



# CORRELATION BETWEEN NECK DISABILITY AND SMARTPHONE ADDICTION AMONGST YOUNG (18-25 YEARS) SMARTPHONE USERS IN COVID-19 PANDEMIC.

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## ABSTRACT

**Background:** During the pandemic of Covid-19 virus, people spent a greater amount of time at home which has changed their routine, leading to an increase in the use of smartphones, in turn causing its addiction among the young generation. People tend to bend their neck in forward direction to stare at their smartphones. Maintaining this position for a long duration, leads to stress on the cervical spine, and causes neck pain and neck disability.

**Methods:** Cross sectional study with 100 smartphone users between the age group 18-25 years were selected. The study was explained to them and consent was taken. Smartphone Addiction Scale Short Version (SAS-SV) is used to find out the addiction of smartphone. Neck Disability Index (NDI) is used to evaluate the neck disability.

**Result:** The mean value of Smartphone Addiction Scale Short Version (SAS-SV) is 29.42 and the mean value of NDI is 13.80. The coefficient of correlation  $r=0.09$ . Therefore, this study shows that there is a significant correlation between neck disability and smartphone addiction.

**Conclusion:** There is a positive correlation between neck disability and smartphone addiction in young smartphone users.

**Keywords:** Smartphone addiction, Neck Disability Index, Smartphone addiction Scale-Short Version.

## I. INTRODUCTION

Most countries had imposed a lockdown in 2020 to break the chain of community transmission of the Covid-19 virus, which has changed the way we were used to living in. Stay at home and work from home strategies were recommended worldwide to prevent infection at both, individual and community levels. This self-isolation motivated people to turn to their smartphones to stay connected with the world. <sup>(4)</sup>

Time spent at home has increased exponentially after the Covid-19 pandemic and it has also changed the daily routine of most people. Pandemic time reduced opportunities of direct face to face interactions, which is why people have started relying more on internet-based services to overcome boredom, seek information, and to relieve anxiety related to the pandemic. <sup>(1)</sup>

A smartphone is one of the most popular devices used by the young population. Advancement in smartphone models, which includes portable media players, compact digital cameras, access to emails, GPS navigation units and high-resolution touch screens, contributes to the frequent use and addiction to smartphones. <sup>(7)</sup> Greater hours spent over a smartphone can damage a person's posture. Visual Display Terminal (VDT) usage can cause consistent pressure on the upper quarter of the body and musculoskeletal pain in regions like neck, shoulders, arms and hands. <sup>(8)</sup>

Neck pain problems which arise from poor posture, which results in abnormal physiological loads over the cervical spine. This load compromises pain-sensitive structures and that affects the function of the cervical spine, causing a musculoskeletal imbalance in the upper quarter of the body. <sup>(8)</sup> While using smartphones people usually flex their neck downwards to stare at the lowered object and to maintain the head in a forward position for long periods of time. <sup>(10)</sup>

The maintenance of this posture decreases cervical lordosis of lower cervical vertebrae and creates a posterior curve in the upper thoracic vertebrae to maintain balance.<sup>(10)</sup> Forward head posture causes shortening of the muscular fibres and overstretching of the muscles around the atlanto-occipital joint, possibly producing chronic neck pain.<sup>(10)</sup> Postural deviations can cause alterations in muscle activities and an increase in cervical load due to which there occurs increased activity of neck extensor muscles and upper trapezius.<sup>(1)</sup>

Continuously using smartphones puts excess load on the upper trapezius, reducing its pressure pain threshold. Also, there occurs reduced activity in thoracic extensors and lower trapezius muscles. As per studies, bad posture can lead to wear and tear of the spine. <sup>(1)</sup>

Neck Disability Index (NDI) assesses the effect of neck pain and symptoms during a range of functional activities. An elevated NDI score indicates greater neck disability. <sup>(7)</sup> NDI is the most widely used and most strongly validated instrument. Smartphone Addiction Scale- Short Version (SAS-SV) is used to identify smartphone addiction. <sup>(1)</sup> This questionnaire consists of three components: demographics, time spent and behavior on smartphone use, and also measures the existence of musculoskeletal pain. <sup>(6)</sup> Thus, the aim of the study is to find out correlation of neck disability and smartphone addiction in young (18-25 years) smartphone users during the Covid-19 pandemic.

## II. RESEARCH METHODOLOGY

The type of study was cross sectional. The study setting was MVP'S College of Physiotherapy, Nashik; Dr. Vasanttrao Pawar Medical College, Nashik; MVP'S Institute of Nursing Education, Nashik. The sample size was 100 subjects. Duration of the study was 6 months.

### MATERIALS AND METHODS

Permission from the ethical committee was obtained. 100 subjects aged between 18-25 years both male and female participated in the study. Subjects using smartphones for more than 1 year and more than one hour per day were included in the study. Subjects with recent neck, shoulder, arm, and hand injury, cervical disc prolapse, spine or cervical trauma within last 6 months, cervical radiculopathy, history of severe surgical procedures of the neck and with congenital abnormalities of the cervical spine were excluded from the study.

### STATISTICAL TOOLS

Data was analyzed using MS Excel. The demographic data of the subjects and the scores of the outcome measures were noted. Using scores of the outcome measures, mean and standard deviation was calculated. To determine the nature and significance of the relationship between SAS-SV and NDI, Pearson's correlation method was used.

## III. PROCEDURE

The study was conducted by distributing questionnaires to the subjects between the age group 18-25 years. A brief description of the study objectives was given. Subjects who agreed to respond and fulfilled the inclusion and exclusion criteria were included in the study. Written consent was taken. Demographic data was documented. Study was explained to them, and later the subjects filled Smartphone addiction scale-short version (SAS-SV) to find out smartphone addiction and Neck disability index to evaluate the neck disability.

## IV. RESULTS

A total of 100 subjects were included in this study out of which 79 were females and 21 were males aged between 18-25 years and using smartphones for more than 1 hour per day. Using Pearson's correlation method, the nature and significance of the relationship between SAS-SV and NDI were determined.

Table No.1: Gender Distribution.

Gender	N	%
Male	21	21%
Female	79	79%

Graph No. 1: Gender Distribution

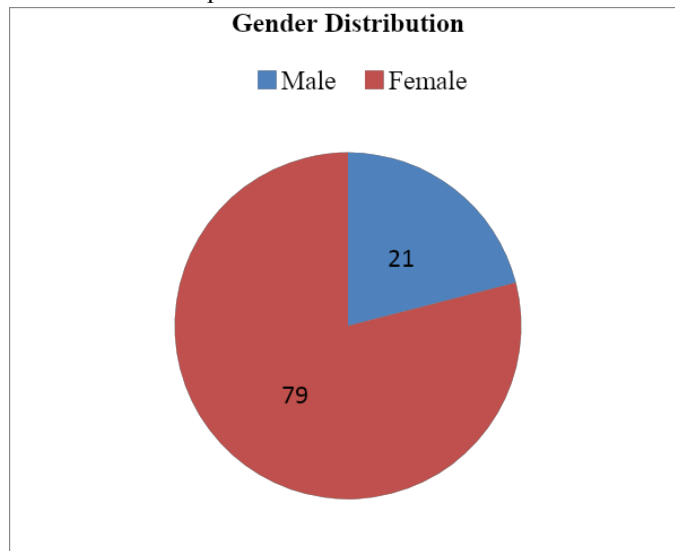


Table No. 2: Age Distribution.

Age	No. of students
18 years	08
19 years	18
20 years	23
21 years	31
22 years	13
23 years	06
24 years	01
25 years	00

Graph No. 2: Age Distribution.

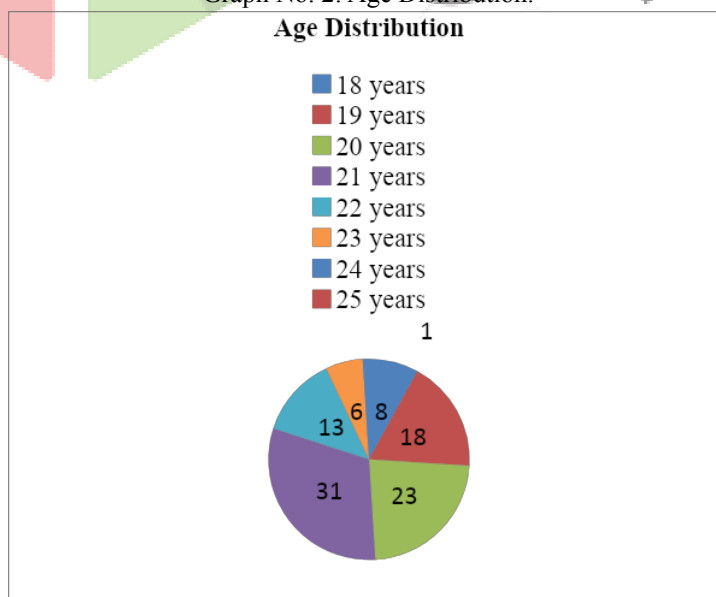


Table No. 3: Level of Neck Disability

No Disability	14
Mild Disability	46
Moderate Disability	30
Severe Disability	6
Complete Disability	4

Graph No. 3: Level of Neck Disability.

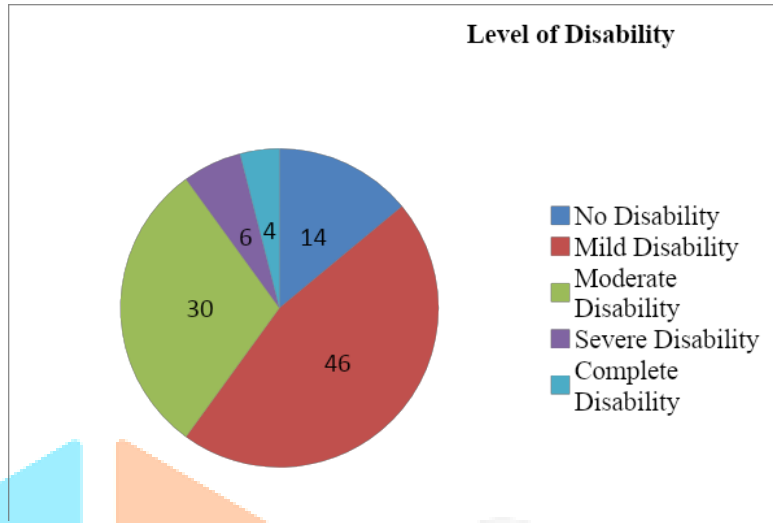


Table No. 4: Level of Smartphone Addiction

	Addicted	Not Addicted	Total	Addicted%	Not Addicted%
Male	13	8	21	61.90	38.10
Female	23	56	79	29.11	70.89
Total	36	64	100	36.00	64.00

Graph No. 4: Level of Smartphone Addiction.

Smartphone Addiction

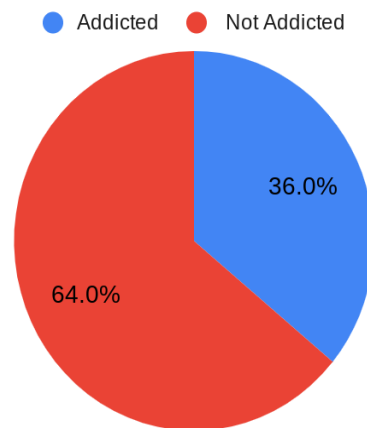
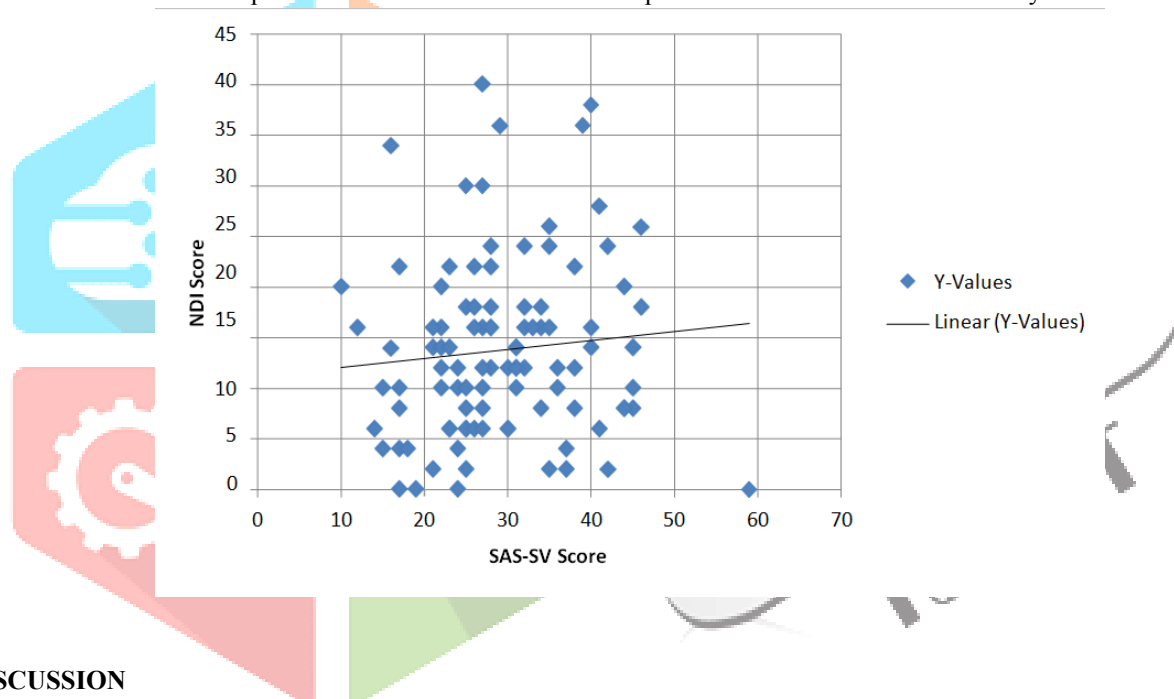


Table No. 5: Correlation between Smartphone Addiction and Neck Disability.

Scales	Mean $\pm$ SD
Smartphone Addiction Scale (SAS)	29.42 $\pm$ 9.22
Neck Disability Index (NDI)	13.80 $\pm$ 8.81
The coefficient of correlation $r = 0.09$	
The R square is 0.008	

Graph No. 5: Correlation between Smartphone Addiction and Neck Disability.



## V. DISCUSSION

The present study showed significant correlation between addiction to smartphone use and neck disability amongst healthy young adult subjects. These findings are in accordance with previous study which have shown a high level of computer use is related to musculoskeletal symptoms especially around the neck among young college students (Jenkins et al., 2007)<sup>(7)</sup>, and that smartphone addiction causes physical health related problems (Kwon et al., 2013).<sup>(7)</sup>

Young adults reported that more than 30% of the population woke with neck pain in the morning at least once a week. Among individuals with neck pain, 37.3% reported persistent neck pain and related disability, and 9.9% experienced an aggravation during follow-up year with their neck problems.<sup>(2)</sup> It is found that functioning in daily activity is the most affected aspect for heavy smartphone users.<sup>(8)</sup>

Heavy smartphone usage is associated with complaints like insomnia and unhealthy lifestyle.<sup>(10)</sup> A recent survey showed that about 70% of internet users, especially the young generation worldwide, use their smartphones more as a direct result of lockdown due to Covid-19 virus outbreak.<sup>(2)</sup>

In a study done in Korea by Choi, smartphone addiction had significant association with gender and daily average hours of smartphone use.<sup>(6)</sup> Hegazy et al. reported that excessive smartphone use is significantly associated with self-reported sleep disturbance, headache, fatigue, depression and musculoskeletal pain.<sup>(5)</sup>

A study by AlAbdulwahab et al. states that smartphone addiction can lead to a significant neck disability which is associated with poor posture while using a smartphone.<sup>(5)</sup> The neck disability among smartphone users might be affiliated with frequent neck flexion posture (Bababekova, Rosenfield, Hue & Huang, 2011; Janwantanakul, Sitthipornvorakul & Paksaichol, 2012), which

changes the natural curve and the amount of stress on the cervical spine (Hansraj, 2014), leading to irritation and spasm of the surrounding skeletal structures and ligaments (Fredriksson et al., 2002), and proprioception deficits in the cervical vertebra (Kim, Kang, Kim, Jang & Oh, 2013).<sup>(7)</sup>

Increased hours of smartphone use produces chronic neck pain by reducing cervical lordosis. When the head moves forward it causes an excessive anterior curve in the lower cervical vertebrae and an immoderate posterior curve in the upper thoracic vertebrae to compensate for balance and stresses on the spinal muscles. This posture causes the muscles of the upper back to continually overwork to counterbalance the pull of gravity on the forward head.<sup>(10)</sup>

The weight supported by the spine greatly increases in forward neck flexion at varying degrees.<sup>(10)</sup> Harrison et al in a study found that the compressive load on the cervical discs in forward flexion position was 10kg greater than that in the upright neck position.<sup>(2)</sup> These stresses can lead to changes in the cervical angle and the threshold of pain in the neck and upper extremity muscles.<sup>(10)</sup> While performing various smartphone tasks there occurs continuous muscle contraction in the neck and upper extremity which can lead to its microscopic damage.<sup>(5)</sup>

## VI. CONCLUSION

This study showed that there is a significant correlation between smartphone addiction and neck disability, which concludes that smartphone addiction is associated with neck disability in young smartphone users in Covid 19 pandemic. There is a need for awareness regarding the excessive usage of smartphone and related musculoskeletal problems which arise due to improper posture, also proper posture and limited duration while using smartphone should be emphasized to control neck pain and disability.

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