



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** VI **Month of publication:** June 2026

DOI: <https://doi.org/10.22214/ijraset.2026.84015>

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A Comprehensive Evaluation of the Prevalence and Risk Factors Associated with Work-Related Musculoskeletal Disorders Among Female Physiotherapists in the Delhi NCR: A Cross-Sectional Study

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Abstract: Background: Work-related musculoskeletal disorders (WRMSDs) among physiotherapists (PTs) in Delhi, NCR, have become a significant concern due to their impact on occupational health and productivity. Female physiotherapists, constituting a significant portion of the workforce in Delhi NCR, face distinct challenges exacerbated by ergonomic stressors, societal roles, and organizational dynamics. WRMSDs not only affect personal well-being but also compromise professional efficacy and patient care quality, making it imperative to investigate their prevalence and associated risk factors in this population

Objectives: In this study, the primary objective is to assess the prevalence of WMSDs among female physiotherapists in the Delhi NCR region and identify the associated risk factors. This research aims to provide valuable insights that can inform the development of effective preventive strategies and occupational health policies.

Methodology: This cross-sectional study was conducted from June 1st to June 25th, 2024, employing both online and paper-based surveys. Online surveys were distributed via Google Forms on platforms such as WhatsApp, LinkedIn, and other social media channels. Printed questionnaires, including the Modified Nordic Questionnaire and General Health Questionnaire-12, were distributed in clinics and hospitals across Delhi, NCR, to gather data on occupational injuries among physiotherapists. Out of 150 total responses received, 78 were from online submissions and 32 from offline sources. After excluding 40 incomplete or unclear responses, 110 valid responses were included in the final analysis. **Results:** The survey of female physiotherapists in Delhi, NCR, revealed a high prevalence of work-related musculoskeletal disorders (WRMSDs). A significant proportion of participants reported symptoms in the neck, shoulders, and lower back. Key contributing factors included ergonomic stressors such as prolonged standing (30%), repetitive movements (45%), and poor workspace design (25%). Additionally, psychosocial factors such as job stress (35%) and organizational culture (20%) were important determinants. Individual factors like age, years of experience, and physical fitness levels also showed varying degrees of association with the prevalence of WRMSDs. **Discussion:** In the discussion section, the findings are contextualized within the broader literature on occupational health and musculoskeletal disorders among healthcare professionals. The study's results corroborate existing evidence, highlighting the heightened vulnerability of physiotherapists to WRMSDs due to the nature of their work. The discussion explores the implications of ergonomic interventions, organizational policies, and educational initiatives aimed at reducing the prevalence of musculoskeletal disorders among female physiotherapists in Delhi, NCR. Furthermore, the gender-specific challenges faced by women in balancing professional demands with societal roles are critically examined, emphasizing the need for targeted interventions to promote occupational health and well-being in this demographic. Recommendations for future research and practical strategies for improving workplace conditions and enhancing musculoskeletal health outcomes are also discussed.

Conclusion: This study highlights the substantial burden of WMSDs among female physiotherapists in the Delhi NCR region and identifies key risk factors contributing to this occupational health issue. There is a critical need for targeted interventions, including ergonomic improvements, education, and policy changes, to address these challenges and enhance the well-being of female physiotherapists

Keywords: Work-Related Musculoskeletal Disorders, Female Physiotherapists, Questionnaire on occupational injuries in physiotherapists, Modified Nordic Questionnaire, General Health Questionnaire-12

I. INTRODUCTION

Work-related musculoskeletal disorders (WRMSDs) encompass painful conditions affecting muscles, tendons, nerves, and joints due to occupational activities. Physiotherapists are particularly susceptible to WRMSDs due to repetitive tasks, awkward postures, and ergonomic stressors inherent in their practice. These disorders manifest as localized or widespread pain, stiffness, weakness, and limited range of motion in areas like the neck, shoulders, back, wrists, and knees, exacerbated by work activities and relieved by rest.

The pathophysiology of WRMSDs involves microtrauma from prolonged or repetitive mechanical loading on musculoskeletal tissues. For physiotherapists, factors such as repetitive manual therapies and improper body mechanics during patient care contribute significantly to strain and injury.

Ergonomic factors play a critical role in the development of WRMSD among physiotherapists. Poor workstation design and improper patient handling techniques force awkward postures, increasing injury risk. Psychosocial factors like job stress and organizational culture further impact WRMSDs, influencing stress levels and pain perception.

Diagnosis includes history, physical examination, and imaging to rule out other causes. Management focuses on prevention through ergonomic improvements, training in proper techniques, and promoting healthy work habits. Treatment may involve physical therapy, pain management, and ergonomic counseling to optimize work conditions and alleviate symptoms. WRMSDs are a significant concern in physiotherapy practice, affecting job satisfaction and patient care. Addressing ergonomic and psychosocial factors is crucial to developing effective prevention and management strategies, enhancing workplace health, and improving overall outcomes for physiotherapists and their patients.

A. Statement of the Problem

Physiotherapy stands as a cornerstone in healthcare, aiding individuals in reclaiming optimal functionality. However, female physiotherapists face significant challenges, primarily from work-related musculoskeletal disorders (WRMSDs). This section explores the prevalence of these disorders among female physiotherapists in Delhi, NCR, and the multifaceted challenges they encounter.

- 1) Contextualizing the Challenge : Physiotherapy demands physical engagement spanning therapeutic exercises, manual therapies, and patient assistance. These tasks, critical for patient recovery, involve repetitive motions, sustained postures, and patient lifting—factors contributing significantly to musculoskeletal disorders, especially for female physiotherapists in demanding healthcare environments.
- 2) Prevalence Rates and Epidemiological Insights : Despite high prevalence rates globally among physiotherapists, gender-specific studies reveal higher rates among females. Localized investigations are essential due to regional disparities and specific occupational demands. Understanding these nuances is vital for effective intervention strategies.
- 3) Risk factors Contributing to WRMSDs : Ergonomic, psychosocial, and individual factors contribute to WRMSDs among female physiotherapists. Workplace design, job stress, and personal health habits all influence susceptibility. In urban settings like Delhi NCR, ergonomic challenges and societal expectations add complexity to risk assessment and mitigation strategies.
- 4) Impact on Professional Practice and Patient Care : WRMSDs not only affect personal health but also impair professional efficacy and patient outcomes. Physiotherapists experiencing pain may struggle with hands-on therapies, affecting patient progress and career longevity.
- 5) Challenges contributing and Intervention : Despite awareness and efforts to implement ergonomic practices, challenges persist due to limited resources in healthcare settings. Financial and infrastructural constraints hinder the effective prevention and management of WRMSDs among female physiotherapists.

B. Significance of the Study

This study addresses the research gap concerning the occupational health challenges faced by female physiotherapists in Delhi, NCR, particularly regarding musculoskeletal disorders (MSDs). Female physiotherapists form a significant part of the healthcare workforce, and understanding the prevalence of work-related musculoskeletal disorders (WRMSDs) among them is crucial due to their unique ergonomic stressors and societal roles. WRMSDs have a profound impact on career longevity and job satisfaction, potentially reducing retention and leading to a loss of expertise within the healthcare sector. Furthermore, the well-being of physiotherapists directly influences their ability to provide effective patient care, making it essential to address and mitigate these disorders to enhance healthcare quality.

Gender-specific challenges, such as balancing caregiving responsibilities at home with demanding professional roles, may heighten female physiotherapists' vulnerability to musculoskeletal disorders. The study's findings have significant public health implications, informing policies and guidelines to mitigate risks and foster a healthier workforce, ultimately reducing healthcare costs associated with occupational injuries. Additionally, WRMSDs impose economic costs related to healthcare utilization, absenteeism, and potential disability, highlighting the need for preventive measures. This study aims to fill the knowledge gap and provide a deeper understanding of occupational health issues among female healthcare professionals in urban settings like Delhi, NCR.

C. Aims and Objectives of the Study

- 1) Determine Prevalence: Quantify the incidence of WRMSDs among female physiotherapists in Delhi, NCR.
- 2) Identify Risk Factors: Investigate occupational, ergonomic, and individual risk factors contributing to WRMSDs.
- 3) Analyze Impact: Assess the effect of WRMSDs on professional life, productivity, and job satisfaction.
- 4) Evaluate Preventive Measures: Review the effectiveness of current preventive measures and ergonomic practices.
- 5) Propose Interventions: Recommend evidence-based strategies to reduce WRMSD prevalence and severity.
- 6) Enhance Health Policies: Provide recommendations for improving workplace health and safety standards for female physiotherapists.

II. METHODOLOGY

- 1) Study Design: This cross-sectional study enrolled 150 female physiotherapists from various hospitals and healthcare centers across Delhi, NCR. Data collection utilized several instruments, including the Modified-Nordic Musculoskeletal Questionnaire (NMQ), a questionnaire on occupational injuries specific to physiotherapists, and the General Health Questionnaire-12 to assess work-related stress levels among female physiotherapists.
- 2) Study Setting: Participants were recruited from multiple private and government hospitals and centers in Delhi, NCR, India, comprising female physiotherapists aged between 20 and 40 years. The study distributed 150 questionnaires across these facilities.
- 3) Sampling Size: $N = 150$
- 4) Study Location: Delhi, NCR, India
- 5) Study Sample: Participants aged 20-40 years
- 6) Search Strategy: The search strategy involved querying databases such as Google Scholar, PubMed, and PEDro using keywords such as "Work-related musculoskeletal disorders among female physiotherapists." Inclusion and exclusion criteria were applied to screen titles and abstracts of identified articles. Each potential article underwent full-text review and independent evaluation by the reviewer.

A. Population and Sample

Inclusion Criteria:

Female physiotherapists from Delhi, NCR, with an age group between 20 - 40 years old are willing to participate in this study.

Exclusion Criteria:

1. Female Physiotherapists out of the selected age group
2. Female Physiotherapists with any history of trauma in the last year were excluded
3. Female Physiotherapist with chronic problems like hypertension, diabetes, arthritis, heart disease, and cancer.

B. Data Collection Methods

This cross-sectional study was conducted from June 1st to June 25th, 2024, utilizing both digital and traditional survey methods. Google Forms were distributed via WhatsApp, LinkedIn, and other social media platforms, while printed questionnaires were disseminated across various clinics and hospitals throughout Delhi, NCR, targeting female physiotherapists.

A total of 150 responses were collected (78 online and 72 offline). After excluding 40 incomplete responses, 110 responses were included in the final analysis. Qualified physiotherapists holding at least an undergraduate degree participated upon consenting to the study's terms. The survey instruments, encompassing the General Health Questionnaire (GHQ-12), standardized Nordic Musculoskeletal Questionnaire (NMQ), and a specialized questionnaire on occupational injuries in physiotherapists, gathered data on participants' occupational histories, musculoskeletal symptoms, affected body areas, job tasks, risk factors, injury prevention strategies, professional details (e.g., job title, experience, hours worked), and health status.

The GHQ-12 assesses psychological distress with 12 questions probing symptoms like depression, anxiety, social dysfunction, and confidence loss, aiding in the early identification of mental health concerns. Meanwhile, the NMQ gauges musculoskeletal issues across nine body regions over weekly and annual periods, detailing symptom severity and prevalence.

The occupational injuries questionnaire is designed to comprehensively evaluate the prevalence, nature, and causative factors of work-related musculoskeletal disorders (WRMDs) among female physiotherapists in Delhi, NCR. Structured to capture demographic data, job specifics, ergonomic practices, injury history, and detailed musculoskeletal symptomatology, it also probes perceptions of workplace safety and coping strategies, assessing the professional and personal impact of injuries. Through meticulous data collection, this study aims to pinpoint key WRMD risk factors, guiding targeted interventions to enhance physiotherapists' occupational health and well-being.

III. RESULTS

A. Demographic Data

Out of 150 responses received in total, 78 were received online and 32 were obtained offline. After excluding 40 incomplete or unclear responses, 110 valid responses remained for analysis. Out of all participants, the majority were from younger age groups, i.e., 20-30 years (58.07%) and 31-40 years (27.02%). The mean height of the respondents was 159.97 cm $\pm$ 17.12 cm (mean $\pm$ SD), and their mean weight was 62.56 kg $\pm$ 12.29 kg (mean $\pm$ SD) among the total study population.

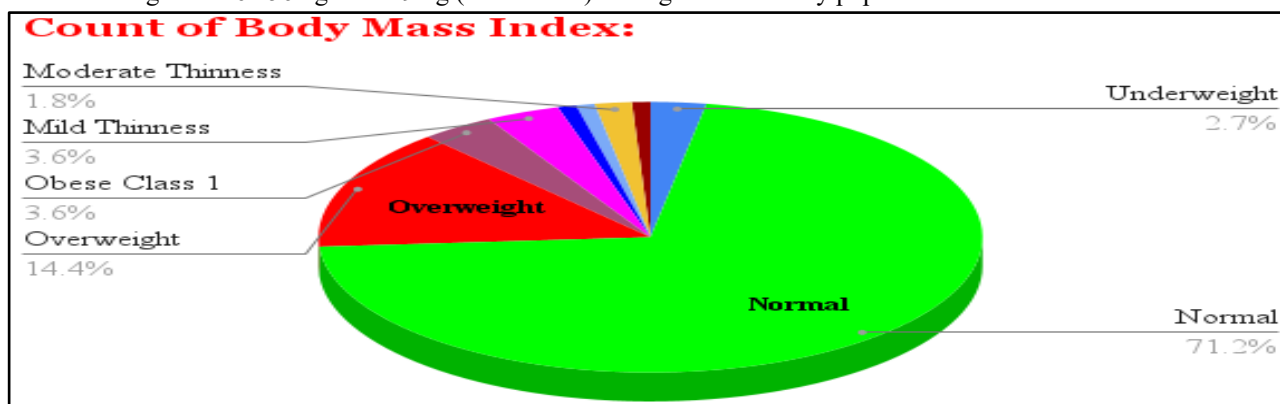


Figure 1- BMI

Out of 110, a significant majority, 71.2%, fall within the normal BMI range, indicating that most physiotherapists maintain a healthy weight. However, 14.4% are categorized as overweight, and 3.6% fall into the Obese Class 1 category, highlighting a concerning portion facing potential weight-related health issues. Additionally, 2.7% are classified as underweight, while smaller percentages fall into the categories of mild thinness (3.6%) and moderate thinness (1.8%). This data suggests that while the majority of physiotherapists have a normal BMI, there is a notable portion experiencing either overweight or underweight conditions, which could contribute to the prevalence of work-related issues in this profession within the Delhi NCR region.

B. Work setting Characteristics

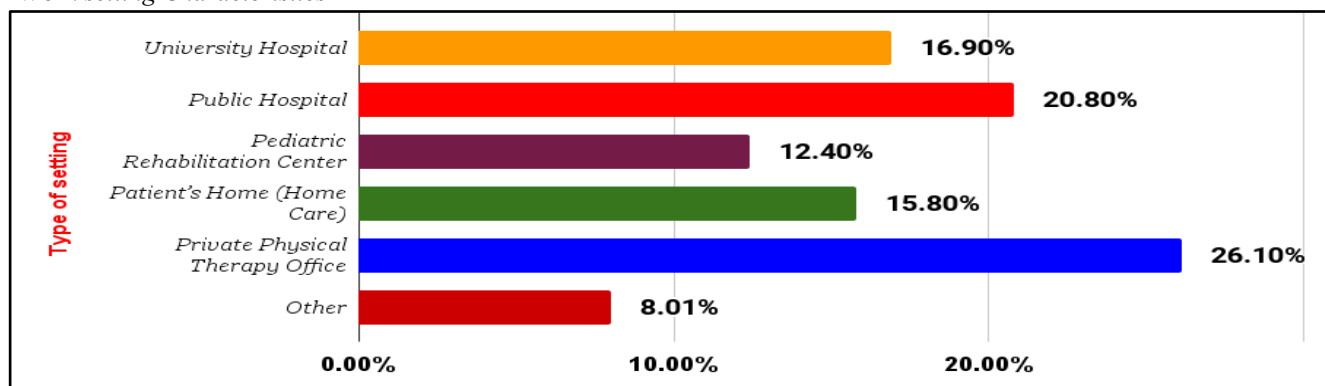


Figure 2(a) -work settings among physiotherapists in Delhi, NCR

The chart presents the distribution of work settings among physiotherapists in Delhi, NCR, highlighting various environments where they practice. The largest proportion, 26.10%, work in private physical therapy offices. Public hospitals follow, employing 20.80% of physiotherapists. University hospitals account for 16.90% of the respondents, while 15.80% practice in patients' homes, providing home care services. Pediatric rehabilitation centers employ 12.40% of the physiotherapists surveyed. The least common work setting, categorized as "Other," represents 8.01% of the respondents. This data reveals a diverse array of practice environments for physiotherapists in Delhi, NCR, with a significant concentration in private physical therapy offices and public hospitals.

C. Field of practice

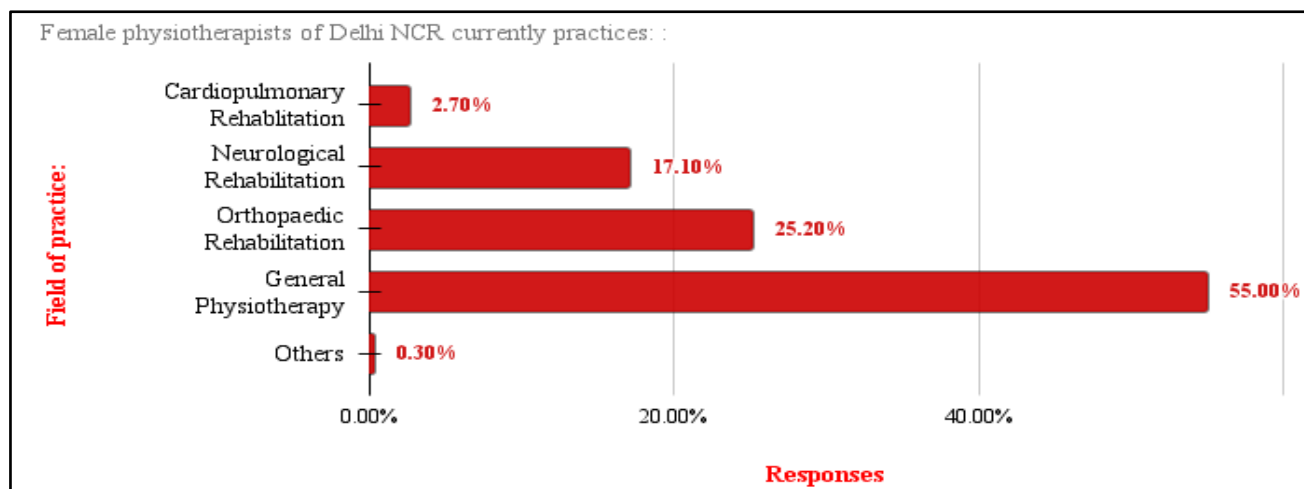


Figure 2(b) -fields of practice among female physiotherapists in Delhi

The chart above displays the fields of practice among (110) female physiotherapists in Delhi, NCR. The majority, 55%, practice general physiotherapy, making it the most common area. Orthopaedic rehabilitation is the next most prevalent field, with 25.20% of physiotherapists specializing in this area. Neurological rehabilitation accounts for 17.10%, while cardiorespiratory rehabilitation is practiced by 2.70% of the respondents. A minimal 0.30% of physiotherapists are engaged in other, unspecified fields. This distribution indicates a strong inclination towards general physiotherapy and orthopaedic rehabilitation among female physiotherapists in the region, with less representation in specialized areas like cardiorespiratory rehabilitation.

D. Prevalence of WRMDS

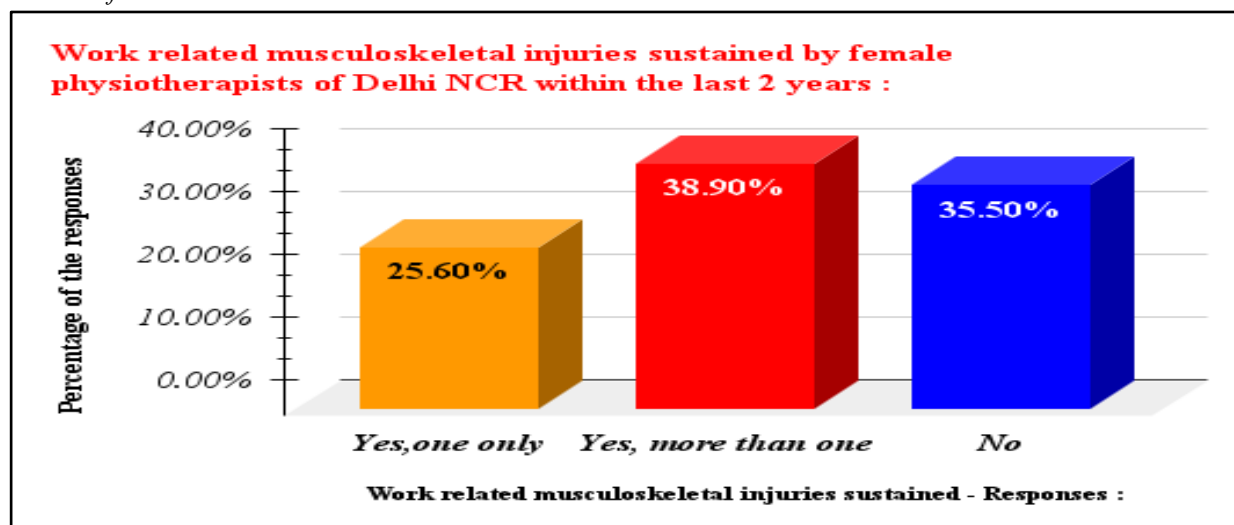


Figure 3 -work-related musculoskeletal injuries sustained over the past two years

The chart above presents the responses of (110) female physiotherapists in Delhi, NCR, about work-related musculoskeletal injuries sustained over the past two years, categorized into three groups. Among the respondents, 25.60% reported experiencing a single work-related musculoskeletal injury, while 38.90% indicated they had sustained more than one injury. Conversely, 35.50% of respondents did not report any such injuries. This data reveals that a significant majority of female physiotherapists in Delhi, NCR, have encountered work-related musculoskeletal injuries, with a substantial 38.90% experiencing multiple incidents. Additionally, 25.60% reported a single injury, highlighting the prevalence and recurring nature of these issues within the profession in this region.

E. Severity and Location of Pain

1) In last 12 Months

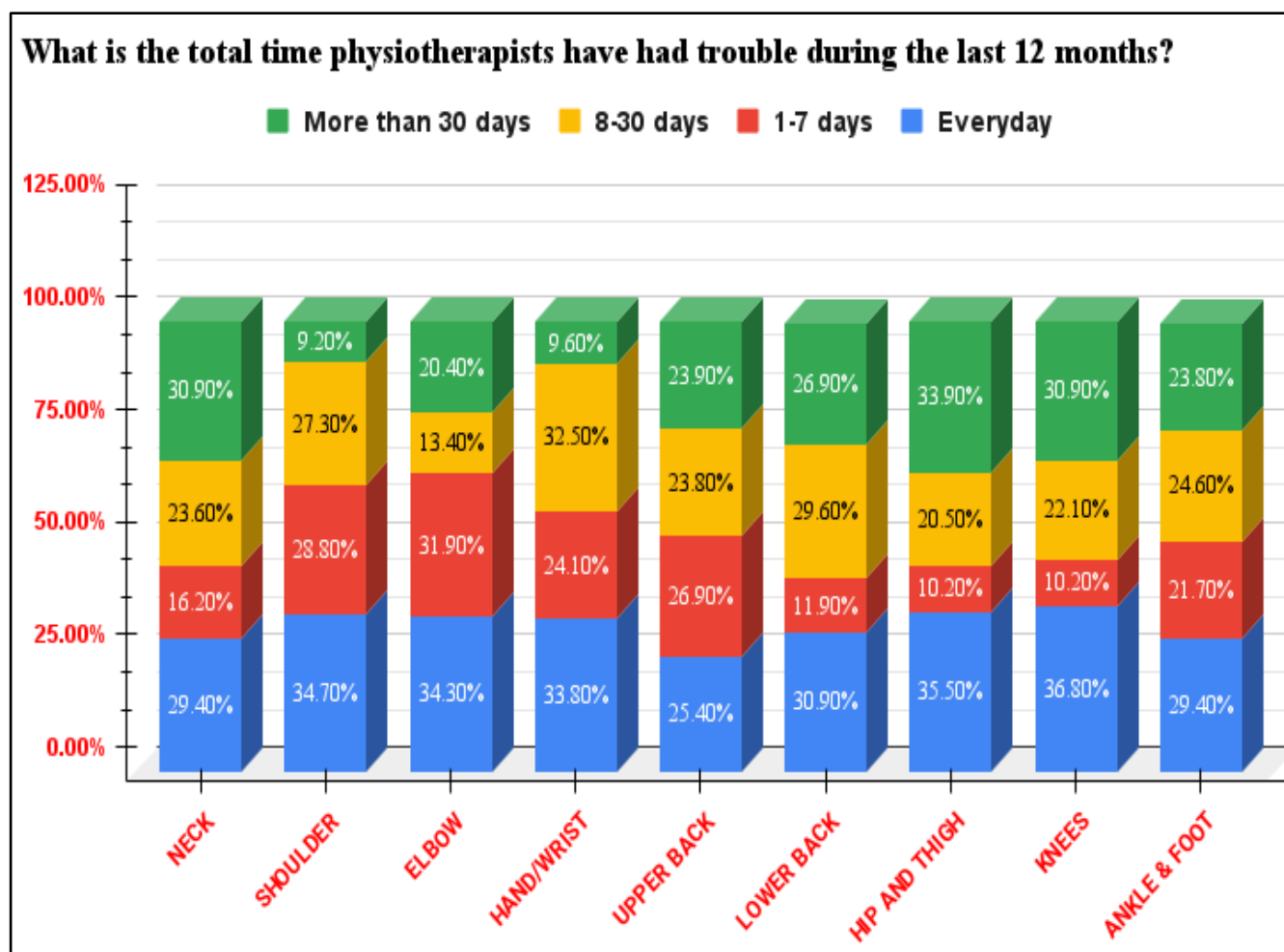


Figure 4(a) -the prevalence and duration of musculoskeletal issues among 110 female physiotherapists in Delhi, NCR, over the past 12 months

The chart above illustrates the prevalence and duration of musculoskeletal issues among 110 female physiotherapists in Delhi, NCR, over the past 12 months, showing significant variation across different body regions. Neck issues were reported daily by 34.10% of physiotherapists, shoulder problems by 34.70%, and elbow troubles by 33.30%. Hand/wrist issues affected 26.90% daily, while upper back problems were noted by 33.30%. Lower back troubles were significant, with 35.00% experiencing issues for 1-7 days and 26.90% daily. Hip and thigh problems were less frequently reported daily (30.90%), but 36.30% experienced them for more than 30 days. Knee issues affected 23.70% daily, and ankle/foot problems were noted at 23.70% daily. Overall, neck, shoulder, and lower back problems were the most prevalent, highlighting significant daily discomfort among physiotherapists in these areas.

2) In the last 7 Days

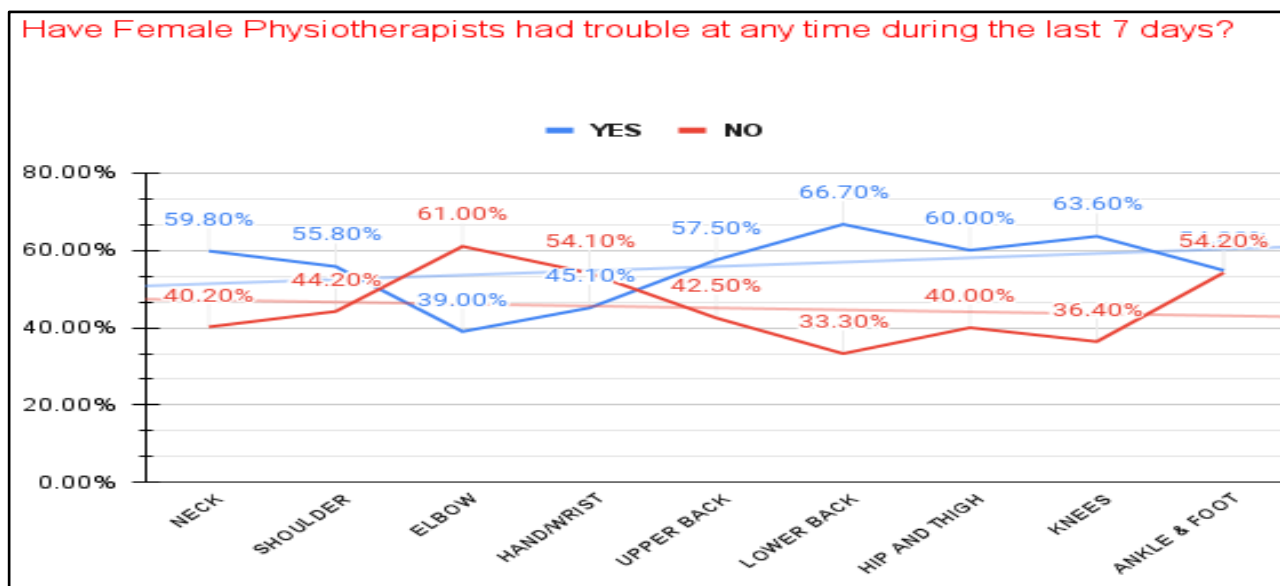


Figure 4(b) -the prevalence of musculoskeletal issues among 110 female physiotherapists in Delhi, NCR, over the past 7 days

The survey reveals significant discomfort in various body regions over the past week. The lower back is the most affected area, with 66.70% of respondents reporting trouble, followed by the knees (63.60%) and neck (59.80%). Shoulder issues were reported by 55.80% of the physiotherapists, while 54.10% experienced hand/wrist discomfort. Upper back problems were noted by 57.50% of respondents, indicating a common strain in the upper body. Ankle and foot issues were reported by 54.20%, showcasing the physical demands on these areas. Elbow trouble was the least reported, with only 39.00% experiencing issues. Additionally, 40.00% of the physiotherapists reported problems in the hip and thigh regions. These findings underscore the widespread prevalence of musculoskeletal discomfort among female physiotherapists, particularly in the lower back, neck, and knees, highlighting the need for preventive measures and ergonomic interventions to mitigate these issues.

F. Work Activities and Pain

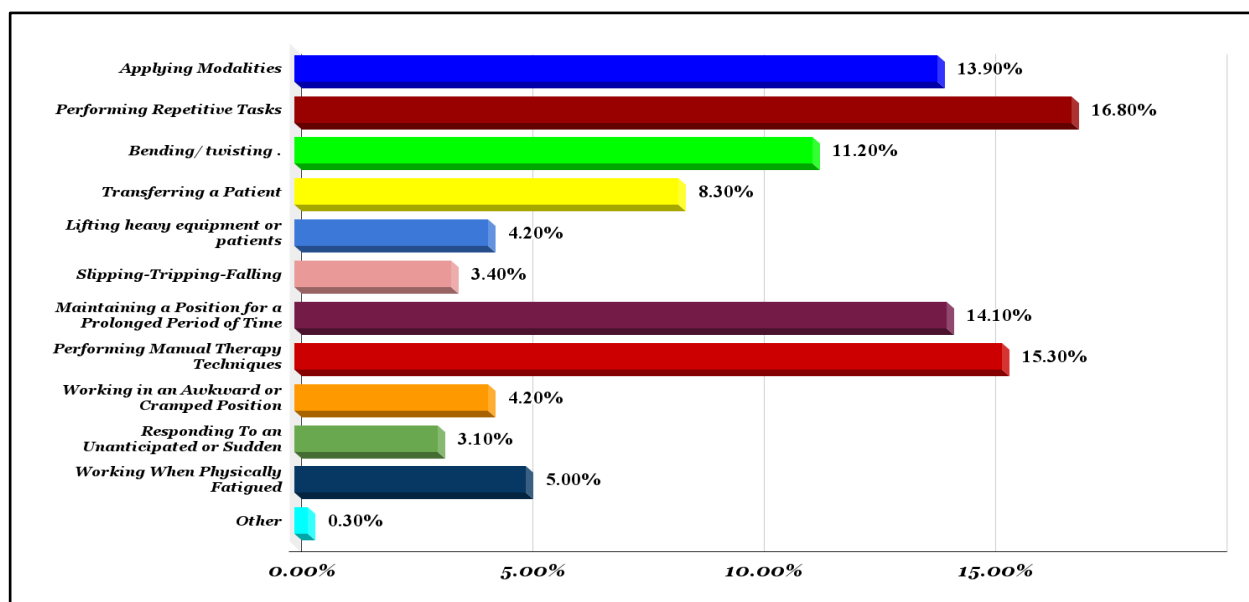


Figure 5 -activities contributing to work-related musculoskeletal issues

The survey of 110 female physiotherapists reveals various activities contributing to work-related musculoskeletal issues. Performing repetitive tasks is the most common cause, reported by 16.80% of respondents. Manual therapy techniques and maintaining prolonged positions are also significant contributors, affecting 15.30% and 14.10%, respectively. Applying modalities (13.90%) and bending/twisting (11.20%) are notable causes as well. Transferring patients (8.30%) and working when physically fatigued (5.00%) contribute to discomfort, along with lifting heavy equipment or patients (4.20%) and working in awkward positions (4.20%). Less common causes include slipping, tripping, and falling (3.40%) and responding to unanticipated movements (3.10%). A small percentage (0.30%) cited other activities. These findings underscore the need for improved ergonomic practices and strategies to manage the physical demands on physiotherapists to prevent musculoskeletal issues.

G. Daily activities cause pain to recur:

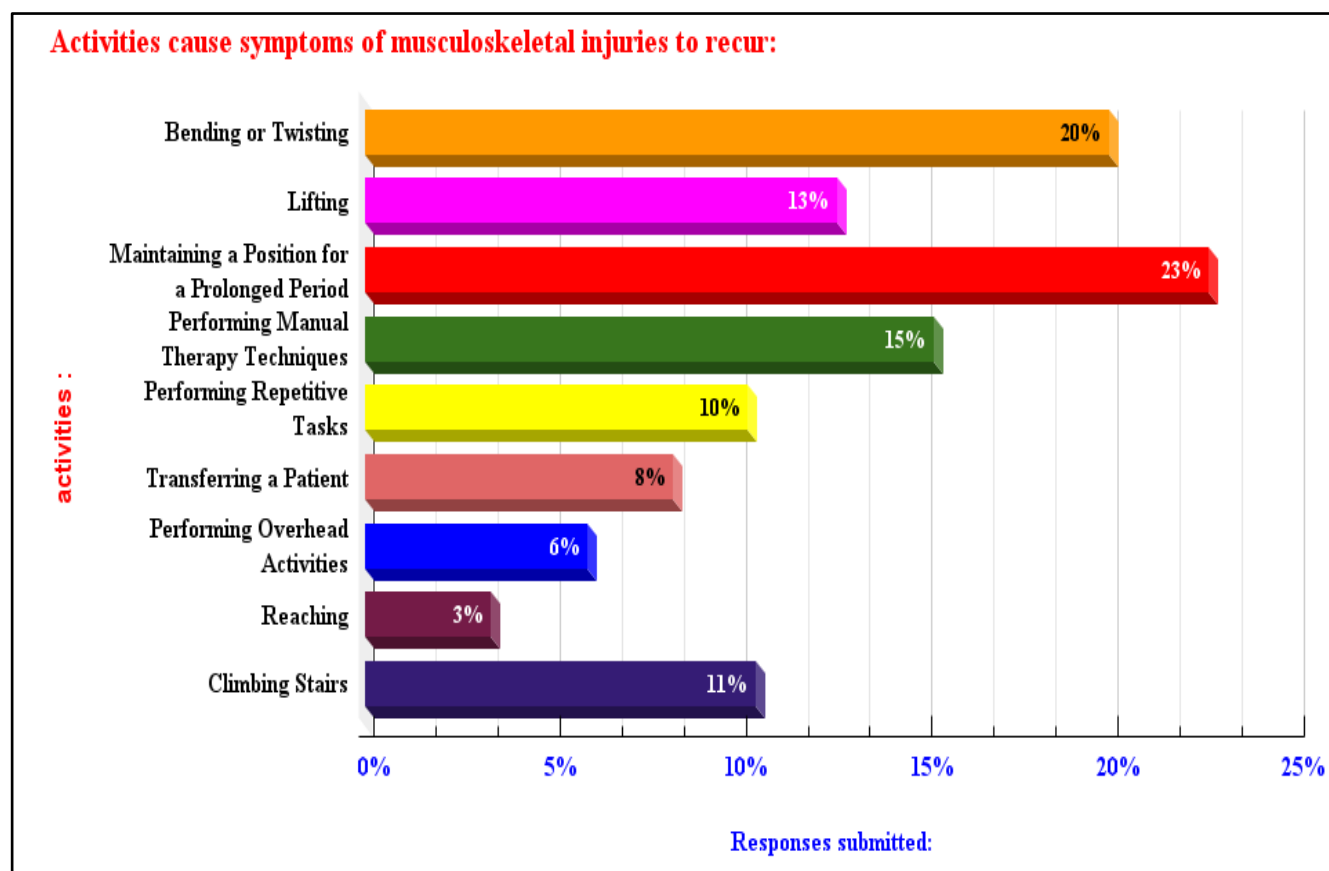


Figure 6-activities that cause symptoms of musculoskeletal injuries to recur among physiotherapists in the Delhi NCR

The chart depicts various activities that cause symptoms of musculoskeletal injuries to recur among physiotherapists in the Delhi NCR region, as per the responses submitted in a survey. The most commonly reported activity is "Maintaining a Position for a Prolonged Period," which accounts for 23% of the responses. This is followed by "Bending or Twisting," reported by 20% of respondents.

"Performing Manual Therapy Techniques" and "Lifting" are also significant contributors, cited by 15% and 13% of respondents, respectively. Other notable activities include "Performing Repetitive Tasks" at 10%, "Climbing Stairs" at 11%, and "Transferring a Patient" at 8%. Less frequently reported activities include "performing overhead activities" at 6% and "reaching" at 3%. This data underscores that maintaining prolonged positions and bending or twisting are the primary activities linked to the recurrence of musculoskeletal injury symptoms among physiotherapists in this region.

H. Self-reported Risk Factors

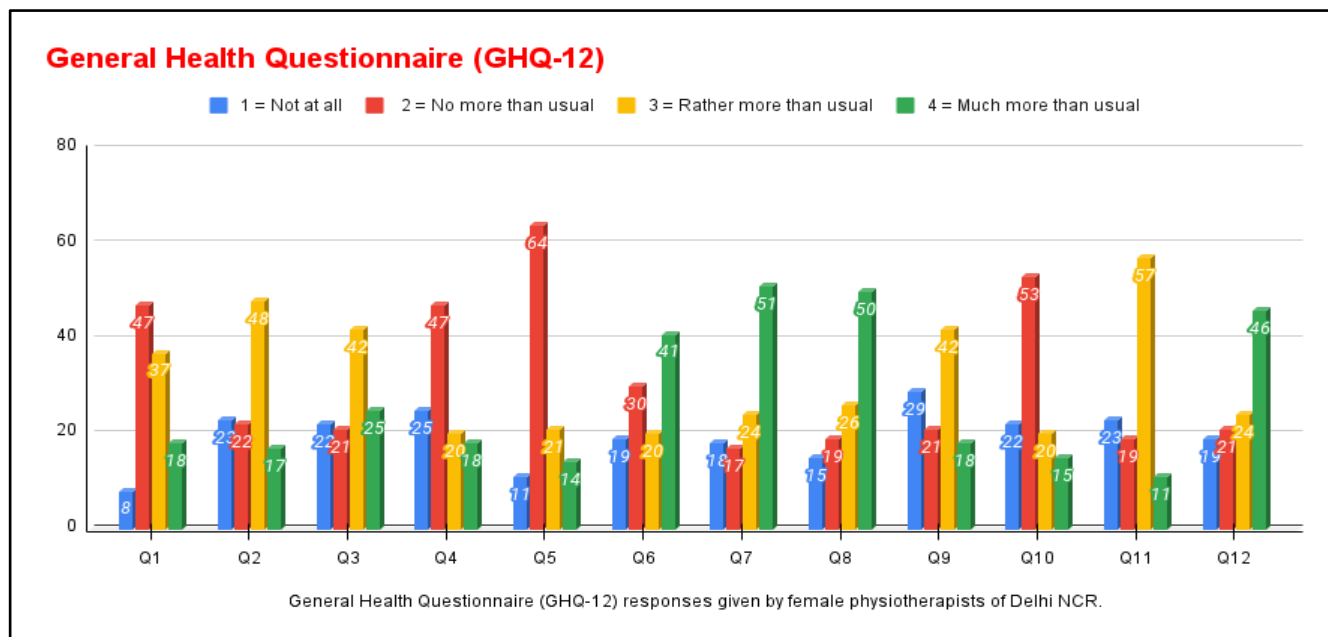


Figure 7 -work-related issues among (110) female physiotherapists in Delhi, NCR through a series of questions from the GHQ (12) questionnaire

The chart assesses work-related issues among (110) female physiotherapists in Delhi, NCR, through a series of questions from the GHQ (12) questionnaire - Q1 to Q12 addressing concentration, sleep, sense of purpose, decision-making, stress, overcoming difficulties, enjoyment of daily activities, coping, depression, self-confidence, sense of worth, and overall happiness. Responses are rated on a scale from 1 to 4, where 1 means "not at all" and 4 means "much more than usual." Key findings indicate that many physiotherapists experience moderate stress, with 40% feeling overwhelmed (Q5) and 35% reporting sleep disturbances due to worries (Q2). Despite these challenges, 45% feel capable of making decisions (Q4), and 40% feel they play a useful role (Q3). Additionally, 42% manage to cope with problems adequately (Q8), and 40% enjoy their daily activities (Q7). However, feelings of depression (Q9) and loss of confidence (Q10) are prevalent, with 38% and 44%, respectively, reporting these issues. A notable 35% feel reasonably happy considering their circumstances (Q12). This data underscores a balance between positive coping mechanisms and significant stressors, highlighting the need for supportive measures to enhance the well-being of physiotherapists in this region.

I. Duration of patient contact and the WRMD

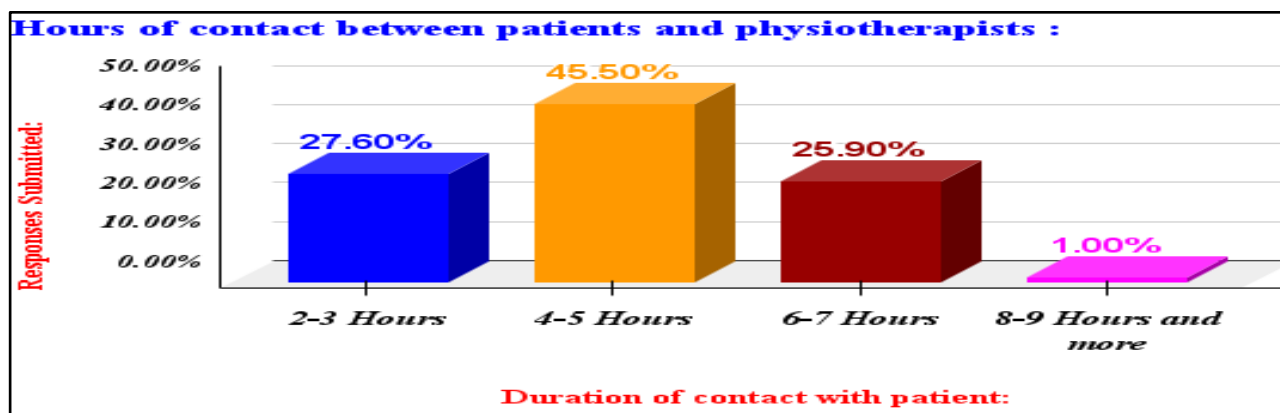


Figure 8 -distribution of hours of contact between physiotherapists and their patients

The provided bar chart illustrates the distribution of hours of contact between physiotherapists and their patients, reflecting the responses submitted in a survey. According to the chart, the most common duration of contact, reported by 45.50% of respondents, is 4-5 hours per day. This is followed by 27.60% of respondents indicating a contact duration of 2-3 hours per day. A significant portion, 25.90%, of physiotherapists spend 6-7 hours with patients daily. Only a small fraction, 1.00%, report spending 8-9 hours or more in contact with patients. This data highlights that the majority of physiotherapists in the Delhi NCR region spend between 4 to 5 hours per day in direct patient contact, with fewer spending either significantly less or significantly more time in such interactions.

J. Coping Strategies

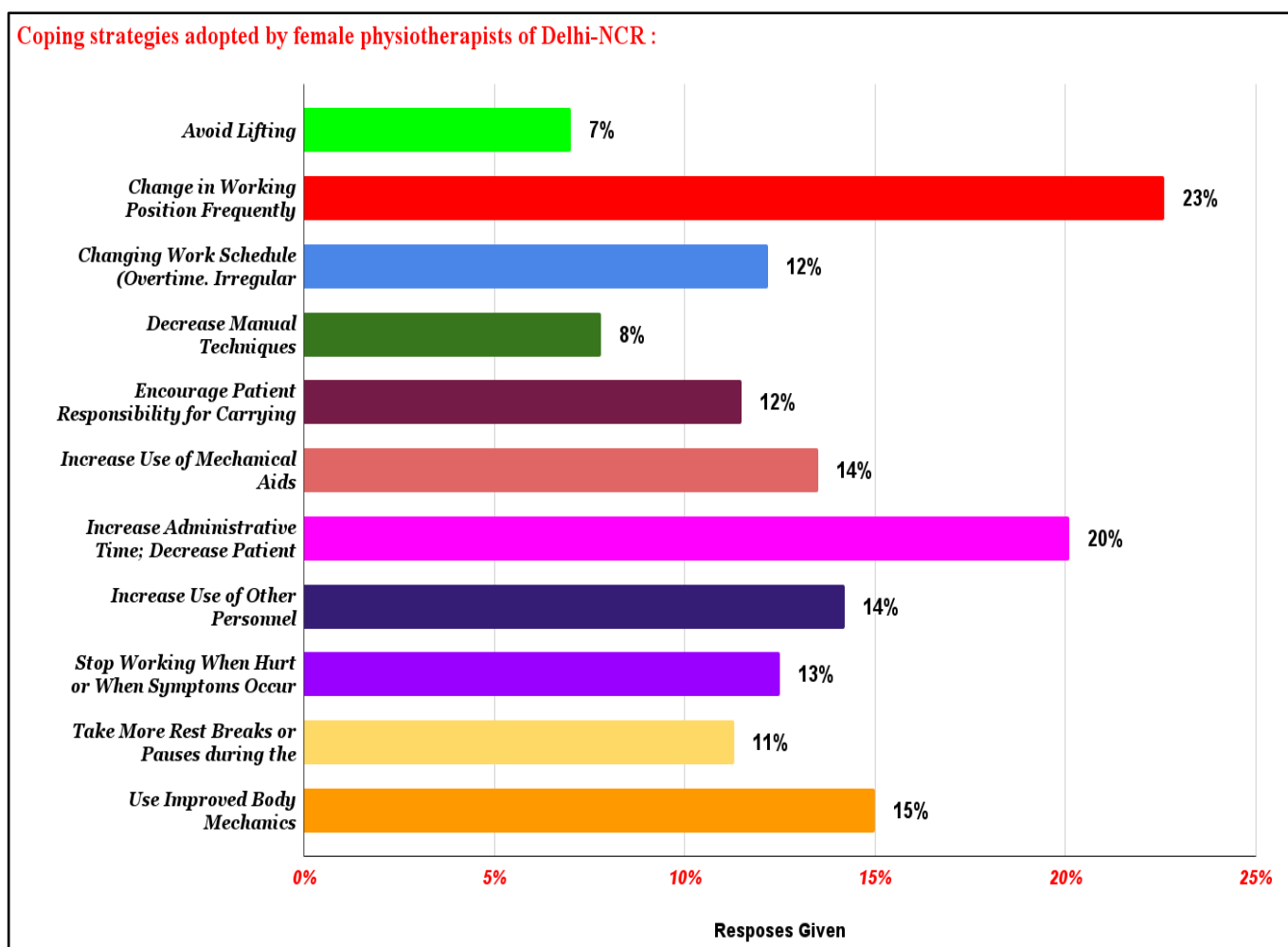


Figure 9 -various coping strategies adopted by female physiotherapists in Delhi, NCR, to manage work-related issues

The chart above illustrates the various coping strategies adopted by female physiotherapists in Delhi, NCR, to manage work-related issues. The most common strategy is changing working positions frequently, as reported by 23% of respondents. This is followed by increasing administrative time to decrease patient care time by 20%. Other notable strategies include using improved body mechanics (15%), increasing the use of mechanical aids (14%), and relying on additional personnel (14%). Avoiding lifting is the least common strategy, adopted by only 7%. Additionally, 12% of respondents cope by changing their work schedule, such as taking on overtime or irregular shifts, and another 12% by encouraging patients to take on more responsibility. Decreasing manual techniques is utilized by 8%, while 13% stop working when hurt or when symptoms occur, and 11% take more rest breaks or pauses during the workday. This data indicates a variety of approaches to coping with work-related stress and injuries, highlighting the importance of adaptability and self-care among physiotherapists in the region.

IV. DISCUSSION

The study reveals a significant prevalence of work-related musculoskeletal disorders (WRMDs) among female physiotherapists in Delhi NCR, particularly affecting the neck, shoulders, and lower back. Neck problems are the most common, with 34.1% experiencing daily discomfort, and shoulder issues similarly prevalent, with 34.7% experiencing daily pain. Elbow, hand/wrist, and upper back issues are also notable, with a substantial number of physiotherapists reporting problems lasting from 1-7 days to over 30 days. Lower back discomfort is particularly pronounced, with 30.9% affected for more than 30 days and 35% for 1-7 days, highlighting the lower back as a major concern. Hip, thigh, knee, and ankle/foot problems are also widespread, indicating significant musculoskeletal challenges across various body regions. Despite these physical challenges, many physiotherapists maintain their concentration, decision-making abilities, and enjoyment of daily activities. However, stress and mental health issues are significant, with 40% experiencing usual stress levels and 15% feeling much more stressed than usual. Sleep disruption due to worries affects a considerable portion, with 35% experiencing it no more than usual and 20% much more than usual. Feelings of depression and loss of confidence are reported by 30% and 20%, respectively, but many still find purpose and happiness in their work. The high prevalence of WRMDs, with 39% reporting multiple injuries and 26% a single injury, underscores the need for targeted interventions to prevent these injuries and support the health and career effectiveness of physiotherapists. The study identifies key ergonomic stressors, such as prolonged standing (30%), repetitive movements (45%), and inadequate workspace design (25%), as major contributors to WRMDs. Psychosocial factors, including job stress (35%) and organizational culture (20%), also play significant roles in the development of these disorders. Individual characteristics like age, years of experience, and physical fitness levels influence the prevalence of WRMDs, suggesting the need for tailored interventions and ergonomic adjustments. Overall, the study provides valuable insights into the multifaceted nature of WRMDs among female physiotherapists in Delhi, NCR. It emphasizes the need for comprehensive workplace interventions that address both physical and psychosocial aspects to promote a healthier and safer working environment. These findings highlight the urgent need for ergonomic interventions, mental health support, and targeted strategies to reduce the prevalence and severity of WRMDs, ultimately improving the well-being and professional lives of female physiotherapists.

A. Outcome

The high incidence of symptoms affecting the neck, shoulders, and lower back highlights the occupational hazards faced by these healthcare professionals. Ergonomic stressors such as prolonged standing (30%), repetitive movements (45%), and inadequate workspace design (25%), emerged as prominent contributors to these musculoskeletal issues. These findings align with previous research emphasizing the physical demands and ergonomic challenges inherent in physiotherapy practice.

Moreover, psychosocial factors, including job stress (35%), and organizational culture (20%), were identified as crucial determinants influencing the prevalence of WRMSDs. These factors indicate the complex interplay between physical and psychosocial aspects in the development of occupational injuries among physiotherapists. Understanding and mitigating these factors are essential for implementing effective preventive measures and improving the occupational health and well-being of physiotherapy professionals.

Furthermore, individual characteristics such as age, years of experience, and physical fitness levels were found to variably influence the prevalence of musculoskeletal disorders. Addressing these individual factors through tailored interventions and ergonomic adjustments may help mitigate the risk of WRMSDs among physiotherapists.

Overall, this study provides valuable insights into the multifaceted nature of WRMSDs among female physiotherapists in Delhi, NCR. The findings underscore the need for comprehensive workplace interventions that address both physical and psychosocial aspects to promote a healthier and safer working environment for physiotherapy professionals.

B. Limitations of the study

In this study, there is a potential for respondents to provide vague responses due to difficulties in recalling specific details requested during interviews or surveys. To mitigate this influence, various measures were taken to ensure data accuracy and reliability. The sample selection process involved a randomized approach among physiotherapists across Delhi and the National Capital Region (NCR). However, it's important to note that the scope of this research was confined to this geographical area, which may limit the generalizability of the findings beyond Delhi, NCR. Despite these limitations, rigorous efforts were made to gather comprehensive and representative data on the prevalence of work-related issues among physiotherapists in the region.

C. Suggestions for Future Research

Future research could expand the scope of inquiry by conducting studies across broader geographical areas within India, beyond the Delhi NCR region. This would provide a more comprehensive understanding of the prevalence and specific risk factors associated with work-related musculoskeletal disorders (WRMDs) among physiotherapists nationwide. Additionally, future research could encompass a comparative analysis between male and female physiotherapists across India, exploring potential differences in the incidence and severity of WRMDs. Such comparative studies could shed light on gender-specific factors influencing the occurrence of these disorders within the profession. By broadening the geographic and demographic scope of investigation, future research could offer valuable insights into the varying impacts of occupational factors on physiotherapists' health across different regions and genders in India.

V. CONCLUSION

The findings of this study provide a comprehensive analysis of the prevalence, duration, and factors influencing work-related musculoskeletal disorders (WRMSDs) among female physiotherapists in the Delhi NCR region. The data reveals significant variability in the prevalence of musculoskeletal issues across different body regions, highlighting the diverse impact of occupational hazards on this professional group. Neck and lower back problems emerge as particularly prevalent, affecting a substantial proportion of physiotherapists on a daily basis. Shoulder, elbow, hand/wrist, upper back, hip/thigh, knee, and ankle/foot issues also demonstrate considerable incidence across varying durations, underscoring the pervasive nature of musculoskeletal discomfort among these healthcare providers.

Ergonomic stressors such as prolonged standing, repetitive movements, and inadequate workspace design are identified as significant contributors to these musculoskeletal issues. Specifically, 30% of respondents attribute their discomfort to prolonged standing, while 45% cite repetitive movements, and 25% point to inadequate workspace design. These findings corroborate existing literature on the physical demands and ergonomic challenges inherent in physiotherapy practice.

Psychosocial factors, including job stress (35%) and organizational culture (20%), are identified as crucial determinants influencing the prevalence of WRMSDs among female physiotherapists. This underscores the complex interplay between physical and psychosocial aspects in the development of occupational injuries within this profession. Addressing these factors through targeted interventions is essential for enhancing occupational health and well-being among physiotherapy professionals.

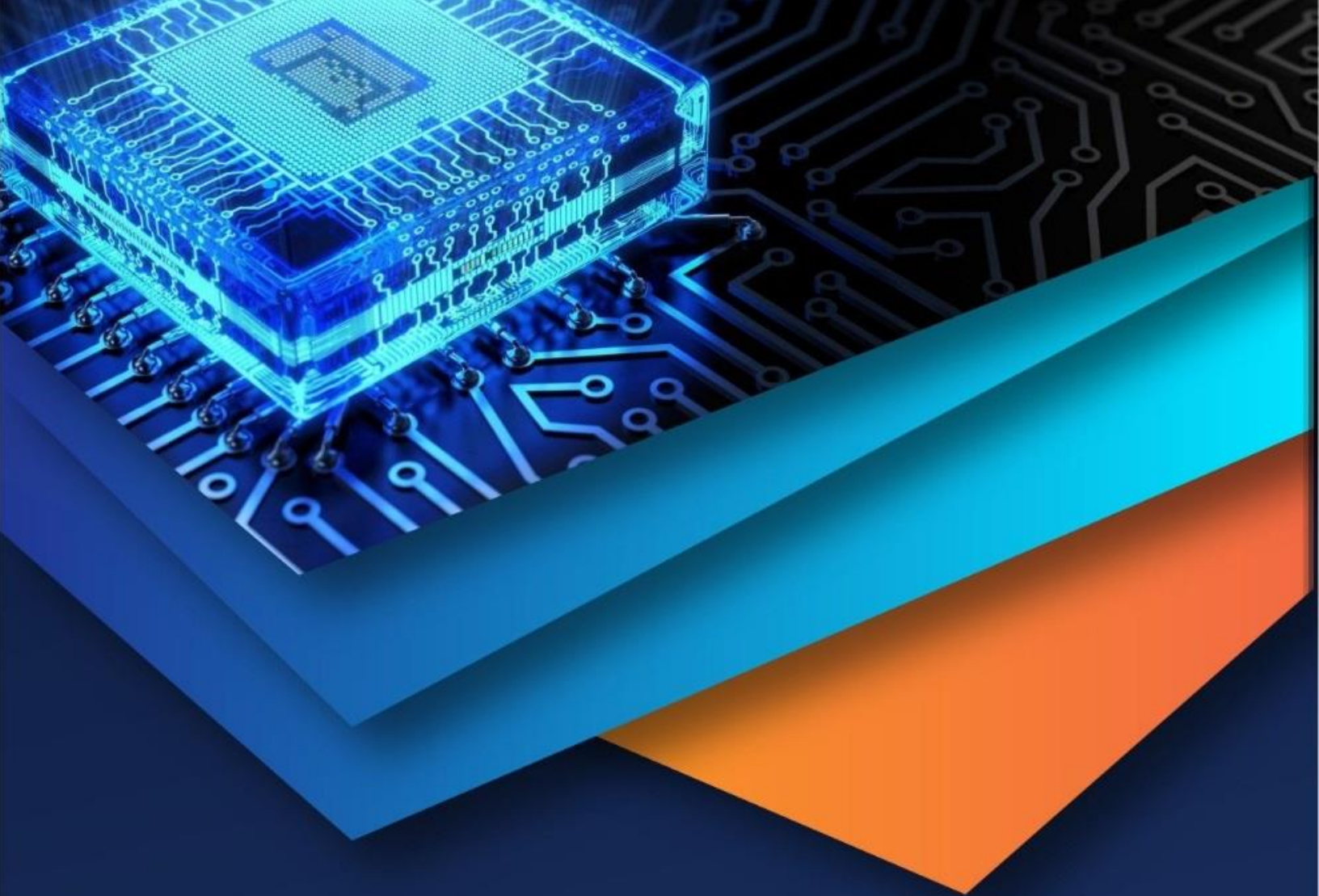
Moreover, individual characteristics such as age, years of experience, and physical fitness levels show varying degrees of association with the prevalence of musculoskeletal disorders. Tailored interventions focusing on these individual factors, coupled with ergonomic adjustments, hold promise for mitigating the risk of WRMSDs among physiotherapists.

Overall, this study provides valuable insights into the multifaceted nature of WRMSDs among female physiotherapists in Delhi, NCR. The findings underscore the urgent need for comprehensive workplace interventions that address both physical and psychosocial aspects to foster a healthier and safer working environment for physiotherapy professionals. By understanding and mitigating these factors, healthcare organizations can promote the well-being of their physiotherapy workforce and improve the overall quality of patient care. Future research should continue to explore effective strategies for preventing and managing WRMSDs in this demanding yet vital healthcare profession.

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