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Prevalence of De Quervain's Tenosynovitis and its Association with Overwriting Pain and Handheld Devices Usage among College Students in Multan

Ayesha Rani[1], Fatima Ejaz[1], Maryam Naveed Sheikh[1], Saleha Tehreem[1], Eber Rohail[2], Hafsa Sattar[2], and Mamona Ansari[3]

[1]Department of Physical Therapy, TIMES Institute, Multan, 60000, Pakistan.
[2]KKT Orthopedic Spine Center, Multan, 60000, Pakistan.
[3]Childern Hospital and Institute of Child Health, Multan, 60000, Pakistan.
*Corresponding Author: Fatima Ejaz. Email: drfatima@t.edu.pk

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Abstract: De Quervain Tenosynovitis is an inflammatory and degenerative disease. Thumb function impairment, radial wrist pain, and thickening of the ligamentous structure covering the tendons in the wrist's first dorsal compartment are the hallmarks of this disorder. Moreover, Repetitive strain injury can lead to inflammation and bump of tendons. Overuse injuries of the hand and wrist can affect any of the constituent bones, tendons, ligaments, nerves and cartilage. The purpose of the study was to determine the frequency of De-Quervain's tenosynovitis, its relationship with the handheld devices usage among college students in Multan. It was a cross-sectional study of 339 College Students conducted on Thumb Problems. Students were randomly selected from different areas of Multan. Prevalence of De Quervain tenosynovitis among 339 students was analyzed among whom 123 students were Positive after performing Finkelstein test. The association between writing and Finkelstein test shows significant relationship. This study shows 36.2% preponderance of De Quervain tenosynovitis among college students in Multan. Pain upon writing and Finkelstein test show positive association.

Key Words: College Students; De Quervain Tenosynovitis; Handheld Devices; Pain.

1. Introduction

In our daily life activities hand acts as most important part of our body.(Sehar et al., 2018) Thumb-to-hand function is highly significant and variable, depending on an individual's vocation, expectations, and needs.(Emerson et al., 1996). The inability to perform daily tasks is greatly hampered by thumb pain. Thumb pain has become much more common in recent years, especially in teenagers and young adults.(Sehar et al., 2018). De Quervain's syndrome is a stenosing tenosynovitis of the abductor pollicis longus and extensor pollicis brevis, part of the first extensor compartment. The wrist's radial border aches when the thumb and wrist are moved. The base of the thumb is swollen and painful [1-4].

A positive Finkelstein test result is the gold standard for diagnosing De Quervain's tenosynovitis.(Hetaimish et al., 2020) The use of smartphones, texting, smart games, and other alternative thumb activities like overwriting and outwriting are more closely associated with De Quervain's tenosynovitis.(Reada et al.). According to the results of the Finkelstein Test, there is greater incidence of De Quervain's Tenosynovitis among frequent computer users. More than two to eight hours a day were spent using computers by many of the regular computer operators. Additionally, regular computer users report that typing on a keyboard hurts their discomfort [5] [6].

More and more people are testing positive for the Finkelstein test as the frequency of mobile phone use has increased.(Hetaimish et al., 2020) For the majority of people, smartphones are evolving into important sources

of information and communication technology. They can deliver information services fast and precisely, making them indispensable.(Dr. Bhakti Desai, 2019) [7-9].

2. Literature Review

In a study on "The association between smartphone addiction and thumb/wrist pain" It was determined that students who used smartphones often experienced modest wrist and thumb discomfort and stiffness. Other clinical and subclinical alterations in the soft tissues of the thumb and wrist may result in discomfort, even when a positive Finkelstein test was not linked to smartphone addiction [10].

A study was done on "Frequency of wrist pain and its associated risk factors in students using mobile phones" revealed that Smartphone users frequently experience wrist pain, joint pain, and disability as usage increases, and screen size doesn't significantly impact these issues [11]

A study carried on "Relationship between the incidence of De Quervain's disease among teenagers and mobile gaming" It was found that 49.0% of the pupils at the school had DD. A greater risk of DD was linked to more frequent play, longer mobile gaming sessions, and wrist position changes [12].

A study conducted on "Occurrence of De Quervain's Tenosynovitis and its association with Short Message Service Texting" A study found that young people primarily use touch-screen smartphones for texting and internet, causing wrist pain. A positive Finkelstein examination result revealed a correlation between De Quervain's and frequent smartphone use, potentially leading to severe symptoms [13].

3. Materials and Methodology

3.1. Study Design

The study was cross-sectional and bearing sample size 339. And used simple random sampling technique. Data was collected from Students of different Colleges of Multan.

a. Garrison College
b. Muslim College

3.2. Data Collection Tools:

a. Finkelstein Test
b. 0-10 Numeric pain rating scale

3.3. Sample selection criteria

3.3.1. Inclusion criteria

- Participants with age ranging 15 to 18 years and both genders were included.
- The person who had been using smartphone, Computer or other gaming devices for 2.5 to 3 hours a day

3.3.2. Exclusion criteria

- The persons who were having thumb ache due to any recent trauma of limb.
- Subjects with history of fractured wrist upper extremity surgery, systemic conditions like rheumatoid arthritis or any musculoskeletal disorder of upper limb were excluded.
- Individuals who have cervical discogenic problems, wrist discomfort that radiates, or hand immobilization lasting more than three weeks were not included.

3.4. Data Analysis

Overwriting and excessive use of computers and phones by college students can result in De Quervain Tenosynovitis, a repetitive strain injury, and thumb pain. To determine the condition's prevalence, information was gathered from college students in Multan. In demographic data, age and gender are documented. Writing and handheld devices or computer usage details, pain intensity and movement limitations are assessed by Numeric pain Scale, and self-structured Questionnaire(Awais et al., 2020) [14] used in previous studies. The study utilized self-structured questionnaires (containing variable like twisting keys, opening the door, buttoning the shirt, unscrewing the jar, griping, pinching, typing keyboard, etc.) to gather data, analyzing responses and determining disease prevalence using SPSS software, with a sample age range of 15-18 years for both genders. Descriptive and Chi Square test were applied to analyze frequency of variables in Finkelstein test questionnaire to determine daily living limitations of students with thumb involvement.

4. Results

The data was calculated of 339 subjects. The maximum age of subjects were 18 years and minimum age was 15 years. The maximum handheld devices or computer usage hours are 8 and minimum usage hours are 2-3. The Numeric ache rating score was used to evaluate the severity of Pain in students. The mean value of Numeric Pain rating scale is 1.03 and standard deviation is 0.949.

Table 1. Statistics

Please indicate the intensity of Pain:		
N	Valid	339
	Missing	0
Mean		1.03
Mode		0
Std. Deviation		.949

Mean and standard deviation of intensity of Pain assessed by Numeric Pain Rating Scale

Table 2. Finkelstein Test

Finkelstein Test					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	216	63.7	63.7	63.7
	Positive	123	36.3	36.3	100.0
	Total	339	100.0	100.0	

Assessed by performing Finkelstein test on each student

Out of 339 subjects, 216 students test negative and 123 students test Positive for Finkelstein test.

Table 3. How often you use mobile phone for texting/computer for gaming?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Never**	13	3.8	3.8	3.8
	Rarely	95	28.0	28.0	31.9
	Seldom	107	31.6	31.6	63.4
	Frequently	124	36.6	36.6	100.0
	Total	339	100.0	100.0	

Among 339 students, 124 students use handheld devices or computer frequently. While 107 students use handheld devices or computer seldomly, 95 uses rarely and 13 students never use such devices.

Table 4. Chi-Square Tests for evaluating association between Usage of Handheld devices or computer and finkelstein test

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.571a	1	.450		
Continuity Correctionb	.000	1	1.000		
Likelihood Ratio	.903	1	.342		
Fisher's Exact Test				1.000	.637
Linear-by-Linear Association	.569	1	.450		
N of Valid Cases	339				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .36.

b. Computed only for a 2x2 table

According to above table the association between Finkelstein test and usage of handheld devices is found as not significant by applying Chi Square test.

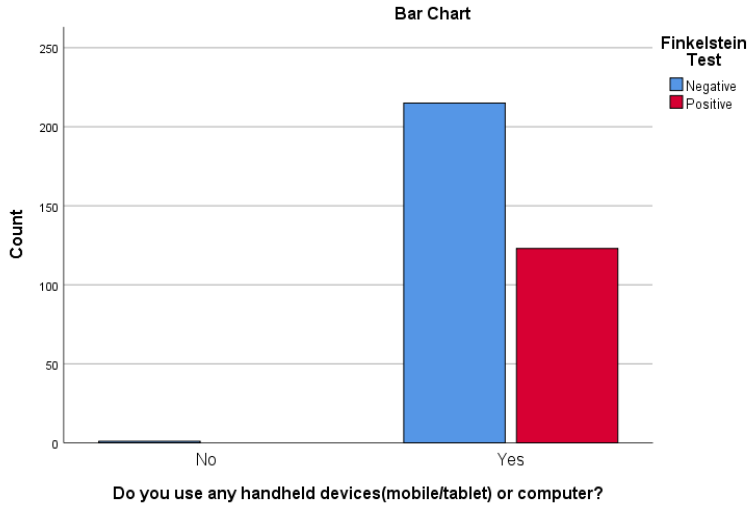

Figure 1. Graph of association between Usage of Handheld devices or Computer and Finkelstein test

Table 5. Chi-Square Tests for evaluating association between pain due to writing and finkelstein test

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.659a	1	.000		
Continuity Correctionb	13.803	1	.000		
Likelihood Ratio	14.921	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.615	1	.000		
N of Valid Cases	339				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 55.88.

b. Computed only for a 2x2 table

According to above table the association between Finkelstein test and pain due to writing is found significant by applying Chi Square test.

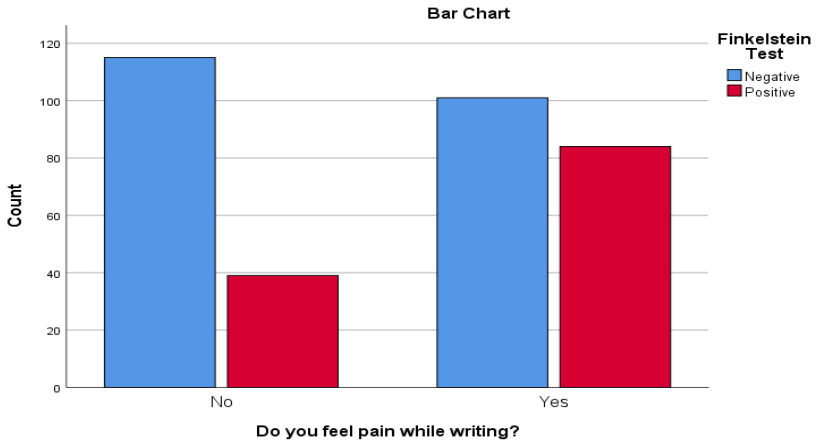

Figure 2. Graph of association between Pain due to writing and Finkelstein test:

5. Discussion

According to a research by Priyal P. Shah et al., participants' musculoskeletal pain was substantially connected with their smartphone use. The study's sample consisted of 100 participants, the majority of whom were female (76/100), and the largest number of users (46/100) had usage hours of 2-4 hours each day. They discovered a strong link between musculoskeletal problems and smartphone use.(Shah & Sheth, 2018) While the present study of ours represent low frequency of de Quervain tenosynovitis among college students in Multan [15] [16].

Among a research by Dr. Bakhti Desai et al., the Finkelstein test and MRC scale were used to determine the prevalence of De Quervain Tenosynovitis among smartphone users. They came to the conclusion that prolonged exposure is the primary cause of thumb discomfort in smartphone users. The prevalence of de Quervain disease was 33% in a sample size of 100.(Dr. Bhakti Desai, 2019) And the present study among college students in Multan shows 36.2% prevalence of de Quervain tenosynovitis in 339 sample size. The age limit ranges from 15 – 18 for both genders. Our study reveals that students of different colleges of Multan show negligible association between Smart phone usage and positive Finkelstein test [17] [18].

6. Conclusion

The study found a low frequency of De-Quervain tenosynovitis among college students age ranging 15–18 in Multan, with a 36.2% prevalence rate by using Finkelstein test. The study also showed that there was remarkable association between Writing pain among students and Finkelstein test while no association between handheld devices or computer usage by students and Finkelstein test.

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