International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Prevalence of Thumb Pain in Practicing Physiotherapists

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Abstract: ***Background: Thumb pain is a common issue among physiotherapist due to repetitive motion and manual technique involved in their work. Studies suggest that the high prevalence of thumb pain among physiotherapists is primarily attributed to repetitive strain injuries manual therapy techniques and the use of handheld tools. It is generally agreed upon that thumb pain is a significant concern in this field. Aim: To evaluate the occurrence of pain and discomfort in the thumb among practicing/ clinical physiotherapists. Materials and Methods: This was a Cross Sectional Survey. Based on inclusion criteria, 40 Subjects were taken. Data was collected through the questionnaire and yielded the following result. Statistical Analysis Used: Tables and chart were prepared with the help of Microsoft Word and Excel Software. Statistical software STATA version 14.0 was used for data analysis. Result: There was a high prevalence of thumb pain 66.67% in practicing physiotherapist while 33.33% do not experience pain. Conclusion: From this study we can conclude that the prevalence of thumb pain in practicing physiotherapists is high i. e 66.67%. Factors that significantly increased the likelihood of having thumb problems included working in orthopaedic out patients using manual therapy, trigger point therapy or massage. Based on these finding it is recommended that the potential for thumb problems in physiotherapists, including possible risk factors, should be discussed in undergraduate and work place settings.***

Keywords: Thumb, pain, physiotherapy, manual therapy

1. Introduction

Thumb problems are a common occupational hazard for physiotherapists, with their prevalence second to back/neck pain.[3] Work - related injury to the thumb has become a recognized problem for physiotherapist who performs manual techniques in the treatment of patients with musculoskeletal disorders.

Many spinal therapy techniques involve thumb. If ligamentous support of thumb is not sufficient then application of compressive forces longitudinal to thumb and first ray causes subluxation at carpometacarpal.[2]

During manual techniques, thumb joint of hand is more vulnerable to biomechanical load and injuries related to their work because of direct transmission of forces through the thumb joint.[2] Inappropriate use of thumb while performing manual techniques causes hyper mobility to metacarpophalangeal joint (MP) joint which later on leads to osteoarthritis of carpometacarpal (CMP) joint.[2] If thumb position is not correct during the application of techniques, it causes pain and ultimately thumb injury.[2]

Wajon and Ada (2003) attempted to determine which particular manual therapy technique aggravated pain in the thumbs of musculoskeletal physiotherapists, and found that central postero - anterior (PA) vertebral mobilizations using thumb tips aggravated thumb pain in 85% of their respondents with pain.[4]

The technique of central PA vertebral mobilizations using thumb tips is a rhythmical oscillatory passive accessory movement performed on the patients spine (Watson and Burnett 1990).[4]

It is recommended that the thumbs are in contact with each other and that the pressure is applied by the arms combined with the trunk (Maitland, 1986).4 Positioning the MP and IP joints in extension during the application of force should encourage the direct transfer of pressure to more proximal joints, reducing the tendency for a zigzag collapse of the polyarticular chain (Nordin and Frankel 1989) with associated joint subluxation and pain.[4]

Observation of physiotherapists performing this technique reveals that some therapists are able to comfortably position their MP and IP joints in extension.[4]

Definition of pain according to The International Association for the study of pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.[2]

Many physiotherapists due to thumb pain use various management strategies such as some alter their method of treatment, some use preventive measures and in extreme cases, they leave their profession.[2]

Wajon et al reported 83% physiotherapists had pain in thumb when performing spinal manipulative therapy, 87% unilateral and 85%PA glide cause pain and 74% changed their choice of technique.[2] A study from India reported that their pain was due to applying manual techniques and 88% altered their techniques.[2]

Thumb pain may cause physiotherapists to alter the way they perform manual techniques.2 Changes to treatment applications due to musculoskeletal pain in treating therapist, rather than to enhance the treatment benefit, may decrease the effectiveness of manual therapy techniques and lead to less efficient and less successful treatment of patients, potentially increasing healthcare costs In addition,

it has also been reported that one in six physiotherapists moves within or leaves the profession as result of a work related musculoskeletal disorder (Cromie et al 2000).

This loss of physiotherapists from the workforce places an increased burden not only on the healthcare system that often has difficulty retaining qualified physiotherapists, but also on the education system that trains physiotherapists

Therefore, prevention of work - related injury in physiotherapists, particularly to the thumb and hand should become a priority in order to ensure the continued health and quality of life of the members of the profession.[5]

Of all the structures in the hand, the thumb joints are particularly vulnerable to biomechanical overload and work - related injury in physiotherapists, because forces are often transmitted directly through the thumb during the application of manual techniques.[5]

The human body is well adapted to repetitive movements, and the upper limbs, although often considered vulnerable in this regard, are no different this only becomes a potential problem when the repetitive action is continued for overly extended periods, or where substantial force is applied, or where the activity is carried out with parts of upper limb in awkward postures.[1]

It has been reported that high force at the joints is linked with increased flexion at the interphalangeal (IP) and metacarpophalangeal (MCP) joints.[1] These problems of the thumb have been recognized by several physiotherapy association around the world.[1]

2. Materials & Methods

The study was carried out among practising physiotherapist after getting ethical approval from institutional review board. Permission for taking video gamers as subjects was obtained from Head of the Department (HOD). Using a convenient sampling method of 40 practising physiotherapists was taken. Detailed subjective assessment was taken including demographic data, work status in last 12 months, number of years worked as physiotherapists, area of practise, etc. Data was collected from subjects. Data was entered into Microsoft Excel spreadsheet. Tables and graphs were prepared using Microsoft Word and Excel Software. Statistical software STATA version 14.0 was used for data analysis. No statistical test was applied because there was no comparison. It is just descriptive study.

3. Result

The study is supporting the aim and was able to measure the prevalence of thumb pain in practicing physiotherapist. Questionnaires were sent to 40 physiotherapists out of which 33 filled the entire questionnaire. The questions were analyzed and yielded the response as depicted in the following tables. The prevalence of thumb pain was found to be 66.67% while 33.33% of practicing physiotherapist do not experience thumb pain.

Table no 1 represents the gender of respondents and table no 2 represents the handedness of the participants

Table 1: Distribution of study population according to Gender

Gender	No. of respondent	Percentage
Male	3	9.09
Female	30	90.91

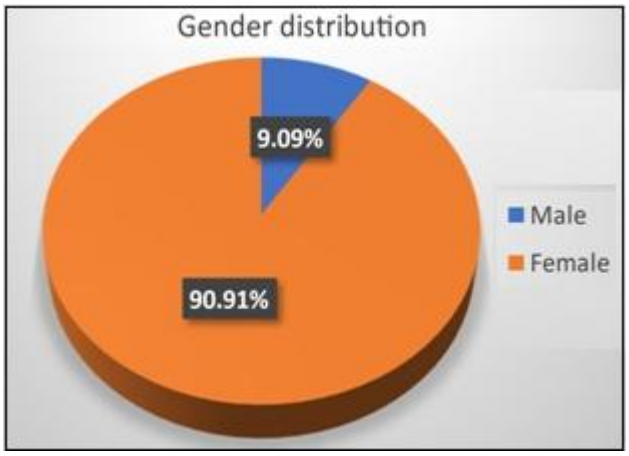

Table 2: Handedness

Handedness	No. of respondent	Percentage
Right	33	100
Left	0	- -

Table no 3 represents the work status in the past 12 months and table no 4 represents the years worked as a physiotherapist

Table 3: Work status in the last 12 months.

	No. of respondent	Percentage
Full time	33	100
Part time (<15 household)	0	- -
Sessional/Causal	0	- -
Others	0	- -

Table 4: Years worked as a physiotherapist.

	No. of respondent	Percentage
<7	0	- -
1 – 5	6	18.18
6 – 10	20	60.61
11 – 20	6	18.18
>20 years	1	3.03

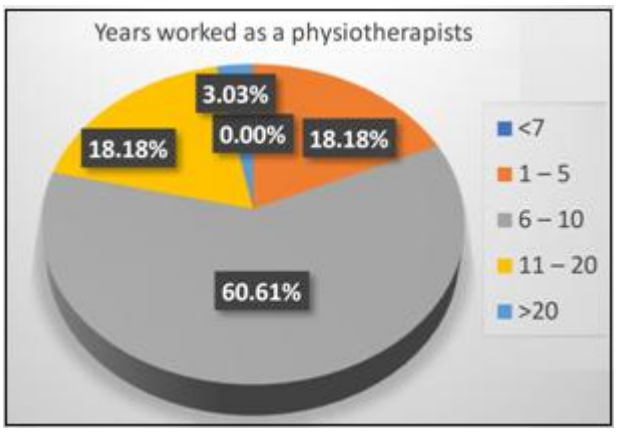

Table no 5 represents the current area of practice and table number 6 represents the hours worked per week

Table 5: Current area of practice

	No. of respondents	Percentage
Orthopaedics	33	100
Neurology	28	84.85
Cardiology	6	18.18
Outpatients	21	63.64

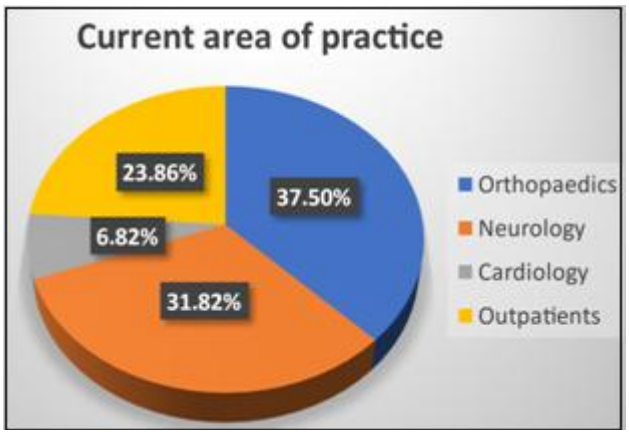

Table 6: Hours worked per week

	Orthopaedics	Neurology	Cardiology	Outpatients
0	0	5 (15.15)	27 (81.82)	12 (36.36)
1 – 10	7 (21.21)	17 (51.52)	1 (3.03)	13 (39.39)
11 – 20	17 (51.52)	9 (27.27)	5 (9.09)	7 (21.21)
21 – 30	4 (12.12)	2 (6.06)	0	0
31 – 40	3 (9.09)	0	0	1 (3.03)
41 – 50	0	0	0	0
51 – 60	2 (6.06)	0	0	0
>60	0	0	0	0

Table no 7 represents the years worked in current area of practice

Table 7: Years worked in Current area of practice.

	Orthopaedics	Neurology	Cardiology	Outpatients
<1	0	5 (15.15)	27 (81.82)	14 (42.42)
1 – 5	7 (21.21)	7 (21.21)	2 (6.06)	4 (12.12)
6 – 10	20 (60.61)	17 (51.52)	3 (9.09)	12 (36.36)
11 – 20	5 (15.15)	3 (9.09)	0	2 (6.06)
>20	1 (3.03)	1 (3.03)	1 (3.03)	1 (3.03)

Table no 8 represents percentage of time spent in hands on activities

Table 8: Percentage of time spent in hands on activities.

Hands on activities	% of time spent
Manual therapy technique	31 %
Trigger point work	8 %
Massage	5 %
Respiratory care	6 %
Passive/active assisted exercise	10 %
Manual handling - neurological	17 %
Manual handling - orthopaedics	21 %
Making splints	0
Administration (Typing, writing etc)	6 %

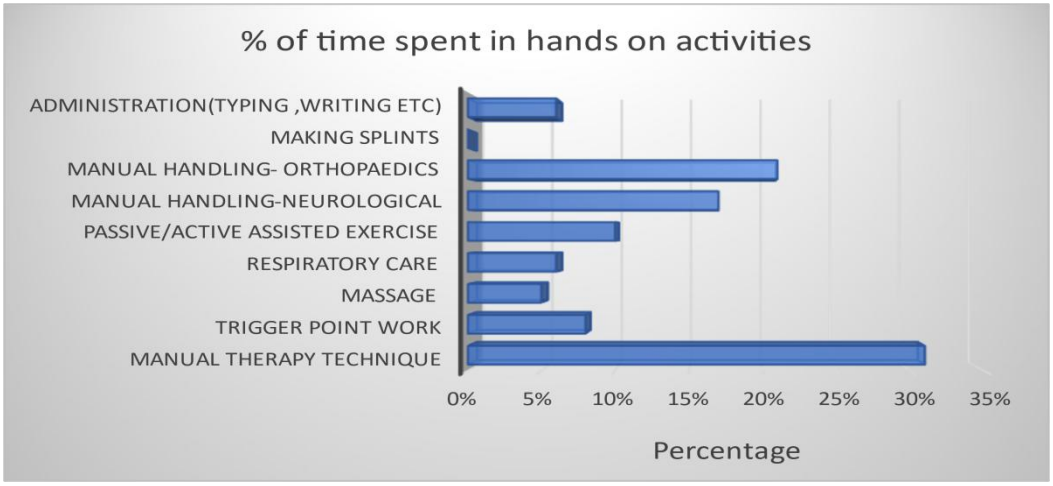

Table no 9 represents the prevalence of thumb problems in respondents.66.67% respondent reported thumb problems or symptoms such as pain, ache, discomfort, instability, weakness or triggering.

Table 9: Prevalence (Problems/symptoms) of thumb problems

	No. of respondents	Percentage
Yes	22	66.67
No	11	33.33

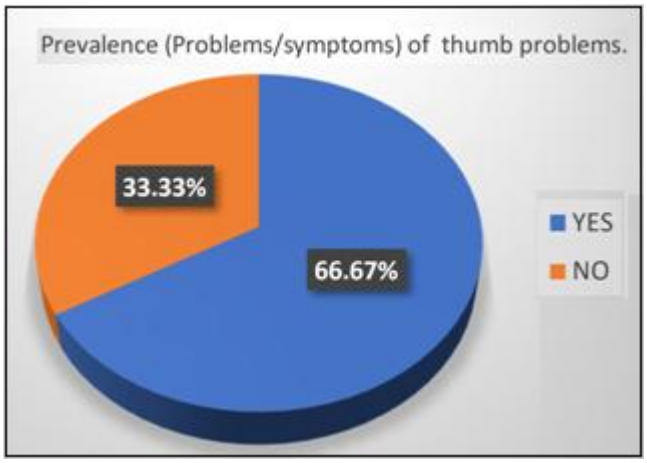

Table no 10 represents the thumb affected. All the participants reported thumb problems in right (dominant) thumb

Table 10: Thumb affected (N=22)

	No. of respondents	Percentage
Right	22	100
Left	0	- -
Both	0	- -

Table no 11 represents the duration since thumb affected, 50% respondents have thumb problems since 1 - 3 years whereas 40.91% have thumb problems since 4 - 10 years

Table 11: Duration since Thumb affected

	Right	Left
<1 week	1 (4.55)	0
1 – 4 weeks	0	0
1 – 6 months	0	0
7 – 12 months	0	0
1 – 3 years	11 (50)	0
4 – 10 years	9 (40.91)	0
>10 years	1 (4.55)	0

Table no 12 represents the respondents currently experiencing thumb problems and table no 13 represents respondents experienced thumb problem in past 12 months

Table 12: Presently experience a problem with your thumbs

	No. of respondents	Percentage
Yes, Right	22	66.67
Yes, Left	0	0
Yes, both	0	0
No	11	33.33

Table 13: Experienced a problem with your thumbs during 12 months

	Right	Left
0 days	11 (50)	0
1 – 7 days	1 (4.55)	0
8 – 30 days	8 (36.36)	0
1 – 3 months	8 (36.36)	0
>3 months	5 (22.73)	0
Every day	0	0

Table 14 represents the whether the respondent experienced thumb problems in specific incident and table 15 represents the onset of symptoms developing insidiously

Table 14: Injure your thumb in specific incident

	No. of respondents	Percentage
Yes, Right	0	- -
Yes, Left	0	- -
Yes, both	0	- -
No	22	100

Table 15: Thumb problem develop insidiously.

	No. of respondents	Percentage
Yes, Right	22	100
Yes, Left	0	- -
Yes, both	0	- -
No	0	- -

Table 16 represents the onset of symptoms related to thumb use at work and table no 17 represents the time since the thumb problems developed

Table 16: Onset of symptoms related to thumb use at work.

	No. of respondents	Percentage
Yes, Right thumb	22	100
Yes, Left thumb	0	- -
Yes, both thumb	0	- -
No	0	- -

Table 17: Thumb problem begin since when. (N=22)

	Right	Left
Prior to physiotherapy	0	0
As an undergraduate student	0	0
In first 5 years after graduation	15 (68.18)	0
6 – 15 years after graduation	7 (31.82)	0
Don't know	0	0

Table no 18 represents the respondents' tissues currently affected

Table 18: Which tissues are currently affected.

		Right	Left
Joint	CMC	5 (22.73)	0
	MCP	21 (95.45)	0
	IP	18 (81.82)	0
Soft tissues	Tendon	13 (59.09)	0
	Muscle	17 (77.27)	0
	Other	1 (4.55)	
Bone	Fracture	0	0
	Don't know	0	0

Table no 19 represents the respondents' factors associated with thumb problems and table 20 represents the non - work - related factors

Table 19: Factors associated with your thumb problems.

Factors	Irrelevant	Minor relevance	Moderate relevance	Major relevance
Increase in thumb use	2 (9.09)	0	3 (13.64)	17 (77.27)
Treating a large number of patients in one day	1 (4.55)	0	5 (22.73)	16 (72.73)
Performing the same task over and over	0	0	3 (13.64)	19 (86.36)
Not enough rest breaks during the day	1 (4.55)	2 (9.09)	2 (9.09)	17 (77.27)
Performing manual technique				
• Accessory movements	0	6 (27.27)	14 (63.64)	2 (9.09
• Physical movement	0	7 (31.82)	15 (68.16)	0
Soft tissue technique	0	1 (4.55)	16 (72.73)	5(22.73)
Working at or near your physical limits	1 (4.55)	1 (4.55)	7 (31.82)	13 (59.09)
Wide grips (eg to support a patients unstable joint)	0	9 (40.91)	13 (59.09)	0
Using scissors	5 (22.73)	17 (77.27)	0	0
Lateral pinch eg. Using a key	3 (13.64)	19 (86.36)	0	0
Writing	0	21 (95.45)	1 (4.55)	0
Continuing to work when thumb is injured or hurt	2 (9.09)	1 (4.55)	8 (36.36)	11 (50)
Inadequate training in thumb injury prevention	2 (9.09)	3 (13.64)	4 (18.18)	13 (59.09)

Table 20: Non - work related factors.

	Right	Left
Wide grip	13 (59.09)	0
Lateral pinch	13 (59.09)	0
writing	17 (72.27)	0
Using scissors/secateurs	13 (59.09)	0
Other	0	0

Table no 21 represents the symptoms of thumb problems in respondents

Table 21: Symptoms of thumb problem

symptoms	At rest only	Does not limit activity	Limit activity	Stops activity	Not applicable
Ache	2 (9.09)	1 (4.55)	8 (36.36)	10 (45.45)	1 (4.55)
Pain	1 (4.55)	3 (13.64)	5 (22.73)	13 (59.09)	0
Thenar muscle spasm	0	1 (4.55)	6 (27.27)	14 (63.64)	1 (4.55)
Deep thenar eminence tenderness	1 (4.55)	0	3 (13.64)	17 (77.27)	17 (77.27)
Feeling of instability at these joints	0	0	5 (22.73)	0	17 (77.27)
• CNC	0	0	11 (50)	3 (13.64)	8 (36.36)
• MCP	0	0	14 (63.64)	1 (4.55)	7 (31.82)
• IP	0	0	0	0	22 (100)

Table no 22 represents hypermobility of the joints

Table 22: Hypermobility of joints

	Right	Left
Elbow hyperextension	0	0
Knee hyperextension	0	0
Ankle dorsiflexion	0	0
Little finger MCP hyperextension	0	0
None of the above	22 (100)	22 (100)

Table no 23 represents the ability to stabilize the thumb while performing physiotherapy technique

Table 23: Able to stabilise the joints of thumb while performing physiotherapy technique.

	Right	Left
YES	33 (100)	0
NO	0	0

Table no 24 represents hyperextension of MCP joint of thumb with CMC and MCP joints of thumb in full extension

Table 24: With CMC and MCP joints of your thumb in full extension, whether actively hyperextend MCP joint of your thumb.

	Right	Left
No	3 (9.09)	4 (12.12)
YES, between 0 and 30 degrees	24 (72.73)	27 (81.82)
YES, more than 30 degrees	6 (18.18)	2 (6.06)

Table no 25 represents hyperextension of MCP Joint of the thumb with CMC joint of your thumb in flexion

Table 25: With CMC joints of your thumb in flexions, whether actively hyperextend MCP joint of your thumb.

	Right	Left
No	3 (9.09)	4 (12.12)
YES, between 0 and 30 degrees	24 (72.73)	27 (81.82)
YES, more than 30 degrees	6 (18.18)	2 (6.06)

Table no 26 represents the hyperextension of IP joint of the thumb with CMC joint of your thumb in full extension

Table 26: With CMC joints of your thumb in full extension, whether actively hyperextend IP joint of your thumb.

	Right	Left
No	3 (9.09)	4 (12.12)
YES, between 0 and 30 degrees	24 (72.73)	27 (81.82)
YES, more than 30 degrees	6 (18.18)	2 (6.06)

Table no 27 represents hypermobility or lack of active control over your thumb joints associated with thumb problems

Table 27: Having hypermobility or lack of active control over your thumb joints associated with your thumb problem

	No. of respondents	Percentage
Yes, both thumbs	2	6.06
Yes, right thumb	5	15.15
Yes, left thumb	0	- -
No	8	24.24
Not applicable	18	54.55

Table no 28 represents the presence of joint condition

Table 28: Any generalised joint condition (eg. Rheumatoid arthritis, osteoarthritis, gout)

	No. of respondents	Percentage
Yes	0	- -
No	33	100

Table no 29 represents the interventions done by the therapist to reduce strain on the thumb when working

Table 29: In order to reduce the strain on my thumb when working with following

	Not applicable	Never	Sometimes	Often	Always
I get someone else to help me handle a heavy patient	2 (6.06)	4 (12.12)	5 (15.15)	20 (60.61)	2 (6.06)
I modify patients' position/my position	2 (6.06)	0	6 (18.18)	18 (54.55)	7 (21.21)
I use electrotherapy instead of manual techniques to avoid stressing my thumb	2 (6.06)	13 (39.39)	18 (54.55)	0	0
I warm up and stretch before performing manual techniques	0	0	5 (15.15)	18 (54.55)	10 (30.30)
I pause regularly so I can stretch and change thumb position	0	2 (6.06)	11 (33.33)	18 (54.55)	2 (6.06)
I adjust plinth/bed height before treating a patient	0	1 (3.03)	6 (18.18)	16 (48.48)	10 (30.30)
I select techniques that will not aggravate or provoke my thumb discomfort	0	10 (30.30)	16 (48.48)	7 (21.21)	0
I stop a treatment if it causes or aggravates my thumb discomfort	0	10 (30.30)	18 (54.55)	5 (15.15)	0
I use thumb splints	5 (15.15)	28 (84.85)	0	0	0
I use thumb taping	2 (6.06)	12 (36.36)	11 (33.33)	7 (21.21)	1 (3.03)
I use medication	2 (6.06)	31 (93.94)	0	0	0

Table no 30 represents if the therapists have undergone any surgery for the thumb problems

Table 30: Had surgery for your thumb problem

	No. of respondents	Percentage
Yes, right thumb	0	0
Yes, left thumb	0	0
Yes, both thumb	0	0
No	22	100

Table no 31 represents the no of therapists who have left the profession due to thumb pain

Table No.31: Left the physiotherapy profession to pursue another because of your thumb problem.

	No. of respondents	Percentage
Yes	0	- -
No	22	100

Table no 32 represents the percentage of therapist who think that their thumb problem was caused or exacerbated by a particular area of practice

Table 32: Whether thumb problem caused or exacerbated by a particular area of physiotherapy.

	No. of respondents	Percentage
Yes	21	95.45
No	1	4.55

Table no 33 represents whether the therapist have changed their field of practise due to thumb problem

Table 33: Whether change the field of practice because of thumb problem.

	No. of respondents	Percentage
Yes	0	- -
No	22	100

Table no 34 represents the percentage of therapist who have sought any kind of treatment for their thumb problems

Table 34: Having sought ant treating, including self directly, for your thumb problem.

	No. of respondents	Percentage
Yes	22	100
No	0	- -

Table no 35 represents the kind of treatment used for thumb problem

Table 35: Treatment used for thumb problem. (N=22)

	No. of respondents	Percentage
Medication	1	4.55
Injection	0	- -
Others	0	- -
Stabilising exercises	19	86.36
Taping	16	72.73

Table no 36 represents the percentage of therapists who have been given advice regarding thumb problems

Table 36: As a physiotherapist, have you ever been given advice regarding thumb problem.

	No. of respondents	Percentage
Yes	20	60.61
No	13	39.39

Table no 37 represents the duration during which they were given advice regarding the thumb problems

Table 37: If you were given advice regarding thumb problem, when did this occur.

	No. of respondents	Percentage
As an undergraduate student	4	18.18
When working in an area which involves considerable use of the thumbs.	15	68.18
As a postgraduate student	1	4.55

Table no 38 represents the percentage of therapists who think that physiotherapists should be warned about the potential thumb problem and advice regarding the same

Table 38: Do you think physiotherapy students should be warned about potential thumb problem and advice to protect their thumbs?

	No. of respondents	Percentage
Yes	32	96.97
No	1	3.03

4. Discussion

The questionnaire was completed by 33 participants, the prevalence of thumb problems among the practicing physiotherapists is 66.67%.

A physiotherapist deals with many patients in his daily work but during his work when he performs manual techniques on patients, he undergoes various musculoskeletal injuries. Various factors such as patient handling, transferring and positioning causes pain in various body areas of therapist. Most commonly involving back, hand and wrist.

It is recommended in Maitland that the thumbs are in contact with each other and that the pressure is applied by the arms combined with the trunk.

In current study performing manual therapy, trigger point therapy and massage all increased the risk of thumb problems. These findings are compatible with the earlier research.

Based on these finding it is recommended that the potential for thumb problems in physiotherapists, including possible risk factors, should be discussed in undergraduate and work place settings.

If physiotherapists choose to work in an area of high thumb usage particularly if they have unstable or hyper mobile thumb joints, they should consider modifying their work practices to reduce repeated weight transmission through the thumb joints.

In terms of risk factors for developing thumb problems the current study found that the prevalence of thumb problems was higher in therapist represented in orthopedic outpatient area of practice, thus spending more time performing manual therapy techniques and increasing the risk of thumb problems.

5. Conclusion

From this study we can conclude that the prevalence of thumb pain in practicing physiotherapists is high i. e 66.67%. Factors that significantly increased the likelihood of having thumb problems included working in orthopaedic outpatients using manual therapy, trigger point therapy or massage.
Based on these finding it is recommended that the potential for thumb problems in physiotherapists, including possible risk factors, should be discussed in undergraduate and work place settings.

Ethical Policy and Institutional review board statement:
The study was approved by Institutional Review board.

Declaration of patient consent:
The authors certify that they have obtained all appropriate patient consent form. In the form, the patients has/have given his/her consent for his/her images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship:
Nil

Conflict of Interest:
There is no conflict of interest.

Acknowledgement:
The authors would like to thank all physiotherapists who participated in this study.

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