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Comparison of leg and back strength of office workers and manufacturing workers under applied ergonomics

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Abstract
The purpose of the present study was to know the working environment effect on workers in relation to leg and back strength. To know the environmental effect on workers working different type of work total 50 men workers selected as subject among them 25 office workers working in Bilaspur Railway office section and 25 manufacturing workers working in spin packaging industry Bilaspur. The age was ranging between 25 to 35 years. For the purpose of the present study keeping the possibility standard in mind, the researcher has selected Leg and Back strength as independent variables. To find out the nature of the data and difference between office workers and construction workers descriptive statistics and independent t-test was applied. All statistics were calculated with SPSS 16.0. Level of significance was set at 0.05. The mean Scores of Office workers & Manufacturing workers of Leg Strength are 120.68 & 135.94 and S.D. 5.163 & 2.732 respectively. The obtained t-value 13.067 is significant at 0.05 level. After the analysis of data on the basis of outcome it is clear that in the matter of Leg Strength significant difference was found between Office workers and manufacturing workers ($t = 13.067$, $p < 05$). On the basis of findings it is clear that significant difference was found on Back Strength between Office workers and Manufacturing workers ($t = 5.672$, $p < 05$).

Keywords: office workers, Manufacturing workers, Leg strength, Back Strength

1. Introduction
Occupational risks among manufacturing workers are high compared to those in other occupations. Manufacturing work is physically demanding, often with high repetitiveness. Physical demand of work required physically fit workers including strength and speed for the nature of repetitiveness work. Some working tasks are physically heavy while others are carried out in awkward postures. Fully flexed postures are very common among rodmen, and are dominant when tying reinforcement bars together (Saari and Wickstr. O Om, 1978) [13]. The back is fully flexed forwards, the knees usually over-stretched and the neck extended at times. Tying rods is experienced as one of the most tiring tasks. During the tying the external load is relatively small, while other tasks such as cutting and bending the bars involve higher loads. Leg strength, back strength and flexibility are very essential factors for the proper functioning of workers in many construction places.
Certain physical fitness components specially body strength like that leg strength and back strength are the important parameters of workers working in different conditions and environment. Back pain due to less back strength is common problem among workers. Several studies have established that job-related risk factors are linked to the development of low back pain in the workplace (NIOSH, 1997). In order to prevent low back pain, ergonomic interventions have been advocated to decrease the exposure of workers to these risk factors (Garg and Moore, 1992; Stobbe, 1996) [3]. To avoid back pain many experts suggest strengthening the back muscles. Participatory ergonomics has been claimed to add several advantages to the traditional ergonomic intervention, including the compilation of a powerful, diverse set of skills and knowledge on which to draw (Launis, 1996) [7], with the increased likelihood of successful implementation of ergonomic solutions (Imada, 1991) [5].
Leg and Back strength is the force applied by the Leg and Back to pull on or suspend from objects and is a specific part of Body and these strength play a very important role to perform any activity of movements. Leg strength is the maximum strength of leg to overcome the resistance or act against resistance. Leg strength is necessary to components to perform important work of day to day life. Leg strength is the performance related components of an individual. Back strength is the ability of the lower back muscles to act against resistance. Back strength is important bend forward and pick up any object and to throw any object. The range of motion around a joint as determined by the flexibility of the muscles, tendons and ligaments associated with the joint under consideration. The flexibility is not a general body character but it is specific to each body region. If a person has highly flexible shoulder joint, it does not necessarily mean that he/she will have good knee flexibility or hip flexibility. Even it is possible that one shoulder joint is more flexible than the other. (D.K. Kansal).

1.1 Objectives: Objective of the present study was to know the working environment effect on workers in relation to leg and back strength.

1.2 Hypothesis: It was hypothesized that there will be no significant difference between different working environment workers in relation to their leg strength and back strength.

2. Methodology
To know the environmental effect on workers working different type of work total 50 men workers selected as subject among

them 25 office workers working in Railway office section and 25 manufacturing workers work in spin packaging industry Bilaspur. The age was ranging between 25 to 35 years.

For the purpose of the present study keeping the possibility standard in mind, the researcher has selected Leg and Back strength as independent variables. Leg strength was measured by leg strength dynamometer recorded in kg. Back strength measured by back strength dynamometer and recorded in kg.

Statistical Analysis: - To find out the nature of the data and difference between office workers and construction workers descriptive statistics and independent t-test was applied. All statistics were calculated with SPSS 16.0. Level of significance was set at 0.05.

Fig : Manufacturing workers working conditions

Fig : Office workers working conditions

3. Result and Findings

Table 1: Descriptive and comparative table of Office Workers and Manufacturing workers in relation to Leg Strength

Group	Mean	SD	Std. Error of Mean	t-value	p-value
Office workers	120.68	5.163	1.032	13.067*	.000
Manufacturing workers	135.94	2.732	.546		

Table-1: shows that the mean of Office workers & Manufacturing workers of Leg Strength are 120.68 & 135.94 and S.D. 5.163 & 2.732 respectively. The obtained t-value 13.067 is significant at 0.05 level that shows significant difference exists between the means of Office Workers and manufacturing workers in relation to Leg Strength.

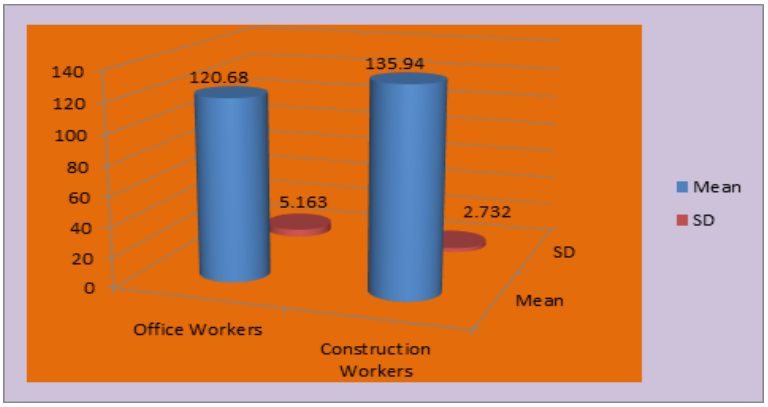

Fig 1: Graphical presentation of mean values of Office Workers and Manufacturing Workers in relation to Leg Strength

Table 2: Descriptive and comparative table of Office Workers and Manufacturing workers in relation to Back Strength

Group	Mean	SD	Std. Error of Mean	t-value	p-value
Office workers	129.04	9.026	1.805	5.672*	.000
Manufacturing workers	140.98	5.426	1.085		

Table-2: show that the mean scores of Office workers & Manufacturing workers of Back Strength are 129.04 & 140.98 and S.D. 9.026 & 5.426 respectively. The obtained t-value 5.672 is significant at 0.05 level that shows significant difference exists between the means of Office Workers and manufacturing workers in relation to Back Strength.

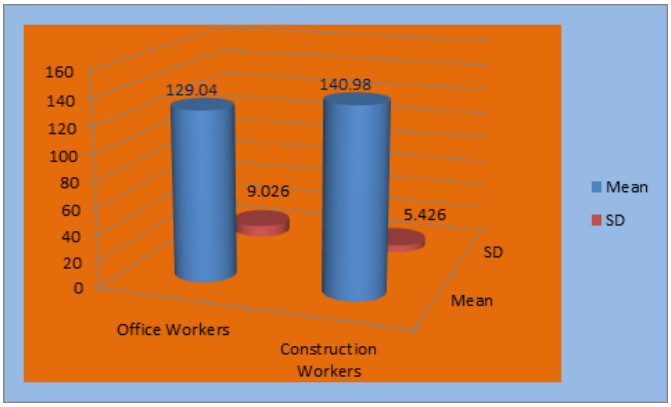

Fig 2: Graphical presentation of mean values of Office Workers and Manufacturing workers in relation to Back Strength

4. Discussion of Findings

The mean Scores of Office workers & Manufacturing workers of Leg Strength are 120.68 & 135.94 and S.D. 5.163 & 2.732 respectively. The obtained t-value 13.067 is significant at 0.05 level that shows significant difference exists between the means of Office Workers and Manufacturing workers in relation to Leg Strength. The mean of Office workers & Manufacturing workers of Back Strength are 129.04 & 140.98 and S.D. 9.026 & 5.426 respectively. The obtained t-value 5.672 is significant at 0.05 level that shows significant difference exists between the means of Office Workers and Manufacturing workers in relation to Back Strength. The probable reason of this finding is the Manufacturing workers working in different type of construction work and they are doing hard physical work like that climbing on stairs, picking up the heavy objects and also different type of physical work so they have greater Leg Strength, and Back Strength. On the other hand the office workers not doing such type of activity they directly involve in office work like that working on computer, entering the data on register and many more work doing in sitting position in the chair and also this is the main reason of back pain of office workers. The nature of work of the workers plays a very important role to maintain fitness level of workers.

5. Conclusions

After the analysis of data on the basis of outcome it is clear that in the matter of Leg Strength significant difference was found between Office workers and manufacturing workers ($t = 13.067$, $p < 05$). On the basis of findings it is clear that significant difference was found on Back Strength between Office workers and Manufacturing workers ($t = 5.672$, $p < 05$).

Initially it was hypothesized that there will be no significance difference on Leg Strength and Back Strength of Office Workers and Manufacturing workers is not accepted at 0.05 level of significance.

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