Prevalence and Factors Associated with Occupational Musculoskeletal Disorders Among Preschool Educators

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ABSTRACT

Musculoskeletal disorders (MSDs), which include inflammatory and degenerative disorders that affect the lower back, neck, and upper and lower limbs, are among the leading causes of occupational injuries. Preschool services are essential in modern societies since they have a strategic role, in concert with families, in sustaining children's whole development (e.g., emotional, social, physical, and cognitive). In this context preschool teachers, who are professionals, mostly women are properly trained to fulfill these aims and carry out a job primarily of a relational nature, consisting of nurturing and teaching children under the age of six years, as well as constantly interacting with their parents.

However, an under-considered aspect of the preschool teaching profession is that the job requires the mobilization not only of emotional but also of physical resources. Teachers are constantly required to lift, bend, or carry children as well as sit on small furniture or on the floor to take care of, play with, and interact with children. As the facilities are usually designed to be height-appropriate for children, preschool teachers are bound to adopt awkward body postures to perform their work tasks. Research has demonstrated how these kinds of physical demands negatively impact preschool teachers' musculoskeletal systems. According to research, the incidence rate of musculoskeletal disorders (MSDs) among such teachers is quite high, varying from 39% to 95%. MSDs involve various body regions, particularly the back, neck, shoulders, and knees.

There is no research done on the safety and ergonomical aspect of preschool teachers whereas there has been plenty of literature that tells what to do when it comes to the safety of preschool teachers but nothing has been implemented. Therefore, based on this gap analysis this research study has been formulated. To address this gap, 40 preschools were examined and in-depth interviews with 60 educators using a validated self-constructed questionnaire and an adapted safety checklist. Furthermore, observational methods were employed to capture real-time behaviours and interactions in the studied environment.

The objectives of this research were to analyze the postures adopted by teachers while doing daily activities in schools using the Owako Working Posture Analysing System [OWAS] and to analyze the risk of Musculoskeletal Disorders and Injuries among preschool teachers using Cornell Musculoskeletal Discomfort Questionnaires [CMDQ]. This study also aims to identify hazards and it reveals that Physical hazards were found to be the most prevalent, emphasizing the urgent need for safety measures.

Psycho-social hazards closely followed, indicating the importance of addressing emotional and social well-being. Safety hazards underscored the need for accident prevention, while ergonomic hazards suggested a necessity for improved design considerations.

Chemical hazards, though less common, warrant careful management for a secure environment, and biological hazards, while the least prevalent, still require attention to hygiene standards. This study contributes to creating safer and more efficient preschool environments, benefiting educational quality and the well-being and betterment of preschool teachers.

Key Words: OWAS, CMDQ, Musculoskeletal Disorders, Hazards, Postures, Preschool teachers.

INTRODUCTION

Musculoskeletal disorders (MSDs), which include inflammatory and degenerative disorders that affect the lower back, neck, and upper and lower limbs, are among the leading causes of occupational injuries and have a considerable socio-economic impact. Epidemiological and experimental studies have shown that the physical work features currently cited as MSD risk factors include rapid work pace, repetitive motion patterns, insufficient recovery time, heavy lifting, and awkward body postures (Rao, 2018).

Preschool teachers are expected to handle a range of duties, such as feeding and cleaning the classroom and educating and supervising. From a metabolic standpoint, these tasks lead to various postures used throughout the workday, such as walking, stooping, lifting, crouching, extended standing, and kneeling. The resulting workload is characterized as mild exercise. Preschool teachers perform their work with awkward body postures, such as a "head down" posture or bending down at the waist and adopting a posture of sustained trunk flexion, as well as prolonged periods of stooping and knee-straining postures, such as squatting and kneeling to be at the level of the child, because the facilities are typically designed to be height-appropriate for children. Several studies have shown that even percentages as low as 6% of the work shift spent in knee-straining postures can result in elevated risks of MSDs, specifically knee osteoarthritis (Hsu & Siwiec., 2023).

Few internationally published studies, mostly from Japan, Sweden, and the USA have looked into MSDs in preschool teachers. Research indicates that teaching may be a high-risk profession for MSDs). According to a comprehensive review by Erick and Smith between 40% and 95% of teachers and preschool teachers have MSDs (Patience N. Erick, 2011).

In addition to lower extremity MSDs, there has been a documented rise in the prevalence of neck, shoulder, arm, and lower back pain. Even little research has been done on how to lower MSDs in the preschool setting by addressing the possible work aspects that affect the chance of acquiring MSDs. Despite this, there is a dearth of literature on the subject. Moreover, the stress and strain of jobs in this field have been the subject of very little research and even fewer studies have examined the objective musculoskeletal burden.

The effectiveness of current strategies to lessen physical strain brought on by work-related variables and enhance posture while performing this job has not yet been assessed or proven. Numerous researches suggest that preschool teachers experience significant psychological stress levels in addition to physical stress. This is a topic that will only get worse over time as more kids enter preschool. Preschool workplace complaints about excessive stress are becoming more and more common

This study attempts to design ergonomically safe preschool environments, forging a path to enhance the safety, health, and developmental prospects of educators.

In the vibrant world of preschools, the safety and well-being of their dedicated teachers take centre stage. This research delves into a comprehensive study that scrutinizes every nook and cranny of preschool safety and conducts an ergonomic assessment to safeguard the health of our educators.

AIM and Specific Objectives

The main aim of the study this to determine the prevalence and factors associated with occupational musculoskeletal disorders among preschool educators. The specific objectives are to: (i) analyze the postures adopted by teachers while doing daily activities in preschools. (OWAS); and (ii) analyze the risk of MSDs and injuries among staff using (CMDQ)

Rationale

To provide the groundwork for a child's future intellectual and social success, preschool teachers are essential. Young children can acquire vital abilities including language development, problem-solving, and social interaction in their supportive and stimulating environment. Early childhood educators cultivate imagination,

inquisitiveness, and a passion for education, laying the groundwork for lifetime learning success. They also help kids grow emotionally and socially by teaching them how to communicate, settle disputes, and engage in constructive social interactions. Preschool teachers are more than just academic instructors; they are dependable mentors and role models who assist kids in developing life skills and self-worth that will carry over into adulthood.

Creating a safe learning environment aligned with ergonomic principles greatly enhances the well-being of our preschool teachers. Pre-school teachers were chosen as the research study topic because it was acknowledged that none of the preschools has given importance to musculoskeletal disorders in preschool teachers. It was recognised that although there have been a few researches done on this topic none of the recommendations and suggestions have been implemented to date. Therefore, based on this gap analysis this research study "Prevalence and factors associated with occupational musculoskeletal disorders among preschool educators." has been formulated.

This study delves into the realm of designing ergonomically safe preschool environments, forging a path to enhance the safety and health of our preschool teachers. An environment attuned to ergonomic principles substantially enhances the teachers, wellbeing. Conducive surroundings foster better health and good posture in contrast to unwanted discomfort along with aches and pains. With preschool teachers and staff deeply immersed in diverse child-centered activities, ensuring a safer, comfortable milieu not only bolsters job satisfaction but also curtails work-related stress and minimizes the vulnerability to occupational injuries.

By using the Owako Working Posture Analysing System [OWAS] and the Cornell Musculoskeletal Discomfort Questionnaires [CMDQ] the musculoskeletal health of our preschool teachers was analyzed (Ming-Hsu W., 2019). It can contribute to valuable insights as well as foster heightened cognizance and widespread adoption of ergonomic safety norms across the educational spectrum. By shedding light on the challenges faced by the preschool teachers we can reduce the rate of MSDs and injuries among staff and create a safer working environment for them.

Choosing "Prevalence and factors associated with occupational musculoskeletal disorders among preschool educators." as a research topic is a holistic approach to understanding the risks posed to the staff, prioritized remedial measures grounded in hazard severity, and pragmatic counsel to tackle pinpointed hazards. By conducting thorough research, analyzing the data, and implementing recommended interventions the research can contribute to yield refined ergonomic safety, curtailing injury incidence, and abating the risk of musculoskeletal disorders. Moreover, these interventions stand to amplify staff well-being, reinforce legal compliance, and cultivate a reputation of conscientious and safety-centric institutional ethos.

METHODOLOGY

Research methodology is a structured approach used to carry out research, which includes various methods and techniques for gathering, analyzing, and interpreting data. It guides the overall plan of the study, covering elements like research design, sampling methods, data collection techniques, and analysis approaches.

Researchers select methods based on their research goals, characteristics of the study population, and practical considerations. Common methods for collecting data include surveys, interviews, observations, experiments, and document analysis. Researchers also acknowledge any limitations of their study, such as sample size or biases, and discuss the implications, significance, and suggestions for future research.

This topic was chosen because it was acknowledged how important it is to look into risks that preschool teachers may ignore, how subtle they are, and how much of an impact they have.

Study Location: Between August 2023 and February 2024, a descriptive study was carried out to evaluate the risks and hazards in different preschools as well as the musculoskeletal problems in preschool teachers. The study was conducted in Mumbai City and its suburbs.

Research Design: The research design used was an exploratory study, this approach helped in exploring and understanding the unique aspects of each preschool.

Sample Size: A total of forty preschools were visited physically as part of this research. One-on-one interviews with sixty educators during these visits were conducted, spending a significant amount of time with each preschool teacher. The three hours that each preschool survey lasted roughly allowed for in-depth discussions and insightful observations. It challenging to visit forty schools, particularly because we had to reassure them that no pictures would be taken. Another difficult element of the research procedure was persuading educators to reserve time for our interviews. Each participant was provided with informed consent via a worded permission letter.

Sampling Technique: A key component of research design is the sampling technique, which establishes the degree to which study results can be extended to a larger population. The methods and applicability of these strategies differ according to the goals of the study, the characteristics of the population, and the resources at hand. The random technique was used to begin this study before switching to the snowball technique. Random sampling is a sampling technique where every member of the population has an equal chance of being selected for inclusion in the study. It is considered one of the most unbiased and representative methods of sampling. For this study local preschools were looked up on Google, then were mailed with the informed permission, after the appointment was confirmed, the preschool was visited. The Snowball technique is when you start with one or a few participants who meet your criteria, and then you ask them to recommend other people who might also meet those criteria. This process continues, like a snowball rolling down a hill and picking up more snow as it goes until you have enough participants for the study. It's often used when it's hard to find participants through other methods, like in small or specific communities.

Data Collection Tools: The data collection involved utilizing a variety of tools to ensure a comprehensive understanding of the subject matter such as the Owako Working Posture Analysing System [OWAS]. The Owako Working Posture Analysis System is a tool used in many different industries, including preschools, to assess the ergonomic risks related to working postures. The main goal of OWAS is to detect and correct poor ergonomic practices to reduce and lessen the risk of musculoskeletal disorders (MSDs) among workers. In actuality, OWAS entails watching employees while they work and instantly assessing how they are positioned. Next, a code is assigned to each observed posture according to how far it deviates from the neutral or suggested stance. The total risk rating for the work at hand is then determined using these codes. OWAS helped in offering a methodical approach to ergonomics assessment, assisting in the creation of safer and healthier work environments for preschool teachers. The Cornell Musculoskeletal Discomfort Questionnaires [CMDQ] were also used to analyze the risk of Musculoskeletal Disorders and Injuries among preschool teachers. The Cornell Musculoskeletal Disorders Questionnaire (CMDQ) can help determine the musculoskeletal health of preschool teachers by assessing various factors related to discomfort, pain, and ergonomic issues they may experience while performing their job duties. The questionnaire typically asks about different body regions (such as neck, shoulders, back, etc.) and inquires about the frequency, severity, and duration of any musculoskeletal symptoms. By analyzing the responses, researchers or healthcare

professionals can identify common areas of discomfort or pain experienced by preschool teachers, as well as potential ergonomic risk factors contributing to these issues. This information can then be used to develop interventions or ergonomic improvements in the preschool environment to promote better musculoskeletal health and reduce the risk of work-related injuries or discomfort for teachers.

To delve deeper into teachers' perspectives and experiences, one-on-one structured interviews were conducted, allowing for qualitative insights. Furthermore, observational methods were employed to capture real-time behaviours and interactions in their respective preschool environment itself.

Data Analysis: The data analysis included simple statistics such as mean, standard deviation, and percentage and graphs and charts to break down the complicated data into easy-to-understand parts. This helped to get a clear picture and understand the research findings in a detailed way. Through CMDQ and OWAS it was discovered that the most common musculoskeletal parts that cause discomfort and pain in preschool teachers are the neck, right and left shoulder, lower back, and right and left knee.

RESULTS

This section includes the results that have been acquired and their presentation and interpretation. It is an essential part of the research since it offers a thorough summary of the conclusions drawn from the study that was carried out. The gathered data is examined, using a range of statistical tools and approaches to analyze, interpret, and assess the results.

Through a rigorous analysis of the data, researchers can derive significant inferences, detect trends, and establish correlations across variables, ultimately enhancing the thorough understanding of the research subject. Analysis of the postures adopted by teachers while doing daily activities in preschools using the Owako Working Posture Analysing System [OWAS].

The purpose of this assessment was to offer useful tactics and acquire a thorough grasp of preschool educators' job duties, especially about any potential link between these duties and musculoskeletal disorders (MSDs). The OWAS core approach requires evaluating distinct postures employed throughout various activities, such as sitting, standing, and moving teaching rhymes, arts and crafts activities, dancing, playing, etc.

It also considered forward-bending positions that are frequently used when getting ready for before-class exercises. Researchers can learn more about the ergonomics and possible hazards of certain postures by analyzing them. This knowledge can then be used to design ways to enhance posture and reduce the risk of musculoskeletal illnesses.

The results of the findings are as follows:

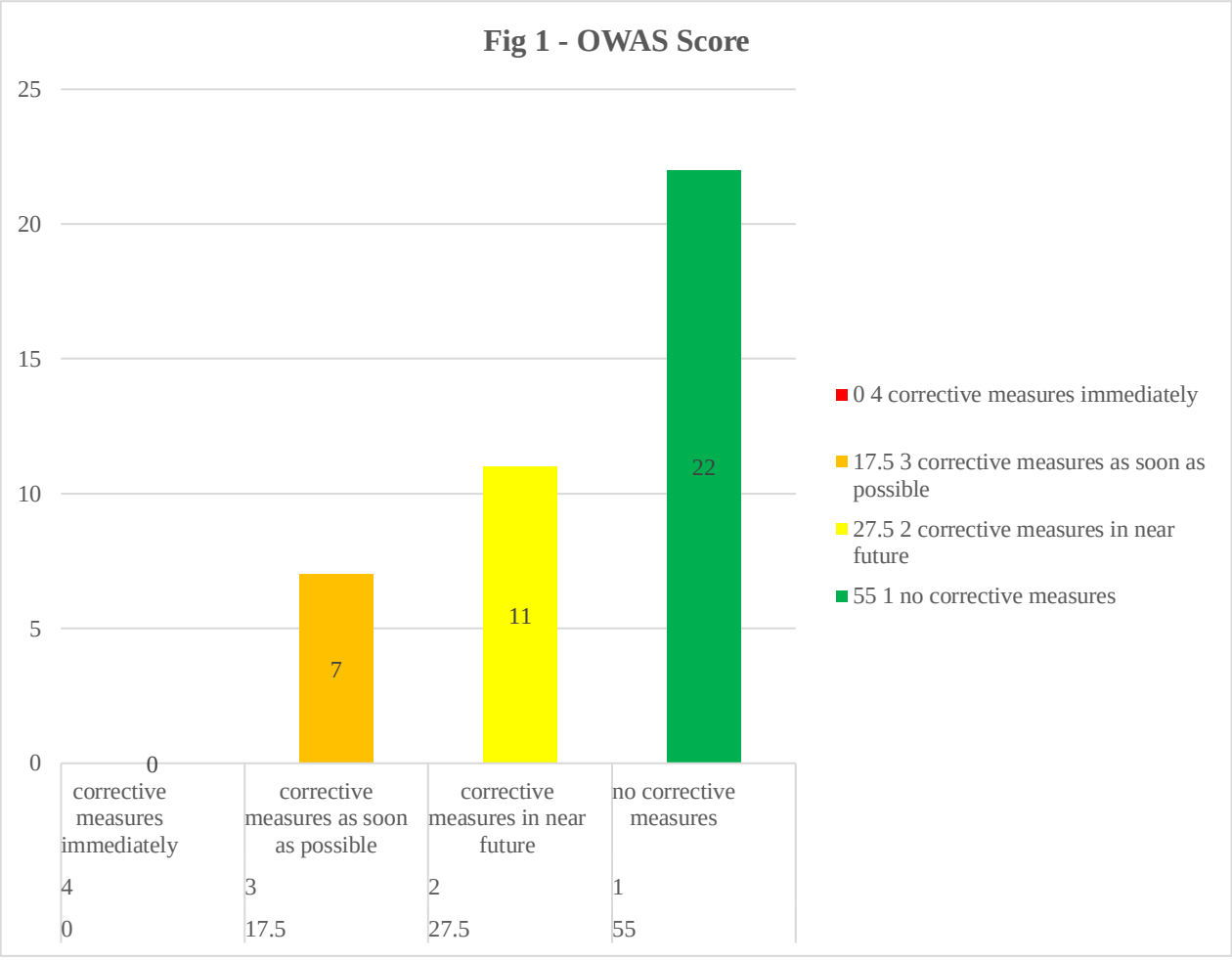

Figure 1 depicts that 22 out of 40 teachers, constituting 55%, had an OWAS score of 1, indicating no immediate need for corrective action. Similarly, 11 teachers, comprising 27.5%, had a score of 2, suggesting that corrective measures might be needed shortly.

Furthermore, 7 teachers, making up 17.5%, received a score of 3, indicating a pressing need for corrective actions as soon as possible. Importantly, none of the teachers received a score of 4, which would have required immediate corrective measures.

The risk assessment was conducted using the Cornell Musculoskeletal Discomfort Questionnaires (CMDQ), focusing on assessing discomfort in various body areas during work activities, particularly the neck and lower back. The study findings were categorized into three tables based on prevalence, severity, and impact on workability. After evaluating 40 preschool teachers, a detailed analysis of the results was conducted.

Table 1: Prevalence of pain, ache, and bodily discomfort

Body site	0 (Never)		1 (1-2 times last week)		2 (3-4 times last week)		3 (Once every day)		4 (Several times every day)	
	f	%	f	%	f	%	f	%	f	%
Neck	11	27.5	11	27.5	9	22.5	9	22.5	0	0
Shoulder R	19	47.5	15	37.5	2	5	4	10	0	0
Shoulder L	26	65	6	15	4	10	4	10	0	0
Upper Back	34	85	2	5	3	7.5	1	2.5	0	0
Upper Arm R	32	80	6	15	1	2.5	1	2.5	0	0
Upper Arm L	35	87.5	4	10	1	2.5	0	0	0	0
Lower Back	8	20	8	20	8	20	15	37.5	1	2.5
Forearm R	36	90	4	10	0	0	0	0	0	0
Forearm L	37	92.5	3	7.5	0	0	0	0	0	0
Wrist R	32	80	2	5	6	15	0	0	0	0
Wrist L	36	90	4	10	0	0	0	0	0	0
Hip/Buttocks	31	77.5	8	20	1	2.5	0	0	0	0
Thigh R	35	87.5	5	12.5	0	0	0	0	0	0
Thigh L	36	90	3	7.5	1	2.5	0	0	0	0
Knee R	15	37.5	9	22.5	10	25	6	15	0	0
Knee L	19	47.5	8	20	9	22.5	4	10	0	0
Lower Leg R	32	80	4	10	4	10	0	0	0	0
Lower Leg L	32	80	2	5	6	15	0	0	0	0
Foot R	30	75	10	25	0	0	0	0	0	0
Foot L	30	75	10	25	0	0	0	0	0	0

	(75% and Above %) Severely Prevalent / Affected
	(60%- 74.9%) Highly Prevalence
	(45.9%- 59.9%) Moderately Prevalence
	(44.9%- 20%) Average Prevalence
	(Below- 19.9%) In the Safe Zone

A classification system has been devised to categorize the prevalence of a specific condition based on the percentage of occurrence. Red denotes severe prevalence (75% and above), orange indicates high prevalence (60% to 74.9%), yellow represents moderate prevalence (45.9% to 59.9%), cream signifies average prevalence (44.9% to 20%), and green indicates low prevalence (below 19.9%). According to the research findings, intense pain and discomfort are most prevalent in the neck (76%) and lower back regions (80%), followed by reports of discomfort in the right knee (62.5%), right shoulder (42.5%), and left knee (42.5%). Conversely, average levels of pain and discomfort are reported in areas such as the left shoulder, hips/buttocks, lower legs, and foot.

The study revealed that the most severe pain, ache, and discomfort were primarily reported in the neck, lower back, and right knee by 31(77.5%), 33(82.5%), and 30(75%) participants, respectively. Following closely was the right shoulder and left knee, reported by 24(60%) and 25(62.5%) participants, respectively. The left shoulder was moderately prevalent, with 19(47.5%) participants experiencing symptoms. Other body regions were categorized as average in terms of severity and likelihood of experiencing such symptoms.

Table 2: Interference of pain, ache, and bodily discomfort with work

Body site	1 (Not at all)		2 (Slightly interfered)		3 (Substantially interfered)	
	f	%	f	%	F	%
Neck	9	22.5	24	60	7	17.5
Shoulder R	16	40	19	47.5	5	12.5
Shoulder L	20	50	13	32.5	7	17.5
Upper Back	30	75	5	12.5	5	12.5
Upper Arm R	30	75	8	20	2	5
Upper Arm L	30	75	7	17.5	3	7.5
Lower Back	8	20	25	62.5	7	17.5
Forearm R	30	75	10	25	0	0
Forearm L	30	75	10	25	0	0
Wrist R	30	75	5	12.5	5	12.5
Wrist L	30	75	6	15	4	10
Hip/Buttocks	30	75	9	22.5	1	2.5

Thigh R	30	75	7	17.5	3	7.5
Thigh L	30	75	9	22.5	1	2.5
Knee R	10	25	28	70	2	5
Knee L	16	40	21	52.5	3	7.5
Lower Leg R	30	75	4	10	6	15
Lower Leg L	30	75	4	10	6	15
Foot R	30	75	10	25	0	0
Foot L	30	75	10	25	0	0

	(75% and Above) Severely Prevalent / Affected
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	(45.9%- 59.9%) Moderately Prevalence
	(44.9%- 20%) Average Prevalence
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The findings from the CMDQ analysis underscore the significant impact of pain, aches, and discomfort on work performance, as evident from the presented data. The analysis highlights that the neck, lower back, and right knee are the most affected body parts, with severity percentages of 31(77.5%), 32(80%), and 30(75%) respectively. The right shoulder and left knee also show high levels of interference, each reported by 24(60%) participants. Meanwhile, the left shoulder exhibits a moderate level of interference, with a result of 20(50%). Notably, the remaining body regions demonstrate an average level of interference ranging from 20% to 44.9%.

DISCUSSION

The OWAS assessment revealed a concerning lack of awareness among many teachers regarding the potential health implications of their posture. While the majority of preschool teachers scored a 1 on the OWAS scale, indicating no immediate need for corrective measures, this apparent comfort may be misleading, especially considering the physical demands of their job. As teachers age, they may become increasingly susceptible to musculoskeletal issues if they continue with the same posture.

Preschool teachers are extensively engaged in physically demanding activities, including playing with children, leading songs and crafts, and conducting exercises, all of which necessitate frequent bending and changes in posture. Therefore, it is imperative to prioritize education on proper posture for each activity among preschool teachers to mitigate the risk of developing musculoskeletal disorders in the future. By raising awareness and providing guidance on ergonomic practices, educators can safeguard their long-term health and well-being, ensuring they can continue to effectively fulfill their vital role in nurturing young minds (Khushi, 2023).

Table A displays the prevalence of body pain, aches, and bodily discomfort experienced by preschool teachers. Severe afflictions, indicated in red, predominantly affect the neck and lower back. High prevalence, shown in orange, includes issues with the right knee. Moderate prevalence, highlighted in yellow, encompasses the left knee and right shoulder. Average prevalence, depicted in cream, involves the left shoulder, hips/buttocks, right knee, right and left lower leg, and right and left foot. Lastly, the green zone indicates low prevalence,

encompassing the upper back, right and left upper arm, right and left forearm, right and left wrist, and right and left thigh.

The red zone encompasses severe issues with the neck, lower back, and right knee. In the orange zone, there are notable discomforts in the left knee and right shoulder. The yellow zone signifies moderate discomfort, including the left shoulder. The cream zone includes a range of discomforts from the upper back to the feet, covering various body parts such as the upper arms, forearms, wrists, hips, buttocks, thighs, lower legs, and feet. Unlike Table 1, there is no green zone in Table B, according to the research findings.

Table 2 depicts how pain, ache, and bodily discomfort affect work performance. In the red zone, which represents severe interference, the neck, lower back, and right knee are prominent. The orange zone indicates significant interference, particularly from the right shoulder and left knee. In the yellow zone, work interference is notable due to discomfort in the left shoulder. The cream zone signifies moderate interference across various body parts, including the upper back, upper arms, forearms, wrists, hips, buttocks, thighs, lower legs, and feet. As per the research, there is no green zone in Table 2.

The research sheds light on a lack of awareness regarding the significance of maintaining correct posture and understanding fundamental concepts such as ergonomics and musculoskeletal disorders (Roopa Rao, 2022). Many teachers were found to be unaware that their current posture could potentially lead to severe musculoskeletal issues in the future. This lack of awareness is particularly concerning given the prevalence of pain and discomfort reported in areas such as the neck, lower back, and knees, which are commonly affected due to the nature of their daily activities. Despite experiencing pain in these areas, many teachers dismissed it as insignificant, attributing it to the demands of their job. However, what they fail to recognize is the potential severity of these symptoms and their implications for both their professional and personal lives. Without proper education and awareness, preschool teachers may unknowingly put themselves at risk of developing musculoskeletal disorders, which could significantly impact their ability to perform their duties effectively and enjoy a healthy lifestyle. Therefore, it is imperative to prioritize initiatives aimed at educating teachers about the importance of maintaining proper posture and recognizing the early signs of musculoskeletal issues to ensure their long-term health and well-being. By fostering a culture of awareness and proactive prevention, we can empower preschool teachers to take proactive steps toward safeguarding their health and enhancing their overall quality of life.

Mitigation Strategies

Recommendations are helpful suggestions based on expertise or analysis, guiding actions to address challenges or improve outcomes. They offer a roadmap for decision-making, drawing on past experiences and research to help individuals or organizations navigate complex situations more effectively, minimizing risks and uncertainties.

Engineering Controls: Engineering controls are controls that modify the workplace to make tasks safer by changing the physical environment or equipment. Engineering controls based on the results of this study to reduce or eliminate musculoskeletal disorders in preschool teachers

- Provide adjustable chairs, desks, and workstations allowing teachers to customize their workspace to support proper posture and reduce strain on muscles and joints.
- Using ergonomic tools such as supportive cushions, padded mats, and ergonomic keyboards can help reduce repetitive strain injuries and discomfort during activities like sitting, standing, and typing.
- Implementing efficient storage solutions and organizing materials at appropriate heights reduces the need for teachers to bend or reach excessively, thereby minimizing strain on the back and limbs.
- Installing cushioned flooring or using anti-fatigue mats in areas where teachers stand for extended periods can help reduce foot and leg fatigue, as well as lower back pain.
- Ensuring proper lighting in classrooms and work areas reduces eye strain and fatigue, allowing teachers to maintain good posture and focus on their tasks without discomfort.

Administrative Controls: Administrative controls are controls that establish rules and practices to promote workplace safety and minimize hazards. Some administrative measures to prevent or reduce musculoskeletal issues among preschool teachers

- Ensuring reasonable workloads and scheduling breaks throughout the day can help prevent overexertion and fatigue, reducing the risk of musculoskeletal injuries.
- Providing training on proper lifting techniques, ergonomics, and posture awareness empowers teachers to adopt safe work practices and reduce the likelihood of strain or injury.
- Rotating tasks among teachers can help distribute physical demands evenly and prevent overuse injuries associated with repetitive tasks, such as lifting or bending.
- Encouraging teachers to take regular breaks and stretch during the day helps alleviate muscle tension and fatigue, promoting overall comfort and well-being.
- Conducting regular ergonomic assessments of classrooms and work areas enables proactive identification of potential hazards and implementation of appropriate controls to mitigate risks.

Personal Controls: PPEs, or Personal Protective Equipment, are gear and clothing worn to protect against workplace hazards. Few Personal Protective Equipment to reduce or eliminate musculoskeletal disorders in preschool teachers

- Wearing supportive shoes with cushioned soles and proper arch support can help reduce foot fatigue and provide stability during standing and walking activities.
- Using knee pads can help cushion the knees and reduce pressure on the joints during activities that involve kneeling or crouching, such as interacting with children at their level or conducting floor-based activities.

Limitations of the Study

Our research encountered several limitations. Conducting the study in Mumbai and its suburbs posed challenges due to travel time constraints. Data collection faced limitations such as time constraints and the availability of preschool teachers. Each preschool visit and interview process took around 3 hours, limiting the number of interviews per day. Participants struggled to dedicate prolonged attention to the assessments due to their diverse nature, and some were uncomfortable discussing their work conditions. Obtaining consent and ensuring confidentiality required meticulous effort. Photographs of teachers' posture and workspace were not allowed due to security concerns. Conflicting schedules between researchers' commitments and preschool operating hours added difficulty to visitation. Age differences between researchers and participants may have affected rapport. The research was also conducted during the time of festivities due to which most of the preschools were busy. Despite these limitations, our study offers valuable insights and suggests avenues for future research.

Scope of the Study

Studying preschool teachers' postures and associated musculoskeletal risks in India provides a comprehensive understanding of the challenges they face in their daily work. By identifying risky postures and assessing potential musculoskeletal hazards, this research sheds light on the importance of creating a safe and supportive work environment for teachers. Through detailed analysis and examination, valuable insights can be gained into the specific factors contributing to discomfort and injury among preschool educators. These findings not only inform preventive measures but also underscore the need for proactive intervention strategies aimed at promoting long-term health and well-being. Furthermore, by raising awareness and promoting best practices in ergonomics and workplace safety, this research has the potential to positively impact the lives of preschool teachers across the country. By addressing these issues and implementing effective interventions, educators and administrators can work together to ensure a healthier and more sustainable future for all preschool staff.

Author Statements

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- Informed Consent: Before their participation, all participants provided written informed consent, demonstrating their understanding of the study's objectives, procedures, and potential risks.
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