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Original Research Article

Prevalence of activity limitation due to work related musculoskeletal disorder in long standing metro station workers

Gayathri[1], Harshitha N.[2]*

[1]Department of Community Based Rehabilitation, College of Physiotherapy, Dayananda Sagar University, Bengaluru, Karnataka, India
[2]Student, College of Physiotherapy, Dayananda Sagar University, Bengaluru, Karnataka, India

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***Correspondence:**
Dr. Harshitha N.,
E-mail: gayathri-physio@dsu.edu.in

ABSTRACT

Background: The study sought to estimate the prevalence of work-related musculoskeletal disorders among metro workers in Bangalore using the REBA scale, ICF, and WHO-QOL. Workers at metro stations must perform strenuous jobs, such as standing for long hours or walking, performing repetitive activities, and maintaining awkward postures during work hours. They are therefore more prone to musculoskeletal disorders (MSDs) and their symptoms. Objective was to determine the prevalence of activity limitations among long-standing metro station workers with WRMSD.
Methods: A cross-sectional study involving 100 Bangalore metro station workers aged 20-45 were assessed for their activity limitation using ICF core sets and REBA score derived from captured postures of most awkward positions maintained by the subjects for more than a minute. Consent was obtained and WHO-QOL BREF questioner was used to evaluate their overall productivity.
Results: The findings revealed that 67% of participants had WMSDs, and that there were significant relationships between musculoskeletal discomfort and demographic traits. The results highlight the need for targeted ergonomic interventions and workplace changes in order to improve the health of workers at metro stations.
Conclusions: In conclusion the study revealed a high percentage of prevalence of WRMSD among long standing metro station workers as well as a negative association between age and activity restriction, suggesting that as age increases, the amount of activity limitation tends to decrease.

Keywords: Activity limitation, ICF, Metro workers, Musculoskeletal disorders, Participation restriction, REBA, WHO-QOL

INTRODUCTION

A musculoskeletal disorder (MSD) refers to an injury or condition that has an effect of the musculoskeletal system in body of a human, which includes blood vessels, nerves, cartilage, tendons, ligaments, joints, and spinal discs. These injuries can occur as a result of repetitive movements, physical forces, and vibrations that are experienced by the human body during the performance of specific job tasks.[1]

Musculoskeletal disorders can be closely associated with work activities and working conditions, playing a significant role in the development of MSDS. MSDs can cause various symptoms, such as aching, stiffness, and fatigue. Muscle twitching, pain that intensifies with movement, and disruptions in sleep patterns. Workplace biomechanical or psychological factors have a direct correlation with the development of musculoskeletal illnesses. Workplace biomechanical or psychological factors have a direct correlation with the development of musculoskeletal illnesses. In addition to posture,

biomechanical risk variables include force, effort, and time. The type of load- static or repetitive- is determined by the length and the sequence of external forces exerted during postural loading and unloading (recovery intervals). These two load types are very taxing and have the potential to cause MSD development. There are two further categories for musculoskeletal disorders (MSDs): specific and non-specific. Nonspecific musculoskeletal disorders include discomfort without any indication of a separate disorder, whereas specific musculoskeletal disorders have distinct clinical features. Patients with musculoskeletal diseases have lower mobility and independence, higher hospitalization rates, and higher mortality rates. Therefore, the health-related quality of life (HRQoL) of patients with any musculoskeletal condition is greatly reduced. However, when workers spend more than 50% of their total working hours in a standing position, which is referred to as prolonged standing.[2]

The International Classification of Functioning, Disability, and Health (ICF) is a framework for describing and organising information on functioning and disability.[3] It provides a standard language and a conceptual basis for the definition and measurement of health and disability. The ICF core set provides a standardised approach to assessing activity limitations and participation restrictions related to specific health conditions or disorders.[3]

The two elements, performance and capacity, can be used to operationalise the scale for the activity limitation and participation restriction domains. These elements provide a mechanism for explaining how an environment affects an individual's actions, as well as how an environment modification may improve an individual's functioning. A clinical evaluation of some kind is necessary to determine a person's capacity, which is defined as what they can accomplish in a typical situation. What they actually do in their current circumstances is referred to as a performance. Activity limitation is defined as the difficulties that someone may encounter when carrying out duties and when engaging in routine activities, an individual may experience participation constraints. Activity constraints, according to the ICF, are obstacles that people encounter in their daily lives or when completing tasks.[4]

The REBA approach is a quick and simple observational postural analysis tool for whole-body exercises that uses direct observation of an employee's posture at their workstation to assess the ergonomic risk factor. The following goals guided the establishment of REBA: Develop an action level with an indication of urgency; segment the body into units that can be individually coded with reference to movement planes; provide a scoring system for muscle activity resulting from static, dynamic, rapidly changing, or unstable positions; acknowledge that coupling is essential for the handling of loads but may not always occur through the hands; and create a postural analysis system that is sensitive to musculoskeletal risks in a variety of tasks. There has been a suggestion that workplace ergonomic risks are predictive of WMSDs; thus, in order to identify a hazard, one should examine its potential manifestations.[5]

According to the WHO, QOL is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns".[6] The World Health Organisation quality of life scale brief version (WHOQOL-BREF) was created to facilitate the assessment of four domains: physical, psychological, social, and environmental, and to provide an easily available and comparable instrument of measurement across national boundaries.[6]

Professionals who are exposed to MSD risk factors start to get tired, and when their bodies cannot recover from that exhaustion, they develop musculoskeletal imbalance. It is well known that a stagnant work attitude may hasten the onset of muscle soreness and tiredness. Daily and prolonged exposure to these conditions can result in chronic pain, which can permanently harm tendons, ligaments, muscles, joints, and other structures. Additionally, enduring discomfort at work can lower productivity and efficiency, and if the pain persists, it can lead to a handicap that eventually renders the worker unable to perform their job.[7]

Significant work-related musculoskeletal disorders (WMSDs) can have a notable impact on the productivity and quality of life of metro station workers. Metro workers often perform physically demanding tasks that can put stress on their musculoskeletal system, increasing the risk of developing WMSDs. The nature of the work in metro stations includes repetitive movements, prolonged standing or walking, and maintaining awkward postures.

These activities can lead to the development of WMSDs over time, including conditions such as back pain, neck and shoulder pain, joint injuries, and tendonitis. Moreover, WMSDs can have a significant impact on metro station workers' quality of life. Chronic pain and discomfort can reduce their overall well-being and make it difficult for them to engage in daily activities, both at work and in their personal lives. Quality of life (QOL) is a concept that aims to capture the well-being of a population or individual in terms of both positive and negative elements within the entirety of their existence at a specific point in time.[8]

QOL assessment helps us to evaluate the seriousness of the illness which is interfering with normal functioning and affecting social role performance. It also helps us in determining the root cause tension and stress in patients. WMSDs are frequent among the contemporary working population and may induce long-term absences, demand disability benefits, and result in low quality of life (QOL).[9]

Thus, the principal purpose of the study is to ascertain the level of activity limitation in long-standing metro station workers with work-related musculoskeletal disorders related to their field of work using the ICF core set, as well

as to assess the prevalence of these conditions and employee's quality of life using the REBA and WHO-QOL BREF questionnaires.

METHODS

This observational, cross-sectional study was conducted over six months, from November to April, at Bengaluru Metro Stations, targeting metro station workers employed at Namma Metro Bengaluru. A total of 100 participants were selected using non-probability, convenience sampling. The inclusion criteria comprised metro station workers aged 20-45 years, both males and females, with long-standing working hours of ≥8 hours daily. Exclusion criteria included individuals unwilling to provide informed consent and those with recent fractures, systemic illnesses, congenital anomalies, or recent surgeries. Data collection utilized tools such as the International Classification of Functioning, Disability, and Health (ICF), the WHO-QOL BREF questionnaire, and the rapid entire body assessment (REBA). Ethical approval was secured before the study, and informed consent was obtained from all participants. Statistical methods were applied to analyse the collected data effectively.

RESULTS

The present study is an observational study design aimed at finding out the prevalence of activity limitation due to work-related musculoskeletal disorders in long-standing metro station workers. The ICF, the WHO-QOL BREF, and the REBA were the three outcome measures used in this study to assess the prevalence of activity limitation caused by musculoskeletal disorders as well as the prevalence of WRMSD and QOL among long-term metro station workers.

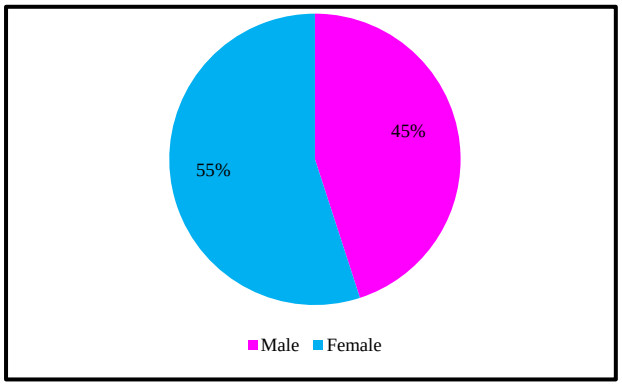

Figure 1: Gender distribution.

To ensure the credibility of the results, all the data were obtained via evaluation. In total, 100 metro station workers participated in the study, out of which 55% were female and 45% were male Figure 1.

Among the 100 participants, the prevalence of WRMSD was low (15%), medium (67%), and high (18%) (Figure 2).

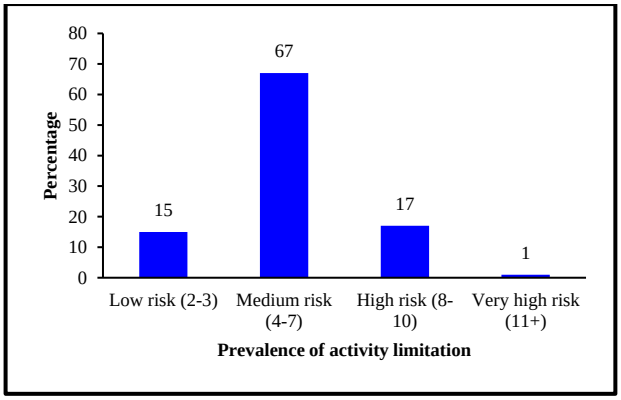

Figure 2: prevalence of REBA.

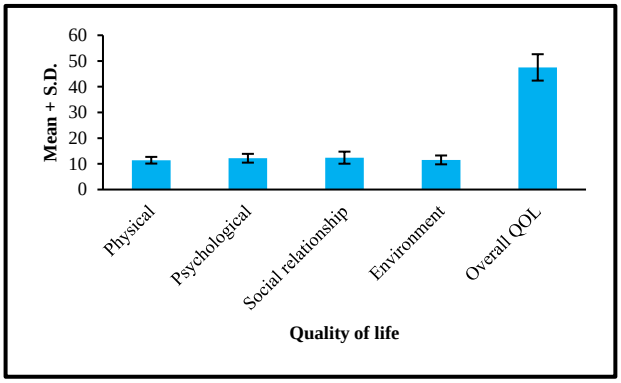

Figure 3: Quality of life.

Quality of life (QOL) assessments across various domains (physical, psychological, social relationships, environment, and overall QOL) showed no significant differences between genders or across different levels of activity limitation. The domains of QOL were generally positively correlated with each other ($p<0.05$), indicating that improvements in one domain often correlated with improvements in others (Figure 3).

Overall, the study provides insights into the occupational health and quality of life of the participants. It highlights significant gender differences in hours of work, but no substantial differences in other demographic factors or quality of life domains. The findings suggest that while there are variations in occupational risk and work hours between genders, these differences do not significantly impact overall quality of life or perceived ergonomic risk.

The prevalence and comparison of activity limitations and participation restrictions among participants, as shown in the tables, suggests that the performance and capacity in various tasks (e.g., managing daily routine, changing body positions, squatting, walking) were significantly different, indicating varying degrees of difficulty across tasks.

Significant differences were observed between males and females in managing their daily routines (capacity), with females reporting higher difficulties (Table 1).

Table 1: Prevalence of activity limitations and participation restriction in WRMSD.

		No difficulty	Mid difficulty	Moderate difficulty	Severe difficulty	Complete difficulty
Managing daily routine	Performance	15	64	21	0	0
	Capacity	31	65	4	0	0
Change in basic body position	Performance	6	54	39	1	0
	Capacity	22	72	6	0	0
Lying down	Performance	15	66	19	0	0
	Capacity	25	74	1	0	0
Squatting	Performance	0	34	58	8	0
	Capacity	5	56	36	3	0
Kneeling	Performance	0	23	66	11	0
	Capacity	3	49	46	2	0
Sitting	Performance	22	50	23	5	0
	Capacity	26	62	11	1	0
Standing	Performance	1	9	53	36	1
	Capacity	2	26	54	18	0
Bending	Performance	0	59	40	1	0
	Capacity	4	82	9	5	0
Maintaining the body position	Performance	0	75	23	2	0
	Capacity	7	88	5	0	0
Maintaining a sitting position	Performance	16	65	17	2	0
	Capacity	25	66	9	0	0
Maintaining a standing position	Performance	2	14	62	21	1
	Capacity	6	34	47	13	0
Walking	Performance	1	59	40	0	0
	Capacity	10	73	17	0	0
Walking short distance	Performance	7	54	39	0	0
	Capacity	18	74	8	0	0
Walking for a long distance	Performance	10	79	11	0	0
	Capacity	59	38	3	0	0
Climbing	Performance	0	17	68	14	1
	Capacity	1	44	52	3	0
Using transport	Performance	12	47	38	3	0
	Capacity	21	55	24	0	0

The majority of the 100 participants had mild difficulty (64%) managing their daily routine; 21% had moderate difficulty; and 15% had no difficulty in the performance. Most of the cases had mild difficulty (65%) managing their daily routine, and 4% had moderate difficulty. In 31% of cases, there was no difficulty managing their daily routine. None of the participants experienced severe or complete difficulty in their performance or capacity to manage their daily routine. The majority of the participants experienced mild difficulty (54%) in performing the change in basic body position, moderate difficulty (39%), and severe difficulty (1%). 6% of the cases had no trouble performing the change in basic body position, and none of them had complete difficulty. Regarding the capacity for change in basic body positions, the majority had mild difficulty (72%), moderate difficulty (6%), and 22% had no difficulty, and there were no cases of complete or severe difficulty in the capacity for change in basic body positions.

66% of the cases had mild difficulty in the performance of lying down, 19% had moderate difficulty, and 15% had no difficulty in the performance. Most of the cases had mild difficulty (74%) in lying down, followed by moderate difficulty (1%). 25% of the participants had no difficulty in the capacity of lying down, and none of the cases experienced severe or complete difficulty either in the performance or in the capacity of lying down. The majority of the subjects experienced moderate difficulty (58%) in the squatting performance, mild difficulty (34%), and severe difficulty (8%). 56% of the participants had mild difficulty in the capacity of squatting; 36% had moderate difficulty; 3% had severe difficulty; and 5% of cases had no difficulty in the capacity of squatting. Most of the subjects had moderate difficulty (66%) in the kneeling performance, mild difficulty (23%), and severe difficulty (11%). 49% of the participants had mild difficulty in the capacity of kneeling; 46% had moderate difficulty; 2% experienced severe difficulty; and 3% had no difficulty in the capacity of kneeling.

Regarding sitting performance, most of the cases had mild difficulty (50%), moderate difficulty (23%), severe difficulty (5%), and 22% had no difficulty in sitting performance. 62% of the subjects felt mild difficulty in sitting; moderate difficulty was found among 11%, and 1% felt severe difficulty. 26% of the cases had no difficulty in the capacity of sitting, and none of the participants had complete difficulty in the performance or capacity of sitting. The majority of the cases had moderate difficulty (53%) in standing; 36% had severe difficulty, and 9% had mild difficulty. The 1% experienced complete difficulty in the performance of standing. Most of the participants felt moderate difficulty (54%) in standing, then mild difficulty (26%), severe difficulty (18%), and no difficulty (2%). Most of the cases had mild difficulty (59%) in the performance of bending, 40% had moderate difficulty, and 1% had severe difficulty in the performance of bending. Mild difficulty in the capacity of bending was found among 82% of the participants; 9% had moderate difficulty, 5% had severe difficulty, and 4% had no difficulty in the capacity of bending. There were no cases of complete difficulty in bending performance or capacity.

The majority of the subjects had mild difficulty (75%) in maintaining their body position, 23% had moderate difficulty, and 2% had severe difficulty. 88% had mild difficulty in the capacity of maintaining the body position; 5% had moderate difficulty; and 7% had no difficulty in the capacity of maintaining the body position. Most of the participants had mild difficulty (65%) maintaining a sitting position, 17% had moderate difficulty, and 2% had severe difficulty. 16% of the subjects had no trouble maintaining a sitting position. The majority (66%) had mild difficulty maintaining a sitting position, 25% had no difficulty, and 9% had moderate difficulty. None of the participants experienced complete difficulty in their performance or capacity to maintain their body position or sitting position. 62% of the cases had moderate difficulty maintaining a standing position; 21% had severe difficulty; 14% had mild difficulty; 1% had complete difficulty; and 2% had no difficulty performing. Most of the cases were found to have moderate difficulty (47%) in maintaining a standing position, 34% had mild difficulty, 13% had severe difficulty, and 2% had no difficulty in maintaining a standing position.

Mild difficulty in the performance of walking was found in 59% of the cases, followed by moderate difficulty (40%), and no difficulty (1%) in the performance. The capacity for walking reveals mild difficulty (73%), moderate difficulty (17%), and no difficulty (10%). There were no cases of severe or complete difficulty with walking performance or capacity. Regarding walking short distance, the performance levels were no difficulty (7%), mild difficulty (54%), and moderate difficulty (39%), and its capacity was no difficulty (18%), mild difficulty (74%), and moderate difficulty (8%). Most of the cases were found to have mild difficulty (79%) in the performance of walking for a long distance, 11% had moderate difficulty, and 10% had no difficulty in the performance. 50% of subjects had no difficulty walking a long distance, 38% had mild difficulty, and 3% had moderate difficulty. None of the participants had severe or complete difficulty in the performance or capacity of walking short or long distances.

68% of the subjects had moderate difficulty climbing, 17% had mild difficulty, and 14% had severe difficulty. Most of the cases had moderate difficulty (52% in the capacity of climbing), followed by mild difficulty (44%), severe difficulty (3%), and 1% with no difficulty. The majority of the cases had mild difficulty (47%) in the performance of using transport; 38% had moderate difficulty; 3% had severe difficulty; and 12% had no difficulty in the performance of using transport. Regarding the capacity to use transport, the majority had mild difficulty (55%), 24% had no difficulty, and 21% of cases were presented with no difficulty. Also, none of the participants had complete difficulty regarding the performance or capacity of using transport (Table 1).

The mean score for managing daily routine: performance was 1.06±0.60 with mean deviation 0.39 and for capacity it was 0.73±0.53 with mean deviation 0.45; change in basic body position: performance was 1.35±0.61 with mean deviation 0.54, and capacity 0.84±0.51 with mean deviation 0.37; lying down performance was 1.04±0.59 with mean deviation 0.36, and capacity 0.76±0.45 with mean deviation 0.38; squatting performance was 1.74±0.60 with mean deviation 0.50, and capacity 1.37±0.63 with mean deviation 0.55; kneeling performance was 1.88±0.57 with mean deviation 0.40, and capacity 1.47±0.59 with mean deviation 0.55; sitting performance was 1.11±0.80 with mean deviation 0.60, and capacity 0.87±0.63 with mean deviation 0.46; standing performance was 2.27±0.68 with mean deviation 0.56, and capacity 1.88±0.72 with mean deviation 0.53; bending performance was 1.42±0.52 with mean deviation 0.50, and capacity 1.15±0.56 with mean deviation 0.34; maintaining the body position performance was 1.27±0.49 with mean deviation 0.41, and capacity 0.98±0.35 with mean deviation 0.41; maintaining a sitting position performance was 1.05±0.64 with mean deviation 0.40, and capacity 0.84±0.56 with mean deviation 0.42; maintaining a standing position performance was 2.05±0.69 with mean deviation 0.44, and capacity 1.67±0.78 with mean deviation 0.66; walking performance was 1.39±0.51 with mean deviation 0.49, and capacity 1.07±0.52 with mean deviation 0.32; walking short distance performance was 1.32±0.60 with mean deviation 0.53, and capacity 0.90±0.50 with mean deviation 0.32; walking for a long-distance performance was 2.01±0.46 with mean deviation 0.22, and capacity 1.44±0.56 with mean deviation 0.42; climbing performance was 1.99±0.60 with mean deviation 0.34, and capacity 1.57±0.57 with mean deviation 0.53; using transport performance was 1.32±0.72 with mean deviation 0.62, and capacity 1.03±0.67 with mean deviation 0.47 (Table 2).

Table 2: Descriptive statistics for activity limitation and participation restriction in WRMSD.

		Mean	SD	Mean deviation
Managing daily routine	Performance	1.06	0.60	0.39
	Capacity	0.73	0.53	0.45
Change in basic body position	Performance	1.35	0.61	0.54
	Capacity	0.84	0.51	0.37
Lying down	Performance	1.04	0.59	0.36
	Capacity	0.76	0.45	0.38
Squatting	Performance	1.74	0.60	0.50
	Capacity	1.37	0.63	0.55
Kneeling	Performance	1.88	0.57	0.40
	Capacity	1.47	0.59	0.55
Sitting	Performance	1.11	0.80	0.60
	Capacity	0.87	0.63	0.46
Standing	Performance	2.27	0.68	0.56
	Capacity	1.88	0.72	0.53
Bending	Performance	1.42	0.52	0.50
	Capacity	1.15	0.56	0.34
Maintaining the body position	Performance	1.27	0.49	0.41
	Capacity	0.98	0.35	0.14
Maintaining a sitting position	Performance	1.05	0.64	0.40
	Capacity	0.84	0.56	0.42
Maintaining a standing position	Performance	2.05	0.69	0.44
	Capacity	1.67	0.78	0.66
Walking	Performance	1.39	0.51	0.49
	Capacity	1.07	0.52	0.32
Walking short distance	Performance	1.32	0.60	0.53
	Capacity	0.9	0.50	0.32
Walking for a long distance	Performance	2.01	0.46	0.22
	Capacity	1.44	0.56	0.52
Climbing	Performance	1.99	0.60	0.34
	Capacity	1.57	0.57	0.53
Using transport	Performance	1.32	0.72	0.62
	Capacity	1.03	0.67	0.47

DISCUSSION

This study provides valuable insights into the prevalence and risk of WRMSD among long-standing metro station workers in Bangalore. It is an observational study. The outcome measures utilised were REBA, WHO-QOL BREF questionnaire, and ICF core set, and the analysis was done by the SPSS program.

A total of 100 metro station workers participated in this investigation. The study was done according to age, gender, height, weight, BMI, working hours, and years of experience.

The study indicated that 85% of workers were rated at medium to very high risk for WRMSD according to the rapid entire body assessment (REBA). Specifically, 67% were evaluated as medium risk, 17% as high risk, and 1% as very high risk.

This study used the ICF and the WHO-QOL BREF questionnaires to get a detailed picture of how various illnesses impair not only physical functioning but also overall quality of life.

Furthermore, the demographic study, which included both male and female workers aged 20-45, gave substantial insights into the influence of gender and age on WRMSD prevalence. With 55% of the sample being female and 45% male, the study shows that female workers, who may experience specific ergonomic challenges in physically demanding industries, are particularly vulnerable. Gender comparisons also indicated that males worked greater hours on average (10.3 hours per day compared to 9.5 hours for females).

The association between demographic characteristics and activity restrictions was also obvious in our data. While previous research, such as that by Hogg-Johnson et al, indicated that gender differences in occupational roles can

lead to varying levels of musculoskeletal discomfort, our analysis revealed that female workers reported greater activity restrictions despite similar levels of work experience between genders.[11]

This finding coincides with the work of Krishnan and Raju, which showed that women in physically demanding jobs often suffer increased ergonomic risks, presumably due to variations in body mechanics and physical strength.[10]

The current study, as well as Kothare and Shakkarwar, reveal a high prevalence of WRMSDs among labour-intensive metro workers.[9] The current study indicated a 65% prevalence of MSDs, while Kothare and Shakkarwar reported comparable findings among 120 workers aged 20 to 45, notably in the 20–24 and 30-34 age groups.[9]

Our study's statistical analysis revealed a negative association between age and activity restriction, suggesting that as age increases, the amount of activity limitation tends to decrease. Study by Sheth et al concludes may reflect adaptation techniques developed by older workers. This study highlights the higher prevalence of WRMSDs among metropolitan bus transit drivers compared to administrative staff, with significant pain reported in the lower back, knees, and hips. Modifiable risk factors such as tobacco use and BMI were found to be significant predictors of WRMSDs. Addressing these factors through lifestyle interventions could reduce the burden of musculoskeletal disorders in this group.[12] Future research should focus on the effectiveness of preventive strategies and other contributing occupational factors.

The independent sample t-test was employed to compare REBA scores between male and female individuals. The results showed no significant difference, with a p-value of 0.134. Male and female participants demonstrated significant differences in activity restrictions ($p<0.05$) when examined using the independent sample t-test. The study indicated that age and years of experience were inversely connected with the physical domain of quality of life ($p<0.05$), indicating that older individuals and those with more experience judged their physical quality of life to be poorer. Arnau et al scoping review analysed 32 ergonomic assessment methods and found that only 6 considered sex as a factor. The limited inclusion of sex-related factors in these methods highlights the need for more comprehensive approaches. The study suggests that considering sex differences is crucial due to varying impacts of musculoskeletal disorders. Integrating sex factors in ergonomic assessments could improve their accuracy and effectiveness.[13]

This study has certain limitations that should be considered while interpreting the findings. The sample size was relatively small, and the use of convenience sampling may limit the generalizability of the results to all metro station workers. The cross-sectional design restricts the ability to establish causal relationships between work-related musculoskeletal disorders (WRMSDs), demographic factors, and quality of life. Additionally, reliance on self-reported measures, such as the WHO-QOL BREF questionnaire, may introduce response bias, potentially affecting the accuracy of the data. The exclusion of individuals with systemic illnesses, congenital anomalies, and recent surgeries may have omitted relevant populations with increased risk factors for WRMSDs. Furthermore, the study did not account for differences in job roles, environmental factors, or psychosocial stressors, which could influence the prevalence of WRMSDs. While tools like REBA provided valuable insights, they may not fully capture the multifaceted nature of musculoskeletal strain and injury. Future research should address these limitations by incorporating longitudinal designs, larger and more diverse samples, and detailed assessments of specific job tasks and environmental conditions.

CONCLUSION

The study revealed a high prevalence of work-related musculoskeletal disorders (WRMSDs) among metro station workers in Bengaluru, with 67% of participants reporting significant musculoskeletal discomfort. The findings highlight a notable association between demographic factors, ergonomic risk, and activity limitations, emphasizing the adverse impact of prolonged standing, repetitive tasks, and awkward postures on workers' health and quality of life. The use of ICF, REBA, and WHO-QOL BREF tools allowed for a comprehensive evaluation of activity limitations, participation restrictions, and quality of life domains. Notably, older workers experienced fewer activity limitations compared to younger counterparts, suggesting adaptive mechanisms or differing job roles.

This study underscores the urgent need for ergonomic interventions, targeted workplace modifications, and regular health monitoring to improve the well-being and productivity of metro station workers. Implementing strategies such as job rotation, improved workstation design, and tailored physical therapy programs can significantly reduce WRMSD risks and enhance workers' quality of life.

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REFERENCES

1. Bernard BP, Putz-Anderson V. Musculoskeletal disorders and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back. US Department of Health and Human Services; 1997.
2. Rush RD. Evaluating the World Health Organization (WHO)'s International Classification of Functioning,

Disability and Health (ICF) as a Biopsychosocial Epilepsy Self-Management Model. University of Iowa; 2020.
3. Maier P. International classification of functioning, disability and health (ICF). LMU München; 2004.
4. Hignett S, McAtamney L. Rapid entire body assessment (REBA). Appl Ergonom. 2000;31(2):201-5.
5. Chang YF, Yeh CM, Huang SL, Ho CC, Li RH, Wang WH, et al. Work ability and quality of life in patients with work-related musculoskeletal disorders. International J Environ Res Public Health. 2020;17(9):3310.
6. Hanumegowda PK, Gnanasekaran S. Risk factors and prevalence of work-related musculoskeletal disorders in metropolitan bus drivers: an assessment of whole body and hand-arm transmitted vibration. Work. 2022;71(4):951-73.
7. Teoli D, Bhardwaj A. Hospice appropriate diagnoses. In: StatPearls Publishing, Treasure Island (FL); 12 2019.
8. Ding X, Guan Z, Liu N, Bi M, Ji F, Wang H, et al. Prevalence and risk factors of work-related musculoskeletal disorders among emerging manufacturing workers in Beijing, China. Front Med. 2023;10:1289046.
9. Kothare H, Shakkarwar K. Work Related Musculoskeletal Symptoms among Metro Rail Workers in Nagpur City. Int J Sci Healthcare Res.2021;6(3):7-12.
10. Krishnan KS, Raju G, Shawkataly O. Prevalence of work-related musculoskeletal disorders: Psychological and physical risk factors. Int J Environ Res Public Health. 2021;18(17):9361.
11. Hogg-Johnson S, van der Velde G, Carroll LJ, Holm LW, Cassidy JD, Guzman J, et al. The burden and determinants of neck pain in the general population: results of the bone and joint decade 2000-2010 task force on neck pain and its associated disorders. J Manipulat Physiol Ther. 2009;32(2):S46-60.
12. Sheth A, Pagdhune A, Viramgami A. Prevalence of work-related musculoskeletal disorders (WRMSDs) and its association with modifiable risk factors in metropolitan bus transit drivers: a cross-sectional comparison. J Fam Med Prim Care. 2023;12(8):1673-8.
13. Serna Arnau S, Asensio-Cuesta S, Porcar Seder R. Musculoskeletal disorders risk assessment methods: a scoping review from a sex perspective. Ergonomics. 2023;66(12):1892-908.
14. Perala A. Occupational workload and musculoskeletal disorders of women bus conductors working in Hyderabad and Secunderabad. Professor Jayashankar Telangana State Agricultural University, Hyderabad; 2016
15. Cho YS, Park JB, Kim S, Lee K. Repeated measures study of the association between musculoskeletal symptoms and mental health in subway workers. Indus Health. 2019;57(6):721-31.

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