

DEVELOPMENT AND VALIDATION OF QUESTIONNAIRE TO ASSESS KNOWLEDGE, ATTITUDE, AND AWARENESS ABOUT WORK RELATED MUSCULOSKELETAL DISORDERS AMONG CONSTRUCTION WORKERS- A CROSS SECTIONAL STUDY

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ABSTRACT

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) are a major occupational health problem. These disorders affect muscles, tendons, ligaments, joints, and nerves, caused by prolonged exposure to physically demanding tasks. Studies show that the construction sector has the highest rate of injuries and fatalities compared to other industries. Despite this, workers' knowledge, attitude, and awareness regarding WMSD risks remain limited. Improving workers' understanding of these hazards is crucial for promoting safer work practices.

AIM

To assess the knowledge, attitude, and awareness about work-related musculoskeletal disorders among construction workers using a self-administered questionnaire.

DESIGN

An observational study was conducted over 6 months across various construction sites. Using a probability sampling method, randomly selected sites and workers were surveyed. A validated self-structured questionnaire covered four domains. A pilot study was conducted and a survey involving 152 workers tested the tool's validity. Ethical approval and informed consent were obtained before data collection. Data were analyzed statistically.

RESULTS

The participants were predominantly male with most of them engaged in manual labour work. Education status of the participants varied widely. Participants were classified for having low scores in all the three domains of the questionnaire. These findings reflect a significant gap in recognizing, preventing, and managing work related musculoskeletal disorders. Positive correlations are seen between knowledge, attitude, awareness and the overall score which signifies that improvement in one domain can bring positive changes in other domains. There was a negative correlation found between socio-demographic characteristics and age, weight, BMI, and year of experience of the worker.

CONCLUSION

The study revealed low levels of knowledge, attitude, and awareness about WMSDs among workers because of the factors like low education, older age, and long hours of working hours. This also signifies that this industry needs to be educated about the health education programs to reduce the prevalence of work related musculoskeletal disorders.

KEY WORDS: construction workers, knowledge, attitude, awareness, work related musculoskeletal disorders.

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BULLETED LEARNING OUTCOMES

- Understand the concept and significance of work-related musculoskeletal disorders (WMSDs) in construction workers.
- Identify key risk factors and occupational hazards contributing to WMSDs in the construction industry.
- Develop the ability to design a structured questionnaire to assess knowledge, attitude, and awareness (KAA).
- Evaluate content validity using expert review and relevance assessment techniques.
- Assess reliability of the questionnaire using appropriate statistical methods (e.g., internal consistency, test-retest reliability).
- Conduct pilot testing to refine questionnaire items for clarity and feasibility.
- Analyze responses to determine levels of knowledge, attitudes, and awareness among construction workers.
- Interpret findings to identify gaps in awareness and misconceptions related to WMSDs.
- Understand ethical considerations in data collection from occupational groups.
- Utilize validated tools to support occupational health interventions and policy planning.
- Enhance skills in data interpretation and reporting for research in workplace health.

INTRODUCTION

Musculoskeletal disorders (WMSDs) are a serious health issue for the general public as well as construction workers⁽¹⁾. These conditions impact muscles, tendons, ligaments, joints, nerves, and blood vessels and are brought on by extended exposure to physically demanding tasks at work⁽²⁾. According to studies, WMSDs are the most expensive occupational health problem, impacting both developed and developing nations and making up over 30% of all injuries requiring time away from work⁽³⁾. According to studies, when compared to other industries, the construction sector has the highest incidence of worker fatalities and injuries, therefore there is a significant risk of work-related musculoskeletal disorders (WMSDs) for those employed in the construction industry⁽⁴⁾. The International Labour Organisation (ILO) estimated that approximately 6000 workers die

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each day worldwide and 337 million people are victims of work-related accidents or illnesses arising from occupational injuries (Medical Legal Partnership for Children MLPC, 2008)⁽⁵⁾. In terms of age, older people are more likely to experience WMSDs because they report physical discomfort, which makes them less productive⁽⁶⁾. The most common work-related physical characteristics are posture and heavy lifting, the time to exposure is another predictor of WMSDs in this model⁽⁷⁾. According to studies, the longer workers are exposed to work related physical risk factors, the higher the prevalence of MSDS⁽⁸⁾. Employees working on a construction site who lack proper awareness of safe working standards are more likely to contact MSDS at work⁽⁹⁾. According to the findings of ergonomics research conducted among South African construction management and workers the use of body force, reaching away from body, reaching above the head, repetitive movements, bending or twisting the back, climbing and descending were common and constitute work related job problems⁽¹⁰⁾. Construction work involves awkward postures, lifting heavy objects, handling heavy and irregularly sized loads by hand, bending and twisting the body frequently, working above shoulder height, working below knee level, standing still for extended periods of time, climbing and descending, pushing and pulling loads, and more, all of these work under challenging conditions⁽¹¹⁾. Workers attitude, behaviour, and comprehension of WMSDs risk are still unclear despite the high incidence of fatalities and injuries in the construction sector⁽¹²⁾. Increasing workers knowledge of these hazards can help them change their behaviour and follow safety protocols more closely⁽¹³⁾. The focus has recently shifted to health education and early prevention, with a particular focus on surveys that evaluate workers attitude, knowledge and awareness of WMSDs⁽¹⁴⁾. The prevalence of WMSDs can be decreased by emphasizing education and prevention, which will result in healthier and more effective employee.

METHODOLOGY

The study was an analytical, cross sectional survey done over a 6 month period among 154 construction workers, with data collected from several construction sites in Belagavi city. The target population consisted of construction workers aged 19 to 55 with more than one year of experience, such as masons, carpenters, plumbers, and painters. Workers who refused to participate, subcontractors, and supplier personnel were excluded from the survey. The study used a probability sample approach with cluster sampling, in which construction sites were randomly chosen

and workers from these sites were surveyed. A self-structured questionnaire was created, with four domains: demographics, knowledge, attitude, and awareness. Items were produced for each area and submitted to content validity. The institutional Ethical Committee provided ethical approval, and permission from the onsite supervisor was taken by the investigator. Participants who met the inclusion criteria and decided to participate gave their informed consent after being briefed on the study's methodology. The investigator administered the questionnaire, and each session lasted roughly half an hour. A pilot study was undertaken to test the questionnaires validity, after that survey among 154 workers was done to evaluate the workers awareness, attitudes, and knowledge data was gathered and statistically analysed.

STATISTICAL ANALYSIS

The collected data were summarised by using the Descriptive Statistics : frequency, percentage; mean and SD. The pearson correlation coefficient was used to find the relation of knowledge, attitude, and awareness with years of experience and hours of work the spearman's ratio was used. The Likelihood ratio test was used to find the association of knowledge, attitude, and awareness about work related musculoskeletal disorders with gender, educational status, nature of work, and duration of work. The p value less than 0.05 was considered as significant. Data were analysed by using the SPSS software version 29.0.10

RESULTS

Demographic data, Knowledge, Attitude, and Awareness were the domains used to construct a questionnaire. The language used to construct the questionnaire was English. It was developed to assess the Knowledge, Attitude and Awareness about Work Related Musculoskeletal Disorders among Construction Workers. All the questions were closed type that is yes or no. The Knowledge domain had 10 questions, Attitude domain had 8 questions and Awareness domain had 10 questions, so in total there were 28 questions in Knowledge, Attitude and Awareness domain.

Descriptive statistics for age, height, BMI, years of experience, and hours of work

Age of the participants in the study ranged from 19-55 years with mean: 34.91 ± 8.62 years, weight ranged from 31 to 72kg with mean: 60.60 ± 6.29 kg, height ranged from 4.9 to 5.8 feet with mean : 6.43 ± 0.20 feet, BMI ranging from 17.6 to 27.1 kg m² with mean : 22.86 ± 2.15 kg m², experience ranged from 1 years with mean : 8.67 ± 6.00 years, and the hours of work ranged from 1 to 12 hours with mean 10.03 ± 1.36 hours.

Distribution of gender, educational status, nature of work, history of trauma, comorbidities, and duration of break.

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There was male predominance seen with males (81.2%) and females (18.8%) from the total 154 participants of survey. Most of the cases had high school education(29.2%), followed by illiterate(27.3%), middle school education(24.7%), primary school(24.7%), higher secondary(3.9%), ITI (0.6%) and degree education(0.6%). The nature of work reveals: Manual (72.7%), loading and carrying (15.6%), painter (3.9%) carpenter (1.9%), carrying and loading (1.9%), flooring work (1.9%), and tile fixator (1.9%). The majority of participants had the duration of break for two hours (67.7%), followed by one hour (17.5%), and one and half hours (14.9%).

Descriptive statistics of the scores of knowledge, attitude, and awareness

The knowledge score of participants ranged from 1 to 7 with mean 3.66 ± 1.27 ; attitude score ranged from 1 to 7 with 2.99 ± 0.91 ; awareness score ranged from 0 to 3 with mean; 1.07 ± 0.86 , and the overall score ranged from 3 to 15 with mean: 7.71 ± 2.65 .

Level of knowledge, attitude, and awareness about work related musculoskeletal disorders.

The survey study reveals that among the 154 participants the majority had low level (98.1%) of knowledge, attitude, and awareness about work related musculoskeletal disorders and the 1.9% had moderate level of knowledge, attitude, and awareness.

Relation between knowledge, attitude and awareness

The Pearson correlation coefficient was used to find the relation between knowledge, attitude, and awareness. The knowledge, attitude, awareness and the overall score were positively correlated ($p < 0.05$) with each other.

Relation of knowledge, attitude, and awareness with age, height, weight, and BMI

The Pearson correlation coefficient was used to find the relation of knowledge, attitude, and awareness with age, height, weight and BMI. The knowledge, attitude, awareness and overall score were negatively correlated ($p < 0.05$) with age, weight, as well as BMI.

Relation of knowledge, attitude, and awareness with years of experience, and hours of work

The Spearman's ratio was used to find the relation of knowledge, attitude, and awareness with years of experience, and hours of work. The knowledge, attitude, awareness and the overall scores were negatively correlated ($p < 0.05$) with years of experience.

Association of knowledge, attitude, and awareness about work related musculoskeletal disorders with gender, education status, nature of work, and duration of work

The Likelihood ratio was used to find the association of knowledge, attitude, and awareness

about work related musculoskeletal disorders with gender, educational status, nature of work, and duration of work. There was an association ($p < 0.05$) between educational status and the knowledge, attitude, and awareness about work related musculoskeletal disorders.

DISCUSSION

The study was a cross sectional study among 154 participants carried out in different areas of Belagavi to assess the knowledge, attitude and awareness of work related musculoskeletal disorders among construction workers using a self structured questionnaire which included questions about workers knowledge, attitude and awareness about work related musculoskeletal disorders. Since the prevalence of work related musculoskeletal disorders in construction industry is higher than the other industries, this study aimed to decrease the prevalence by emphasizing education and prevention, which will result in healthier and more effective employees by assessing workers knowledge, attitude and awareness using a novel questionnaire.

Demographic characteristics

The participants were predominantly male (81.2%) with mean age of 34.91 years, with most of them engaged in manual labour work. Education status of the participants varied widely, but most of the participants had basic high school education and followed by participants having no basic education. This low level of education among the participants explains the low knowledge, and awareness among the workers. In terms of BMI of the participants it was 22.86 kg m^2 which was within the normal range. Participants through the survey reported working for long hours with mean 10.03 hours per day with physically demanding work nature with generally adequate of break given between the work hours.

Knowledge, attitude and awareness about WMSDs

The scores of knowledge, attitude and awareness among participants were classified as low with mean knowledge, attitude, and awareness as 3.66, 2.99 and 1.07 respectively. Participants were classified for having low scores in all the three domains of the questionnaire. These findings reflect a significant gap in recognizing, preventing, and managing work related musculoskeletal disorders. It was also found that there was lack of awareness about the access to healthcare among workers. The survey study reveals that among the 154 participants the majority had low level (98.1%) of knowledge, attitude, and awareness about work related musculoskeletal disorders and the 1.9% had moderate level of knowledge, attitude, and awareness. General workers should be aware of

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work-related MSDS the same way they are aware of the importance of having personal protective clothing at work. If one is knowledgeable, they can take precautions or implement preventive measures to protect themselves from anything that may cause MSDS. Humans attitudes are mainly influenced by what they know or understand. Those with knowledge of health and safety at work were less likely to be MSDS positive.

Relation of knowledge, attitude, and awareness

Positive correlations are seen between knowledge, attitude, awareness and the overall score which signifies that improvement in one domain can bring positive changes in other domains. Having adequate and proper knowledge results in better and more informed decisions while working. With knowledge, the attitude of the worker while working is also almost important like using safety measures, using safety equipment's, knowing about the policies can help in preventing certain WMSDs. Likewise having awareness about musculoskeletal disorders and preventive measures are important. If the worker has good knowledge and awareness about certain things can change their attitude while working which can result in decreasing the work related musculoskeletal disorders among construction industry.

Relation of knowledge, attitude and awareness with socio-demographic characteristics

There was a negative correlation found between socio-demographic characteristics and age, weight, BMI, and year of experience of the worker. Older and more experienced individuals tended to have low awareness and knowledge, this is maybe because of lack of occupational training or access to healthcare over time or a sense of normalization of pain as part of work.

Association with socio-demographic characteristics

There was an association between educational status and the knowledge, attitude, and awareness about work related musculoskeletal disorders. The higher the educational status of the individual the more will be the knowledge and awareness about WMSDs among workers. No significant association were found with gender, nature of work, or break duration. This signifies that education is an important factor in promoting occupational health literacy.

CONCLUSION

The study revealed low levels of knowledge, attitude, and awareness about WMSDs among workers because of the factors like low education, older age, and long hours of working hours. This signifies that if one domain among knowledge and awareness is improved than there will be significant changes seen in the other two domains. This also signifies that this industry need to be

educated about the health education programs, should be given workplace training and awareness camps should be initiated among the construction industry to reduce the prevalence of work related musculoskeletal disorder.

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TABLES

TABLE 1 : Descriptive statistics for age, height, BMI, years of experience, and hours of work

(n = 154)	Range	Mean	S.D.
Age (Years)	19 to 55	34.91	8.62
Weight (Kg)	31 to 72	60.60	6.29
Height (Feet)	4.9 to 5.8	6.43	0.20
BMI (Kg/M ²)	17.6 to 27.1	22.86	2.15
Years of experience	1 to 22	8.54	5.45
Hours of work	1 to 12	10.03	1.36

TABLE 2 : Distribution of gender, educational status, nature of work, history of trauma, comorbidities, and duration of break.

		Frequency	%
Gender	Male	125	81.2
	Female	29	18.8
Educational status	Illiterate	42	27.3
	Primary	21	13.6

Nature of work	school		
	Middle school	38	24.7
	High school	45	29.2
	Higher secondary	6	3.9
	ITI	1	0.6
	Degree	1	0.6
	History of trauma	Carpenter	3
Carrying and loading		3	1.9
Flooring work		3	1.9
Loading and carrying		24	15.6
Manual		112	72.7
Painter		6	3.9
Tile fixator		3	1.9
History of trauma	Nil	154	100
Comorbidities	Nil	154	100
Duration of break	1 Hour	27	17.5
	1 and 1/2 Hours	23	14.9
	2 Hours	104	67.5

TABLE 3 : Descriptive statistics of the scores of knowledge, attitude, and awareness

	Range	Mean	S.D.
Knowledge score	1 to 7	3.66	1.27
Attitude score	1 to 7	2.99	0.91
Awareness score	0 to 3	1.07	0.86
Overall score	3 to 15	7.71	2.65

TABLE 4 : Level of knowledge, attitude, and awareness about work related musculoskeletal disorders.

		Frequency	%
Knowledge, attitude, and awareness about work-related musculoskeletal disorders	Low	151	98.1
	Moderate	3	1.9

TABLE 5 : Relation between knowledge, attitude and awareness

	Knowle dge score	Attit ude score	Aware ness score	Over all scor e

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Knowledge score	"r"	1	0.619	0.684	0.909
	p value	--	< 0.001*	< 0.001*	< 0.001*
Attitude score	"r"	1	0.629	0.840	
	p value	--	< 0.001*	< 0.001*	
Awareness score	"r"	1	0.863		
	p value	--	< 0.001*		
Overall score	"r"	1			
	p value	--			

TABLE 6 : Relation of knowledge, attitude, and awareness with age, height, weight, and BMI

		Age (Years)	Weight (Kg)	Height (Feet)	BMI (Kg/M ²)
Knowledge score	"r"	-0.571	-0.230	0.338	-0.530
	p value	< 0.001*	0.004*	< 0.001*	< 0.001*
Attitude score	"r"	-0.531	-0.058	0.263	-0.306
	p value	< 0.001*	0.478	0.001*	< 0.001*
Awareness score	"r"	-0.500	-0.253	0.303	-0.507
	p value	< 0.001*	0.002*	< 0.001*	< 0.001*
Overall score	"r"	-0.613	-0.209	0.349	-0.519
	p value	< 0.001*	0.009*	< 0.001*	< 0.001*

TABLE 7: Relation of knowledge, attitude, and awareness with years of experience, and hours of work

		Years of experience	Hours of work
Knowledge score	Spearman's ratio	-0.459	-0.092
	p value	< 0.001*	0.258
Attitude score	Spearman's ratio	-0.448	0.098

	p value	< 0.001*	0.228
Awareness score	Spearman's ratio	-0.383	-0.036
	p value	< 0.001*	0.655
Overall score	Spearman's ratio	-0.483	-0.028
	p value	< 0.001*	0.729

Table 8 : Association of knowledge, attitude, and awareness about work related musculoskeletal disorders with gender, education status, nature of work, and duration of work

		Knowledge, attitude, and awareness about work-related musculoskeletal disorders				Likelihood ratio	p value
		Low		Moderate			
		n	%	n	%		
Gender	Male	122	80.8	30	10.0	1.27	0.261
	Female	29	19.2	0	0.0		
Educational status	Illiterate	42	27.8	0	0.0	14.57	0.024*
	Primary school	21	13.9	0	0.0		
	Middle school	38	25.2	0	0.0		
	High school	44	29.1	1	3.3		
	Higher secondary	5	3.3	1	3.3		
	ITI	1	0.7	0	0.0		
	Degree	0	0.0	1	3.3		
Nature of work	Carpenter	2	1.3	1	3.3	5.69	0.459
	Carrying and loading	3	2.0	0	0.0		
	Flooring work	3	2.0	0	0.0		

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	Loadi ng and carryi ng	2 4	15 .9	0 0		
	Manu al	1 1 0	72 .8	2 0	66 .7	
	Paint er	6	4. 0	0 0		
	Tile fixato r	3	2. 0	0 0		
Durati on of break	1 Hour	2 6	17 .2	1 0	33 .3	1.25 0.5 35
	1 and 1/2 Hour s	2 3	15 .2	0 0		
	2 Hour s	1 0 2	67 .5	2 0	66 .7	