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Effectiveness of a Structured Program on Awareness Regarding Neck Disability Prevention and Corrective Exercises in Individuals with Text Neck Syndrome: A Quasi-Experimental Study

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Abstract **Objectives:** This study aimed to assess the effectiveness of an instructional program in enhancing individuals' awareness regarding the prevention of neck disability and corrective exercises for Text Neck Syndrome (TNS). It also sought to explore the relationship between participants' awareness and their demographic characteristics. **Methods:** A quasi-experimental design was employed using non-probability purposive sampling at the Kirkuk Center for Rehabilitation. A total of 40 participants with a Neck Disability Index (NDI) score of 5 or higher (≥10%) were included and assigned to study and control groups. Individuals with a history of neck surgery were excluded. Both groups completed pre- and post-tests. The study group received a structured instructional program over four weeks, consisting of weekly 45-60 minute sessions covering TNS anatomy, prevention strategies and corrective exercises, supported by visual materials. Data collection involved a validated and reliable questionnaire (test-retest reliability = 0.80) and analysis was conducted using SPSS version 26.0. **Results:** No significant differences were found in baseline demographic characteristics between the groups. In the study group, awareness of preventive measures increased significantly from 55% low to 95% good and awareness of corrective exercises improved from 95% poor to 100% good in the post-test. Effect sizes were large (~0.88) for both outcomes, indicating strong intervention impact. In contrast, the control group showed minimal improvement with smaller effect sizes (0.497 for prevention and 0.316 for corrective exercises). A statistically significant association was observed between occupational status and awareness ($p = 0.013$), while other demographic factors showed no significant relationships ($p>0.05$). **Conclusions:** The structured instructional program led to significant improvements in awareness in the intervention group, with effect sizes indicating a strong impact, while the control group exhibited minimal changes.

Key Words Text Neck Syndrome, Awareness, Prevention, Correction Exercises

INTRODUCTION

In recent decades, swift advancements in digital technology have resulted in a substantial rise in the use of smartphones, tablets and other electronic devices for diverse activities including work, entertainment and social interaction. However, this surge in device usage has led to pervasive a new health concern, notably "Text Neck Syndrome" (TNS). This disorder is brought on by prolonged forward head flexion, which causes repetitive strain and causes musculoskeletal pain and discomfort in the neck, shoulders and upper back. The phrase "text neck syndrome" was initially coined by Dr. Dean L. Fishman to refer to injuries caused by excessive use and bad posture when using mobile devices. Clinically, TNS is characterized by symptoms like headaches, stiff necks, muscle spasms and reduced mobility, which are mostly related to improper head and neck posture [1-4].

The World Health Organization (WHO) ranks neck pain and musculoskeletal disorders fourth and tenth in the world, respectively, highlighting them as serious health issues [4]. Since studies show that between 25% and 47% of people in India suffer from TNS, young people seem to be particularly vulnerable [5]. On top of that, up to 79% of adults between the ages of 18 and 44 spend the majority of their time on smartphones, which aggravates bad posture and raises risk factors [6]. Despite the widespread nature of the problem,

awareness concerning preventive strategies remains limited, especially in regions such as Jazan, Saudi Arabia, where underdiagnoses and low awareness levels have been reported. This emphasizes the need for educational programs that emphasize ergonomics, frequent breaks and neck and upper back muscle strengthening exercises [7,8].

In order to avoid strain, it is essential to practice proper ergonomic behavior, which includes holding devices at eye level and keeping the head upright. Regretfully, a lot of users tilt their devices at angles between 56.12° and 75.3°, which is much higher than the 33° to 45° that is advised [9,10]. Despite acknowledging the health hazards linked to excessive device use and sedentary lifestyles, the WHO provides little specific guidance on TNS, indicating a lack of focused research and clinical procedures [11]. More research on the diagnosis, treatment and prevention of TNS is therefore desperately needed. This includes the use of instruments such as the Neck Disability Index (NDI) to gauge the severity of the condition and direct interventions.

Prevention measures are crucial; TNS incidence can be significantly decreased by early education and awareness campaigns about the use of ergonomic devices in schools and colleges [12]. In order to address muscle imbalances, improve posture and enhance functional movement, physical correction exercises that incorporate stretching and strengthening routines are crucial. These workouts promote everyday activities, athletic performance and injury prevention [13]. To reduce symptoms, methods like stretching, chin and scapula retraction and neck muscle warm-up are advised, along with lifestyle changes like talking more and texting less, ergonomic adjustments and the use of heat or cold [14].

Underdiagnoses is still a challenge, though, especially in places like Jazan, Saudi Arabia, where awareness is often inadequate. According to research by Akshaya *et al.* [15], it's critical to teach teenagers about responsible smartphone use. It has been shown that structured educational programs are beneficial for improving posture awareness, lowering disability and expanding awareness [15]. In addition, Çimen [16] evaluated the effectiveness of preventive strategies, including regular breaks and stretching exercises among office workers. They concluded that structured breaks significantly reduced neck pain reports and improved overall well-being [16].

Comprehensive approaches, such as ergonomic training, public education and focused exercises, are crucial given the increasing incidence of TNS. Physical therapy and behavioral changes can greatly reduce symptoms and slow down the progression of the condition. This highlights the importance of putting these measures into place as soon as possible to safeguard musculoskeletal health in the face of continuous technological advancements, suggested to reduce symptoms [14]. Patients and caregivers must receive education on pain assessment and management since, according to Majeed *et al.* [17], insufficient pain control assessment and management is the most prevalent patient-related barrier.

On the other hand, literatures reported some of the techniques necessary to be done to get relief from text neck; warm up neck muscles time to time, stretches, chin and scapula retraction, rest, talk more and text less, apply ice or heat, massage, adapt better posture and modify lifestyle [18]. AL-Shammary and AL-Fayyadh [19] concurred that non-pharmacologic pain management approaches may explain that significant difference, using the pain gate control theory pillars. Finally, for importance, a study found that most of sample had some problems in self-care (82%) and usual activities (90%) during pre and posttest [20].

Despite Iraq's high smartphone penetration and documented post-conflict musculoskeletal burden, evidence-based interventions for TNS remain critically unexplored in this context. To date, no rigorous intervention research exists within Iraq's unique healthcare landscape-characterized by rehabilitation service gaps, cultural patterns of prolonged device use and limited Arabic-language health resources. Thus**,** this study aimed to assess the effectiveness of an instructional program in enhancing individuals' awareness regarding the prevention of neck disability and corrective exercises for TNS. It also sought to explore the relationship between participants' awareness and their demographic characteristics.

Objectives

- To evaluate the effectiveness of a structured instructional program in improving awareness of neck disability prevention
- To assess changes in awareness of corrective exercises for TNS
- To determine the relationship between participants' demographic characteristics and awareness levels

METHODS

The study was conducted using a quasi-experimental design (pretest-posttest) to ascertain whether an instructional program was successful in raising individuals' awareness of prevention of neck disability and correction exercises for TNS at a rehabilitation center in Kirkuk City between August 14th, 2024 and February12th, 2025. A non-probability purposive sampling approach is used in order to obtain accurate data and a representative sample from the individuals attending Kirkuk center of rehabilitation. The NDI was developed by Vernon and Mior in 1991. It is a widely used questionnaire designed to measure neck disability and assess the impact of neck pain on daily activities. It was used to assess the extent of neck disability, participants with neck disability index 5 points (10%) and more considered eligible for participation in the study, while subjects with past history of neck surgery were excluded. For sample size estimation, an alpha level of 0.05 and a medium effect size were used to determine the appropriate number of participants [21]. A total of 40 eligible individuals were selected for the study using purposive sampling (individuals with text neck syndrome) [21]. Participants were then non-randomly assigned to either the study group (n = 20) or the control group (n = 20) based on matching criteria to ensure baseline comparability. All 40 participants completed the study (Figure 1). Both groups received a pretest assessment.

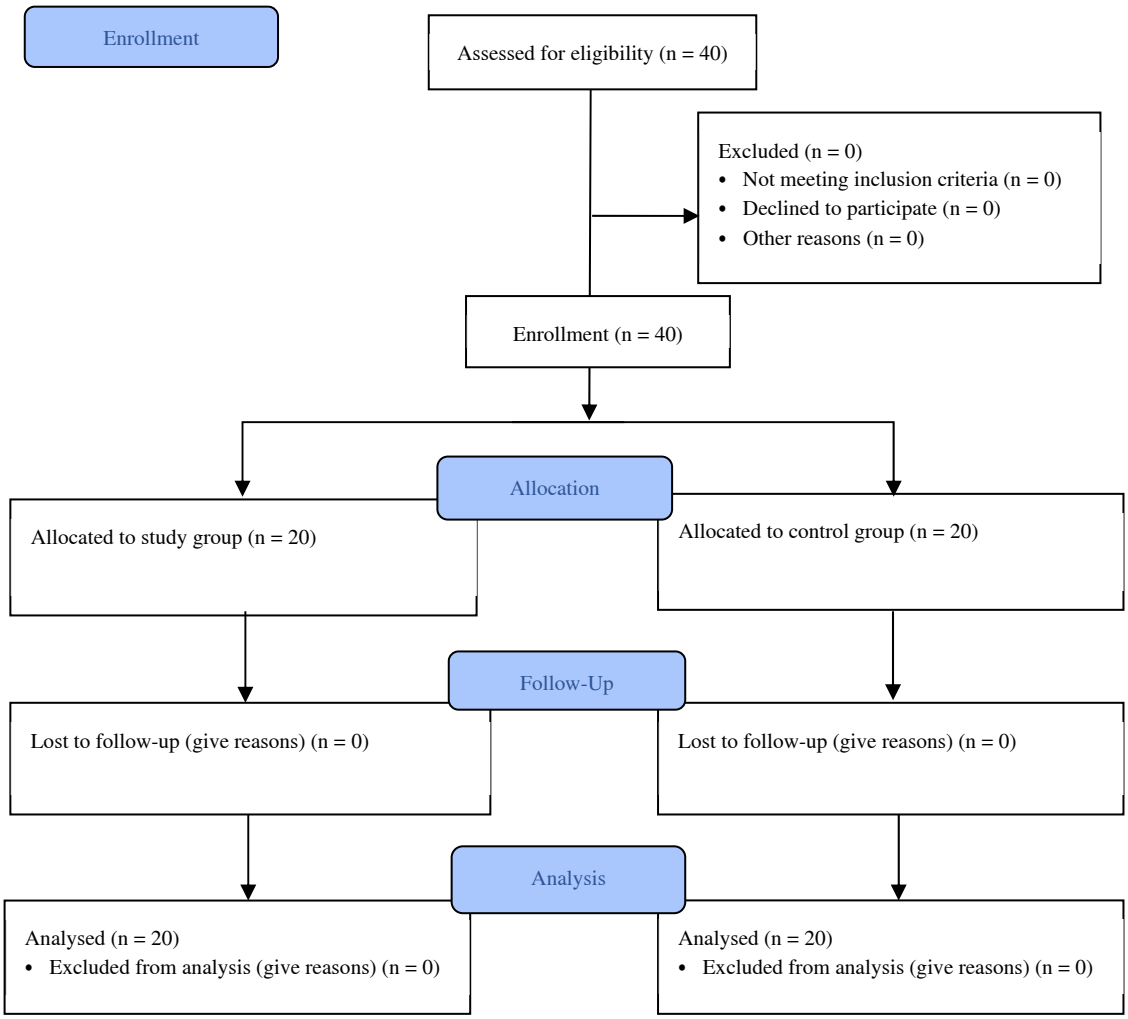

Figure 1: CONSORT flow diagram

Subsequently, the study group participated in a structured instructional program focused on neck disability prevention and corrective exercises, while the control group received no intervention. Following the intervention period, a posttest was administered to both groups.

The instructional program included 4 sessions for 4 weeks. Each session was designed and scheduled for at least 45-60 minutes. It covers information related with identification of text neck syndrome anatomically and physiologically, strategies of prevention, avoiding risk factors, applying Range of Motion (ROM) and divers correction exercises (Stretching and strengthening exercises) supported by photos and videos. The dropout cases were excluded from the study finding. Initially, the level of participants' Awareness was assessed through a simple questionnaire composed of AlZarea and Patil [18] MCQ on Lee *et al.* [10] participants, the result was that majority (90%) of them had a low level of awareness toward (TNS).

A structured questionnaire designed for the study, based on literature reviews and prior studies concerning Text Neck Syndrome, comprised of four parts: The 1st addressed participants' demographic data and medical history; the 2nd pertained to participants' awareness regarding the prevention of neck disability included (15) Item addressed awareness concerning (correct posture, need for stretching exercises, mixing stretches with routine exercises, taking regular breaks, arranging computer screen level, avoiding stress and agitation, impact of driving for long distance, holding mobile phone level, lifting heavy weights, reducing neck muscle tension, pillow level with body, ROM exercises) and the 3rd focused on participants' awareness regarding corrective exercises (13 Item) covered different stretching exercises (stretching for upper trapezius with chin tucked in, lateral neck bending, flexion, rotation, side bending and extension) and strengthen exercises by moving neck against resistance with hand (neck flexion, neck extension and rotation (left and right side).

Awareness about correction exercises questions were encompassed of a multiple-choice question while (True or False) was applied to the items of prevention. Both questions styles are scored as: zero (0) for wrong answers while (1) for correct answers, while (NDI) was scored by points as: no disability (0-4), mild disability (5-14), moderate disability (15-24), sever disability (25-34), very sever (35-50).

A group of experts in the field (n = 24) checked the questions for relevance, clarity and applicability as part of a content validity process. For internal consistency the Cronbach's Alpha analysis showed 0.854. The correlation coefficient utilized to assess the test-retest reliability. Coefficient was 0.80, indicating an adequate level of reliability. Administrative arrangements were obtained from the Kirkuk center for rehabilitation and the research ethics committee at the college of nursing/university of Baghdad. Additionally, formal consent was obtained from each participant. The data was gathered via a self-administered questionnaire assessing awareness and the (NDI) for participants' neck impairment. A Descriptive (frequency percentage mean and standard deviation) and inferential statistics (Correlation coefficient, the standardized Z-value, Spearman Correlation coefficient, Biserial correlation coefficient) were employed to analyze numerical data using the Statistical Package for the Social Sciences (SPSS), version 26.0.

RESULTS

The results of the study concur that p-value of Chi-square and Fisher's test indicated that there are no differences between the sample distribution between study and control groups except occupation Table 1 revealed that (30%) of participants in both groups were at age group 20-26, the study group had a higher percentage of females (75%), married individuals (55%) and those with bachelor's degrees or higher (55%). The majority of participants resided in the city center (95% in the study group) and were government employees (70% in the control group). Work was the most common cause of current spasm (60% in both groups). Both groups had a higher percentage of moderate neck disability. The results of Table 2 demonstrated that 55% had low awareness but by the post-test, dropped to 0% and 95% had good awareness. The control group's awareness level initially was low but dropped to 55% at the post-test. Also, the study found that 95% of participants had poor awareness about correction exercises at pre-test but by post-test, this number had dropped to 0% and all participants had reached the indicated level of good awareness. The control group had 90% low awareness at both pre-test and post-test

Table 3 showed that 95% of participants had poor awareness about correction exercises at pre-test but by post-test, this number had dropped to 0% and all participants had reached the indicated level of good awareness. The control group had 90% low awareness at both pre-test and post-test.

Figure 2 shows individuals with poor to fair awareness during the pretest and good awareness during the posttest. The control group showed a fair level of awareness, suggesting no discernible change, on both pretest and posttest.

The findings of Table 4 revealed that both prevention and correction exercises have large effect size (~ 0.88), indicating that these interventions had a substantial impact on the outcomes measured in the study group, this suggests

Table 1: Distribution of Participants (N = 40) according to their Socio-demographic and medical data

No.	Characteristics		Study group (n = 20)		Control group (n = 20)		Variance test
			f	%	f	%	
1	Age (year)	20-26	6	30	6	30	0.979**
		27-33	3	15	4	20	
		34-40	3	15	3	15	
		41-47	4	20	2	10	
		48-54	2	10	3	15	
		55-61	2	10	2	10	
2	Sex	Male	5	25	8	40	0.501*
		Female	15	75	12	60	
3	Marital status	Unmarried	9	45	10	50	1.000*
		Married	11	55	10	50	
4	Level of education	Primary	2	10	0	0	0.103*
		Secondary	5	25	1	5	
		Diploma	2	10	5	25	
		Bachelor +	11	55	14	70	
5	Residency	City center	19	95	20	100	1.000**
		Outside city	1	5	0	0	
6	Occupation	Government Employee	7	35	14	70	0.008**
		Non-government Employee	4	20	0	0	
		Free work	3	15	5	25	
		Housewife	1	5	1	5	
		Student	5	25	0	0	
7	Current spasm cause	Posture	1	10	1	5	0.829**
		Mobile use	6	15	6	30	
		Sudden move	1	5	0	0	
		Work	12	60	11	55	
		Others	0	10	2	10	
8	Neck disability severity	Mild	4	20	7	35	0.074**
		Moderate	14	70	8	40	
		Severe	2	10	5	25	

No: Number, f: Frequency, %: Percentage, *Pearson Chi-Square, **Fisher's Exact Test

Table 2: Assessment of individuals' awareness about prevention of text neck Syndrome (N = 40)

	Pre-test				Post-test				Pre-test				Post-test			
Level of awareness	f	%	M	SD	f	%	M	SD	f	%	M	SD	f	%	M	SD
Poor	11	55	4.85	2.925	0	0	12.4	1.095	12	60	4.95	2.544	11	55	5.45	2.212
Fair	9	45			1	5			8	40			8	40		
Good	0	0			19	95			0	0			1	5		
Total	20	100			20	100			20	100			20	100		

f: Frequency, %: Percentage, M: Mean of total score, SD: Standard deviation, Poor = 0.00-5.00, Fair = 5.01-10.00, Good = 10.01-15.00

Table 3: Assessment of individuals' awareness about correction exercise for text neck syndrome (N = 40)

	Study Group (n = 20)								Control Group (n = 20)							
	Pre-test				Post-test				Pre-test				Post-test			
Levels of awareness	f	%	M	SD	f	%	M	SD	f	%	M	SD	f	%	M	SD
Poor	17	85	2.6	2.393	0	0	11.25	1.164	18	90	2.45	1.638	18	90	2.55	1.538
Fair	2	10			0	0			2	10			2	10		
Good	1	5			20	100			0	0			0	0		
Total	20	100			20	100			20	100			20	100		

f: Frequency, %: Percentage, M: Mean of total score, SD: Standard deviation, Poor = 0.00-5.00, Fair = 5.01-10.00, Good = 10.01-15.00

Table 4: Effectiveness of an instructional program on individuals' awareness about text neck syndrome (N = 40)

		Study Group (n = 20)					Control Group (n = 20)			
Awareness of TNS	Test	Mean Rank	Z	p-value	E.S	Effect Size	Mean Rank	Z	p-value	Effect Size
Prevention	Pretest	0.00	-3.929	0.001	0.878	L	0.00	2.226	0.026	0.497 S
	Posttest	10.00					4.00			
Correction exercise	Pretest	0.00	-3.935	0.001	0.880	L	0.00	1.414	0.157	0.316 S
	Posttest	10.00					4.00			

M: Mean, Z: The standardized Z-value, p: Probability, E.S: Effect Size (S = 0.2 , M = 0.5 , L = >0.5)

Table 5: Relationships among Awareness and Sociodemographic Variables of Individuals (N = 40)

		Overall Awareness		
Variables		Mean	SD	Relationship
Age (year)	20-26	50.33	1.751	rs = 0.005
	27-33	54.33	3.055	p-value = 0.984
	34-40	53.33	5.508	
	41-47	53.50	4.041	
	48-54	50.00	7.071	
	55-61	49.50	2.121	
	Total	51.90	3.740	
Sex	Male	52.20	2.168	r* = 0.071
	Female	51.80	4.195	p-value = 0.766
	Total	51.90	3.740	
Marital status	Unmarried	51.67	2.872	r* = 0.110
	Married	51.40	4.033	p-value = 0.645
	Total	51.90	3.740	
Level of education	Primary	52.00	9.899	rs = .258
	Secondary	50.20	1.924	p-value = 0.272
	Diploma	51.00	4.243	
	Bachelor +	52.82	3.311	
	Total	51.90	3.740	
Residency	City center	51.79	3.809	r* = 0.182
	Outside city	54.00	-	p-value = 0.443
	Total	51.90	3.740	
Occupation	G. Employee	55.00	3.464	rs = 0.544
	N.G Employee	50.25	2.872	p-value = 0.013
	Free work	52.00	2.646	
	Housewife	45.00	-	
	Student	50.20	1.924	
	Total	51.90	3.740	

rs: Spearman Correlation coefficient, r*: Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

that the interventions were highly effective for participants who received them. While The effect size for prevention (0.497 ~ around medium) and correction exercise (0.316) was small in the control group suggest that without the intervention, the changes or improvements were less pronounced. The difference in effect sizes between groups highlights the efficacy of interventions (instructional program).

The analysis of Table 5 reveals no significant relationship between age, sex, marital status, education

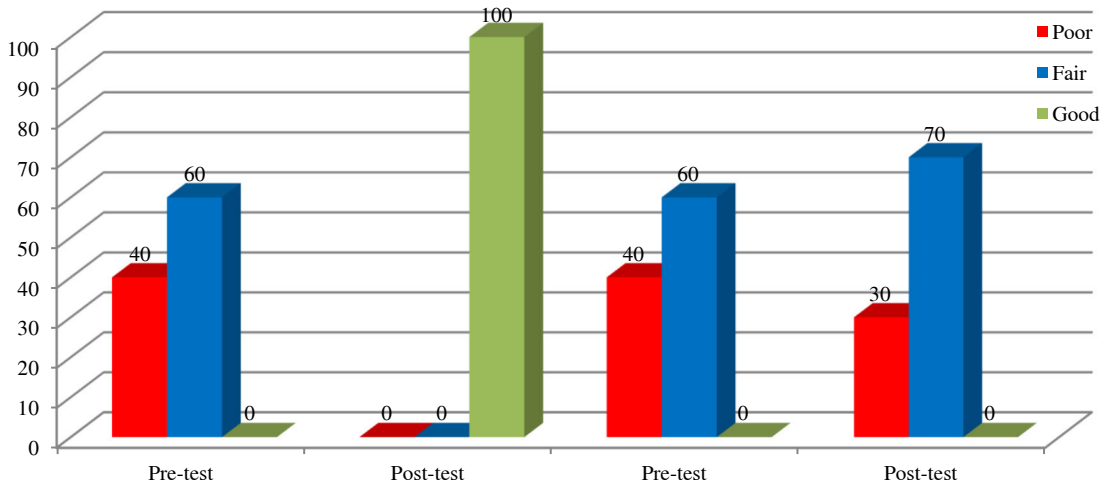

Figure 2: Levels of Individuals' Awareness about Text Neck Syndrome

level and residency with overall knowledge, as indicated by p-values greater than 0.05. However, occupational status shows a significant effect; government employees exhibit notably higher knowledge scores compared to other occupational groups, with a p-value of 0.013.

DISCUSSION

The results exhibited that there is no discernible difference in the age distribution between the two groups, with an equal proportion (30%) of participants in the 20-26 age range ($\Lambda = 0.026$, $p = 0.872$). Kaur *et al.* [7] strongly concur with our findings when they say that the age group most affected by text neck syndrome is 18 to 25 years old. This indicates that they live in the digital age and more needs to be done to raise awareness of the condition before it becomes a concern, particularly among young people [7]. Despite their awareness and education, a similar study in Abbottabad found that medical students had a high prevalence of text neck syndrome, mainly as a result of gadget addiction [22]. The before mentioned results of age are related to that its age of studying, using smartphone excessively in addition to computer use for texting, following social media, translation searching of researches and watching videos.

In both the study group (75%) and the control group (60%) the proportion of females is higher. This result is consistent with that of Javed *et al.* [22], who discovered that the majority of participants were female (66.67). Similar results were found in a Puducherry study (57.6%) [23]. The study group (55%) and the control group (50%) have the highest percentages of married people, indicating that the two groups' marital status distributions are comparable. There is no significant difference in the groups' marital status ($\Lambda = 0.741$, $p = 0.395$). This result is in contrast to Rashid *et al.* [24], who found that a higher percentage of single participants (88.6%) participated in their study. This outcome could be explained by the fact that they were students at the time and were not preoccupied with money matters [24].

The study group had a higher percentage of people with a bachelor's degree or higher (55%) than the control group (70%) ($\Lambda = 12.244$, $p = 0.001$), indicating a significant difference in educational attainment. According to a recent study conducted in Jazan, Kingdom of Saudi Arabia, 73.2% of participants held a university degree [11].

In terms of residency, the majority of participants in both groups-95% in the study group and 100% in the control group-live in the city center. The outcome supports the findings of Abdali *et al.* [11], who showed that 53.8% of the sample resided in a city. This urban residency trend challenges participants' mobility patterns and lifestyle choices, particularly in relation to their travel habits. Young people, for instance, usually prefer to live in metropolitan areas due to their desire for an active city life and the close proximity of their jobs, which may affect their commute [25].

In regard to occupational status, the control group has a higher proportion of government workers (70%) than the study group (35%). Kaur *et al.* [7] strongly concur with our findings, which showed that the number of people suffering from text neck syndrome is rising due to the increasing number of smart device users and poor posture when using them. Following the pandemic, the number of students studying online and employees working from home who are between the ages of 18 and 25 are more likely to develop text neck syndrome [7]. According to AL-Mussawi and Baqer [26], the largest proportion of the sample (32.5%) were employed. It is important to acknowledge that the significant baseline difference in occupational status could have influenced awareness outcomes, suggesting a potential confounding factor.

Furthermore, the results were consistent with those of Andersen *et al.* [27], who noted that employees' complaints of upper body pain have increased. Office workers are more likely than those in other occupations to experience neck pain (NP), which can be physically taxing [27].

Work was cited as the primary cause of current spasm in both the study group (60%) and the control group

(55%). The findings of this study concur with those of Andersen *et al.* [27] and Petit *et al.* [28], who noted that complaints of the upper body have increased among workers. Office workers are more likely than those in other occupations to experience neck pain (NP), which can be physically taxing. The results show that the study group and control group had higher percentages of participants with moderate neck disabilities (70 and 40 percent, respectively). The results of Javed *et al.* [22] also support this finding, which suggests that 39% of the participants had a moderate disability.

The study's findings show that the study group's awareness of preventing text neck syndrome has significantly improved when compared to the control group. The study group's level of awareness significantly increased. 55% of participants had low awareness on the pre-test (mean = 4.85, SD = 2.925). In the post-test, 95% of participants achieved a good awareness level and this number fell to 0% (mean = 12.40, SD = 1.095). At the beginning, 60% of participants in the control group had low awareness (mean = 4.95, SD = 2.544). This marginally dropped to 55% at the post-test (mean = 5.45, SD = 2.212).

The beforementioned findings were in good agreement with Samani *et al.* [29] who reported out of 109 young adults, 75% subjects answered that preventing TNS is possible but the ways of preventing are not known to them. The possible reason for this could be lack of awareness and ignorance towards this syndrome [29]. In addition, Rathi *et al.* [30], stated that prevention is always better than cure; hence, the role of physiotherapists is to create the awareness and spread awareness in school and colleges at earliest to prevent this technology-induced musculoskeletal disorder. Proper patient education regarding the preventive measures of TNS and proper ergonomics of smartphone usage [30]. The change in our study's findings confirms that the educational program successfully filled in the knowledge and awareness gaps regarding preventive measures. The control group, on the other hand, consistently demonstrated poor to fair awareness from the pretest to the posttest, suggesting that misconceptions and ignorance regarding text neck syndrome endure in the absence of focused instruction. This significant benefit probably motivates the participants to incorporate health-related behaviors into their everyday routines, highlighting the significance of taking preventative action in order to manage any potential health problems associated with extended device use.

Our study demonstrates a notable improvement in awareness of correction exercises. Ninety-five percent of participants showed poor awareness at the pre-test (mean = 2.60, SD = 2.393). By the post-test, this number had fallen to 0% (mean = 11.25, SD = 1.164) and all participants (100%) had attained the indicated level of good awareness. At the beginning, 90% of participants in the control group had low awareness (mean = 2.45, SD = 1.638). Poor awareness was observed in the same proportion at the post-test (mean = 2.55, SD = 1.538).

These results are supported by research by Pinto *et al.* [31], who concurred that a structured teaching program can successfully raise awareness of text neck syndrome. In accordance to a study, participants understanding of pain management is inadequate [32]. According to a study, findings showed vibration and exercises both help to lessen shoulder pain but applying vibration to the shoulder has a more significant impact on lowering shoulder pain intensity than exercises [33]. Other research outcomes, students who have FHP issues may benefit from selective corrective exercises that help them correct their posture [34]. Given the growing prevalence of electronic device use, it is imperative to put into practice community-based strategies that raise awareness and support self-management with regard to TNS. There is currently no universal agreement on a standardized set of exercises designed for a variety of populations to manage TNS, despite numerous studies focusing on corrective exercises for the most vulnerable groups (young adults, students and office workers) with stressors that can cause neck muscle frustration because of their lifestyle. This gap highlighted the need for further research and development of targeted intervention programs.

The study group's awareness of TNS variables showed significant changes after participating in an instructional program, with individuals demonstrating poor to fair awareness during the pretest (40 and 60%%, Mean±SD = 20.75±8.873) and good awareness during the posttest (100%, Mean±SD = 51.90±3.740). On the pretest (60%, Mean±SD = 20.70±7.554) and posttest (70%, Mean±SD = 22.95±5.880), the members of the control group demonstrate a fair level of awareness, suggesting no discernible change in their awareness.

In a similar finding, Swati and Sachin (2023) found that the pre-test mean score of 6.8 with SD 4.1 was significantly lower than the post-test mean score of 11.7 with SD 3.5. Given that the degree of freedom was 59 and the computed "t" value was -9.79, which was higher than the table value (2.00) at the $p<0.05$ level of significance. As a result, the study found that college students' understanding of text neck syndrome was enhanced by a structured teaching program [35]. The results in this related topic are consistent with those of Bhende *et al.* [36], who found that integrated postural training significantly improved posture, cervical joint position error, cervical range of motion and pain relief in individuals with text neck syndrome.

The large effect sizes in the study group indicate that the intervention for prevention and correction exercises were highly effective for this group. The smaller effect sizes in the control group suggest less impact, possibly due to natural progression or other factors unrelated to the intervention. This suggests that the efficacy of an instructional program raises people's awareness of neck disability prevention and Text Neck Syndrome correction exercises. According to Fares *et al.* [37], the educational program has resulted in a significant increase in participants' care knowledge.

The study's analysis shows that there is no significant correlation between overall awareness and p-values greater than 0.05, which indicate that age, sex, marital status, education level and housing. Occupational status is one notable exception. A p-value of 0.013 indicated that

government employees had significantly higher awareness scores than the study group. However, the examination of Table 3-14 in the control group indicates that there are no noteworthy correlations between sociodemographic characteristics and general awareness.

Our results are in line with a previous study and revealed no significant correlation between pre-test knowledge scores and specific demographic factors related to Text Neck Syndrome [31]. The disparity among government employees may also be explained by a number of characteristics that are specific to them, such as perhaps easier access to resources for health education, heightened awareness of ergonomic and health concerns and a structured training program brought on by job requirements that raise awareness of conditions like TNS.

Structured educational programs could be implemented in rehabilitation clinics and schools to reduce TNS risk. Findings suggest that occupational setting influences awareness, supporting targeted workplace interventions. Physiotherapists should play a key role in delivering and adapting such programs.

CONCLUSIONS

The findings of this study demonstrate that the structured instructional program was effective in significantly enhancing participants' awareness regarding the prevention of Text Neck Syndrome (TNS) and the application of corrective exercises. This underscores the value of targeted educational interventions in promoting musculoskeletal health in populations at risk for technology-related postural issues. Notably, among the various demographic factors examined, occupational status emerged as the only variable significantly associated with awareness levels. This suggests that individuals' professional roles may influence their baseline understanding or receptivity to health education regarding postural ergonomics. These results highlight the importance of integrating occupational context into the design of preventive health programs and suggest a need for workplace-specific strategies to mitigate TNS. Future research with larger and more diverse samples is recommended to validate these findings and explore long-term behavioral and clinical outcomes.

Strengths and Limitations

This study offers important contributions by addressing a recognized health education gap related to TNS in Iraq. A major strength lies in the use of a validated questionnaire combined with a quasi-experimental design incorporating both pre- and post-tests, as well as a control group. This methodological rigor enhances the internal validity of the findings. Additionally, the inclusion of effect size reporting provides practical insight into the magnitude of the instructional program's impact, strengthening the clinical relevance of the results. However, several limitations should be acknowledged. The study was conducted within a specific geographic region, which may limit the generalizability of the findings to broader populations. Furthermore, the absence of a long-term follow-up restricts the ability to assess the sustained impact of the intervention over time. Future studies should consider expanding to multiple regions and incorporating longitudinal assessments (3-6 months follow up) to evaluate long-term behavioral and functional outcomes.

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