https://doi.org/10.47993/gmb.v47i2.894

To assess the relationship between neck pain and handgrip strength due to text neck syndrome in medical students

Evaluar la relación entre dolor de cuello y fuerza de presión por síndrome de cuello de texto en estudiantes de medicina

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Abstract

Background: to evaluate the association between the strength of a student's grasp and text neck syndrome. **Methodology**: on 60 college students, correlation research was conducted. were assigned into two equal groups (groups A and B) at random; group A represents those who use cell phones for less than four hours each day. Group B is made up of those who use their smartphones for more than four hours each day. individuals with a history of upper limbs or neck traumas, inflammatory joint disease, Genetic spinal deformity, or history of surgery the neck were excluded. The subjects filled out a detailed assessment form that asked for information like Name, age, dominant hand, how many hours were spent using a phone, and Neck Disability Index are also included. Later, the strength of their dominant hand's grip was evaluated using a digital hand dynamometer. **Result**: the connection between the neck disability index and the power of the hands' grasp test was evaluated using Pearson's correlation coefficient because the data were not regularly distributed. There is no significant difference between the groups. **Conclusion**: prolonged use of smartphones increases neck pain without affecting on handgrip strength.

Keywords: handgrip strength, neck pain, medical students, posture, text neck syndrome.

Resumen

Fundamento: evaluar la asociación entre la fuerza de comprensión de un estudiante y el síndrome del cuello del texto. **Metodologia**: se realizó una investigación de correlación con 60 estudiantes universitarios. fueron asignados aleatoriamente a dos grupos iguales (grupos A y B); El grupo A representa a aquellos que utilizan el teléfono móvil menos de cuatro horas al día. El grupo B está formado por quienes utilizan sus smartphones más de cuatro horas al día. Se excluyeron las personas con antecedentes de traumatismos en las extremidades superiores o el cuello, enfermedad inflamatoria de las articulaciones, deformidad genética de la columna o antecedentes de cirugía del cuello. Los sujetos completaron un formulario de evaluación detallado que pedía información como nombre, edad, mano dominante, cuántas horas pasaron usando un teléfono y también se incluye el índice de discapacidad del cuello. Posteriormente, se evaluó la fuerza de agarre de la mano dominante utilizando un dinamómetro de mano digital. **Resultado**: la conexión entre el índice de discapacidad del cuello y la prueba de potencia de presión de las manos se evaluó utilizando el coeficiente de correlación de Pearson porque los datos no se distribuyeron regularmente. No hay diferencia significativa entre los grupos. **Conclusión**: el uso prolongado de teléfonos inteligentes aumenta el dolor de cuello sin afectar la fuerza de presión manual.

Palabras claves: fuerza de agarre, dolor de cuello, estudiantes de medicina, postura, síndrome del cuello de texto.

Recibido el
11 de enero de2024
Aceptado
05 de diciembre de 2024
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https://doi.org/10.47993/gmb.v47i2.894

A vital component called the "Neck" connects our bodies to our heads. Neck discomfort is regarded as the fourth most common disability cause the fourth most common disability cause across the world[1]. It also known as neck dysfunction, is a musculoskeletal condition caused by the poor posture that results in physical disability or functional constraint[2].

According to a recent systematic study conducted in Hong Kong, the prevalence of musculoskeletal issues associated with mobile phone usage ranges from 17.3 percent to 67.8 percent for neck symptoms[3].

With the rise in the use of mobile phones, The prevalence of usage of hand-held mobile devices (HHMD) by adults, adolescents, and children is growing by the day. The typical adult admits to using 5.1 hours per day on a smartphone[4].

In terms of physical work variables, maintaining the neck in a forward bent posture for an extended period and performing repetitive activities were substantially connected with neck discomfort[5]. Excessive use of electronic gadgets causes extended neck flexion, which leads to text neck syndrome.

American chiropractor Fishman D. first identified text neck syndrome. It alludes to neck discomfort brought on by repetitive stress injury or overuse. It is brought on by neck flexion, which happens when a person looks down at a mobile phone or device, such a tablet or laptop, for a prolonged amount of time[6]. Text neck is an overuse injury to the cervical spine that results from prolonged forward head bending when looking down at a mobile device[7].

According to a recent study conducted in Thailand, Text Neck Syndrome has evolved into a global epidemic impacting a big number of people. Mobile phones are used by practically everyone of all ages. Text neck syndrome is an increasing health concern that can have serious consequences. A vast number of people all across the world are affected[3].

Thoracic kyphosis, shoulder discomfort, and radiating pain to the hand, are all symptoms of the text neck. People are staring for long periods of time. Neck stiffness is caused by looking down at smartphones. While staring at the phone with a sharp downward gaze neck stiffness is a result of this condition. Staring down at mobile phones with a strong downward gaze can lead to an excessive anterior curve in the lower cervical vertebra and an excessive posterior curve in the upper thoracic vertebra[1,3,4].

For lengthy lengths of time, checking and/or using smartphone applications is linked to stress, withdrawal, anxiety, sleep disturbances, less physical activity, worse academic achievement, and a decline in wellbeing[8]. When using a cell phone for an extended period, users typically adopt a prolonged forward head posture. Individuals who tend to text or view for lengthy periods are more likely to be affected[1,8].

One of the most prevalent issues found in persons who constantly text on their phones is the forward head position. In chronic phases, this can also result in lower back discomfort[1,5].

Extensive smartphone usage has been linked to physical health issues including wrist and neck discomfort, as well as exposing hands to extreme stressors that can lead to pain and musculoskeletal abnormalities in the hand and thumb function[9].

The highest force created during maximal voluntary contraction under a specific set of conditions is known as handgrip muscular strength. It refers to a person's ability to create muscle strength and force using their hands. The entire amount of static force exerted by the overall static force applied by the hand overall static force applied by hand when squeezing a dynamometer is known as handgrip strength. Changes in posture, such as having the elbow extended rather than flexed (by 90%), providing forearm assistance, and standing or sitting while being measured, might all affect the outcomes[8].

The force has traditionally been measured in kilograms and pounds, although it has also been measured in milliliters of mercury and Newtonian units[10]. Though both males and females experience many of the negative physical and postural symptoms linked with text neck, there are some minor differences. Disparities between men and women as standing and staring at an HHMD, head, and neck flexion angles are considerably enhanced in both males and females when compared to standing without a mobile device. Males, on the other hand, have been demonstrated to have significantly larger angles in two measurements: head flexion angle and neck flexion angle[4].

Text neck may be dangerous if not addressed or remedied in a timely manner cause major long-term harm and can end in repetitive stress injury or overuse syndrome Over time Text neck irritation might develop if left untreated. Neck ligaments, muscles, and nerves cause lifelong damage like arthritic symptoms Early development of arthritis, the flatness of the spinal curve, dislocation of the spine, spinal degenerative, disc pressure, and herniation[3].

Statement question

Is there any relation between text neck syndrome and handgrip strength in the medical student?

Aims and objectives of the study

To evaluate the handgrip strength and neck pain among medical students. The purpose of this research is to evaluate the association between medical students' handgrip strength and text neck syndrome.

Hypothesis

Hypothesis: Text neck syndrome and handgrip strength in medical students are significantly correlated.
Null Hypothesis: Text neck syndrome and handgrip strength in medicine do not significantly correlate.

Methods

Study design

The research is a two-group comparison study in design.Male and female college-bound medical students make up the study population.age range of 18 to 25.The total duration of study is two months ,Galgotias University students.

Inclusion criteria

Male and female included and Only subjects between the ages of 18 and 25 were examined. Subjects with main hands. Referred case by (neurosurgeon and orthopedic surgeon)

Exclusion criteria

Exclude criteria of this research Injuries to the upper extremity or neck, History of inflammatory joint disease, Surgical treatment for the neck or a higher body limb and Genetic spinal deformity.

Measurement tools and instruments

Neck pain Disability Index

Howard Vernon created the Neck Disability Index (NDI) in 1989. The Index was created by combining a measure of low back pain disability using the Oswestry Low Back Pain Disability Index Index .the original author's permission.

Scoring: Each question has six response categories, ranging from 0 (no disability) to 5 (full disability). The overall score is then recorded on a scale of 0 to 50, with 0 being the best possible score and 50 being the worst. We can record the score on a scale of 0 to 100. The result is frequently expressed as a percentage (0 to 100 percent).

Score

0% to 20% Very Little Disability
20–40% of the total slight Disability
between 40% to 60% severe impairment
between 60% to 80% Disability impairment
from 80% to 100%

Administration

It takes between 3 and 8 minutes.

Validity of the Tool

Based on the subject's reaction during the first assessment as to whether the question was related to his or her disease, face validity was evaluated.

Reliability of the tool

Acute neck discomfort has a reliability range of 0.81 to 0.89. Chronic neck pain had a 0.97–0.99 reliability..

Digital hand dynamometer

The Digital Hand Dynamometer has a lot of functions that can be used for routine screening as well as for analyzing hand damage and disease.

In contrast to The Jamar hydraulic system, the dynamometer test's concurrent validity is determined to be r=0.982 and its test-retest reliability to be r=0.9999. (Shechtman, Gestewitz, and Kimble, 2005) - to check handgrip strength and for exercise training.

Procedure of study

60 young students were included as per inclusion and exclusion criteria.after that The subjects' permission to conduct the study was initially obtained through the use of a consent form.There are two group .GROUP A and GROUP B 30 participants in group A and 30 participants in group B Text neck syndrome and hand grip strength were taken as baseline. Person who using the phone for Less than 4 hours is put in the group A and person who is using the Phone more than 4 hours is put in the group B and this all data is analyzed with SPSS20

Grip strength was tested in the same way for all students sitting in seated in a back- and arm-supporting chair with the elbows bent at 90 degrees and the forearm and wrist in the middle position., grasping the object. By using the dominant hand, you can operate a dynamometer. The therapist made the recommendation." Squeeze the dynamometer as much as you can" is an order. The therapist stood in front of the student to gauge the amount of force used. We with a one-minute pause, take the average of three Kg measurements between each press to avoid exhaustion.

Fig 1: Sitting position

Fig2: Digital Hand Dynamometer

Data Analysis: Data analysis was done under the Social Science Packaging Software SPSS 27.0 version Pearson's correlation coefficient test was done.

Results

The sample consisted of 60 individuals, the majority of whom were female. The outcomes were analyzed using SPSS statistical analysis software. Table 1 provides a summary of the student's characteristics. Body mass index (BMI), mean age, weight, and height were not significantly different across the groups ($p > 0.001$). There is no significant correlation between text neck syndrome and hand grip strength, according to Tables 2 and 3, which exhibit p values ($p>0.001$).

In this table 2, the pearson correlation test was done, and the results indicate a negative value that is inversely proportionate for both the HGSmin (Hand Grip Strength with a Minimum Disability) and the NDImin (Neck Disability Index with a Minimum Disability). The p value is greater than ($p>0.001$) and the sig (2-tailed) value is.589.

In this table 3, the pearson correlation test is done, and the results indicate a negative value that is inversely proportionate for both HGSSeveremoderate and NDISevereModerate. The p value is greater than ($p>0.001$) and the sig (2-tailed) value is .006.

Discussion

Examining the connection between text neck syndrome and grip strength in medical students was one of the study's main goals.. A person's life nowadays would be incomplete without a cell phone. Smartphones are required for a range of daily tasks. Instructional objectives, games, and so on listening to music, and a variety of other activities. Smartphones harm certain people. Coronavirus 2019 diseases .

Table 1 Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AGEmin	30	18.00	24.00	21.533	1.25212
BMImin	30	16.00	28.70	22.088	3.36028
AgeSEVmoderate	30	18.20	25.00	21.7667	1.40647
BMISEVmoderate	30	16.90	24.70	20.0400	2.21338
Valid N (listwise)	14				

Table 2. correlation between HGSmin and NDImin

		HGSmin	NDImin
HGSmin	Pearson correlation	1	-0.114
	Sig. (2- tailed)	-	0.589
	N	30	30
NDImin	Person correlation	- 0.114	1
	Sig.(2-tailed)	0.589	-
	N	30	30

Table 3. correlation between HGSmoderate and NDImoderate

		Moderate	Moderate
HGSSevere moderate	Personal correlation	1	-0.491
	Sig. (2- tailed)	-	0.006
	N	30	30
NDISevere Moderate	Person correlation	-0.491	1
	Sig.(2-tailed)	0.006	-
	N	30	30

HGSSeveremoderate: Hand Grip Strength with severe and moderate disability, NDISevereModerate: Neck Disability Index with severe and moderate disability.

Addiction had reached a point where it was no longer manageable. People were spending a lot more of their time on the internet. Smartphone addiction is a serious problem. Nomophobia is a term used to describe a fear or anxiety about not having a mobile phone. Neck discomfort is one of the things that affect everyone. An individual once-in-a-lifetime experience. Later it might have an impact on our everyday activities and trigger a malfunction.

In this investigation, we looked at the connection between neck discomfortand hand grip strength due to text neck syndrome in medical students. According to the findings of this study, there was a substantial negative relationship between neck pain and hand grip strength in both the group. Decreasing neck discomfort intensity is associated with increasing grip strength. But there is no correlation between a person who uses the phone more than 4 hours and those who use the phone less than 4 hours. There was a significant negative correlation with p-value is p>0.001

In this research, we discovered that 26.66 percent of respondents had continuous neck stress and had a severe neck disability, while 23.3% had moderate neck disability and the remaining 50% had no neck disability. Females were found to be more affected by neck disability than males.

According to a recent study 60 healthy individuals between the ages of 14 and 18 were put into two equal portions (groups A and B). Group A represents the control group and uses cellphones less often than four hours per day. Group B is made up of research participants who use their smartphones for more than four hours each day. The ulnar and middle nerves' nerve conduction velocities were examined using an electromyography equipment. The forward head angle was determined using a universal goniometer. The neck discomfort was evaluated using the Visual Analogue Scale. The hand grip strength of the individuals in both groups was measured using a hand dynamometer. Results: indicated the influence on group by demonstrating substantial differences in ulnar muscle activity, forward head angle, and visual analogue scale for pain without affecting the strength of the handgrip[11-13].

Text neck syndrome is a repetitive stress injury, it may be readily addressed by taking regular pauses, such as every 20 minutes, to relax the muscles. Alternatively, we can raise our hands slightly so that our neck does not bow too much while using a smartphone.

Strength

The main strength of this study was the awareness of text neck syndrome.

for this study, it occupies less space, and the portable type and easy to set up. The hand dynamometer, which measures handgrip strength, is interesting to patients.

Limitation

The research was conducted exclusively among young adults, with medical students serving as the primary subjects of the investigation. Notably, there was a higher representation of women compared to men in the participant pool. The study focused on students from a single college and was carried out over a relatively short period of time, limiting the scope to this specific population and timeframe. This focused approach provides valuable insights but may also constrain the generalizability of the findings to a broader demographic or educational context.

Recommendation

Future research could be broadened by including professionals from various age groups and different occupations, allowing for a more comprehensive understanding of the relationship between neck pain and handgrip strength. Expanding the participant pool to cover diverse work environments would make the findings more generalizable. Furthermore, increasing the sample size would enhance the study's statistical power and credibility. Conducting the research across multiple colleges or institutions would also contribute to a more inclusive perspective. Additionally, examining different degrees of neck positions could provide a deeper analysis of how posture affects musculoskeletal health.

Conclusion

There was shown to be no relationship between neck discomfort and hand grip strength due to text neck syndrome. Prolonged use of smartphones increases neck pain without affecting handgrip strength.

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