ORIGINAL ARTICLE

ASSOCIATION OF LENGTH AND MUSCLE STRENGTH OF THUMB WITH THUMB PAIN AMONG MANUAL PHYSICAL THERAPISTS

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ABSTRACT

Objectives: To find out association of length and muscle strength of thumb with thumb pain among manual physical therapists.

Material and Methods: A Self-administered questionnaire based cross-sectional survey was undertaken to detect the association of thumb pain among 74 physical therapists at different hospitals and clinics of Lahore, Pakistan from Jan 2017 to June 2017. The length of the thumb was measured using inch tape. The push force of thumb was measured using pinch gauge. The data was collected and analyzed statistically by SPSS software 20.

Results: Odds greater than 1 (>1) means the chances of thumb pain is greater as compared to no thumb pain. Variables like Length of thumb, Force applied by right thumb & both thumbs on gauge have high odds and they have high effect on thumb pain. Force applied by left thumb below 1 (<1) odds is having less contribution in thumb pain.

Conclusion: Length of the thumb, force of right and both thumb, are associated with thumb pain. Other variables and force of left thumb are not associated with thumb pain.

Key words: Thumb pain, physical therapist, Thumb length, muscle strength

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INTRODUCTION

The World Health Organization (WHO) gave a classification of occupational or work associated musculoskeletal disorders (WRMSD) or complaints as a type of ill healthiness stretching from light momentary sicknesses to irretrievable incapacitating damages that are encouraged or heightened by work and associated environments[1]. Even though physiotherapists' professional familiarity on injury stoppage, they are also disposed to work related or occupational musculoskeletal disorders (WRMSD). They also develop musculoskeletal disorders. Work-related harm or injury to the thumb has become an accustomed problem for physical therapists who implement manual performances in the handling of patients with musculoskeletal disorders[2-4]. Problems of the thumb are most common among the physical therapists with their commonness second to back/neck pain[5]. This can be attributed to the work which physical therapists do involving thumb joint compressions frequently[2,4,6-11]. A hands-on method of manual therapy is routinely used in orthopedic outpatient departments (OPD) and in other musculoskeletal setups. Augmented use of their hands puts these physical therapists at danger of evolving work related musculoskeletal disorders (WRMSD) of the wrists and hands[2,4,10,12]. Of all the structures in the hand, the thumb joints are predominantly defenseless to biomechanical overwork and occupational injury in physical therapists because forces are often transferred straight through the thumb during the manual procedures[10]. Work-related musculoskeletal discomfort in physical therapists of Australia is exceedingly wonted or usual. A survey of 824 physical therapists explained that 91% of respondents had developed occupational musculoskeletal pain or uneasiness at sometimes in their functioning lives[2].

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Thumb pain may cause physical therapists to modify the way they accomplish manual therapy techniques. In fact, 43- 91% of physical therapists with thumb pain modify their manual therapy techniques from the onset of thumb pain related to their work[4,13,14]. Some studies discovered that occupational or work related thumb pain in physical therapists using manual therapy performances described that this pain could be present at the level of any joint such as carpometacarpal joint (CMC), metacarpophalangeal joint (MCP), the interphalangeal joint (IP) solely or a combination of those. The physical therapists must link this pain to their work and no difference is made among incidence of pain at the time of doing manual therapy work or after termination of these tasks[15]. The foremost objective of this study is to conclude the lifetime and prevailing occurrence of thumb complications in respondents of physical therapists of Lahore, Pakistan. Another purpose was to examine the nature of thumb discomfort and the influences connected with them. The motive is to find a relation between length and muscle strength of a thumb with pain among physical therapists. The thumb strength is measured through a gauge known as Pinch gauge. The instrument is used in a way the push force of thumb is applied without using weight of any other part of body (using only thumb force).

There is no recent study conducted nationally using these variables about work-related thumb pain. The aim is to find a way that push force if certain factors (thumb length and muscle strength of thumb) were connected with work related or occupational thumb pain in physical therapists.

MATERIAL AND METHODS

A descriptive Cross-sectional study was conducted to find out association of different variables with thumb pain among physical therapists of Lahore, from Jan 2017 to June Sample size was calculated as 66 by utilizing the online Epi Tools software for calculation of sample size proportions (epitool.ausvet.com)[16]. Estimated proportion was 0.41, desired precision of estimate was 0.1 and confidence level was 0.9. But Seventy four (74) physical therapists were included in the study and a self-administered questionnaire was used. The sampling procedure was convenient sampling procedure. Data was collected from different public and private clinical set ups of Lahore. The physical therapists using manual techniques without any trauma, surgery of thumb or any rheumatic disease were included. The study duration was 9 months.

The inclusion criteria were: 1. Manual physical therapists working at any public or private clinical set-up of Lahore having more than 1 year experience of clinic. 2. Physiotherapists having healthy thumbs and applying manual techniques at their clinical setups or any government set-up of Lahore.

The exclusion criteria were:

1. Physiotherapists having any thumb Infection/Tumor,
2. Physiotherapists with any fractured thumb
3. Any recent surgery of thumb,
4. Physiotherapists having any rheumatic disease like rheumatoid arthritis,
5. Physiotherapists having no experience in manual therapy and,
6. Undergraduate physiotherapy students.

The variables under study were length of a thumb and muscle strength of thumb.

The assessment tools were VAS, inch tape and pinch gauge. The outcome measure was pain intensity.

The null hypothesis for this study was: Length of the thumb, Force of right, left and both thumb are not associated with thumb pain.While the alternate hypothesis was that length of the thumb, Force of right, left and both thumb are associated with thumb pain.

RESULTS

Total 74 participants were included among which 42 were females and 32 were males. Age of participants was Mean ±SD is 34.49±4.964 years. The minimum age of participants was 30 and maximum was 49.

Figure No.1 shows 52.70% had experience between 0 to 5 years, 32.43% had 6 to 10 years, 6.757% had 11 to 15 years, 1.351 % had 16 to 20 years and 6.757 had 21 to 25 years of experience.

Some factors are positively associated and some factors are negatively associated with thumb pain. Factor like force of left thumb measured by gauge are negatively associated with thumb pain. In other words they have not significant effect on thumb pain. Factors like Length, force of right and both hands measured by gauge are positively associated with thumb pain. Odds ratio showing association of all variables.The effect of

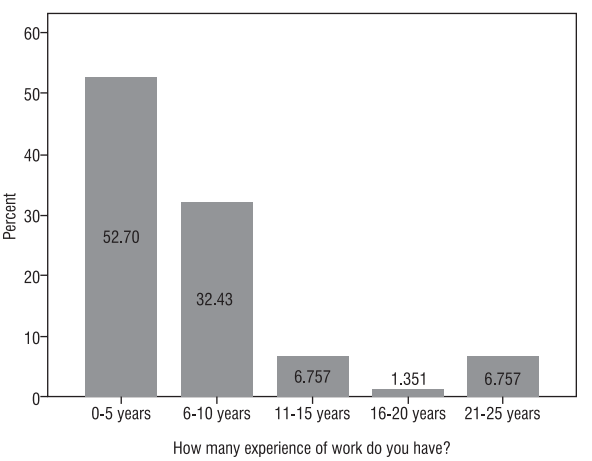

Figure 1: Working experience of physical therapists

Table I: Variables under study

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I. for EXP (B)	
							Lower	Upper
Length	.029	1.240	.001	1	.982	1.029	.091	11.684
Force_R	.236	.235	1.005	1	.316	1.266	.799	2.005
Force_L	-.283	.237	1.425	1	.233	.754	.474	1.199
Force_B	.263	.132	3.969	1	.046	1.301	1.004	1.685
Constant	-14.335	5.361	7.149	1	.007	.000		

a. Variable(s) entered on step 1: Length, Force_R, Force_L, Force_B.

the length of the thumb on physiotherapists with thumb pain and physical therapists with no thumb pain is 0.91 times lesser than those. Table No.1 shows the significance of variable included in the model. The variables included in logistic model on the basis of Wald test p-value, odds and confidence interval of the variables. All the p-values of the before mentioned variables are less than 0.05 means that statistically we reject the null hypothesis (i.e; variable is insignificant in this study). It means alternative hypothesis is falling in acceptance region (i.e. variables are associated with thumb pain). Odds greater than 1 means the chance of thumb pain is greater as compared to the no thumb pain. Variables like length of thumb, force applied by right thumb & both thumbs on gauge have high odds and they have high effect on thumb pain. Force of thumb of left hand and right hand measured are insignificant but force applied by both thumbs has significant relationship.

DISCUSSION

The purpose of the study is to find association between different variables and thumb pain among physical therapists of Lahore, Pakistan those who use manual therapy techniques. The variables of this research were length and strength of thumb muscles. Strength of a muscle is checked or measured through push force of thumb on a pinch gauge. The force was measured in pounds.

Madzivire DM et al found that thumb, wrist and hand pains are regarded as greater in term of prevalence. The possible cause of this might be that the respondent used manual techniques for treatment, which are found physically challenging and more likely to cause injuries than modality[3]. Supporting this study, the collected data from physical therapists found concordant evidence using manual therapy techniques at different hospitals and clinical setups. Madzivire DM et al also found that symptoms differed slightly between male and female physical therapists, though the observation was not statistically significant. These results are also supported and this point was explained earlier. This study has not found any association between gender and thumb pain. The possible factor could be the variances in the sample size of genders in all those previous studies having association between gender and work related musculoskeletal disorders.

Nor Azlin MN et al found work related musculoskeletal disorders among Malaysian Physical therapists[4]. The department was under staff and there was a workload. So the working hours increased in a way to fulfill the duty of limited staff. The conflict found in previous researches[17]. Nor Azlin MN et al found wrist, hand and thumb most vulnerable to pain but nothing like this is supported by this research.

Another study by Wajon A et al found thumb pain among physical therapists and their associated factors also supported by our study. The manual therapy techniques are the cause of thumb pain shown by a study conducted on Australian Physical therapists[5]. This observational study revealed that there is an association between position of a thumb and posterior-anterior Pressure (PA). This study also supports the result of above mentioned study.

An observational study conducted by Van De Velde K[18] found thumb pain as a barrier in their profession. Physical therapists doing frictions are more prone to develop thumb pain. It is highly indicated as a cause of thumb pain[6]. Friction manipulation is found to be a cause of thumb pain. Research did not consider massage practitioners but for evidence massage practitioners using thumb repeatedly also develop thumb problem. Certain other studies also suggests their practitioners to receive adequate information on how to protect their thumb from work related musculoskeletal disorders[19,20].

There are some limitations to this study which might have influenced the result of the study. First is the limited time available to collect data from different areas. Second, this study only investigated the measurements and it did not provide any information regarding ideal position for physiotherapists to mitigate the pain.

CONCLUSION

Force applied by Left thumb on gauge found not to be associated with thumb pain among physical therapists. The factors having relation with thumb pain were Length of thumb, Force applied by right thumb & both thumbs on gauge.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Abbas ZU: Article writing, Questionire Design, Literature review, Introduction.

Ahmad A: Article review + Discusion.

BurqnSIA: Data collection, methodology

Gilani SA: Biblography.

Bashir MS: Article data analysis.

Noor R: Results

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.