



THE PREVALENCE OF WORK RELATED MUSCULOSKELETAL DISORDERS AND PHYSICAL ACTIVITY AMONG PHYSIOTHERAPISTS IN INDIA :A SURVEY STUDY

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Introduction

Work related musculoskeletal disorders(WMSDs) are defined as musculoskeletal conditions caused by or made worse by an individual's occupation and work environment. Musculoskeletal conditions are injuries to the muscles, tendons, ligaments, joints, spinal discs and nerves.(1)

WMSDs are common in various professions within the health care industry with healthcare professions such as physical therapist, dentistry surgeons and nursing identified as high-risk jobs for developing WMSDs caused by risk factors such as heavy physical work inform of; repeated lifting and handling of various loads, awkward and strained posture which includes twisting bending and repetitive movements of different joints. (2,3)

Physiotherapists diagnose, rehabilitate, and treat movement dysfunctions. They also maintain and promote individuals' optimal physical function as well as help prevent musculoskeletal injuries or conditions and their progressions. (4)

Although physical therapists are better trained and possess deeper knowledge of the body, its mechanisms along with its musculoskeletal injuries or conditions and strategies to manage treat and prevent them, they often have to perform repetitive and physically intense tasks such as manual therapy, transfers, myofascial release putting them at a higher risk of WMSDs. A study by Molumphy M et al reports that's up to 70% of physiotherapists visit doctors because of WMSDs (19) with some studies stating that most physiotherapists are less likely to report their injuries or seek medical treatment relying on self-administered treatment making it difficult to gets statistics from hospital or clinical records. (3,4,5)

Amongst the WMSDs reported by physiotherapists in other countries Low back pain is the most common and wise spread complaint with a recorded incidence rate of 45-60% in the USA, 68% in the UK,70% in Kuwait and

49% percent in Canada to name a few. With conditions such as neck pain, shoulder pain, wrist pain, and thumb pain following closely. (3,6,11,)

Multiple studies have been done on strategies for the prevention and management of musculoskeletal conditions WMSDs, these include work ergonomics, physiotherapy treatment and physical activity. (20,21,22)

Physical activity is defined by WHO as any movement done by the body that's expends energy. Physical activity includes movement during leisure time, occupational hours, and commuting. (18)

Physical inactivity is considered to be a global epidemic with approximately 70 % of the world's population affected by it studies show that about every 1 in 4 adults does not meet the required level of physical activity recommended and this statistic varies among countries with factors such as economic growth, means of transportation and urbanisation contributing highly to the increase of physical inactivity consequently resulting in increase of musculoskeletal conditions and disorders. (8)

The recommended level of physical activity for children and adolescence being 60 minutes of moderate to vigorous intensity daily and for adults aged 18 and above being 150 to 300 minutes of moderate intensity of aerobic physical activity per week. (8)

Physical activity that is structured and planned increases strength flexibility and endurance which in turn increases and improves muscle balance, postural control, resistance to muscle fatigue and muscle recovery time leading to an overall improvement in physical performance preventing improving and managing musculoskeletal condition including WMSDs.(9)

Recent studies show that there is inadequate physical activity among physiotherapists. A study by Anna Lowe et al done on physiotherapists in the UK found that there was a poor understanding and knowledge of physical activity guidelines and that the majority of the physiotherapists did not meet the recommended levels of physical activity.(10)

Despite this more studies have been done on professions such as office workers, nurses, And construction workers as compared to physiotherapists.

To the best of our knowledge there is limited information regarding the prevalence of WMSDs amongst physiotherapists in India and its association with physical activity to date.

Therefore, this study aims to:

Investigate the prevalence of WMSDs, their associations with demographic data such as age, gender, experience, and professional characteristics such as preferred treatment techniques and clinical setups

To evaluate prevalence of physical activity and its effects on WMSDs amongst physiotherapists in India.

To evaluate the strategies used by physical therapists to manage WMSDs.

Methodology

This study was a cross sectional questionnaire based online survey. The questionnaire was created on google forms and was sent out in form of a link targeting physiotherapy groups and individuals currently working in India, inviting them to participate in the survey.

A cover letter was added to the questionnaire having an introduction and objectives of this study. The participants were informed that their participation and submission of the questionnaire along with their consent were agreeing to their data being analyzed and published.

This study was done under the Lovely Professional University school of applied medical sciences.

Inclusion and exclusion criteria

Our inclusion criteria were both male and female clinical Physiotherapists working in India, have at least 6 months of clinical experience, with > 1 hour per day of direct contact with patients, Exclusion criteria included those, who have not practiced within two years of this study and those who did not complete the questionnaire.

Questionnaire

The questionnaire was made to gather information on the prevalence and features of WMRDs as well as prevalence of physical activity amongst physiotherapist in India.

It consisted of two questionnaires which made the two parts, with the first being the Questionnaire on occupational injuries in physical therapists which has been published in previous articles (24) and the second being the International Physical Activity Questionnaire short form (IPAQ-SF) its validity and reliability reported previously. (25)

Part one : The questionnaire on occupational injuries in physical therapists was split into 2 sections the demographic portion and the musculoskeletal portion.

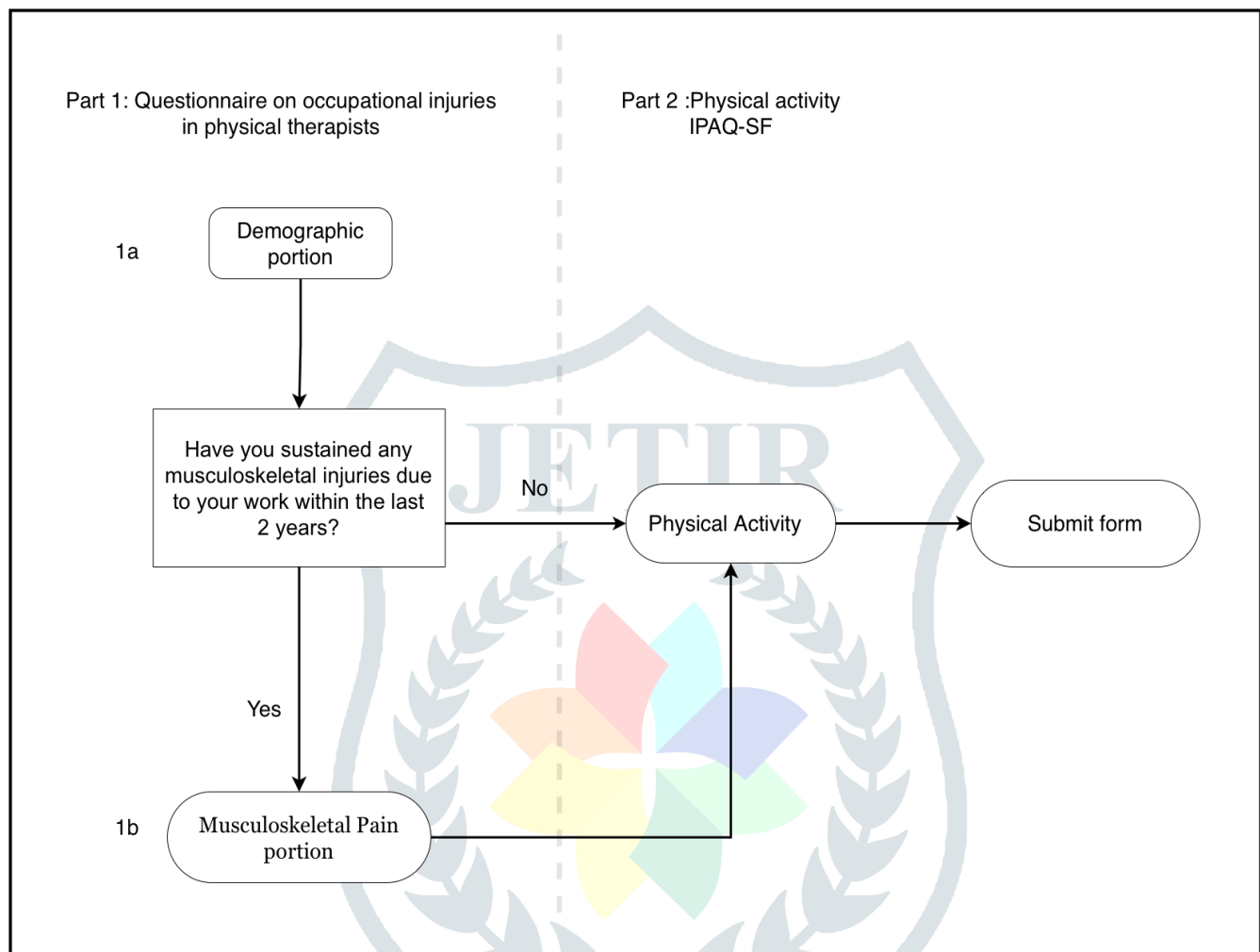
The demographic portion was to be filled by everyone participating in the survey this portion inquired about the individuals age, weight, height, years of experience, number of hours of patient contact as well as area of practice. The Musculoskeletal Pain portion had questions pertaining to the site of the musculoskeletal pain with these 9 anatomical regions listed neck, shoulder, upper back (thoracic), elbow, wrist/hand, lower back (lumbar/sacral), hip, knee, and ankle/foot the questions that followed asked about the history (the type of injury, how it was sustained and what exacerbated the symptoms) and strategies used to manage the conditions.

Part two: IPAQ-SF consisted of questions pertaining to physical activity of the physiotherapists in the last 7 days they were asked if they had done any vigorous, moderate activity, walking and sitting as well as inquiring how much time they spent doing them.

The demographic portion was to be filled by all participants they were then directed to the different parts of the questionnaire with the use of the question "Have you sustained any musculoskeletal injuries due to your work

within the last 2 years? Yes/No”. Those that answered yes continued on to the Musculoskeletal Pain portion and later went on to part two while those that answered No were directly sent to part two: Physical Activity

Figure 1: Chart showing how the participants were directed to different parts of the form based on their answers .



Statistical Analysis

For this present study data was extracted from the google forms and transferred to an Excel sheet (2010) and was then transferred to the statistical package of social science version 18 (SPSS 18) software which was used to analyze the data. The Chi- Square Test was used with a level of significance of 0.05 (5%) to assess associations between variables.

Results

250 clinical physiotherapists working in India participated in the online survey of which 149 were female and 105 were male, with an average age of 24.27 height in cm 158.29 and an average weight of 64.43. The participants were also asked about their years of experience and hours of contact with patients per day and the data collected showed the average years of experience to be 23.75 months and an average of 7.20 contact hours per day Table 1.

The participants were asked in what area (specialization) they practiced at the time of the study and 63% reported

to be working as General Physiotherapists, with 26.8% working in Orthopedic Rehabilitation and 9.6% working in Neurological Rehabilitation Table 2

A hundred and ten respondents 44% of the 250 participants reported to have experienced work related musculoskeletal pain within the last 2 years while 140 (56%) reported to have had no WMRDs. The data shows that of the 250 participants the overall prevalence of WMRDs was 44% with 24.4% reporting to have sustained more than one injury due to their work Table 4.

The data showed a high prevalence of neck pain 25.2% and shoulder 19.6%, neck 18.4%, wrist and hand 16.8%, upper back 12.0% with ankle and foot and knee regions both recording a 10.4% with the least affected parts being Hip 7.25% and elbow 0% Figure 2. Muscle strain was the main type of injury reported at 41.6% followed by tendinitis at 14.8% with degeneration accounting for 6.8 % Figure 3.

The frequent factors that led to these injuries included performing respective tasks 19.6%, lifting 17.2%, transferring a patient 16.0%, performing manual therapy 13.2% maintaining positions for prolonged periods 11.6% Table 9.

The most injuries happening in public hospitals 24.8% followed by private physical therapy offices 9.2%, university hospitals 1.2% pediatric rehabilitation centre 0% other 6% Table 12. Of those that sustained WRMDs only 18 (7.2%) individuals reported their injuries Table 6.

Of the respondents who reported WRMDs 57.6% reported to be using a combination of rest, exercise and their personal knowledge of physical therapy such as postural adaptations to manage their symptoms While 7.2% sort surgical intervention Table 8.

The top changes and strategies used by the participants that reported WRMDs to manage their symptoms while they worked included take more rest breaks or pauses during the work day 21.6%, change of work positions frequently 20.8% use of improved biomechanics 20%, stop working when hurt or when symptoms occur 11.2% and 10% encouraged patient responsibility for carrying out treatments Table 10.

Physical activity reported by the participants as seen in Figure 4 showed that participants regularly participate in vigorous and moderate activities 7 days with others reporting low physical activity and reporting walking as their major physical activity done throughout the week. On an additional note, the majority of the physiotherapists that reported having no injuries had participated in vigorous and moderate activities on all 7 days prior to their participation Table 11.

Table 1: Distribution of males and females who participated in this study .

Variables	Opts	Percentage(%)	Frequency(f)
Sex	Male	40.4%	101
	Female	59.6%	149

Table 2: Descriptive data, Mean Standard deviation and number of participants.

DESCRIPTIVE STATISTICS	Mean	Standard Deviation	Maximum	N
Age in years	24.47	4.40	47.00	250
Height in cm	158.29	34.14	187.00	250
Weight in kg	64.43	9.16	94.00	250
Years of experience (months)	23.75	31.33	144.00	250
Hours of the contact with patients per day?	7.20	2.03	12.00	250

Table 3 : Shows different clinical physiotherapy setups the participants work in.

Variables	Opts	Percentage(%)	Frequency(f)
In what area do you currently practice?	Orthopaedic Rehabilitation	26.8%	67
	General Physical Therapy	63.6%	159
	Neurological Rehabilitation	9.6%	24
	Cardiopulmonary Rehabilitation	0.0%	0

Table 4: Response of the participants as to whether or not they had WRMDs in the last 2 years.

Variables	Opts	Percentage(%)	Frequency(f)
Have you sustained any musculoskeletal injuries due to your work within last 2 years?	Yes. one only	19.6%	49
	Yes. more than one	24.4%	61
	No	56.0%	140

Table 5: The setting in which the injury occurred with the percentage and frequency.

Variables	Opts	Percentage(%)	Frequency(f)
In what type of setting did the injury occur?	University Hospital	1.2%	3
	Public Hospital	24.8%	62
	Paediatric Rehabilitation Centre	0.0%	0
	Patient's Home (Home Care)	1.6%	4
	Private Physical Therapy Office	9.2%	23
	Other	6.0%	15

Table 6: Response to injury by respondents.

Variables	Opts	Percentage(%)	Frequency(f)
Did you officially report the injury?	No	35.6%	89
	Yes	7.2%	18

Table 7: Response on whether or not to change jobs by the participants who have WRMDs.

Variables	Opts	Percentage(%)	Frequency(f)
Are you considering changing jobs because of this injury or because you fear another injury?	No	36.4%	91
	Yes	6.4%	16

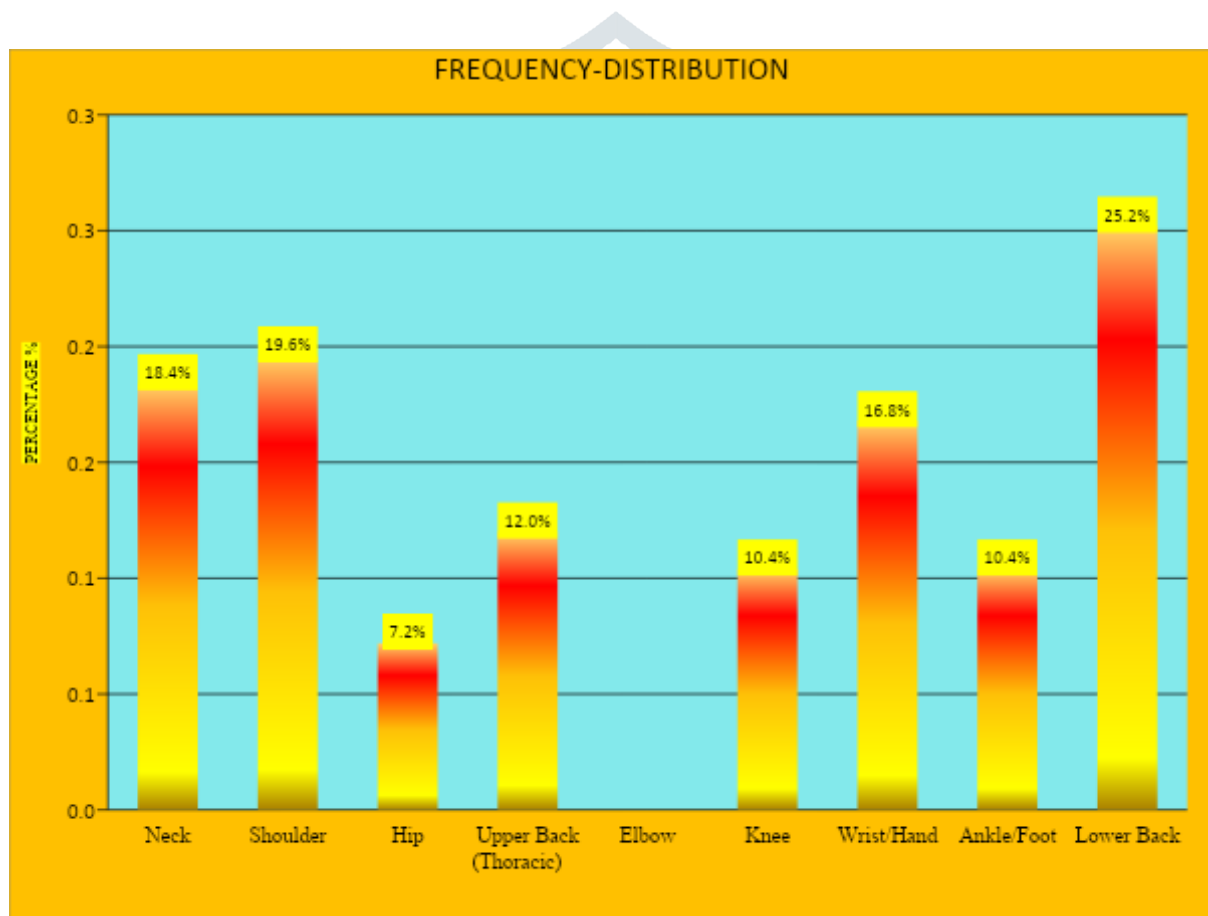


Figure 2: Participants response to site of injury

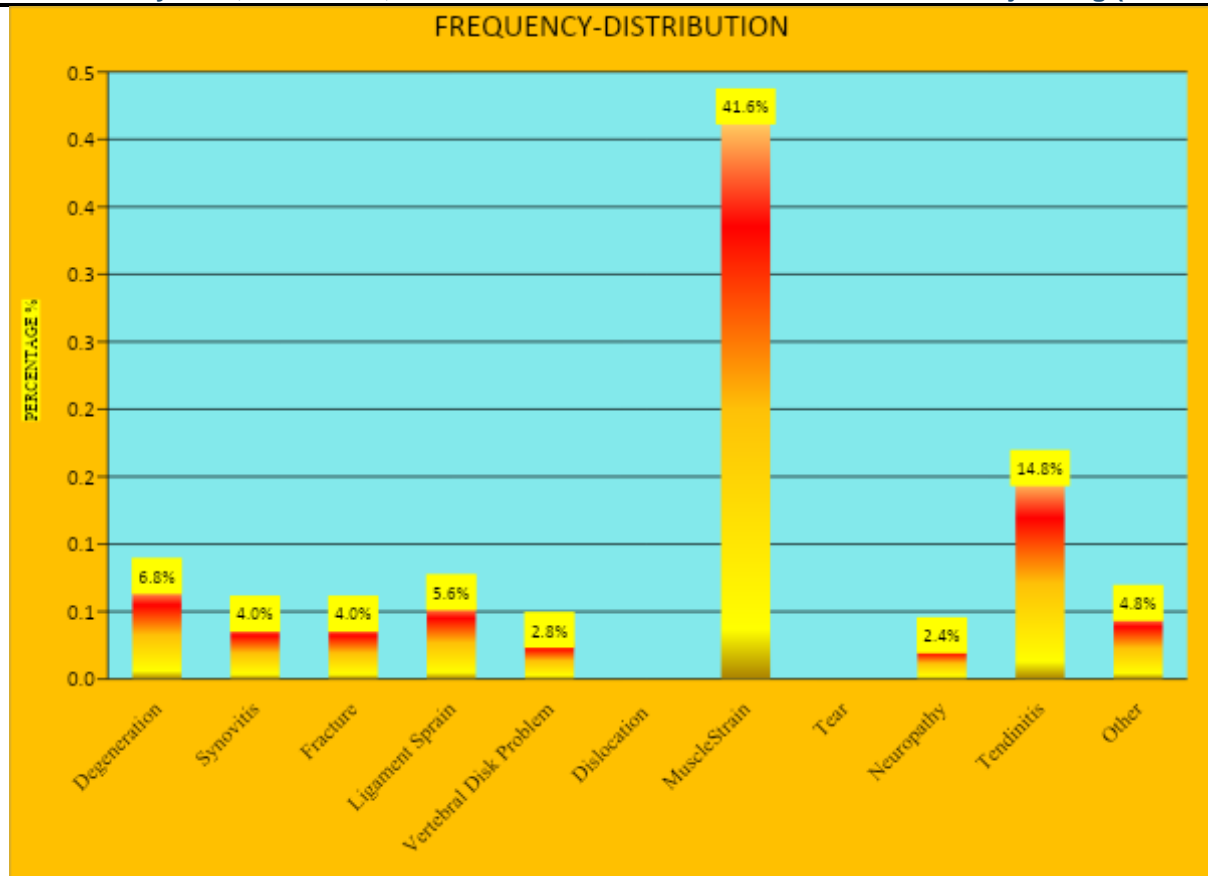


Figure 3: Types of injuries sustained by respondents due to their work.

Table 8: interventions used by physiotherapists for their WRMDS.

Variables	Percentage(%)	Frequency(f)
Surgical	7.2%	18
Medical	0.0%	0
Rest	4.0%	10
Exercises	19.6%	49
Personal knowledge of physical therapy (postural adaptation, ergonomics...)	34.0%	85

Table 9: Activity that was being done when injury occurred.

Variables	Percentage(%)	Frequency(f)
Lifting	17.2%	43
Maintaining a Position for a Prolonged Period	11.6%	29
Performing Manual Therapy Techniques	13.2%	33
Performing Repetitive Tasks	19.6%	49
Transferring a Patient	16.0%	40
Performing Overhead Activities	7.6%	19
Reaching	8.4%	21
Climbing Stairs	7.6%	19
Squatting	1.2%	3
Walking	10.0%	25
Working in an Awkward or Cramped Position	10.0%	25

Other	2.8%	7
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Table 10: strategies used by participants to prevent and manage provocation of symptoms.

Variables	Percentage(%)	Frequency(f)
Avoid Lifting	9.6%	24
Change Working Position Frequently	20.8%	52
Change Work Schedule (Overtime. Irregular Shifts. Length of Workday)	4.0%	10
Decrease Manual Techniques	7.2%	18
Encourage Patient Responsibility for Carrying Out Treatment	10.0%	25
Increase Use of Mechanical Aids	4.0%	10
Increase Administrative Time; Decrease Patient Care Time	1.2%	3
Increase Use of Other Personnel	7.2%	18
Stop Working When Hurt or When Symptoms Occur	11.2%	28
Take More Rest Breaks or Pauses during the Workday	21.6%	54
Use Improved Body Mechanics	20.0%	50

Table 11: showing number of days and type of physical activity done (vigorous, moderate and walking)

Variables	vigorous physical activities (%)	moderate physical activities (%)	walk for at least 10 minutes
1 Day	12.0%	7.2%	4.0%
2 Day	3.2%	14.8%	6.8%
3 Day	4.4%	12.4%	8.4%
4 Day	16.4%	9.6%	3.2%
5 Day	3.6%	3.6%	8.0%
6 Day	4.4%	0.0%	19.6%
7 Day	54.8%	51.2%	48.8%

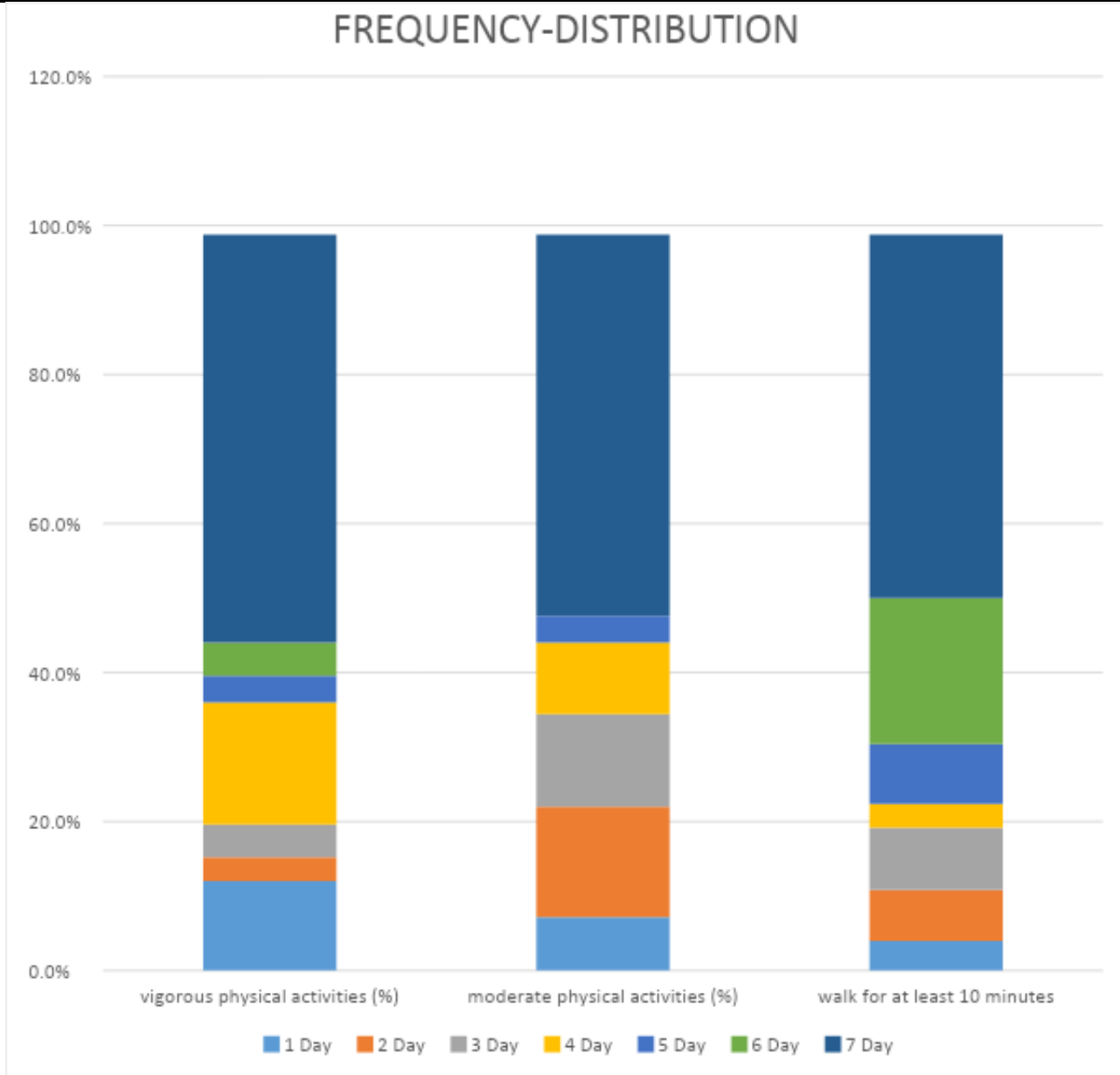


Figure 4: showing distribution and frequency of physical activity.

Table 12: showing association between different variables and prevalence of WRMDs with the Chi-Test.

		Musculoskeletal injuries			ASSOCIATION				
Variables	Opts	Yes. one only	Yes. more than one	No	Chi Test	P Value	df	Table Value	Result
Age in years	Upto 20 years	0	3	3	148.261	0.000	6	12.592	Significant
	21-30 years	49	51	137					
	31-40 years	0	0	0					
	>40 years	0	7	0					
Sex	Male	30	21	50	260.588	0.000	6	12.592	Significant
	Female	19	40	90					
	Upto 12 months	45	33	96		0.000	12	21.026	

Years of experience (months)	13-36 months	1	6	31	54.043	0.000	9	16.919	Significant
	37-60 months	3	8	7					
	61-84 months	0	0	0					
	85-108 months	0	7	0					
	>108 months	0	7	6					
In what area do you currently practice?	Orthopaedic Rehabilitation	4	15	48	276.440	0.000	9	16.919	Significant
	General Physical Therapy	33	39	87					
	Neurological Rehabilitation	12	7	5					
	Cardiopulmonary Rehabilitation	0	0	0					
During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?	One	0	7	23	56.143	0.000	12	21.026	Significant
	Two	3	5	0					
	Three	0	0	11					
	Four	8	7	26					
	Five	0	0	9					
	Six	3	8	0					
	Seven	35	31	71					
During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.	One	7	0	11	50.270	0.000	10	18.307	Significant
	Two	3	20	14					
	Three	13	0	18					
	Four	3	7	14					
	Five	0	0	9					
	Seven	23	31	74					
In what type of setting did the injury occur?	University Hospital	3	0	0	21.438	0.000	4	9.488	Significant
	Public Hospital	31	31	0					
	Paediatric Rehabilitation Centre	0	0	0					
	Patient's Home (Home Care)	4	0	0					
	Private Physical Therapy Office	11	12	0					
	Other	0	15	0					

Discussion

In this study a self administered questionnaire was used to collect demographic data along with features of WRMDs as well as details of physical activity that included questions on vigorous activity, moderate activity and sitting and how much time was spent doing these activities this was collected from 250 physiotherapists working in india who choose to participate.

Different modalities and techniques are preferred and commonly used for management of various conditions

among physiotherapists in India as compared to other countries hence we felt that investigating the prevalence of WRMDs and level of physical activity amongst physiotherapists in India as well as to shed some light on what coping mechanisms are used and what are the most common factors contributing to injury in physiotherapists work places in india.

Musculoskeletal related to work places are very common amongst health care workers. Health care professionals suffering from WRMDs report loss of money as well as working hours as a result of their injuries and this in turn has an effect on the quality of service they provide. With health care workers in direct contact with patients such as physiotherapists having a high prevalence of WRMDs.

Studies done around the world on prevalence of WRMDs amongst physiotherapists have yielded similar results with some small differences from country to country and can be attributed to various factors such as the country's developmental status, the level of physiotherapy profession in that particular country with other factors like psychosocial and epidemiological factors contributing to these differences.(24)

Our study revealed a prevalence rate of 44% which is lower than reports from other countries as well as a study done by Shah IS et al reported 69.8% prevalence of WRMDs amongst physiotherapists in India.(29)

According to the results of this study 21-30 year olds showed a higher prevalence of musculoskeletal pain associated with work with females reporting higher percentage as compared to males which can be due to lower physical strength as compared to men and differences in body composition and is consistent with other studies(6,28). A study by Cromie et al showed that younger physiotherapists tend to suffer from WRMDs as compared to older physiotherapists which can be accounted for by the lack of experience and lower knowledge which individuals have in their earlier years in careers.(11)

With 72 of the 110 participants that reported injury due to their workplace in the last 2 years being public hospital workers this corresponds with other findings done by other countries which associate this finding to the high number of patients the physiotherapist comes into contact with, as compared to physiotherapist working in private practice which a previous study had found to be the highest risk factor of WRMDs (29)

Lower back pain was the highest reported incidence site involved in musculoskeletal injuries due to their occupation at 25.2% as reported by the participants. Cromie et al showed an incidence rate of low back pain was 45% with a study by Holder et al showing a higher incidence rate of 62%. Interestingly at 25.2% our incidence rate of low back pain is lower than other findings done in other countries.

Literature shows that low back pain, hand-wrist and neck respectively are the most common involved sites which corresponds with the results of this study with low back at 25.2% followed by shoulder at 19.6%, neck at 18.4% and wrist/hand at 16.8% (13,24)

Studies on WRMDs have revealed that the work related activities that put individuals at high risk of occupational injuries in the healthcare profession include lifting heavy equipment as well as patients, repeated movements, manual therapy and maintaining same postures for prolonged periods of time.(19,27)

Our study revealed that the main cause of injury in physiotherapists who participated included performing repetitive tasks, lifting, transferring patients, maintaining prolonged postures and manual therapy techniques respectively.

Holder et al found that physiotherapists suffering from WRMDs changed their professional attitudes in order to prevent and exacerbate their injury symptoms previous research findings show that the most used strategies by physiotherapists to avoid occupational injuries include correction of body mechanics and changes in posture frequently. In our survey study results showed that the most used strategies to prevent exacerbation of symptoms and prevent injury included taking more rest breaks and pauses during work day, change in working posture frequently and the use of improved body mechanics (13)

A study done by Thiago Mattus Ribas et al states that high levels of physical activity was not adequate to promote the body adaptations that are required to confirm that physical activity can be used as a preventative measure against WRMDs. In these same lines a study by showed that high levels of physical activity are not always successful at lowering WRMDs as the activity itself may be the a factor that increases the risk of WRMDs.(8)

On the other hand some literature have shown that vigorous intensity physical exercises done at least 3 days a week is effective at reducing low back pain, shoulder pain and neck pain. The study further suggested that the combination of regular stretching at work as well as muscular fitness with adequate time of rest and recovery are more effective at reducing the risk of WRMDs as compared to high levels of physical activity alone .(26)

Physical exercise can be used as a tool to prevent and manage occupational related conditions (8)

Studies have shown that regular participation in exercises such as yoga and Pilates which recruit multiple muscle groups and mimic movement patterns that are done in day to day activities such as bending twisting have been found to reduce musculoskeletal discomfort and WRMDs in health care professionals.(9)

Implications of the findings and recommendation for future research

Will be added after data analysis. The findings of the study are clinically significant to clinical physiotherapists as well their employers. It is advised that clinical physiotherapists should incorporate physical activity in their daily routines that include strengthening and stretching to maintain muscle balance and health. Adequate knowledge of various techniques, modalities and equipment is important to reduce risk of WRMDs because of improper handling and repeated use.

Employers need to recognise excessive workload and repeated uses of a technique can cause stress both physically and mentally increasing the wear and tear and affect muscle recovery increasing prevalence of WRMDs which may lead to employer, employee and patient dissatisfaction. So having an even distribution of patients amongst the physiotherapists as well as increasing the number of physiotherapists in the departments or clinics according to the number of patients will help see a decrease in injuries related to high patient contact.

Adding workplace interventions such as targeted exercise programs depending on technique and modalities used as well a professional setup of the clinics or hospitals can help lower then occurrence of work related

musculoskeletal pain.

This study also has an educational significance as it recognises that WRMDs usually occur in younger physiotherapists who have just started out their careers in physiotherapy and are at higher risk of the same due to lack of experience and knowledge of practical aspects of physiotherapy. So teaching students proper techniques, physiotherapy positions and biomechanics will help improve their postures and also equip them to adapt to different treatment techniques to ensure that they are not putting themselves at risk for WRMDs. A re-evaluation of how ergonomics is taught and emphasis on the importance of regular targeted exercise and high physical activity should be done by educational programs to ensure that every physiotherapist is equipped from the beginning of their careers and are constantly reminded of the importance of personal fitness and ergonomics even in their workplaces and the role it plays at managing and preventing WRMDs. This will ensure reduced WRMDs and allow physiotherapists a smooth and durable career.

Study Limitations

The study was done with the use of a self reported questionnaire which in most studies has been found to have a participants bias as individuals tend to overestimate their experiences which can be the case in this study.

The length of the questionnaire and the time taken to complete the survey which was estimated to take 10 -15 minutes might have discouraged participants from completing and participating in the study which can account for the lower sample size.

There is a possibility that physiotherapists that were most interested in participating were those that suffer from WRMDs which may have introduced selection bias.

Other factors like the intensity of pain as well as type of exercise done in physical activity were not specified in the study which needs to be investigated. This could assemble evidence on which specific physical activity or exercise is more efficient at lowering the prevalence of WRMDs.

Conclusion

This study provides informational data on WRMDs and physical activity amongst physiotherapists working in India. Revealing that young female physiotherapists are at a higher risk of developing WRMDs.

Our study revealed that the prevalence of WRMDs to be at 44% amongst physiotherapists in India and the Physiotherapists suffered injuries to similar body sites and incidence rates as other physiotherapists in other countries regardless of different working cultures and conditions.

Vigorous activity and high physical activity was more prevalent amongst participants that reported no work related musculoskeletal disorders.

Conflict of Interest

There was no personal or institutional conflict of interest for this study.

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