

Most Prevalent Complication of Smart Phone and Its Preventive Measures – A Review Literature

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Abstract:- Aim of the study is to determine the complication of hand due to over usage of smart phones, to prevent the complications by proper way of handling mobile phone and to prevent an epidemic of smartphone induced diseases especially in hand. Methodology was Study designed as systemic review, The Study setting is done in Google scholar, MEDLINE, PubMed and Research gate, sample size was 230 published studies describing about smartphone and its complication due to overuse in which only 20 articles were selected for the review in Pub med central library. Results shows Out of 20 studies 8 studies shows that the common complication of hand due to over usage of mobile phone is De Quervain's tenosynovitis, 7 studies shows the 1st carpometacarpal arthritis, 2 studies has shown thickness of flexor pollicis longus. For preventive measures 1 study shows the target size should be 9.2mm in single task and 9.6mm for multi task, 1 study has shown during sitting the thumb, trapezius and forearm muscle activities are low, 1 study has mentioned that using mobile phone with two hands in landscape provides stability as well as faster input. By reviewing the studies, we conclude that the size of screen should be 4.7 inch or less, thickness should be 1.5 to 2 cm, curvature should be 6mm, the smart phone should be hold in landscape position and in sitting posture. Using the smart phone in the following way can prevent the Complications of hand.

Keywords:- De Quervain's Tenosynovitis, Smart Phones, Flexor Pollicis Longus, Prevention, Prevalence.

I. INTRODUCTION

Use of mobile device increased when compared in the past decade, as the price of the smartphone decreases, the availability of the smartphones increases (1). The total population of the world in 2018 is 7.7billion and in which the mobile users are 4.21 billion (2). In young adults between the age 15 to 24 years 100% were mobile phone users in which 100% were using smartphones (3). Continuous usage of the mobile phones may lead to health-related disturbance and causes musculoskeletal pain and disorder in wrist and hand (4). Over usage of the smartphones for texting may leads to carpal tunnel syndrome, 1st carpometacarpal osteoarthritis and de Quervain tenosynovitis and FPL tendon founds to be thicker (5). When compare to males, females are more risk

for the musculoskeletal disorders because female uses a greater relative force and higher muscular activity than males (6,7). This study will review the complications of the smartphones and its preventive measure.

Many individuals may suffer from De Quervain's tenosynovitis, carpal tunnel syndrome, musculoskeletal problem, 1st CMC osteoarthritis, so this study will be identifying the most prevalent complication and its preventive measures and hence an epidemic state can be avoided. This act as a primary prevention of a disease. Aim of the study is to determine the complication of hand due to over usage of smart phones, to prevent the complications by proper way of handling mobile phone and to prevent an epidemic of smartphone induced diseases especially in hand.

II. METHODOLOGY

Study designed as systematic review, The Study setting is done in Google scholar, MEDLINE, Pubmed and Research gate, sample size was 230 published studies describing about smartphone and its complication due to overuse in which only 20 articles were selected for the review in Pub med central library. The inclusion criteria were, Studies published between 2009 to 2018 were only selected, Studies which are mentioned about the complication of wrist and hand by over usage of smartphones were only taken, Studies mentioned with preventive measure, No limitation in sample size, and Age group between 15 to 40. The exclusion criteria were, Studies which are mention only about complications of neck, shoulder, back, elbow were excluded, Studies done with individual were already diseased were excluded, and Studies which has done on treatment for complications were excluded respectively. The procedure of the study was 230 published studies describing about smartphone and its complication due to overuse in Google scholar, MEDLINE, PubMed and Research gate, in which only 20 articles were selected for the review in Pub med central library.

III. RESULTS

Out of 20 studies 8 studies shows that the common complication of hand due to over usage of mobile phone is De Quervain's tenosynovitis, 7 studies shows the 1st carpometacarpal arthritis, 2 studies has shown thickness of flexor pollicis longus. For preventive measures 1 study

shows the target size should be 9.2mm in single task and 9.6mm for multi task, 1 study has shown during sitting the thumb, trapezius and forearm muscle activities are low, 1 study has mentioned that using mobile phone with two hands in landscape provides stability as well as faster input as shown in Figure 1 respectively.



Fig 1

DISCUSSION

Smartphones are used by every people in this generation. Using smart phones repeatedly may leads to certain dysfunction in hand, so some of the previous literatures had mention the prevalence and preventive measures for hand and wrist dysfunction and they are, Pekka et.al has done a study on 2006 with the sample size of 22 in which 17 males and 3 females aged between 19 to 42 years has concluded target size of the thumb should be 9.2mm and 9.6mm in single and multi-task (10). Abdool et.al studied about the short term and long-term effect of smart phone usage in the year 2009 in which the sample size was 320 between the age of 20 to 40 years and he concluded that short-term effect of texting affects the hand function and long-term usage affects the posture and upper extremities function (11). Ewagusta et.al has studied about the impact of thumb in the year 2010 in which the sample size was 41 aged between 19 to 45 years has concluded during sitting thumb activity is low Female are at the risk¹². Marayam et.al has studied about the frequency of De Quervain's tenosynovitis, in the year 2014 in which the sample size was 300 aged between 18 to 25 years has concluded 50 SMS per day leads to weakness in the base of the thumb and De Quervain's positive (13). Charu et.al has studied about ultrasonic investigation of wrist in smart phone users, in the year 2014 in which the sample size was 1500 aged between 18 to 29 years has concluded Ultrasonic investigation shows fluid accumulation in extensor compartment (14). Faiza et.al has studied about the frequency of De Quervain's tenosynovitis in the year 2015 in which the sample size was 137 aged between 18 to 25 years has concluded 32% frequent de queverian in students with abnormal use of thumb musculature (15). Esra et.al has studied about the pitch strength in carpal tunnel syndrome in smartphone users in the year 2015 in which the sample size was 102 aged between 18 to 25 years has concluded Overuse of smartphone causes carpal tunnel syndrome and affect the pitch strength (16). Ewagusta et.al

has studied about effect of short-term use of smartphone in thumb musculature in the year 2017 in which the sample size was 100 aged between 20 to 24 years has concluded Short term use of smart phones affects thumb musculature (17). Epan et al has studied about the impact of smartphone in thumb in the year 2018 in which the sample size was 117 aged between 18 to 25 years has concluded Tenderness in joints of thumb and hypermobility grade 2 (18). Dharti et al has studied about the prevalence rate of De Quervain's tenosynovitis in the year 2018 in which the sample size was 100 aged between 18 to 25 years has concluded Prevalence rate of De Quervian's is 46% and no effect in pitch strength (19). Hugo et al. had determined that landscape provides a faster input²⁰. Sofrom above studies it has been clearly identifies that DeQuervain's tenosynovitis is most common complication of hand due to overuse of smart phone.

CONCLUSION

By reviewing the studies, we conclude that the size of screen should be 4.7 inch or less, thickness should be 1.5 to 2 cm, curvature should be 6mm, the smart phone should be hold in landscape position and in sitting posture. Using the smart phone in the following way can prevent the Complications of hand.

Type of mobile	Touch screen
Size of screen	4.7 inch or less
Thickness	1.5 to 2 cm
Curvature	6mm
Hold	Landscape with two hands and forearm rested
Position	Sitting

Table 1:- Conclusion of this study:

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