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"A Study and Evaluation of Stress Levels in Industry"

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ABSTRACT

Anything that possesses a challenge or a threat to our well-being is stress. Stress is a universal element at work and all human beings have to face stress in all walks of life. The consequences of stress are a deviation from the existing individual determinants of the human life that could be attributed to health, work environment and work related problems in the work system of industries. Work related stress is reflected in physiological, emotional & behavioral effects of worker. Today's worker faces challenge of stress on one hand & pain on the other. Postural stress causes discomfort in the neck, back and arms resulting in fatigue and fidgeting. The aim is to evaluate various factors of stresses accountable to musculoskeletal pain and help to develop a good solution. The focus of this paper is to find out and compare the impact of stress levels among garment occupational groups. Data gathered is analyzed through tabulated results and meaningful graphs. A Statistical analysis is carried out to identify the stress levels based on questionnaire and a reliability check is made to come out with a multiple regression analysis.

Key words: *Garment IndustryStress, questionnaire, musculoskeletal pain, multiple regression analysis.*

1. INTRODUCTION

Ergonomics normally are known to be related to human and their job. In larger scope ergonomicsexamines human behavioral, psychological, and physiological capabilities and limitations. Professionalsin the field of ergonomics normally will design new work environments or modify established workenvironments based on the studies on the human capabilities and limitation.The basic premise of ergonomics is that job demands should not exceed workers' capabilities andlimitations to ensure that they would not be exposed to work stresses that can adversely affect safety andhealth as well as the industry's productivity. Therefore, the objective of an ergonomics program is toprovide a safe and productive workplace to the worker's comfort to fulfill the goals and objectives of the industry. The focus of ergonomics implementation should removes barriers to quality, productivity and safe human performance by fitting products, tasks, and environments to people instead of forcing the person toadapt to the work. In order to assess the fit between a person and their work, ergonomists will considerthe worker, the workplace and the job design.Ergonomics is a broad science with wide variety of working conditions that can affect worker'scomfort and health, including factors such as lighting, noise, temperature, vibration, heavy lifting,repetitive motion, workstation design, tool design,

machine design, chair design and footwear and others.Job design also gives a great impact with such factors such as shift work, breaks, and meal schedules.These factors can result in injuries or related problems involving the tendons, muscles, or nerves whichmost of the problems may develop to musculosketal pains (MSPs).The studies on ergonomics are really important to minimize the pain that canbenefit the employer and also their workers.

ERGONOMICS RISK FACTORS (ERF):

Workplaces traditionally have been designed to move products or support machines efficiently. Since people have always seemed so adaptable, how they fit into the workplace has received less attention. The increasing number of injuries caused by repetitive motion, excessive force and awkward postures, ergonomics has become a critical factor in workplace safety. Parts of our job that may strain our bodies or increase the risk of injury (MSI) are called risk factors. Risk factors may be experienced by the affected individual during non-occupational activities. The major work-related risk factors are repetitive work, exerting a force, awkward and static postures, contact stress or pressure. The factors that contribute to the risk of MSI are called risk factors. A risk factor is something that may cause or contribute to an injury. Two or more risk factors can be present at one time, increasing the risk of injury. Workers may not always be able to identify all the risk factors in a task. However, it is important for workers to recognize situations when they are at higher risk. Further, not every person exposed to any or all of these risk factors will develop a MSD. Nor, for that matter, will any two people who are exposed to the same combination of risk factors and in the same degree, respond to them in the same way. Nevertheless, these are common factors that may give rise to a MSD in some combination and in some people. The Ergonomic Risk Factor (ERF) discussed in this study is Awkward Posture.

AWKWARD POSTURE:

Posture refers to the position of different parts of your body. Muscles, tendons, and ligaments must work harder and can be stressed when you are in an awkward posture. Awkward posture occurs when any joint of your body bends or twists excessively, outside a comfortable range of motion, various work activities can result in awkward postures:

- Leaning sideways, such as when reaching heavy containers (awkward back posture)
- Bending down to work at a low level (awkward back posture)
- Reaching overhead (awkward shoulder posture)
- “Flaring” the elbows out to the side (awkward shoulder posture)
- Bending the wrist when moving objects (awkward wrist posture)
- Bending the neck down, such as looking at small components in poor lighting conditions (awkward neck posture)

Awkward posture is associated with an increased risk for injury. It is generally considered that the more a joint deviates from the neutral (natural) position, the greater the risk of injury. Posture issues can be created by work methods (bending and twisting to pick up a box, bending the wrist to assemble a part) or workplace dimensions (extended reach to obtain a part from a bin at a high location. Specific postures have been associated with injury such as wrist, shoulder, neck, and more on low back.

OBJECTIVE OF THIS PAPER:

To identify the physiological stresses related toworkers working in garment industry. Then to identify the stress levels based on questionnaire and reliability check was made to come out with a multiple regression analysis.

ANALYSIS:

1. **Questionnaire**

The expert reviews scrutinized earlier were free flowing and relaxed. Our expertise in the medical field allowed us to provide key points out of immovable constraints and draws attention to questionnaire design problems and issues on which advice is sought. A questionnaire consists of cross-sectional study and structured interview questionnaire to determine the extent to which respondents provide the answers to a 'Health Related Quality of Life'.

- **Cross-sectional study**

They are often used to assess the prevalence of acute or chronic conditions, or to answer questions about the causes of disease. Cross-sectional studies may involve special data collection, including questions about the past, but they often rely on data originally collected for other purposes.

- **Structured interview questionnaire**

It is a quantitative research method commonly employed in survey research. This ensures that answers can be reliably aggregated and that comparisons can be made with confidence between sample subgroups or between different survey periods. The choice of answers to the questions is often fixed (close-ended) in advance, though open-ended questions can also be included within a structured interview.

II. Data collection

- **Sampling Technique:**

  The survey was based on non-probability convenience sampling technique which represents a valuable group of sampling technique that can be used in qualitative, mixed methods and quantitative designs.

- **Sample size:**

  The sample size calculator by survey system software enabled us to determine how many people were needed to interview in order to get results that reflect the target population as precisely as needed. For this, a sample size of 50 respondents was taken with a confidence level of 95% to collect the data using questionnaire schedules. The questionnaire included 48 items classified into 4 sections including personal details, general health status, back pain and psychosocial factors.

- **Contact methods:**

  To fill the questionnaire, images interpretation and personal interviewing technique was used.

III. Sorting the Data

Basic Microsoft excel spreadsheet was used to sort the data. The questions corresponding to each section were converted to number of items in order to calculate Cronbach's Alpha to estimate the reliability of the questionnaire. Each item was rated equivalent to their weight-age of importance on numerical basis. Table 1 presents the distribution of personal characteristics like gender, age, education and experience of the respondents. Simple present-gender consideration has been used for sorting.

Personal Details	Particulars	Percentage%
Gender	Male	50
	Female	50
Age	20-29	50
	30-39	28
	40-49	20
	50 & above	2
Experience	0-9	76
	10-19	6
	20-29	16
	30 & above	2
Education	Primary	32
	High school	50
	Higher education	18

Table 1: Personal Details of Respondent's

ANALYZE THE DATA :

Cronbach's Alpha test was adopted to analyze the data collected using IBM SPSS [Statistical Package for the Social Science] version 23 for this study. The SPSS data view spreadsheet consisting of 48 items with numerical value of 50 respondents reported alpha reliability of 0.781. Hence it confirms the minimum number of acceptability to prove internal reliability for the survey questions.

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	50	100.0
	Excluded[a]	0	.0
	Total	50	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.781	23

Table 2: Output From SPSS Software Of Reliability Test

Multiple Linear Regression Analysis :

$$Y= b_O+b_1x_1+b_2x_2+b_3x_3----------+b_Kx_K \quad \text{.....eq 1}$$

Where Y = Pain in %, b_0= Intercept, x_1= Age in years, x_2 = Pain duration in days,

x_3= pain intensity in %

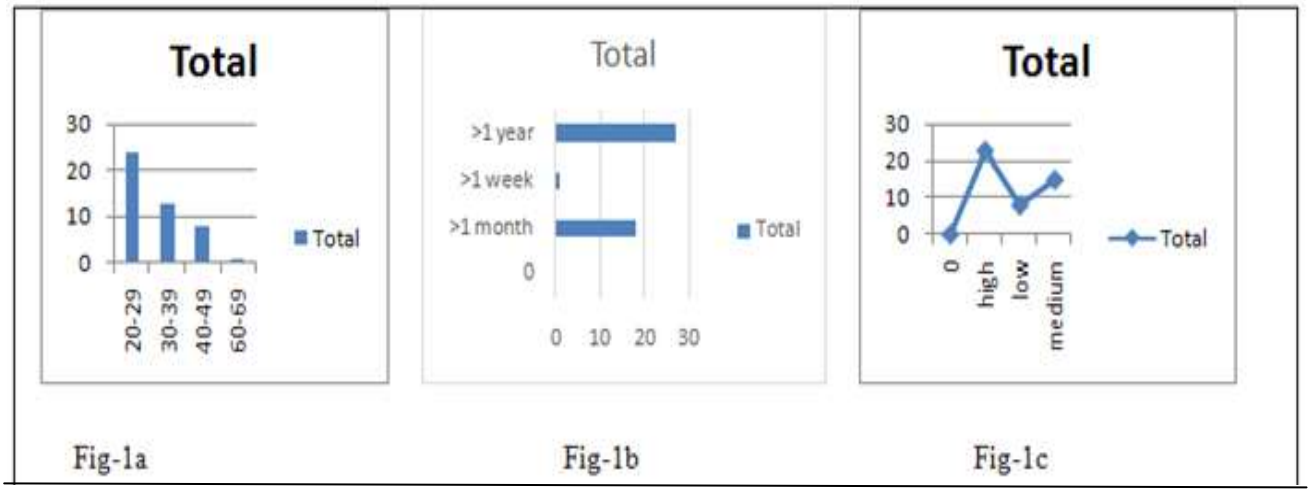

Fig-1a Fig-1b Fig-1c

Table

3- Graphical representation of Age(a) , Pain duration (b) & Pain Intensity(c) with back Pain

RESULTS ON ANALYSIS:

Male

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678[a]	.460	.383	.217

a. Predictors: (Constant), Pain Intensity, Pain Duration , Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.847	3	.282	5.971	.004[b]
	Residual	.993	21	.047		
	Total	1.840	24			

a. Dependent Variable: Back Pain

b. Predictors: (Constant), Pain Intensity, Pain Duration , Age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.463	.392		-1.182	.250
	Age	1.970	.991	.391	1.988	.060
	Pain Duration	1.677	.456	.719	3.675	.001
	Pain Intensity	.660	.337	.316	1.961	.063

a. Dependent Variable: Back Pain

FEMALE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.735[a]	.540	.475	.201

a. Predictors: (Constant), Pain Intensity, Pain Duration , Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.995	3	.332	8.234	.001[b]
	Residual	.845	21	.040		
	Total	1.840	24			

a. Dependent Variable: Back Pain

b. Predictors: (Constant), Pain Intensity, Pain Duration , Age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.602	.412		-1.460	.159
	Age	2.350	1.296	.276	1.814	.084
	Pain Duration	1.511	.376	.610	4.019	.001
	Pain Intensity	.673	.334	.304	2.017	.057

a. Dependent Variable: Back Pain

CONCLUSION:

Stress tends to be either ignored or dismissed by the people, the opportunity exists to make way for changes that will reduce stress-related illness. At the outset, preliminary survey was carried in order to explore the performance of individuals in industrial settings such as:

- Study the frequency of pain in industrial workers
- To observe and record postures and movements of workers performing job tasks
- Evaluation of workers stresses as an effect of pain.

From the results it is seen that the intensity of back pain is severe when ergonomic concepts are not considered, with respect to the physiological stresses related to workers working in garment industry. The stress levels were identified based on questionnaire and reliability check was also made & multiple regression analysis is tabulated as shown in the results on analysis.

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