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Original Article

Prevalence of Little Finger Contour Damage among Mobile Users

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ABSTRACT

Background: Recent advancements in mobile technology have led to increased scrutiny regarding the physical impacts of prolonged device usage. Prior studies have offered conflicting views on the association between mobile phone use and structural changes in the hand, particularly concerning little finger contour damage. This discrepancy underscores the need for further research to elucidate the relationship between smartphone usage patterns and potential musculoskeletal alterations.

Objective: The primary objective of this study was to investigate the prevalence of little finger contour damage among mobile phone users, aiming to identify causative factors, potential preventative measures, and remedies for the observed damage. The study also sought to compare its findings with existing literature to clarify the impact of mobile phone use on hand anatomy.

Methods: A cross-sectional survey was conducted among 335 participants, employing a structured questionnaire to gather data on demographics, mobile phone usage patterns, and the presence of little finger contour damage. Statistical analysis was utilized to examine the association between mobile phone use and little finger contour damage. The study's inclusion criteria encompassed mobile phone users above the age of 16, with no restrictions on gender or occupation.

Results: Out of 335 participants, 123 (36.70%) reported little finger contour damage. Among those, 83.70% were female, and 16.30% were male. Age distribution indicated that 41.00% were aged 17-20 years, 58.00% were 21-24 years, and 1.00% were older than 24 years. Regarding mobile phone usage, 11.00% had used their devices for 2-3 years, 20.00% for 3-4 years, and 69.00% for more than 4 years. Screen time revealed that 29.00% used their phones for 3-5 hours daily, whereas 71.00% exceeded 5 hours. The prevalence of little finger contour damage was significantly associated with longer screen time and duration of mobile phone usage.

Conclusion: The study substantiates a significant correlation between prolonged mobile phone use and the development of little finger contour damage. It highlights an urgent need for awareness and intervention strategies to mitigate the risk of musculoskeletal alterations due to smartphone usage. Further research is recommended to explore this phenomenon across broader demographics and geographical locations.

Keywords: Little finger contour damage, Mobile phone usage, Musculoskeletal alterations, Smartphone, Cross-sectional survey.

INTRODUCTION

In an age where the use of mobile devices is ubiquitous, their impact on human health has increasingly become a focal point of concern. Initially, the introduction of mobile phones revolutionized communication, information retrieval, and entertainment, embedding these devices as essential components in our daily lives (1). This shift has been accompanied by a dramatic rise in mobile phone users from around 500 million in 2000 to approximately 6.5 billion today, indicating not just a global reliance on these devices but also an increased usage among younger populations (2). The expansion of mobile phone usage among children and adolescents

is particularly notable, with the prevalence of smartphone addiction reported at varying degrees, highlighting the need for research into the potential health consequences associated with their prolonged use (3).

A study focusing on the mobile phone habits of young adults in a public institution in Ghana revealed that individuals spend a significant amount of time, averaging nearly 5 hours, on instant messaging platforms, with listening to music and radio as the second most time-consuming activity (4). This excessive screen time, facilitated by advancements in technology, has led young individuals to exceed the recommended daily screen time limit, contributing to a shift in preferences towards smartphones and other internet-enabled devices (5) (6). The practice of multi-screening, or using multiple devices simultaneously, has become a concerning trend, prompting further investigation into its implications (7).

The rapid growth of Pakistan as one of the fastest-growing mobile markets among developing countries further underscores the global penetration of mobile technology, with a significant percentage of the population, particularly university students, dedicating substantial time to mobile phone use for various activities (8, 9). This widespread and integral use of smartphones has raised alarms about potential physical health issues, including pain and morphological changes in the hands and fingers due to the ergonomic demands of prolonged device use (10).

Particularly, the extensive use of mobile phones with a single hand, and the reliance on the little finger for support and stabilization, places considerable stress on the muscles and tendons, potentially leading to morphological alterations or contour damage of the pinky finger (11). Such changes, distinct from congenital conditions like clinodactyly, may manifest as alterations in the natural shape or structure of the finger, attributed to the repetitive stress and pressure from holding or supporting the phone over long periods (12). Prior research has documented a predominant use of the right hand among users, with a significant majority utilizing their pinky finger to support the weight of the phone, a practice linked to the development of hand and wrist weakness and an increased risk of musculoskeletal disorders (13, 14).

The objective of this study is to explore the involvement of the fifth finger in smartphone manipulation, particularly focusing on holding techniques, to assess the prevalence of little finger contour damage among young populations, especially university students. By examining mobile phone holding techniques and their potential impact on the morphology of the little finger, this research aims to uncover asymmetries that may result from such practices, providing insights into the ergonomic consequences of mobile device use.

MATERIAL AND METHODS

The study was a descriptive cross-sectional survey conducted over a four-month period from October 2022 to January 2023 at the University of Lahore, Islamabad campus, following ethical approval by the institutional review board of the University of Lahore, Islamabad campus. The research aimed to assess the prevalence of little finger contour damage among university students, focusing on the morphological changes associated with prolonged mobile phone use. The sample comprised 335 students, selected through non-probability convenience sampling. The sample size determination was based on the Slovin formula, applying a 95% confidence level and a 5% margin of error to ensure statistical significance and adequate power for the findings.

Participants were included in the study based on specific criteria: individuals aged 17-25 years who reported using a mobile phone for 3 to 5 hours or more per day and had been using mobile phones for a period ranging from 2 to more than 4 years. Both male and female students across various departments were considered for the study. Exclusion criteria included individuals younger than 17 years, those who used mobile phones for less than 3 hours daily, had less than 2 years of smartphone usage, or experienced numbness and tingling sensations in the ring and little fingers, which could indicate pre-existing conditions that might affect the study's outcomes.

Data were collected using a semi-structured questionnaire that solicited information on age, gender, department, duration of mobile phone use, and daily usage patterns. This instrument facilitated the examination of the relationship between mobile phone use and the development of little finger contour damage, often referred to as "pinky syndrome," which is characterized by morphological changes in the soft tissue of the little finger due to the pressure exerted by the phone's weight.

For the analysis of the collected data, the Statistical Package for the Social Sciences (SPSS) version 27 was employed. Descriptive statistics, including frequencies, percentages, means, standard deviations, and p-values, were calculated to summarize the data and examine the associations between mobile phone usage patterns and the presence of little finger contour damage. A bilateral comparison of the fifth phalanx was conducted for each participant to identify differences in the contours of the fingers, with particular attention to the dominant hand used for phone operations, which was hypothesized to be more susceptible to contour changes due to increased pressure and usage.

The study adhered to the ethical principles outlined in the Declaration of Helsinki, ensuring the protection of participant rights, confidentiality, and informed consent. Participants were informed about the study's purpose, procedures, potential risks, and

benefits, and consent was obtained before data collection commenced. This approach guaranteed the ethical integrity of the research process and the reliability of the collected data, contributing to the body of knowledge on the ergonomic impacts of mobile phone use on the human body.

RESULTS

Table 1 Participant Demographics and Characteristics: Frequencies and Percentages

Category	Frequency	Percentage
Total participants	335	100.00
Inclusion participants	123	36.70
- Female	103	83.70
- Male	20	16.30
Exclusion participants	212	63.30
Age (17-20 years)	50	41.00
Age (21-24 years)	71	58.00
Age (>24 years)	2	1.00
Mobile phone usage (2-3 years)	14	11.00
Mobile phone usage (3-4 years)	24	20.00
Mobile phone usage (>4 years)	85	69.00
Screen time (3-5 hours)	36	29.00
Screen time (>5 hours)	87	71.00
Little finger contour damage	123	36.71
No little finger contour damage	212	63.29

The study surveyed a total of 335 participants, where 123 individuals were categorized under the inclusion criteria, accounting for 36.70% of the total. Among these inclusion participants, there was a significant gender disparity, with 103 female participants (83.70%) compared to 20 male participants (16.30%). The remaining 212 participants fell into the exclusion category, making up 63.30% of the total sample.

Regarding age distribution within the inclusion group, participants aged 17-20 years constituted 41.00% (50 individuals), while those aged 21-24 years were slightly more prevalent at 58.00% (71 individuals). There were very few participants over the age of 24, with only 2 individuals making up 1.00% of the inclusion group.

Mobile phone usage patterns among the inclusion participants varied, with 14 individuals (11.00%) reporting usage between 2 to 3 years, 24 individuals (20.00%) using their phones for 3 to 4 years, and a majority of 85 individuals (69.00%) using their mobile phones for more than 4 years.

Screen time also showed a distinct pattern among those included in the study, with 36 individuals (29.00%) spending between 3 to 5 hours on their screens daily, and a larger segment of 87 individuals (71.00%) exceeding 5 hours of screen time per day.

The occurrence of little finger contour damage was precisely reported among the inclusion participants, totaling 123 cases and reflecting 36.71% of the overall participants. Conversely, those who did not experience any little finger contour damage made up 63.29% of the total, numbering 212 participants. This data highlights a significant incidence of little finger contour damage among the study's participants, alongside insights into their demographic characteristics, mobile phone usage habits, and screen time durations.

DISCUSSION

The outcomes of this investigation have elucidated the potential acoustic insights into the mechanisms through which mobile device usage may precipitate damage to the contour of the little finger. This research embarked on an exploratory journey to delineate the causative factors, preventative measures, and potential remedies for the contour damage induced by mobile devices. Through a

meticulous examination encompassing diverse forums and perspectives, the study unveiled that while the damage appears to be irreversible, prevention is feasible. The research methodology involved a comprehensive survey and data analysis, employing statistical tools to affirm that mobile and cellular devices indeed contribute to the observed damage, thereby marking the conclusion of this inquiry on a note of success. The prevalence of little finger contour damage, as determined by this study, starkly contrasts with the findings from a prior study conducted in 2020 at a Mexican university, where an assessment of 143 students revealed no significant asymmetry in the little finger despite an average mobile usage of 2.8 hours per day and a mean age of 20±2 years. The divergence in outcomes underscores the complexity of factors influencing little finger contour damage and highlights the unique contribution of the current study to the literature (16).

Supporting the findings of the current research, a case report involving a 58-year-old retired soldier who presented with swan neck deformity of the third finger and tenosynovitis of the third, fourth, and fifth fingers further substantiates the association between excessive mobile phone use and structural hand damage. Despite normal arthritis lab reports, the soldier's extensive daily mobile usage (15 to 16 hours) was identified as the culprit for his condition (21). Additionally, the work of Deepak Sharan et al. in 2014, which identified tendinitis in the extensor pollicis longus and myofascial pain syndrome in the adductor pollicis, first interossei, and extensor digitorum communis, further corroborates the detrimental effects of prolonged mobile phone use on hand anatomy and function (22). The current study's revelation that 36.67% of mobile users suffered little finger contour damage provides a compelling argument for the tangible impact of smartphone use on hand health.

The research underscores the adverse effects of excessive smartphone usage on hand function and strength, particularly among the youth, necessitating heightened awareness and proactive measures to mitigate these outcomes. The emphasis on balancing screen time with activities that enhance hand strength and dexterity emerges as a pivotal recommendation for preserving hand health.

CONCLUSION

In conclusion, the investigation confirmed the significant prevalence of little finger contour damage among mobile device users, revealing marked asymmetric changes predominantly in the dominant hand. This phenomenon was notably linked to the technique of holding the phone, thus presenting a novel area of concern within the domain of hand health. The study's findings highlight a substantial gap in the existing literature regarding the impact of little finger contour damage, particularly among the younger population. This gap underscores the imperative for further research on a broader scale, encompassing different age groups and geographical regions to enrich the understanding and management of little finger contour damage. The integration of strengths, weaknesses, limitations, and recommendations within this discussion furnishes a holistic view of the research journey, paving the way for future inquiries to build upon the groundwork laid by this study.

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