

PREVALENCE OF DE QUERVAIN'S TENOSYNOVITIS AMONG FEMALE SMART PHONES USERS IN UNIVERSITIES OF FAISALABAD

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Abstract: Overuse of smart phones may lead to wrist pain and thumb deformities. The young generation primarily females are mostly addicted to Smart phones usage. Repetitive use of wrist and thumb, for using smart phones, can result into de Quervain's tenosynovitis among them. De Quervain's tenosynovitis is a deformity in which pain is felt on the radial side of the wrist and base of the thumb. The objective of this research study was to find out the prevalence of de Quervain's tenosynovitis among female Smart phones users in universities of the Faisalabad city. The aim of this study was to diagnose de Quervain's tenosynovitis, reducing its risk and creating awareness regarding the proper handling of smart phones. A cross-sectional study was conducted on 350 female students of general and medical universities of Faisalabad. A self-administered questionnaire was used to collect the data by applying convenient sampling technique. Finkelstein test was applied to diagnose De Quervain's tenosynovitis and to assess pain, the numeric pain rating scale (NPRS) was used. The collected data was analyzed through SPSS-23 software by applying the Chi-square test. The statistical value $\chi^2=41.782$ and $p\text{-value}=0.000$ ($P < 0.05$) shows that there was a highly significant association between female smart phone users and de Quervain's tenosynovitis

Key Words: De Quervain's Tenosynovitis, Smart phones Users and De Quervain's Tenosynovitis, Faisalabad Universities, Female Smart Phones Users, de Quervain stenosing tendonitis.

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INTRODUCTION

As the world is witnessing scientific evolution, the advancements in cell phone technology have consequently increased the prevalence of musculoskeletal disorders (1). Hand-held gadgets, particularly smart phones, are used most of the time these days. Smart phones users require thumb and palm muscles excessively for its use leading to a condition called de Quervain's tenosynovitis (2). Usually, the first dorsal compartment of the wrist is affected by De Quervain's tenosynovitis showing up typical characteristics of pain on the radial side of the wrist, impairing thumb functions with stiffening of the ligamentous sheaths over the tendons of the Abductor Pollicis Longus (APL) and Extensor Pollicis Brevis (EPB). This disorder is also considered a wrist tendinitis with inflammation of the tendon sheaths (3). Going back to the history, in the year 1825 the terms "tenosynovitis" and "crepitating peritendinitis" were coined by

Velpeau to describe injuries to the tendons and surrounding tissues respectively. While the term de Quervain's tenosynovitis or tendonitis was first coined by Fritz De Quervain, a Swiss surgeon, in the year 1895 (4).

Ergonomic studies showed that every smart phone user suffered from thumb fatigue and weakness because of static muscle loading and holding hold the phones for longer time spans (5). Repeated stress on the thumb occurs mostly during texting and gaming which increases the prevalence of musculoskeletal disorders (2). Evidence supports that smart phones with its wide spectrum of applications have a tendency to cause overuse injuries of hands in females. De Quervain's tenosynovitis influences females up to 6 times more than men (6). A database of 11000 cases of de Quervain's tenosynovitis showed that females had a considerably greater prevalence of de Quervain's tenosynovitis. About 2.8 %

cases were reported in females while 0.6 % cases of males were present per 1,000 persons (7).

The most common age group of students using smart phones are 18 to 29 years with 77% of students being prone to musculoskeletal disorders of the hand and wrist (8). A survey study conducted by South Korea noticed that 52% of the females used smart phones for more than four hours a day as compared to 29.4 % of male counterparts (9).

Keypad phones have been replaced by touch screen smart phones in recent years because of the versatility and plenitude of applications. With the arrival of every new generation of smart phones, there comes new in-built functions engaging younger people to use phones for a longer time. Repetitive and overuse of smart phones for typing, messaging gaming and other functionalities can lead to de Quervain's tenosynovitis (10). The prevalence of de Quervain's tenosynovitis among smart phones users was higher in the dominant hand and thumb. Weakness in hands was also dependent on the mobile design and anthropometry of the user. Blackberry thumb, another term for de Quervain's tenosynovitis, has been developed by reason of small spacing layout in keypads, increased static loading and end range movement of thumb while using smart phones (11).

The smart phones users in Pakistan were 1.13 billion in the year 2012, which constitutes 27.6 percent of the total number of mobile users and this number reached up to two and a half billion by 2017 (12). Among different age groups of Pakistan, the younger population or youth is more engaged in using smart phones and likely to become reliant on it (13). In Pakistan, there is a literature gap regarding the use of smart phones in the female population and its relationship with de Quervain's tenosynovitis. This research study was

conducted with the purpose to diagnose the disease earlier and prevent its progression in order to lay off irreversible damage.

MATERIALS & METHODS

It was a cross-sectional study design and the study was conducted at different universities of Faisalabad. The duration of the study was five months from September 2017 to January 2018, after the approval from the research committee of the Faculty of Medical Sciences GCUF. Unmarried female students of both public and private general, as well as medical universities of Faisalabad city, were enrolled for the study who were smart phones users from at least one year. The age limit was between 18 to 30 years. Participants from recent shoulder, arm, hand or thumb injury, rheumatoid arthritis, osteoarthritis, congenital deformities, and history of trauma to thumb were excluded. Data was collected from 350 female students by using a self-administered questionnaire by using a convenient sampling technique. A signed consent was taken from all the participants of the study. De Quervain's tenosynovitis was diagnosed through the Finkelstein test and severity of the pain was assessed through a numeric pain rating scale.

Pain was quantified out of 10 from the NPRS scale with the value zero showing up no pain while value of 5 exhibited the pain at a moderate level and 10 presented the unbearable pain. Under the researcher's supervision, the data was taken manually and it was ensured that each questionnaire was filled to avoid any bias. Data were coded and then entered into SPSS version 23 for the analysis and results.

RESULTS

The result of the study showed that out of 350 respondents, the positive Finkelstein test was in 76.0% and negative in 24.0% making a higher percentage of the students having de Quervain's tenosynovitis. It was analyzed that de Quervain's tenosynovitis was equally prevalent among medical and

non-medical female students who used smart phones.

Table.1 shows that the relation of smart phones usage hours was a significant factor in developing de Quervain's tenosynovitis being greater in those subjects' using smart phones for more than 5 hours a day. The association of using dominant thumb and hand was also significant in developing de Quervain's disease. About 63% of respondents had positive Finkelstein test of right hand, 3% respondents had in left hand while 10% respondents showed positive test result of both hands. Pain measured through the NPRS scale showed that there was a significant association of pain with those having de Quervain's tenosynovitis. The most frequent site of pain reported was the base of the thumb with 58% out of 76% cases responding to pain at this site. The p-value of less than 0.05 showed a positive association of pain duration among smart phones users. Table.2 shows that a significant p-value of qualification and occupation had a link with familiarity of the term de Quervain's being greater in medical students. Medical students were familiar with the term and structure of the thumb as compared to non-medical students.

DISCUSSION

The results of the study showed significant relation between de Quervain's among female smart phones users. The previous research study conducted in Pakistan focused on the prevalence of de Quervain's

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tenosynovitis and its association with text messaging in conventional phone users. On the other hands our study showed a significant association of de Quervain's in smart phones users instead of the conventional phone users (4). Another study conducted in Pakistan showed the prevalence of de Quervain's tenosynovitis among medical students of Allama Iqbal medical college. It was more prevalent among female medical students while in our study it was equally prevalent in both the medical and the non-medical female students (11). It would be recommended to aware the public regarding the appropriate way to use smart phones. Seminars, workshops, social media platforms, print media and other sources could be used to spread awareness among the whole community. Rest intervals and breaks could be considered effective with alternate use of thumb to protect against the development of de Quervain's among smart phones users (9).

CONCLUSION

Out of 350 respondents, 76% showed the positive result of Finkelstein test indicating the presence of de Quervain's tenosynovitis and presenting a significant association of de Quervain's tenosynovitis among female smart phones users.

CONFLICTION OF INTEREST

The is no conflict of interests among authors.

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Table 1: Results of Finkelstein test and association with different variables.

Variable	Finkelstein Test of Right Hand		Finkelstein Test of Left Hand	
	χ^2	p-value	χ^2	p-value
Age	1.665 ^a	.797	3.209 ^a	.523
Qualification	.932 ^a	.628	3.237 ^a	.198
Brand Of Smart phones	11.199 ^a	.082	5.433 ^a	.490
Hours Of Smart phones Usage	10.779 ^a	.005	14.948 ^a	.021
Posture	6.738 ^a	.150	7.033 ^a	.134
Dominant Hand	180.922 ^a	.000	63.689 ^a	.000
Preferred Thumb	286.149 ^a	.000	280.30 ^a	.000
Purpose Of Smart phones Usage	12.620 ^a	.126	4.775 ^a	.781
Screen Size	2.101 ^a	.910	8.711 ^a	.190
Pain in Thumb	17.981 ^a	.000	55.298 ^a	.000
Site of Pain	20.110 ^a	.000	55.664 ^a	.000
Duration of Pain	18.165 ^a	.001	18.832 ^a	.000
Type of Pain	18.832 ^a	.001	57.494 ^a	.001
NPRS Values	350.000 ^a	.000	339.850 ^a	.000

Table 2: Results of familiarity of de Quervain's Tenosynovitis

Variable	χ^2	p-value
Qualification	181.220 ^a	.000
Occupation	39.160 ^a	.000
Knowledge of Thumb Structure	200.927 ^a	.000

Treatment Options	350.000 ^a	.000
Data Collector's Guidance	.280 ^a	.597
Questionnaire was Beneficial	2.885 ^a	.089
Topic & Questionnaire was Interesting	2.464 ^a	.292