



# Mapping Work- Related Musculoskeletal Discomfort (WRMSDs) Among Employees Of The BPO Sector Using A Body Map.

<sup>1</sup>Khushi. C., <sup>2</sup>Roopa. R.

<sup>1</sup> Corresponding Author, Student

Department of Community Resource Management, College of Home Science Nirmala Niketan, (Affiliated to the University of Mumbai), Mumbai – 400 020, Maharashtra State, India

<sup>2</sup> Assistant Professor

Department of Community Resource Management, College of Home Science Nirmala Niketan, (Affiliated to the University of Mumbai), Mumbai – 400 020, Maharashtra State, India

Email: [khushi270203@gmail.com](mailto:khushi270203@gmail.com) , [rooparao72@gmail.com](mailto:rooparao72@gmail.com),

**Abstract:** *The present study investigated the prevalence of Work-Related Musculoskeletal Disorders (WRMSDs) among 160 Business Process Outsourcing (BPO) employees in Mumbai and its suburbs. WRMSDs can arise from repetitive tasks and prolonged periods of sitting. The monotony of the workplace can negatively impact performance due to reduced concentration and boredom. BPO employees in Mumbai, akin to their counterparts in other cities, encounter various Musculoskeletal Disorders (MSDs) as a result of their job demands. The Cornell Musculoskeletal Disorder Questionnaire (CMDQ) was employed to assess the experienced discomfort. Findings demonstrated that the participants were prone to developing WRMSDs, with the lower back and neck being the most affected regions. Additionally, the study identified other work-related health issues such as Repetitive Strain Injuries (RSI), neck-shoulder pain, visual fatigue, and associated discomfort. To address these concerns, BPO companies should prioritize the provision of ergonomic workstations, adjustable furniture, regular breaks, training in proper posture, and education on the significance of maintaining a healthy work-life balance.*

**Key Words:** BPO Employees, CMDQ, Ergonomics, Occupational Health, WRMSDs.

## 1. INTRODUCTION:

In today's rapidly changing, extremely competitive business environment, many businesses from small startups to established corporations – choose to outsource certain services. This is where Business Process Outsourcing (BPO) comes in handy. BPO centers are also known as a call. In many BPO call centers, some agents may stand in for a variety of different businesses, frequently within certain expertise, and individually handle consumer complaints or inquiries. Picking up calls and talking to various customers can be very monotonous. Workplace monotony can lead to poor performance because of lack of concentration and boredom, as well as Work-related Musculoskeletal Disorders (WRMSDs) because of repetitive tasks and prolonged sitting hours. WRMSDs or work-related Musculoskeletal Disorders, are a class of acute conditions affecting the muscles, tendons, and nerves. Examples include tension neck syndrome, thoracic outlet syndrome, tendinitis, and carpal tunnel syndrome. It is difficult to pay attention and be productive due to physical discomfort brought on by elements at work (repetitive motion, poor workstation design, prolonged sitting hours, etc.), which can influence the employee's productivity, which in turn can harm the organization. So, it is crucial to ensure that staff are at ease at work.

## 2. LITERATURE REVIEW:

The rationale for the above study lies in the need to investigate and understand the prevalence of Work-Related Musculoskeletal Disorders (WRMSDs) among Business Process Outsourcing (BPO) employees in Mumbai. BPO work often involves repetitive tasks and prolonged periods of sitting, which can contribute to the development of



musculoskeletal issues. By examining the occurrence of WRMSDs and associated discomfort, the study aims to shed light on the specific areas of vulnerability within the BPO workforce in Mumbai and its suburbs. Work-related musculoskeletal problems comprise a substantial cause of employee disability and lost income. Here, the employee's BMI was considered the primary factor when conducting the study (Sethi, J., et al., 2011). There are no studies that concentrate on the WRMSDs that could be brought on by poor workstation design, excessive hours, insufficient breaks, the workplace environment

Understanding the prevalence of WRMSDs is crucial for several reasons. Firstly, it helps identify the extent of the problem and its impact on the well-being and productivity of BPO employees. This information can guide the development and implementation of targeted interventions to mitigate the risk of WRMSDs. Secondly, by pinpointing the most affected areas, such as the lower back and neck, the study can provide valuable insights into the specific ergonomic challenges faced by BPO employees. This knowledge can inform the design of ergonomic workstations and the provision of appropriate furniture to alleviate discomfort and reduce the occurrence of WRMSDs.

Moreover, investigating the relationship between workplace monotony and WRMSDs contributes to the broader understanding of how psychosocial factors can influence musculoskeletal health. The study recognizes that monotonous work environments can impact performance, concentration, and overall job satisfaction, potentially exacerbating the risk of WRMSDs. By highlighting this connection, the study underscores the importance of addressing not only physical ergonomic factors but also psychosocial aspects to promote a healthier and more productive work environment. Ultimately, the study aims to improve the well-being, health, and performance of BPO employees by identifying the prevalence of WRMSDs and informing the development of appropriate interventions and preventive measures.

### **3. SPECIFIC OBJECTIVES:**

The specific objectives are to (i) understand the demographic profile of the employees in the BPO sector from Mumbai city and its suburbs; (ii) analyze the prevalence of musculoskeletal discomfort experienced with the help of Cornell Musculoskeletal Disorder Questionnaire (CMDQ); and (iii) provide strategies to mitigate its occurrence.

### **4. METHOD:**

A survey-based exploratory study was conducted among 160 employees (70 female and 90 male) from 4 major BPO offices in Mumbai city and its suburbs. An exploratory study investigates problems that have not been thoroughly examined before. A self-constructed and validated questionnaire was employed to conduct structured interviews with each randomly selected participant. The questionnaire was divided into 3 sections; demographic profile, work-related profile, and body map (CMDQ). CMDQ is an open-to-use source ware prepared by Dr. Alan Hedge and his students at Cornell University (<https://ergo.human.cornell.edu/ahmsquest.html>). Simple statistics were used to analyze data in an MS Excel sheet (version 2009). The analyzed results were presented using pivot tables, graphs, and charts.

### **5. DISCUSSION & RESULT:**

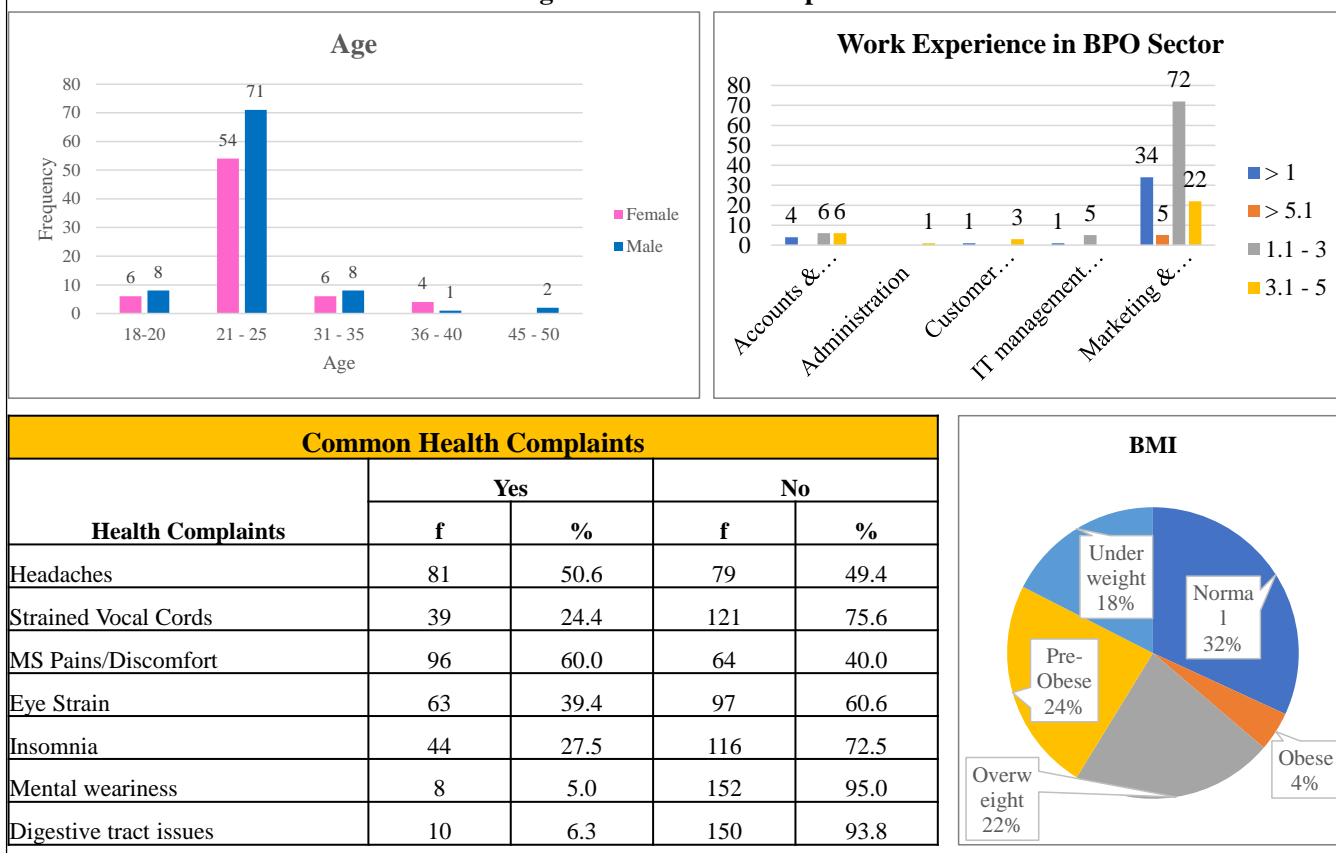
#### **Demographic Profile:**

The profile analysis offers comprehensive facts regarding research participants who are a representative sample of the whole target group. The researchers can use it to determine how closely the sample represents the population. The highlights of the profile of the sample are as follows:

- The average age of the sample is \_\_\_\_\_ years.
- 90 (56%) of the participants were male and 70 (43%) females.
- 86 (53%) are graduates having 19 (11%) have less than one year of related work experience.
- 46 (28%) have 1.1 - 3 years of experience and, a few [3 (1%)] have more than 5.1 years of related work experience.
- Of all the participants the most affected age group is 21-25 years, of which [91(%) ] face no health issues but 31 (19.4%) of them face health issues. Health issues such as headache, eye strain, strained vocal cords, and any psychological disorders, etc. were reported.



Fig 1: Profile of the Sample



### Musculoskeletal Discomfort Experienced

The musculoskeletal discomfort was mapped using the Cornell Modified Discomfort Questionnaire (CMDQ - Cornell University, 1999). The Cornell Musculoskeletal Disorder Questionnaire (CMDQ) can be successfully used to map Musculoskeletal Disorders (MSDs) by following a systematic and comprehensive approach. The CMDQ can be effectively used to map MSDs among BPO employees in Mumbai and its suburbs. The questionnaire provides a standardized approach to collecting data on discomfort and enables a comprehensive assessment of the prevalence and severity of MSDs in different body areas, facilitating evidence-based decision-making for interventions and preventive measures.

Fig 2: Prevalence of MS Discomfort

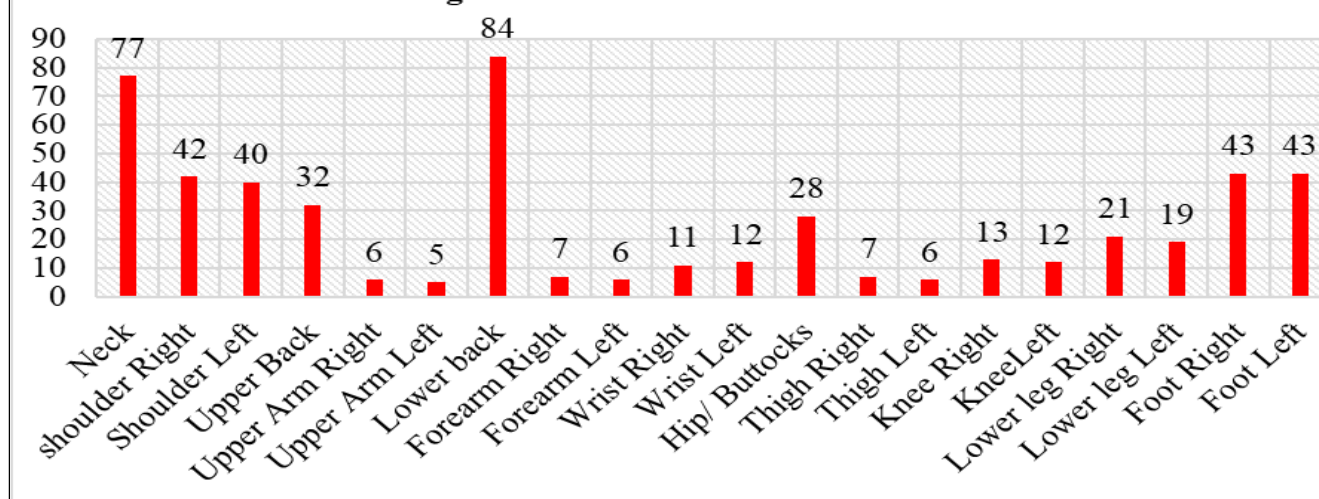




Table A: Prevalence of Body Pains/Aches

Body site	0		1		2		3		4	
	f	%	f	%	f	%	f	%	f	%
Neck	83	51.9	32	20.0	19	11.9	16	10.0	10	6.3
shoulder (R)	118	73.8	18	11.3	16	10.0	6	3.8	2	1.3
Shoulder (L)	120	75.0	18	11.3	13	8.1	5	3.1	4	2.5
Upper Back	128	80.0	16	10.0	12	7.5	3	1.9	1	0.6
Upper Arm (R)	154	96.3	2	1.3	3	1.9	0	0.0	1	0.6
Upper Arm (L)	155	96.9	1	0.6	4	2.5	0	0.0	0	0.0
Lower back	76	47.5	20	12.5	35	21.9	23	14.4	6	3.8
Forearm (R)	153	95.6	2	1.3	3	1.9	0	0.0	2	1.3
Forearm (L)	154	96.3	4	2.5	2	1.3	0	0.0	0	0.0
Wrist (R)	149	93.1	5	3.1	5	3.1	1	0.6	0	0.0
Wrist (L)	148	92.5	7	4.4	4	2.5	1	0.6	0	0.0
Hip/ Buttocks	132	82.5	8	5.0	11	6.9	9	5.6	0	0.0
Thigh (R)	153	95.6	5	3.1	21	13.1	0	0.0	0	0.0
Thigh (L)	154	96.3	5	3.1	1	0.6	0	0.0	0	0.0
Knee (R)	147	91.9	6	3.8	1	0.6	4	2.5	2	1.3
Knee (L)	148	92.5	5	3.1	1	0.6	4	2.5	2	1.3
Lower leg (R)	139	86.9	9	5.6	8	5.0	4	2.5	0	0.0
Lower leg (L)	141	88.1	8	5.0	7	4.4	4	2.5	0	0.0
Foot (R)	117	73.1	20	12.5	16	10.0	7	4.4	0	0.0
Foot (L)	117	73.1	20	12.5	16	10.0	7	4.4	0	0.0

In the study involving 160 participating employees, it was observed that a significant proportion experienced discomfort in various areas of their bodies. Specifically, 77 individuals (48%) reported neck pain, while 84 employees (52%) indicated lower back pain. Moreover, 42 employees (26%) expressed discomfort in their right shoulder, and 40 employees (25%) reported pain in their left shoulder. Upper back pain was reported by 32 employees (20%), while 28 employees (17%) experienced discomfort in their hip and buttocks region.

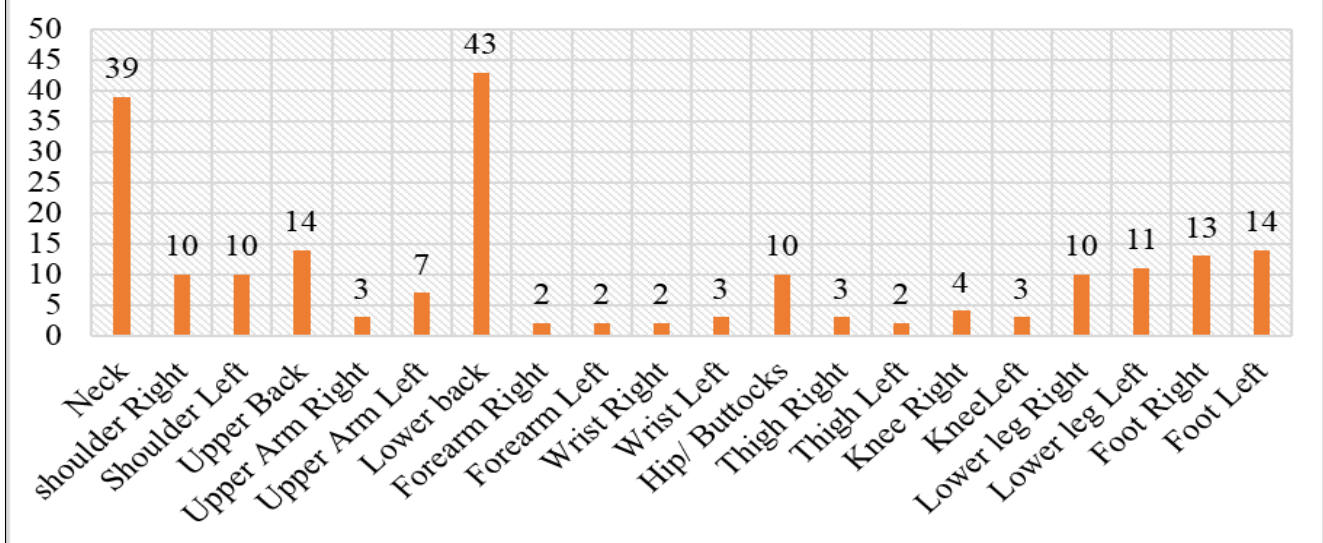
Regarding the perceived level of discomfort, it was found that 75 employees (46%) found the pain in their neck area to be uncomfortable. In addition, 42 employees (26%) experienced discomfort in their right shoulder, whereas 40 employees (25%) suffered from pain in their left shoulder. Lower back discomfort was reported by 82 employees (26.9%). Furthermore, a smaller proportion of employees (6%) found the pain in their upper arm to be uncomfortable, while 43% expressed that foot pain caused significant discomfort.

Additionally, the study revealed that the reported pain experienced by employees had a noticeable impact on their workability. Specifically, 43% of the employees attributed their reduced workability to lower back pain. Furthermore, 39% of employees reported that neck pain adversely affected their workability. Concerning shoulder pain, 10% of the employees indicated that their workability was disrupted by pain in their right or left shoulder.

These findings underscore the significant correlation between musculoskeletal pain and work ability among BPO employees. By recognizing the impact of pain on work performance, it becomes crucial for organizations to prioritize interventions that address these specific areas of discomfort. Improving work conditions and providing necessary support can help alleviate pain and enhance the overall workability and productivity of employees. Such information can inform targeted interventions and strategies aimed at addressing these musculoskeletal issues and improving the overall well-being of the employees.



**Fig 3: Pain interferes with ability to perform work-related duties**



## 6. SUGGESTIONS BASED ON THE RESULTS OF THE STUDY:

The control hierarchy can be utilized to effectively mitigate health issues among employees in the BPO sector. The control hierarchy is a systematic approach that prioritizes strategies to control and eliminate workplace hazards. Based on the results of the study, here are a few effective solutions to mitigate the occurrence of bodily discomfort:

### a. Elimination/Substitution:

The highest level of control is to eliminate or substitute the hazard altogether. BPO companies can assess the work processes and identify tasks that contribute to musculoskeletal issues. By eliminating or substituting these tasks with less physically demanding alternatives, the risk of developing health issues can be significantly reduced. For example, implementing voice recognition software or automated systems to reduce excessive typing and mouse usage can help alleviate repetitive strain injuries.

### b. Engineering Controls:

If elimination or substitution is not feasible, engineering controls should be implemented. This involves modifying the work environment or equipment to reduce the risk of injury. BPO companies can:

- Provide ergonomic workstations and adjustable furniture to ensure proper posture and reduce strain on the body.
- Use ergonomically designed keyboards, mouse, and other input devices that minimize stress on the hands and wrists.
- Install adjustable monitor stands to promote proper eye level and reduce neck strain.
- Implement proper lighting and glare reduction measures to minimize visual fatigue.
- Identify the hazards in the work environment. Implement appropriate changes into action.

### c. Administrative Controls:

Administrative controls focus on modifying work practices and policies to reduce exposure to hazards. BPO companies can:

- Implement regular breaks and rotation of tasks to minimize prolonged sitting and repetitive motions. Provide training and education on proper posture, ergonomics, and the importance of taking breaks.
- Encourage employees to report any discomfort or early signs of musculoskeletal issues for prompt intervention.
- Promote a culture of health and wellness, including initiatives like exercise programs and stress management.
- To avoid or lessen monotony, diversify tasks using two main strategies: job rotation and job enlargement
- Change your work hours, pace, or procedures. Limit the amount of time an employee is required to work
- To organize workshops for the employees where they are given information regarding MSDs and their harmful impact on the body.



**d. Personal Protective Equipment (PPE):**

Personal protective equipment should be considered as the last line of defence. While PPE may not directly address MSDs, it can provide additional support and protection. BPO companies can:

- Provide employees with wrist supports, lumbar cushions, and other ergonomic aids as necessary.
- Select proper PPE while working
- Do not spend extended periods sitting or performing repetitive tasks. Every 30 minutes, take a short break to stand, stretch, and move.
- Adjust the workstation according to the employee.

It is important to note that the control hierarchy should be implemented in a holistic and integrated manner. A combination of multiple control measures is often necessary to effectively mitigate health issues among BPO employees. Regular monitoring, evaluation, and feedback from employees can help refine and improve these control measures over time.

**7. SCOPE OF THE STUDY:**

This study on Musculoskeletal Disorders (MSDs) among Business Process Outsourcing (BPO) employees in Mumbai city and its suburbs is primarily focused on investigating the prevalence of Work-Related Musculoskeletal Disorders (WRMSDs) within this specific population. The study aims to assess the extent of MSDs among BPO employees and identify the areas of the body that are most affected by these disorders. Furthermore, the study seeks to explore the impact of workplace monotony on MSDs and employee performance. It examines how repetitive tasks and prolonged sitting hours contribute to the development of MSDs and the potential consequences on concentration, job satisfaction, and overall productivity. The study acknowledges the importance of addressing the identified issues and suggests potential measures to mitigate MSDs among BPO employees. It highlights the significance of ergonomic workstations, adjustable furniture, regular breaks, training on proper posture, and promoting a healthy work-life balance as possible interventions to alleviate discomfort and reduce the occurrence of WRMSDs.

The scope of the study is limited to BPO employees in Mumbai City and its suburbs, providing insights into the specific challenges faced by this workforce concerning MSDs. The findings and recommendations from this study can potentially be utilized by BPO companies in the region to enhance their work environments and support the well-being of their employees. However, it is important to note that the study's scope does not extend to evaluating the effectiveness of implemented interventions or exploring the long-term outcomes of addressing MSDs in this context.

**AUTHOR'S STATEMENTS:**

- Acknowledgment: The authors express their sincere gratitude to the BPO offices and their employees for their invaluable contributions to this research study.
- Informed Consent: Before their participation, all 160 participants provided written informed consent, demonstrating their understanding of the study's objectives, procedures, and potential risks.
- Conflict of Interest: The authors disclose that they have no conflicting interests that could potentially influence the objectivity or integrity of the research conducted.

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