

Region and Gender Wise Prevalence of Musculoskeletal Disorders Among the Workers of Organized and Unorganized Sectors of Jammu District, J&K

Sapna Kumari¹, Dr. V.K. Shivgotra², Manu Saini³, Asha Ram⁴

¹Research scholar, Department of Statistics, University of Jammu, Jammu, J&K, India, kumarisapna0407@gmail.com

²Sr. Assistant Professor, Department of Statistics, University of Jammu, Jammu, J&K, India, vijayshivgotra@gmail.com

³Research scholar, Department of Statistics, University of Jammu, Jammu, J&K, India, manusaini0206@gmail.com

⁴Research scholar, Department of Statistics, University of Jammu, Jammu, J&K, India, asha150301@gmail.com

ABSTRACT

Background: Musculoskeletal disorders are a group of conditions that can impact the body muscles, bones, joints etc. Based on the employment conditions, occupation has been classified into two categories organized and unorganized sectors. The main focus of our study is towards informal sector there is a strong correlation between the formal and informal employment of an unorganized sector.

Aim and Objectives: Region and gender wise prevalence of musculoskeletal disorders among the workers of organized and unorganized sectors of Jammu district, J&K.

Material and Methods: A cross-sectional study was completed using basic random selection among the employees of Jammu district, J&K. After being entered into an Excel spreadsheet, the data was collated, tabulated, and analysed using software. Using IBM SPSS software (version 29.0 for Windows; SPSS Inc., Chicago, USA), the musculoskeletal conditions' effects on multimorbidity prevalence was investigated.

Results: A total of 800 workers of organized and unorganized sector were covered in our research. in which 525 males and 275 females. Out of 800 workers 447 belongs to rural areas and 353 belongs to urban areas. Significant differences existed between the gender of musculoskeletal disorders except hips/thighs and knee-related problem and moreover, there was a strong correlation between the workers area of musculoskeletal disorders expect ankles/feet.

Conclusion: The present study highlighted major musculoskeletal disorders faced by the workers of organized and unorganized sector. Musculoskeletal disorders affect people quality of life and financial impact, making them a serious public health concern.

Keywords: Organized, Unorganized, Socio-economic, Prevalence, Musculoskeletal disorder

INTRODUCTION

The WHO defines health as a condition of complete physical, mental, and social well-being rather than only the absence of sickness. The importance of health can be understood by the saying “Health is Wealth”. The most essential component of every worker's life is their health. It is essential not just for a happy life but also for increasing worker productivity in a business or society. [1]

A work is a daily life activity done for compensation, profit or family benefit in order to support oneself and keep one's finances stable. The primary focus of occupational health is on employees' health in relation to their jobs and workplace. Two categories - organized and unorganized sectors have been established for occupations based on working circumstances. The organized sector is one that complies with laws and regulations and is registered with the relevant government or authority. Conversely, the unorganized sector is made up of dispersed, tiny businesses that are not governed by the state. The organized sector is made up of government employees, government school and colleges, registered industrial workers, registered factory workers, banks, hospital etc. Agricultural workers, contract labourers, construction workers, bricklayers, shopkeepers, private employees, and home-based workers engaged in crafts like beedi rolling and embroidery are all included in the unorganized sector. [2]

Musculoskeletal disorders are defined as feeling of discomfort, difficulty or pain in the musculoskeletal systems like joint, muscle, tendon, neck, shoulder and elbow etc due to repetitive and irregular movement

or long-term poor body posture and also define as an extensive range of inflammatory and degenerative diseases. Musculoskeletal disorders are the most common physical ailments among the employees with an estimated 33% prevalence in the population as a whole and the frequency of 77% among construction workers. As per the World Health Organization, laboratory workers have a higher prevalence of work-related musculoskeletal problems, including elbow, shoulder, and neck pain. Over 90% of Indian workers were thought to rely on the unorganized sector for their livelihoods and nearly 50% of the country's total income came from this source. According to reports, the prevalence of musculoskeletal problems associated with laboratory work ranges from 72% to 80% in Iran and India. [3]

According to Economic Survey (2021-22) the estimated labour force for the year 2019-2020 was 56.34 Cr of which 40.87 Cr were males and 15.47 Cr were females respectively. Of the total 56.34 Cr labour forces, 53.53 Cr were employed in which 38.77 Cr males and 14.76 Cr females were employed. The employed workers were further divided into organized and unorganized sectors. Of the total 53.53 Cr employed workers, 47.64 Cr were unorganized workers and 5.89 Cr were organized workers respectively. [4]

According to ILO report, it was reported that the majority of the 2 billion people who labour informally are in emerging and developing nations which constitutes more than 61% of the world employed population that make their living in the informal economy. In 2000, about 11% of all workers were employed in the organized sector. In 2019, this increases to about 20% but in 2022, the percentage fell to 18.9%. About 90% of workers are employed in informal jobs, and the percentage of legitimate jobs that had been steadily rising since 2000 began to fall after 2018. [5]

During Covid-19, Workers face high risks of job, income loss and face an increased risk of violence, exploitation, abuse or harassment during times of crisis and quarantine and it also causes increased health-related problems and psychological problems. A recent report by UN women report, that during the lockdown in 2020, only 7% of males lost their jobs but 47% of females lost their jobs. [6]

Approximately 2600 million people work worldwide today, with 75% of them based in developing nations. According to estimates, there are 317 million workers in India, of whom 8.5% work in the organized sector and 91.5% are in the unorganized sector. [2] Hence, the present study was conducted to study the region and gender wise prevalence of musculoskeletal disorders among the workers of organized and unorganized sectors of Jammu district, J&K.

MATERIALS AND METHODS

Study Design and Participants:

With the objectives to calculate the region and gender wise prevalence of musculoskeletal disorders among the workers of organized and unorganized sectors of Jammu district, J&K during the period 6 June, 2022 to 6 July, 2025. There was a simple random selection process to choose the sample of these workers, giving each individual an equal chance of being chosen. All workers between the ages of 25-60 were included in the study. The study included those who consented and were willing to participate.

Sample Size Determination:

The necessary sample size was ascertained by single proportion formula $n = Z_{\alpha}^2 pq/d^2$ by considering 95% confidence interval, the z value at 5% level of significance for the two-tailed test is 1.96, 13.9% is the prevalence of musculoskeletal disorder taken from the study carried out in Perundurai, Tamil nadu in 2014 by Balaji et al. [7] with absolute precision margin of error 2.4% and with usual statistical constant (Type-I error = 0.05) and (Type-II error = 0.2) which gave us an approximate sample size of 799. In order to conduct our study, we selected 800 workers from both the organized and unorganized sectors.

Sampling Methods:

The primary data were collected by using multistage sampling technique. In the first stage, various tehsils were selected from Jammu district. These tehsils were further sub-divided into sub-divisions, blocks and villages respectively. Questionnaires were used to gather information from both organized and unorganized sector employees. These questionnaires consist of variety of open-ended and close-ended questions related to the health status of these workers respectively.

Data Collection:

A pre-designed and pre-tested questionnaire was used for data collection. Data regarding the sociodemographic profile and the various morbidities prevailing among workers from both the organized and unorganized sectors were gathered. Modified Kuppaswamy scale and Udai Parekh scale were used

for measuring the socioeconomic status of urban and rural workers of organized and unorganized sector respectively. [8] To measure the psychological distress of workers, we were using General health questionnaire (GHQ-12). [9] We were also using scale of Standard Nordic Questionnaire to collect the data related to demographic and musculoskeletal health of workers.

Data Analysis:

Excel spreadsheets were used to enter data, and IBM SPSS software (version 29.0 for Windows; SPSS Inc., Chicago, USA) was used to compile, tabulate, and analyse the data. For every variable, descriptive statistics were computed. This paper is based on to estimate the dependent variable, use logistic regression analysis multimorbidity which was recorded in binary form (i.e. a worker with one morbidity or no morbidity was taken as 0 whereas a worker with two or more morbidities was taken as 1 based on various independent variables).

An expression for the model form for predicted probabilities is the odds ratio's natural logarithm (ln):

$$\ln\{P(Y)|1 - P(Y)\} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + I\beta_k X_k$$

where, $\ln\{P(Y)|1 - P(Y)\}$ is the log (odds) of the outcomes, Y is the dichotomous outcome; $X_1, X_2, \dots, X_n$ are the predictor variables, $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ are the regression (model) coefficients and β_0 is the intercept. Among the workers in Jammu district using logistic regression, important risk factors were identified for both multimorbidity and no morbidity. The significance level of $p < 0.05$ was assumed for all the statistical analysis in the study.

RESULTS

In our study, we selected 800 study subjects of whom 525 (65.6%) were males and 275 (34%) were females respectively. About (55.4%) many of the research participants came from nuclear households whereas the remaining (44.6%) respondents were from joint families. Half of the population involved in our study, that is 447 (55.9%) belonged to rural areas whereas the other 353 (44.1%) the research participants were members of urban areas. It was reported that out of the total 800 study subjects, it was noted that most of the employee's population that is 701 (87.6%) belonged to Hindu religion, followed by 65 (8.1%) respondents belonging to Muslim religion whereas the remaining respondents belonged to Sikh and Christian religion respectively. Out of the total 701 Hindu respondents, 449 were males and 252 were females respectively. Table 1 provided the sociodemographic details of the workers in Jammu district, J&K.

Out of the total 800 respondents, most of both males and females identify as Hindu, with 85.52% of males and 91.64% of females falling under this category, totalling 87.63%. Muslims make up a smaller portion of the group, comprising 10.1% of males and 4.37% of females, with a total of 8.13%. A small number identify as "Other" religions, making up 4.43% of males, 3.28% of females, and 3.38% overall. In terms of ethnicity, (42.9%) of males and (42.5%) of females belong to the General category, totalling (42.8%) overall. The OBC (Other Backward Classes) group comprises (39.5%) of males and a slightly higher (45.8%) of females, with an overall total of (41.7%) and SC (Scheduled Castes) makes up (12%) of males and (9.1%) of females, totalling (11%). ST (Scheduled Tribes) represents the smallest group, with (5.5%) of males and (2.2%) of females, totalling (4.4%). In occupation, employment in the organized sector is more common among females (70.5%) compared to males (39.2%), making up (50%) overall. Conversely, the unorganized sector employs a higher percentage of males (60.8%) and fewer females (29.5%), also totalling (50%). According to employment status, regular employment is the most common status, especially for females (80.4%) compared to males (48.6%), with an overall total of (59.5%). Temporary work is more prevalent among males (43%) than females (14.2%), making up (33.1%) overall. Part-time employment is rare, with only (2.9%) of males and (1.5%) of females, totalling (2.4%).

Table 1: Provided the sociodemographic details of the workers in Jammu district, J&K

Variables		Gender		
		Males N (%)	Females N (%)	Total N (%)
Religion	Hindu	449(85.52%)	252(91.64%)	701(87.63%)
	Muslim	53(10.1%)	12(4.37%)	65(8.13%)
	Other	23(4.43%)	9(3.28%)	27(3.375%)
Ethnicity	General	225(42.9%)	117(42.5%)	342(42.8%)
	OBC	207(39.5%)	126(45.8%)	333(41.7%)

	SC	63(12%)	25(9.1%)	88(11%)
	ST	29(5.5%)	6(2.2%)	35(4.4%)
Distance of resident to workplace	Less than 10 kms	225(42.9%)	117(42.5%)	342(42.8%)
	10-20 kms	207(39.5%)	126(45.8%)	333(41.7%)
	More than 20 kms	63(12%)	25(9.1%)	88(11%)
	Others	29(5.5%)	6(2.2%)	35(4.4%)
Mode of transport	Public transport	221(42.1%)	134(48.73%)	355(44.375%)
	Personal vehicles	251(47.81%)	123(44.73%)	374(46.75%)
	Govt. buses	15(2.9%)	4(1.46%)	19(2.375%)
	Others	38(7.24%)	13(4.73%)	51(6.375%)
Occupation	Organized sector	206(39.2%)	194(70.5%)	400(50%)
	Unorganized sector	319(60.8%)	81(29.5%)	400(50%)
	Part time employees	15(2.9%)	4(1.5%)	19(2.4%)
Employment status	Regular employees	255(48.6%)	221(80.4%)	476(59.5%)
	Temporary workers	226(43%)	39(14.2%)	265(33.1%)
	Others	29(5.5%)	11(4%)	40(5%)

The BMI was determined for each study subjects. Distribution of the research participants according to BMI was given in Table 2. More than half of the workers 514 (97.9%) was having normal weight, whereas 9 (1.71%) respondents were overweight and only 2 (0.38%) were obese.

Table 2: Distribution of the research participants according to BMI (kg/cm²)

Variables	Males N (%)	Females N (%)	Total N (%)
BMI			
Underweight	0 (0.0%)	1 (0.36%)	1 (0.12%)
Normal weight	514 (97.9%)	265 (96.36%)	779 (97.37%)
Overweight	9 (1.71%)	7 (2.54%)	16 (2%)
Obese	2 (0.38%)	2 (0.72%)	4 (0.5%)

Table 3 depicted the gender-wise prevalence of musculoskeletal disorders among the workers of Jammu district, J&K. The most common morbidity was neck (79.6%) followed by shoulder (75.4%), upper back (74.6%), Wrist/hands (69.3%), lower back (7.5%), Elbows (7.37%), one or both ankles/feet (4.4%), one or both (hips/thighs) (3.62%) and one or both knees (2.87%). The prevalence of neck, shoulder, elbows, wrist/hands, upper back, lower back, and one or both ankles/feet among workers is significantly correlated with gender, as indicated by p-values below 0.05. Males and females musculoskeletal problems connected to the hips/thighs and knees do not differ significantly, as indicated by p-values above 0.05.

Table 3: Gender-wise prevalence of musculoskeletal disorders among the workers Jammu district, J&K.

Musculoskeletal disorders	Male		Female		Total		χ^2	p-value
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)		
Neck	407(77.5%)	118(22.5%)	230(83.6%)	45(16.4%)	637(79.6%)	163(20.4%)	4.156	0.041
Shoulder	383(73.0%)	142(27.0%)	220(80.0%)	55(20.0%)	603(75.4%)	197(24.6%)	4.829	0.028
Elbows	48(9.1%)	477(90.6%)	10(3.63%)	265(96.3%)	59(7.37%)	741(92.6%)	8.574	0.003
Wrist/hands	345(65.7%)	180(34.3%)	209(76.0%)	66(24.0%)	554(69.3%)	246(30.8%)	8.966	0.003
Upper back	49(9.3%)	476(90.7%)	11(4.0%)	264(96.0%)	60(7.5%)	740(92.5%)	7.399	0.007
Lower back	378(72.0%)	147(28.0%)	219(79.6%)	56(20.4%)	597(74.6%)	203(25.4%)	5.558	0.018

One or both (hips/thighs)	20(3.80 %)	505(96.1 9%)	9(3.27 %)	266(96.7 2%)	29(3.62 5%)	771(96.3 75%)	0.14 9	0.7
One or both knees	13(2.47 %)	511(97.3 3%)	10(3.63 %)	265(96.3 6%)	23(2.87 5%)	776(97%)	1.36 6	0.5
One or both ankles/feet	15(2.9 %)	510(97.1 %)	20(7.3 %)	253(92.0 %)	35(4.4 %)	763(95.4 %)	12.3 61	0.00 6

Table 4 depicted the region-wise prevalence of musculoskeletal disorders among the workers of Jammu district, J&K. For musculoskeletal disorder categories (neck, shoulder, elbows, wrists/hands, upper back, lower back, hips/thighs and knees), the p-values are below the 0.05 significance level. This suggests that the prevalence of musculoskeletal illnesses in each category was significantly correlated with the workers' location (rural vs. urban). Only one category ankles/feet, the p-value are above the 0.05 significance level, this suggests that the workers' area did not significantly correlate with others.

Table 4: Region-wise prevalence of musculoskeletal disorders among the workers of Jammu district, J&K.

Disorder	Yes % (Urban)	Yes % (Rural)	Pearson Chi-Square	p-value (2-sided)
Neck	84.4%	75.8%	8.951	0.003
Shoulder	80.2%	74.0%	4.141	0.042
Elbows	28.3%	21.9%	4.344	0.037
Wrist/Hands	72.2%	78.7%	4.565	0.033
Upper Back	22.1%	15.7%	5.419	0.020
Lower Back	44.2%	51.5%	4.165	0.041
Hips/Thighs	58.6%	51.2%	4.367	0.037
Knees	25.8%	18.8%	7.005	0.030
Ankles/Feet	4.20%	4.30%	0.65	0.885

Table 5 illustrate the connection between musculoskeletal symptoms and occupational characteristics. MSS and the number of working hours each day were significantly correlated ($p < 0.05$). Similarly, there was a strong correlation ($p < 0.05$) between MSS and the length of time employees worked annually.

Table 5: Relationship between occupational characteristics and musculoskeletal symptoms

Variables	MSS		Chi square	p-value
	Yes	NO		
Duration of working hours per day				
1-8 hours	414	279	7.296	0.026
9-12 hours	72	28		
17-24 hours	6	1		
Duration of workers per year				
1-8 years	352	248	8.901	0.031
9-18 years	109	50		
19-24 years	20	7		
More than 25 years	11	3		

The pseudo-R Square table was used to compute the strength of logistic regression. In the logistic regression, the indication of the number of changes in the dependent variable given by Cox and Snell R Square and Nagalkerke R Square was also known as Pseudo R Square. The values in the given table were 0.048 and 0.68 respectively indicating that between 4.8% and 6.8%, the changes in the independent variable multimorbidity were explained by set of independent variables used in the model (Table 6). Hosmer and Lemeshow test were used for model adequacy test in the binary logistic regression model. For this fit, a model is said to be poor if the p-value is less than 0.05. Hence for the prevalence of

multimorbidity among the workers, chi-square=3.800 with 8 d.f. and p-value 0.875 indicated that there was no significant difference between the observed and expected values suggesting that the model fit the data at an acceptable level (Table 7).

Table 6: Pseudo R Square Table for Multimorbidity

Step	-2 Log likelihood	Cox & Snell R square	Nagelkerke R square
1	968.706	0.048	0.068

Table 7: Contingency Table for Hosmer and Lemeshow Test

Multimorbidity = No		Multimorbidity = Yes		Total	χ^2	d.f.	P
Observed	Expected	Observed	Expected				
69	70.198	16	14.802	85	3.800	8	0.875
68	66.307	14	15.693	82			
63	63.442	18	17.558	81			
61	63.473	22	19.527	83			
60	58.673	19	20.327	79			
61	56.384	18	22.616	79			
54	55.844	28	26.156	82			
47	50.713	32	28.287	79			
49	45.719	30	33.281	79			
33	34.246	38	36.754	71			

DISCUSSION

Present study involving 800 workers of organized and unorganized sector of Jammu district and demonstrate that around 80% of employees have at least one health-related problem. Given that our study's p-values are less than 0.05 and that other studies have found that over 71.5% of construction workers experience musculoskeletal illnesses, followed by skin and eye issues, it is evident that hips, knees and ankle/feet discomfort are common among workers. According to a different study, musculoskeletal diseases affect over 70.5% of workers who are migrants from other states, including Andhra, Orissa, West Bengal, Jharkand, Bihar, and Uttar Pradesh. According to this study, musculoskeletal illnesses accounted for 71.5% of the study participants, followed by skin issues (50.9%) and ocular issues (53.3%). According to a different research, musculoskeletal diseases affected only 19.5% of people. [2] Work-related musculoskeletal problems are highly prevalent in a number of occupations. Laboratory technicians who perform pipetting tasks, for example, frequently report having hand, shoulder, elbow, back, and neck pain. The outcome of the current study show that the prevalence of musculoskeletal problems is 17.30% in the neck, 15.90% in the shoulder, 7.90% in the elbows, and so on. Similar results from earlier research show that laboratory technicians had a greater frequency of work-related musculoskeletal problems (approximately 81.3%) than other laboratory workers, with males experiencing a greater prevalence 87.3%. [3]

According to a different survey, 62.76% of hairdressers had musculoskeletal issues related to their jobs. The prevalence found in this study is significantly lower than that seen in earlier investigations by Aweto, Tella, Johnson, and Mussi, Gouveia, who reported prevalences of 81% and 71%, respectively, for work-related musculoskeletal issues. According to age-wise classification, the largest prevalence of reported discomfort from work-related musculoskeletal issues is found among respondents aged 18 to 35. The majority of these patients (about 40%) experienced lower and upper back discomfort, which may be related to their prolonged (10–14 hour) workdays. Of them, 72% of the hairdressers in this study were involved. The results also show that nearly half of the hairdressers experienced foot and knee discomfort (49.5%), followed by upper back pain (38.8%) and lower back pain (39.8%). among terms of years lived with disability (YLDs), musculoskeletal disorders rank as the second most common cause of impairment globally, and they are most prevalent among working age individuals (those between the ages of 20 and 54). The results of the current study could also be crucial because musculoskeletal illnesses associated to the workplace result in both financial burdens for the healthcare system in both developed and developing nations, as well as loss of productivity and work. [10]

In this study the associations between demographic and occupational factors and the prevalence of work-related musculoskeletal conditions in workers involved in prolonged computer use. A primary finding of this study was the significant positive correlation between work experience and reported work-related musculoskeletal disorders symptoms, suggesting that people with longer work histories were more likely to experience musculoskeletal discomfort. This outcome is consistent with earlier studies suggesting that prolonged exposure to repetitive tasks, poor posture, and static work conditions contribute to the development of musculoskeletal issues over time. [11] The results of logistic regression revealed that gender, age, dependency status and the low socio-economic status were the main predictors of multimorbidity among workers of Jammu district, J&K. One of the study's advantages was that few studies had been done on J&K staff. An update on the incidence of musculoskeletal illnesses among employees as well as the different risk factors linked to the prevalence of multimorbidity was given.

CONCLUSION

Our study highlighted the prevalence of work-related musculoskeletal disorders among the workers of organized and unorganized sector of Jammu district, J&K and there may be other related factors like age, obesity, gender, biomechanical loading which can cause musculoskeletal disorders. So, there is an immediate need to enhance the health care facilities for the workers. Thus, the government ought to take steps to increase the income of the workers of unorganized sector so that the problem of inequality can be reduced. Awareness among workers should be created for regular medical checkups to ensure prevention and early detection of musculoskeletal disorders.

Health complaints reported by workers were perceived and related to the work. Employees weren't wearing safety gear devices and that aggravated their exposures. The study findings provide an insight into occupational health problems associated with selected cases of the informal sector. During medical examinations, the primary health centre's medical staff can raise employee's awareness of known dangers and motivate them to enhance their working circumstances. Workers in the informal economy, especially those who are at risk could benefit from preventive actions regarding their working conditions. The government of India should make considerable efforts to improve the well-being status of workers in organized and unorganized sector so that these workers live a prosperous life

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