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Neck Pain Prevalence Among Adults Using Smartphones

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Abstract: ***Neck pain (NP) is a significant public health problem globally and a common complaint among adults, leading to physical, social, and economic burdens. With the rapid increase in smartphone ownership, long hours of daily use and static head flexion postures have become major contributing risk factors for cervical musculoskeletal disorders. The study was conducted to evaluate the effects of smartphone usage on neck pain prevalence and intensity among adult smartphone users in Palestine. A cross-sectional study was conducted with 61 adult smartphone users in Palestine. Data were collected using a semi-structured questionnaire covering demographic profiles, daily usage habits, the Visual Analogue Scale (VAS) for pain assessment, and the Neck Disability Index (NDI) for functional evaluation. Data analysis was performed using SPSS version 23, applying independent samples t-tests, one-way ANOVA, and post-hoc Tukey tests at a significance level of α = 0.05. Among the 61 participants, 73.8% reported suffering from neck pain. There was no statistically significant association between neck pain level and gender (p = 0.149) or Body Mass Index (BMI) (p = 0.424). Conversely, significant associations were observed between neck pain levels and age (p = 0.046), daily time spent using the smartphone (p = 0.001), and NDI functional scores (p = 0.001). Statistical analysis revealed that the strongest predictors of neck pain were the daily duration of phone use and the NDI score. Among adult smartphone users, 73.8% experience neck pain. While gender and BMI show no direct relationship with neck pain intensity, increased daily usage duration, younger adult age, and higher NDI disability scores strongly correlate with greater neck pain severity.***

Keywords: Neck Pain; Smartphones; Adults; Neck Disability Index; Visual Analogue Scale; Palestine.

1. Introduction

Neck pain is a common and often recurrent musculoskeletal disorder worldwide, affecting up to 50% of adults annually [1], [2], [3], [4]. It substantially impacts individuals, families, and healthcare systems [2]. Neck pain can originate from degenerative changes in vertebral bodies, myofascial dysfunction, discopathy, poor sitting postures, or traumatic events [5], [6], [7], [3].

In recent years, smartphones have become an indispensable part of daily life, used extensively for communication, social networking, work, internet browsing, and entertainment [8], [9]. Global statistics indicate that over 79% of adults aged 18–44 keep their smartphones with them almost constantly throughout the day [10]. Frequent smartphone usage involves repetitive movements, long-term grip, and sustained static head flexion ('text neck'), which substantially increases mechanical stress on the cervical spine and surrounding musculature [9], [11], [12], [13].

In Palestine, there is a distinct lack of localized risk profiles regarding neck pain prevalence among smartphone users. Therefore, this study aims to investigate the prevalence of neck pain among adult smartphone users in Palestine and analyze its potential correlation with demographic factors (gender, age, BMI) and usage habits (daily hours, NDI score).

2. Methods

2.1 Study Design and Setting

A cross-sectional descriptive comparative design was conducted in Palestine during May 2022 to answer the research questions and evaluate the study hypotheses efficiently.

2.2 Population and Sampling

A convenient sampling technique was adopted to recruit 61 adult smartphone users. *Inclusion Criteria:* Male and female adults aged 18 years and older, who own a personal smartphone and use it on a daily basis. *Exclusion Criteria:* Individuals under 18 years of age, non-daily smartphone users, or adults who do not own a smartphone.

2.3 Data Collection Procedure & Instrumentation

Participants filled out a structured questionnaire consisting of:

1. **Sociodemographic & Behavioral Information:** Age, gender, height, weight, occupation, daily phone usage duration (≤ 1 hour, 2–4 hours, > 4 hours), and constant phone usage habits.
2. **Body Mass Index (BMI):** Calculated as weight in kilograms divided by height in meters squared (kg/m²). Categorized into Healthy Weight (18.5–24.99), Overweight (25.0–29.99), and Obese (≥ 30.0).
3. **Visual Analogue Scale (VAS):** A standard 0 to 10 scale used to grade self-reported neck pain severity (0 = no pain, 10 = severe/acute pain) [14].
4. **Neck Disability Index (NDI):** A validated 10-item self-report questionnaire assessing neck pain impact on daily activities (pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping, and recreation) [16]. Scores range from 0 to 5 per section (total 0–50 points

converted to percentage), categorized as: 0–8% (no disability), 10–28% (mild disability), 30–48% (moderate disability), 50–68% (severe disability), and 70–100% (complete disability) [15].

2.4 Statistical Analysis

Data were analyzed using SPSS software version 23. Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated. Parametric statistical tests, including independent samples t-test, one-way ANOVA, and post-hoc Tukey tests, were applied at a significance threshold of $\alpha = 0.05$.

2.5 Outcome Measures

1. **Neck Pain Prevalence:** Percentage of participants reporting neck pain.
2. **Neck Pain Intensity:** Numerical score on the Visual Analogue Scale (VAS, 0–10) [14].
3. **Functional Disability Level:** Numerical percentage score and qualitative disability level derived from the Neck Disability Index (NDI) [15], [16].

3. Results

3.1 Sample Demographic Characteristics

A total of 61 participants completed the study: 47.5% were male (n=29) and 52.5% were female (n=32). Age distribution was: 18–28 years (31.1%), 29–39 years (36.1%), and ≥ 40 years (32.8%). BMI distribution revealed 29.5% healthy weight, 52.5% overweight, and 18.0% obese. Occupations included physical workers (41.0%), housewives (26.2%), office workers (18.0%), and students (14.8%). Overall, 73.8% (n=45) reported suffering from neck pain.

Table 1: Participant Baseline Frequencies and Percentages (N=61)

Variable	Category	Count (n)	Valid Percent (%)
Gender	Male	29	47.5%
	Female	32	52.5%
Age	18–28 years	19	31.1%
	29–39 years	22	36.1%
	≥ 40 years	20	32.8%
BMI	Healthy Weight	18	29.5%
	Overweight	32	52.5%
	Obese	11	18.0%
Occupation	Student	9	14.8%
	Office Worker	11	18.0%
	Physical Worker	25	41.0%
	Housewife	16	26.2%
Constant Phone Use	Yes	41	67.2%
	No	20	32.8%
Daily Usage Duration	≤ 1 hour	22	36.1%
	2–4 hours	18	29.5%
	> 4 hours	21	34.4%
Neck Pain Prevalence	Yes	45	73.8%
	No	16	26.2%

3.2 Hypotheses Testing

Hypothesis 1 (Gender): An independent samples t-test indicated no statistically significant difference in neck pain intensity between males (Mean = 3.93, SD = 2.35) and females (Mean = 4.96, SD = 3.10), t(58) = -1.462, p = 0.149 [17], [18], [19].

Table 2: t-Test Results for Neck Pain Level by Gender

Gender	N	Mean	Std. Deviation	DF	t	p-value (Sig.)
Male	29	3.93	2.35	58	-1.462	0.149
Female	32	4.96	3.10			

Hypothesis 2 (Age): One-way ANOVA showed a significant difference in neck pain level across age groups (F(2, 58) = 3.254, p = 0.046). Post-hoc Tukey testing indicated that younger adults aged 18–28 years experienced significantly higher pain levels (Mean = 5.42) compared to adults aged ≥ 40 years (Mean = 3.30) [20], [21].

Table 3: One-Way ANOVA for Neck Pain Level by Age

Source	Sum of Squares	DF	Mean Square	F	p-value (Sig.)
Between Groups	47.142	2	23.571	3.254	0.046
Within Groups	420.104	58	7.243		
Total	467.246	60			

Table 4: Means and Standard Deviations for Neck Pain Level by Age

Age Group	N	Mean Pain Level	Std. Deviation
18–28 years	19	5.42	2.93
29–39 years	22	4.81	2.90
≥ 40 years	20	3.30	2.15

Hypothesis 3 (Daily Phone Hours): One-way ANOVA showed a statistically significant difference in neck pain intensity according to daily phone usage time (F(2, 58) = 41.379, p = 0.001). Post-hoc Tukey tests revealed that participants using phones for 2–4 hours (Mean = 5.33) and > 4 hours (Mean = 6.66) reported significantly greater pain than those using phones for ≤ 1 hour (Mean = 1.77) [21], [12].

Table 5: One-Way ANOVA for Neck Pain Level by Time Spent on Phone

Source	Sum of Squares	DF	Mean Square	F	p-value (Sig.)
Between Groups	274.716	2	137.358	41.379	0.001
Within Groups	192.530	58	3.319		
Total	467.246	60			

Table 6: Means and Standard Deviations for Neck Pain Level by Time Spent on Phone

Usage Time	N	Mean Pain Level	Std. Deviation
≤ 1 hour	22	1.77	1.50
2–4 hours	18	5.33	2.11
> 4 hours	21	6.66	1.85

Hypothesis 4 (BMI): One-way ANOVA indicated no statistically significant difference in neck pain level according to BMI ($F(2, 58) = 0.870$, $p = 0.424$) [22].

Table 7: One-Way ANOVA for Neck Pain Level by BMI

Source	Sum of Squares	DF	Mean Square	F	p-value (Sig.)
Between Groups	13.610	2	6.805	0.870	0.424
Within Groups	453.636	58	7.821		
Total	467.246	60			

Table 8: Means and Standard Deviations for Neck Pain Level by BMI

BMI Group	N	Mean Pain Level	Std. Deviation
Healthy Weight	18	5.16	2.81
Overweight	32	4.37	2.88
Obese	11	3.18	2.48

Hypothesis 5 (NDI Score): One-way ANOVA revealed a strong statistically significant difference in neck pain level across NDI disability levels ($F(3, 57) = 141.435$, $p = 0.001$). Mean pain level increased progressively from 'without disability' (Mean = 1.23) to 'serious disability' (Mean = 9.60) [23], [24].

Table 9: One-Way ANOVA for Neck Pain Level by NDI Categories

Source	Sum of Squares	DF	Mean Square	F	p-value (Sig.)
Between Groups	411.911	3	137.304	141.435	0.001
Within Groups	55.335	57	0.971		
Total	467.246	60			

Table 10: Means and Standard Deviations for Neck Pain Level by NDI Categories

NDI Category	N	Mean Pain Level	Std. Deviation
0–8% (Without disability)	17	1.23	0.97
10–28% (Mild disability)	19	3.84	1.01
30–48% (Moderate disability)	20	6.65	1.03
50–68% (Serious disability)	5	9.60	0.54

4. Discussion

This study investigated the prevalence of neck pain among adult smartphone users in Palestine. The overall prevalence rate of neck pain in this study was 73.8%, demonstrating that neck complaints are highly common among local smartphone users. This finding aligns closely with international findings reported in China (72.9%) [25], Saudi Arabia (71.2%) [26], and Singapore (74%) [19], while being higher than rates reported in India (46.9%) [23], Brazil (66.7%) [27], and Taiwan (52%). Variations across studies are likely attribuTable to differences in sample size, age range, inclusion criteria, and localized cultural screen-time behaviors.

Regarding demographic variables, gender did not exert a statistically significant influence on pain intensity ($p = 0.149$), although females reported a slightly higher mean pain score (4.96) than males (3.93). These results are consistent with findings from Odole et al. [18] and Abdullah et al. [17], which observed higher proportions of neck symptoms among females. Conversely, age showed a significant relationship with neck pain ($p = 0.046$), with younger adults (18–28 years) reporting higher pain levels (Mean = 5.42) [20]. This high prevalence among young adults can be linked to higher daily engagement in mobile gaming, social media browsing, and texting.

A major contributor to neck pain intensity in this study was daily phone usage duration ($p = 0.001$) [21]. Participants using smartphones for > 4 hours daily reported a mean pain intensity of 6.66 compared to 1.77 for those using devices ≤ 1 hour. These findings corroborate biomechanical studies showing that prolonged neck flexion ('forward head posture') exponentially increases compressive stress on cervical intervertebral discs and surrounding paraspinal muscles [9], [12], [13].

Furthermore, a significant positive association was established between NDI scores and neck pain severity ($p = 0.001$) [23], [24]. As pain intensity increased on the VAS scale, functional impairment in everyday tasks—including reading, concentration, work, driving, and sleeping—escalated correspondingly. Finally, BMI showed no statistically significant correlation with neck pain ($p = 0.424$) [22], reinforcing that postural strain and daily exposure duration are more influential factors than body mass index in triggering neck discomfort among mobile users.

5. Conclusion

Our conclusion is among adult 73.8% reported neck pain. There was no association between prevalence of neck pain with the gender and BMI. In addition, there was an association between prevalence of neck pain with the age, the time spent in use phone and NDI. In the other hand that the strongest predictor of neck pain was the time spent in use phone and NDI.

From the finding of the current study, we can conclude that the smartphone users usually experience neck pain, the intensity of which is dependent on the intensity of use of smartphones. neck pain observed in our study couldn't be correlated to be caused by only the use of mobile phones. We recommend that to minimize the adverse effects by limiting the frequency of duration of talking over mobile phones, holding the device as much away from the head, use of hands-free devices, maintaining the proper body posture while texting and avoiding usage of mobile during sleeping hours

6. Recommendations

1. Further research should be conducted to investigate and compare the effects of other types device in adults with neck pain in Palestine, Periodic studies should also be conducted to detect and treat the neck pain, and adhere to physiotherapy sessions
2. Do activities and symposiums to raise awareness about the neck pain associated with smartphone users about it, as well as the time spent on phone and rest times to avoid complications.
3. Time was short to study a large number of samples, but if we re-study at a later time and take a good number of samples, the result will be more accurate.

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