and appreciated	28.73	2

The table revealed that the agreement of respondents regarding work organization as follows. The majority of the respondents agree that they are receiving adequate training to do their job well with weighted mean 28.8. Ranks 1and it is followed by their work had been recognized and appreciated by the management with weighted mean 28.73. The third rank given to their leader keeps informed about important issues and changes with weighted mean 28.2 ranks 3. Most of them agree that their job includes Overtime/ extra time work with weighted mean 25, ranks 4 followed by the fair payment with the weighted mean 21.6

Table:6 Relationship between ergonomics and performance of employees

	Mean rank	Rank
Work organization	3.61	3
Work environment	1.45	5
Equipment design	3.69	2
Task and mental demand	3.94	1
Work posture	2.31	4

Based on the mean rank value the work design (3.94)is good, ranks 1 and it is followed by work environment(3.69). The third rank goes to work organization (3.61). the task and mental demand (2.31), ranks fourth followed by work posture(1.45).

6. FINDINGS AND SUGGESTIONS

- The illumination in the work place is not suitable to do work
- There is noise occur in the work place due to machineries
- The work place is free from toxic and the climatic condition around work place is good
- There is less availability of right tools to perform job
- There is need for awkard posture to cooperate with equipment design
- The employees have to think differently for variety of task
- The employees have to work in awkard posture
- Unsymmetrical body moment needed in the job
- Employees legs and hips are well supported to seated position and there is less demand hyperextension of wrist
- The employees are satisfied with training received, recognization for the work done and receiving proper communication from the leader
- majority of the employees are not satisfied with their salary and work time

7. SUGGESTIONS

- Organizations have to concentrate on reducing the repetitive motion task causing awkward posture and sitting in the same posture. Vary tasks, postures and movements as much as possible. Avoid prolonged repeated work using the same muscle group. Provide education, advice and training about workplace posture to the employees. The human physical performance is optimum when postures and movements are dynamic and varied.
- The illumination in work place have to improve by Providing task lights in addition to general lightning for work with tools, machines and other precision task. Control damaging, unwanted or nuisance noise at its source by improved design, isolation or enclosure of machine. Review work spaces regularly for their suitability for current task and users. Workspace must accommodate all users, their equipments and the tasks to be carried out.
- The availability of right tools should be increased. Use guards to protect users and others from moving parts. Maintenance and repairs schedules should include day to day checks and services, the prevention of parts loosening as well as planned service after longer period of operating.
- Provide satisfying salary for employee contribution. Try to give timely incentives to employees to motivate financially .The duration of the work should be reduce.
- Educational seminars and workshops should be conducted to the employees to know more about the ergonomics issues.
- The task demand of production department has to be reduced. The work environment of hr department have to change
- The automation can be implemented; the process is completed entirely by machine. The worker has the role of operating, monitoring and loading the machinery.
- Establish ergonomic process. Use the work place hazard identification approaches to address ergonomics issues hazard identification, case documentation, assessment of control operation and health safety problem. It is the one of the effective way to reduce CTD's such as carpal tunnel syndrome and back bone injuries for achieving quality and productivity gain.

7. CONCLUSION

The effect of neglecting ergonomics principle in the equipment design, work posture, work environment, task and mental demand, work organization will decrease in employee's performance, production and numerous health effects that could results from poor

ergonomics. The study investigated occupational ergonomics factor which will have an impact on employee's performance in optical industry in kanyakumari district. For the study both primary and secondary data was used. The study reveals that work posture and work environment does not satisfy the employees completely. There is slight problem with work organization and equipment design. Compared to other factors task and mental demand in the company is good. The minor alterations can be made in the existing ergonomic system so that the work can be made easier and safer. The organizations has to concentrate on reducing the repetitive motion task causing awkward posture and should provide proper working condition with good illumination and reduced noise. With regards to equipment design the availability of right tools should be increased so that the employees can work with sufficient tools. The employees can be given more social support and awareness about industrial ergonomics in order to make them feel more secured and the policies can be updated and ergonomic principles can be effectively implemented for further improvements in employee health at workplace. Workers need a basic education in ergonomics to enable them to participate fully in the development of ergonomics solutions to workplace problem so that the employee performance will be improved.

REFERENCES

1. SHRUTHI SEHGAL Relationship between work environment and productivity: IJERA VOL 2, issued 4, July-August 2012
2. EVELYN WANJJIRU KAHARE 2012 Assessment of the role of strategic ergonomics on employee performance: IJSR VOL 3 2012
3. PETER VINK, ERNST A.P KONINGSVELD, JOHAN F.MOLENBROCK Positive outcomes of participatory ergonomics in terms if higher comfort and productivity : applied ergonomics 2006 537-546
4. DEMET LEBLEBICE Impact of work place quality on employees productivity :journal of business, economics & finance 2012 VOL 1
5. GURUNATH V SHINDE , PROF.V.S.JADHAV Ergonomic analysis of an assembly workstation to identify time consuming and fatigue causing factors using application of motion study IJET VOL 4 No 4 Aug-Sep 2012
6. D.C. TAPPIN, A. VITALIS, T.A. BENTLEY T he application of an industry level participatoryergonomicsapproach in developing MSD interventions Applied Ergonomics, Volume 52, January 2016, Pages 151-159
7. KUMAR, S. A conceptual model of overexertion, safety, and risk of injury in occupational settings. Hum Factors 1994; 36(2): 197-209.