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A STUDY ON ROLE OF ERGONOMICS IN PROMOTING EMPLOYEE HEALTH AND INCREASING PRODUCTIVITY

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ABSTRACT

The study "Impact of Workplace Ergonomics on Employee Health and Productivity" focuses on manufacturing company. Ergonomics aims to enhance work effectiveness and maintain human values like health, safety, and productivity. The project's main objective is to assess workplace ergonomics, with secondary goals including analyzing work postures and identifying health issues caused by ergonomic problems. Data from samples were collected through questionnaires and interviews, analyzed using statistical tools like the Percentage method and Chi-square analysis. Findings indicate a fair level of workplace ergonomics, with identified areas for improvement such as noise distraction and environmental settings.

Key words:
Ergonomics, human behavior, movement, cognitive ergonomics, organizational ergonomics, physical ergonomics, musculoskeletal disorders, work environment, worker satisfaction, Productivity optimization.

INTRODUCTION

Ergonomics focuses on human interaction with the environment, vital in fields like aviation and workplaces for better well-being and performance. Yet, its implementation faces challenges due to diverse perspectives and demographic factors. Neglecting ergonomics risks health and safety, affecting both physical and mental abilities. Three types of ergonomics—cognitive, organizational, and physical—address various human-system interactions, crucial for optimizing productivity and ensuring worker well-being, aiming ultimately for enhanced human performance and system effectiveness.

LITERATURE REVIEW

1. **Ergonomics in the workplace:** Defines ergonomics and discusses various issues such as anthropometry, seat design, workplace principles, manual materials handling, and cumulative trauma disorders. These important issues need to be appreciated if the objective of the facilities manager is to reduce work-related injuries, improve productivity, and improve the quality of life of the workers.

2. **Visual Ergonomics in the Workplace:** This article provides information about visual function and its role in workplace productivity. By understanding the connection among comfort, health, and productivity and knowing the many options for effective ergonomic workplace lighting, the occupational health nurse can be sensitive to potential visual stress that can affect all areas of performance. Computer vision syndrome—the eye and vision problems associated with near work experienced during or related to computer use—is defined and solutions to it are discussed.

3. The Aging Workforce: using Ergonomics to Improve Workplace Design:

The "silver tsunami" is real and imminent. Effective strategies and coordinated efforts are needed to reduce the potential negative impact and to turn the silver challenges of an aging workforce into gold. Addressing corporate issues such as policies and procedures, workplace design issues, education and training, and ergonomics programs will all be necessities in the future.

4. Effects of office innovation on office workers' health and performance: A study assessed the impact of introducing paperless offices and new workplace concepts on 138 office workers over 15 months. Short-term results showed no significant changes except for a slight decrease in work output. However, in the long term, there were positive effects on general health and a reduction in upper extremity complaints. Perceived productivity notably increased after 15 months. The study highlights the need for more evaluation of office innovations on worker health and productivity.

5. Ergonomics contributions to company strategy: Managers often view ergonomics as solely related to health and safety compliance, rather than as a driver of business performance. To enhance the role of ergonomics in business, it's crucial to align it with company strategies and goals. This shift involves integrating ergonomics into regular planning cycles and making it a part of strategy formulation and implementation. This transition requires changes within the ergonomics community, moving from a focus solely on health to embracing a broader business perspective while still prioritizing health and safety.

6. The efficacy of workplace ergonomic interventions to control musculoskeletal disorders: A critical analysis of the peer-reviewed literature: This paper reviews workplace ergonomic interventions for musculoskeletal disorders, analyzing 101 studies published before January 1999. The interventions included back belt use, ergonomic training, tools/technologies, exercise, job redesign, and multiple components. Most studies (84%) reported some positive results, though many had mixed findings. Only 32% used experimental or quasi-experimental designs. The paper discusses methodological, practical, and policy implications.

7. Evaluation of the impact of employee ergonomics training in industry: This study examined the effects of three different types of ergonomics training methods upon employee knowledge, attitude and behavior. Employees within intact processing lines ($N = 104$) were randomized into four groups, one group serving as a control group. Pre- and post-test measures were implemented. Results showed training to have a significant effect upon knowledge of ergonomics. No significant differences were noted among all four groups according to empowerment and human factors measures. Training had a significant impact upon employee's job satisfaction, and the recognition and reporting of health hazards associated with their jobs.

8. Ergonomics and manufacturing industry: After some introductory remarks on the terms ergonomics and manufacturing industry, a classification of technique related to human share on capacity is given. An ergonomic description of the manufacturing industry' s development is explained. Today' s manufacturing systems as well as the design and evaluation of future manufacturing systems requires an ergonomic consideration of these very specific man-at-work systems. Ergonomics means in this sense the analysis, measurement, evaluation and design of man-at-work systems. Ergonomics has been developed to the point where today it can provide data for the evaluation and design of present manufacturing work as well as application to future work systems.

OBJECTIVE OFTHE STUDY

1. Analyze employees' work postures, repetitive motions, and attitudes towards equipment design and maintenance.

2. Identify ergonomic issues affecting health and productivity, and suggest improvements.

RESEARCH METHODOLOGY

The research design used in this study is descriptive study. It is also called as explanatory design. The main characteristic of this method is that the researcher has no control over the variables and the researchers can only report what has happened or what is happening.
Questionnaire was used to conduct the survey among 171 Employees which includes open-ended and closed ended questions Open-ended Questions.

TOOLS FOR ANALYSIS

For the analysis of data and its interpretation, various tools of research were used.
Analytical tools

- Percentage method
- Chi-square method
- Rank correlation
- WACC

DATA ANALYSIS AND INTERPRETATIONS

PERCENTAGE ANALYSIS

❖ Most respondents are male (56.1%), aged 30-39 (48.5%), and have a school-level education (39.8%). The majority are married (65.5%) and earn 40,000+ (30.4%).
❖ Many have 10+ years of experience (42.1%), are employees (45.0%), work over 8 hours on repetitive tasks (32.7%), and operate machinery (38.6%). Sitting is the common posture (44.4%), and 36.8% are comfortable with their working hours.
❖ Training on ergonomics is occasional (39.2%), and many are satisfied with equipment design (38.0%). Equipment use issues are encountered by 25.1%, and 34.5% feel the organization values their feedback.
❖ Equipment maintenance is satisfactory (32.7%), training on equipment is neutral (32.7%), and 31.0% report back pain. Suggestions for ergonomics training are given by 32.7%.

CORRELATION ANALYSIS

CORRELATION BETWEEN WORKING HOURS OF THE RESPONDENTS AND COMFORT OF THE WORKSTATION

HYPOTHESIS:

NULL HYPOTHESES:

There is no significant relationship between the difficulties in handling equipments and training provided for handling equipments.

ALTERNATIVE HYPOTHESIS:

There is a significant relationship between the difficulties in handling equipments and training provided for handling equipments.

5.3 CORRELATIONS:

		Issues	Handling Equipm ents
Issues	Pearson Correlation	1	.758**
	Sig. (2-tailed)		.000
	N	171	171
Handling Equipments	Pearson Correlation	.758**	1
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**. Correlation is significant at the 0.01 level (2-tailed).

INFERENCE:

The correlation between the difficulties in handling equipment and training provided for handling equipment r = 0.758. From the result it is seen that there is a positive correlation between the difficulties in handling equipment and training provided for handling equipment.

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CHI SQUARE ANALYSIS
WORKING IN ORGANISATION OF THERESPONDS AND THE WORKPLACE ERGONOMICS

HYPOTHESIS:

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ALTERNATIVE HYPOTHESIS(H1):

There is significant association between working in the organization and ergonomics.

CHI-SQUARE:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Working * Ergonomics	171	98.3%	3	1.7%	174	100.0%

Working * Ergonomics Crosstabulation

Count

	Ergonomics				Total
	Yes, regularly	Yes, Occasionally	Neutral	No	
Working Years 0 - 1 Year	18	0	0	0	18
2 - 5 Years	10	19	0	0	29
5 - 10 Years	0	48	4	0	52
10 & above Years	0	0	49	23	72
Total	28	67	53	23	171

Chi-Square Tests

	Value	df	Asymp. Sig. (2- sided)
Pearson Chi-Square	2.681E2[a]	9	.000
Likelihood Ratio	287.558	9	.000
Linear-by-Linear Association	130.784	1	.000
N of Valid Cases	171		

a. 4 cells (25.0%) have expected count less than 5. The minimum expected count is 2.42.

INFERENCE:

The calculated value is 2.681 and significant at this level of 0.5 degree of freedom 9 less then so, reject the null hypothesis and accept the alternative hypothesis.

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WEIGHTED AVERAGE METHOD

DESIGN AND MAINTANENCE OF EQUIPMENTS

Factors	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Total**
Design and Functionality of the equipment	25	24	65	30	27	171
Issues while using the equipment	32	43	36	33	47	171
Employee feedback	25	59	57	14	16	171
Devices maintenance or service	23	56	44	30	18	171
Training for handling the equipment	24	42	56	37	12	171

CALCULATON OF WEIGHTED AVERAGE METHOD

Weight		5	4	3	2	1		
Facilities	**Weight (W)**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Total**	**Rank**
Design and Functionality of the equipment	X1	25	24	65	30	27	171	**5**
	X1W	**125**	**96**	**195**	**60**	**27**	**503**	
Issues while using the equipment	X1	32	43	36	33	47	171	**2**
	X1W	**160**	**172**	**108**	**66**	**47**	**553**	
Employee feedback	X1	25	59	57	14	16	171	**1**
	X1W	**125**	**236**	**171**	**28**	**16**	**576**	
Devices maintenance or service	X1	23	56	44	30	18	171	**3**
	X1W	**115**	**224**	**132**	**60**	**18**	**549**	
Training for handling the equipment	X1	24	42	56	37	12	171	**4**
	X1W	**120**	**168**	**168**	**74**	**12**	**542**	

INFERENCE :

From the data table it is understood that most of the respondents ranked Employees feedback as first, Issues while using the equipment as ranked second, Devices maintenance or service as ranked third, Training for handling the equipment as ranked fourth, Design and functionality of the equipment as ranked fifth provided by company.

SUGGESTIONS:

- ❖ Implement targeted training on proper posture and ergonomics to reduce health issues like back pain caused by repetitive tasks. Encourage and seek employee feedback on equipment design and maintenance to improve functionality and satisfaction.
- ❖ Address the link between long working hours and discomfort by making ergonomic adjustments, providing comfortable seating, and incorporating breaks. Prioritize resolving equipment issues through regular maintenance and upgrades to ensure smooth workflow.
- ❖ Increase the frequency of training on ergonomics to educate employees on maintaining proper posture. Customize approaches to meet diverse employee needs, considering factors like task nature and age.
- ❖ Continuously monitor and adapt workplace policies to maintain a healthy and productive environment.Investigate chi-square results to identify specific areas of concern and tailor improvements.
- ❖ Promote open communication between management and employees regarding workplace issues and training needs. Implement regular health check-ups or wellness programs to address prevalent issues like back pain.

CONCLUSION:

The study on ergonomics at a manufacturing company shows moderate employee satisfaction with posture, job nature, environment, and schedule. The researcher concludes that current ergonomics are fair. Management can improve by enhancing the environment, maintaining equipment, and controlling noise, which will boost productivity and morale. Additionally, a wide array of machines ensures product quality and effectiveness.

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