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"ANALYSIS OF RISK FACTORS OF TEXT NECK SYNDROME AMONG UNDERGRADUATE PHYSIOTHERAPY STUDENTS – AN EXPLORATORY STUDY"

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ABSTRACT

Background & Purpose: The pain while using smart phone in college/university going students is an area of increasing concern worldwide. The objective of this study was to analyze the risk factors of text neck syndrome among the undergraduate physiotherapystudents of SPB physiotherapy college, Surat.
Method: A Descriptive cross-sectional study was conducted on 289 students of SPB physiotherapy college, Surat, Gujarat, India among undergraduate physiotherapy students. A self-administered questionnaire (using Google form) was distributed among participants to collect the data. Data was entered and analysed by using Microsoft Excel. The descriptive statistics including the frequency, duration and purpose of mobile phone use, severity of pain and demographic characteristics of the participant was collected.
Result: The mean age of students was 20.51±1.18 years. 142 (42.9%) undergraduate physiotherapy students admitted of having text neck pain that is pain due to smart phone use out of 289 participants. Only 15.2% students use phone properly i.e. at an eye level. 1.5%, 12.5%, 87.5% and 41.2% participants admitted of having affected sleep, weight gain, affected physical activity and withdrawal difficulty respectively due to same.
Conclusion: The result of present study concludes that near the half of the undergraduate physiotherapy students are suffering from text neck pain that is pain due tosmart phone use. The factors which are responsible for development of text neck syndrome are faulty adopted position, inappropriate holding level of phone, increased duration and frequency of smart phone use. Due to prolong smart phone participants admitted of having affected sleep, weight gain, affected physical activity and withdrawal difficulty.
Key words: Risk factors, text neck syndrome, physiotherapy, Undergraduate students

INTRODUCTION

Electronic gadgets are indispensable part of our life which has reached every doorstep across the globe. Gadgets consist of online simplified applications that make work easy which helps in better social connectivity. We have grown so used to it that it becomes really tough for us to think of daily life chores in the absence of devices. No onearound the world is untouched by the technologies, even in rural areas one can see a far below middle-class person having smart phone and all other types of luxury goods. (1)

Of the 6 billion people in the world, over 4 billion have mobile phones. Texting has become the dominant form of communication. As per statistical information 25% of the populations in India are using phones. Almost

half of mobile users are younger than 25years, 40% of smart phone users from 18 to 25 years of age group. [1] According to recent Times of India survey, 82 million Indian Adults were smart phone users in 2014. Smartphone users in India usually spend an average of 3 hours a day on their smartphone while heavy smart phone users spend 8-10 hours in a day. [2]

A smart phone is the most popular devices used among adolescents. [3] It is a gadget among the adolescent population nowadays for sharing information, using the internet, watching videos, using social media, gaming, and many other daily activities. [4] We all are taking a lot of interest in these goods as it is used for social, entertainment, booking cab, track destination and various purposes. Sole reasons being addicted is consumerism, and betterment of life with these goods. [1]

Some people especially young people spent averages of 5 and 7 hours per day with their heads are in a wrong position while they are reading or texting or even playing on their smart devices which are most major risk factors for developing this syndrome. [5]Excessive usage of smart phones will cause various health issues in the body. The very well-known health issues are Radiation hazard, Typing hazard, and vision hazard. [1] Those who were constantly engaged to their phones may suffer from worry, stress, panic disorders, and various other psychological illnesses. Apart from these psychologicaldisorders, individuals may suffer from many physical disorders and text neck syndromeis one of the major problems among them. [6] Few studies have been reported about this substantial increase in the number of adolescent smart phone users, having various behavioural effects and its association with musculoskeletal discomfort, in recent years, which is becoming a growing problem and having a large impact globally. [3]

The term "TEXT NECK'' was first coined by United states chiropractor Dr Dean L. Fishman. [7] This term is used to describe neck discomfort and injury of upper back muscle which is caused by the frequent flexion of neck at various angles, while staring down at a mobile phone which alters the normal curve of the cervical spine. [6] Text neck syndrome has become a topic of concern and has potentially affected large number people of all ages who use smart phone all over the world. [3]

The text neck syndrome should be considered as "Pain of the Modern Era" sinceit is caused by modern-era gadgets such as cell phones, computers, and other smart devices, and it causes acute to chronic pain in the neck and upper back area. [6] The term 'Text Neck or another phrase turtle neck posture can be described as repeated stress injury and pain in the neck resulting from excessive texting or watching on hand held devices over a sustained period of time. [8] This condition is a growing health concernand has the potential to affect millions of people all over the world. [3,9] Most smart phonetasks users require to stare sharply downwards or to hold their arms out in front of themto read the screen which makes their head move forward and cause an excessive anterior curve in the lower cervical vertebrae and an excessive posterior curve in the upper thoracic vertebrae to maintain balance, placing stresses on the cervical spine and the neckmuscles. [3] Forward head posture is one of the most commonly recognized poor posture in sagittal plane. [10]

While using smart phones the force on the neck is directly proportional to the angle of neck flexion or tilting of neck. When the head tilts forward at 15 degrees, it is sufficient to produce 27 pounds; at 30 degree it produces 40 pounds of force; at 45degrees it produces 49 pounds of force; at 60 degrees it produces 60 pounds of force. [11] The poor posture of the head and neck has been correlated with chronic musculoskeletal pain of the cervical spine and upper back tightness, and spasm in the upper extremity muscles. [4,12] The end result is neck pain, upper back pain, shoulder pain, chronicheadaches, and increased curvature of spine and hand discomforts. Prolonged flexion of the neck when bent over these devices results in forward head posture. [8,13]

Poor posture leads to fatigue, which will have a negative effect like reduced physiological function, disruption of automatic nervous system and leads to creation of problem in daily life.[11] Musculoskeletal disorder in relation to smart phone use includes fatigue of muscles and increased loading of neck muscles. As a result, pain, stiffness, insensitivity to pain in neck and shoulder may appear. [14] The most common posture adapted to use mobile phones is head down position. It's easily found in people travellingin buses, trains, malls and every other place as most of them are hunched on smart phone.Poor posture can have detrimental effects on the physical body- head, neck, shoulder, affects mood, self-concept and how others perceive you. [1]

If text neck syndrome is not treated or corrected in time it can lead to permanent damage and can result into overuse syndrome. [8,15] It may also lead to some serious damage, such as flattening of the spinal curve, onset of early arthritis, spinal misalignment, spinal degeneration, disc compression, disc herniation, loss of lung volume capacity, gastrointestinal problems, headache, excessive posterior curve in the upper thoracic vertebrae to maintain balance, placing stresses on the cervical spine and neck muscles. [8,16] It may also result in nerve damage, muscle damage, stiff neck, sharp pain, radiating pain, general soreness, weakness and numbness. [8]

The holding level and the position adopted by the smart phone users can affectthe intensity of pain among them. Prolong use of the smart phone can affect the virtual life orientation and adaptive functions of daily life. Precautions from developing sicknessmust be taken. Proper handling of smart phone, simple postural

correction exercise, neck stabilization exercise, and soft tissue massage can help to decrease the development of cervical and upper extremity musculoskeletal disorder. [11] Global awareness needs to be spread among public and medical community. [17] Some of the techniques done to get relief from text neck are mentioned below: Warm up your 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. [11,18]

Due to prolonged flexion of the neck while using smart phones, the static muscular load increases. There is no support to the arms. [19] There is repeated movement of the fingers. This occurs more pronounced when the gadget is held with single hand only. [20] It has been suggested that sitting position with the arms supported is the best position for using the mobile phones with straight neck and using both the hands andboth the thumbs. But it is also advised that the mobile phone even in this best position should not be used for long periods. Bad position has been found to be associated with the text neck syndrome. [21] The important factors associated with text neck syndrome are more use of mobile phones, using the mobile phone when not required, position and neckflexion degree and the position of the body. [22] The excessive usage of smart phones reported to have a negative influence on our anxiety and stress levels. Lack of proper sleep may lead to fatigue, tiredness and shortfall of energy during morning hours. [2,23]

Presently there is lack of knowledge about the risk factors which are responsible for development of text neck syndrome in young students. Thus, the purpose of this study was to analyze the risk factors of text neck syndrome among undergraduate physiotherapy students.

AIMS AND OBJECTIVES

- To analyse risk factors of text neck syndrome among undergraduatePhysiotherapy students.
- To know the prevalence of text neck syndrome undergraduate Physiotherapystudents.

MATERIALS & METHODOLOGY

1. **STUDY DESIGN:** Cross sectional study (exploratory study)
2. **STUDY POPULATION:** Undergraduate physiotherapy students of SPBPhysiotherapy College.
3. **SAMPLING TECHNIQUE:** Convenient Sampling
4. **STUDY DURATION:** 6 months
5. **SAMPLE SIZE:** 289 students
6. **STUDY SETTING:** SPB Physiotherapy College.
7. **INCLUSION CRITERIA:**

- Undergraduate students of SPB Physiotherapy College, Surat.
- Willing to participate voluntarily by signing e consent.

8. **EXCLUSION CRITERIA:**

- Students, who have been diagnosed and are undergoing treatment by anorthopaedic or physiotherapist for Neck pain.
- Students, who had injury/ surgery of Neck in past 6 months.
- Students who suffer from any neurological, psychological orcardiovascular diseases
- Students, not willing to participate.

9. **OUTCOME MEASURE:**

Self -administered questionnaire was prepared with the help of Google forms tocollect the data regarding risk factors of text neck syndrome among undergraduate physiotherapy students. It is designed to judge the four main risk factors namely frequency and duration of mobile phone use, position adopted by user, level of holding phone. To collect data regarding pain due to smart phone use, questions related to area of pain, common time of pain and severity of pain were included in questionnaire.

10. **PROCEDURE**

Undergraduate physiotherapy students of either gender was requested to participate in the study by signing the digital informed consent. They are then asked to fill all the sections of Google form which included five sections. First section was consent form, second section was demographic data which included age, gender, year of study dominant side, third section was personal factors in which they were asked to fill information regarding their dominant side, frequency and duration of mobile phone use, their purpose of use, position adopted and at which

level they hold phone while using it. Forth section was about their affected quality of life due to the same which includes sleep and physical activity affection, withdrawal difficulty and weight gain. Fifth section was about pain characteristics in which their area of pain, time and severity of pain due to the same was asked to fill. Most of the questions in the form were marked as mandatory to be filled by participant.

STATISTICAL ANALYSIS

The participants (n=289), undergraduate Physiotherapy students of SPB Physiotherapy College, Surat completed the self-reported measures. Statistical analysis was conducted using Microsoft Excel. Descriptive statistics and measures of central tendencies for demographic data were evaluated. Pie charts were used to show theprevalence, frequency and relationships among variables.

RESULT

DEMOGRAPHICS AND DESCRIPTIVE DATA

A total number of 289 undergraduate physiotherapy students participated in this study. Mean age of participants was 20.51 years. Around 252 (87.2%) students were female and 37 (12.8%) were male. Out of 289 participants, 36(12.5%), 47(16.3%),82(28.4%), 86(29.8%), 38(13.1%) were students of first year, second year, third year, final year and interns respectively. (Table-1).

Table -1: Characteristics of undergraduate physiotherapy students (n=289)

SR.	ARIABLE		N	%
1	AGE		20.51(SD=1.18)	
2	ENDER	Male	37	12.8
		Female	252	87.2
3	YEAR OF STUDY PT)	First year	36	12.5
		Second year	47	16.3
		Third year	82	28.4
		Final year	86	29.8
		Intern	38	13.1

PERSONAL FACTORS

Self-administered questionnaire was used to collect personal factors related to smart phone among undergraduate physiotherapy students. Among 289 participants, 272 (94.1%) have right while 17 (5.9%) have left as their dominant side.

Among 289 participants, majority of them that is 251 (86.2%) are using mobile phone 7 days/week whereas 9 (3.1%), 9 (3.1%), 8(2.7%), 2(0.69%), 5(1.7%), 5(1.7%) students are using smart phone 6 days, 5 days, 4 days, 3 days, 2days, 1day per week respectively.

Maximum number of participants that is 162 (56.1%) are utilizing 3-4 hours per day on smart phone for various purpose. While 43 (14.9%) and 63 (21.8%) participants are spending 1-2 hours and 5-6 hours per day respectively for the same. However, remaining21 students from the total participants are using smart phone more than 7 hours per day. From the data interpretation it is found that 200 (69.2%), 190 (65.7%), 143 (49.5%), 71 (24.6%), 113 (39.1%) students are spending their time on smart phone for studying,chatting, working, gaming and other purpose respectively.

QUALITY OF LIFE

Self-administered questionnaire was used to collect data regarding quality-of-life affection due to smart phone use among undergraduate physiotherapy students. Among 289 participants, 120 (41.5%) students agreed

that their sleep is affected due to smart phone use while 169 (58.5%) students disagreed for the same.

36 (12.5%) students agreed that they have gained weight while, 253 (87.5%) students disagreed for the same due to mobile phone usage. Whereas physical activity is affected and unaffected in 141(48.8%) and 148 (51.2%) students respectively. In 289 subjects 119 (41.2%) have difficulty in withdrawal of smart phone use while remaining 170 (58.8%) did not find difficulty for the same.

CHARACTERISTICS OF PAIN AMONG UNDERGRADUATE PHYSIOTHERPY STUDENTS

To collect the data regarding characteristics of pain due to smart phone useamong undergraduate physiotherapy students, self-administered questionnaire was used. Among 289 subjects, 124 (42.9%) students agreed that they have pain due to smart phone use and remaining 165 (57.1%) students do not have pain.

134 (67.7%), 61(30.8%), 27 (13.6%), 49 (24.7%), 55 (27.8%) participants have pain in neck, shoulder, arms, upper back and headache respectively. Out of total participants 5 (1.7%) students always have neck pain, while 202 (69.9%) sometimes, 82 (28.4%) never have neck pain due mobile phone use. However, 6 (2.1%) always, 136 (47.4%) sometimes,146 (50.5%) never felt neck stiffness due to smartphone use.1(0.4%), 79 (27.3%), 209 (72.3%) participants always, sometimes and never felt radiating pain due to smartphone use. 3 (1.1%), 80 (28%), 205 (70.9%) students always, sometimes and never felt numbness and weakness after smartphone use respectively.

Majority of participants have night pain from smartphone use that is 235 (81.2%) and 54 (18.8%) have morning pain due to same. 154 (53.2%), 57 (19.8%), 3 (1%) students have rated their pain severity as mild, moderate and severe respectively.

Table-2: Shows the personal factors related to smart phone use among undergraduate physiotherapy students.

R.	VARIABLE		N	%
1	OMINANT SIDE	Right	272	94.1
		Left	17	5.9
2	REQUENCY OF SE(DAYS/WEEK)	7 days	251	86.2
		6 days	9	3.1
		5days	9	3.1
		4 days	8	2.7
		3 days	2	0.69
		2 days	5	1.7
		1 days	5	1.7
3	URATION OF SE(HR/DAY)	1-2 hr	43	14.9
		3-4hr	162	56.1
		5-6hr	63	21.8
		7-8hr	11	3.8
		>8 hr	10	3.7
4	URPOSE	Working	143	49.5
		Chatting	190	65.7
		Studying	200	69.2
		Gaming	71	24.6
		Other	113	39.1
5	OSITION ADOPTED	Standing only	0	0
		Sitting only	49	17
		Lying only	22	7.6
		Mixed	218	75.4
	OLDING LEVEL	Eye level	44	15.2
		Abdominal level	94	32.5
		Chest level	151	52.2

Table 3: Agreed that their life is affected by smart phone use

R	VARABLE		N	%
1	LEEP AFFECTION	ES	120	41.5
		O	169	58.5
2.	EIGHT GAIN	ES	36	12.5
		O	253	87.5
3.	TED PHYSICALACTIVITY	ES	141	48.8
		O	148	51.2
4.	THDRAWALDIFFICULTY	ES	119	41.2
		O	170	58.8

Table – 4 Characteristics of pain among undergraduate physiotherapy students.

R	VARIABLE		N	%
1.	RESENCE OF PAIN	YES	124	42.9
		NO	165	57.1
2.	AIN REGION	NECK	134	67.7
		SHOULDER	61	30.8
		ARMS	27	13.6
		UPPER BCK	49	24.7
		HEADACHE	55	27.8
3	ECK PAIN	ALWAYS	5	1.7
		SOMETIMES	202	69.9
		NEVER	82	28.4
4.	ECK STIFFNESS	ALWAYS	6	2.1
		SOMETIMES	136	47.4
		NEVER	146	50.5
5	ADIATING PAIN	ALWAYS	1	0.4
		SOMETIMES	79	27.3
		NEVER	209	72.3
6	AEKNESS &NUMBNESS	ALWAYS	3	1.1
		SOMETIMES	80	28
		NEVER	205	70.9
7	TIME	MORNING	54	18.8
		NIGHT	235	81.2
8	EVERITY OF PAIN	ENT(0)	75	26
		ILD(1-3)	154	53.2
		ERATE(4-7)	57	19.8
		VER(8-10)	3	1

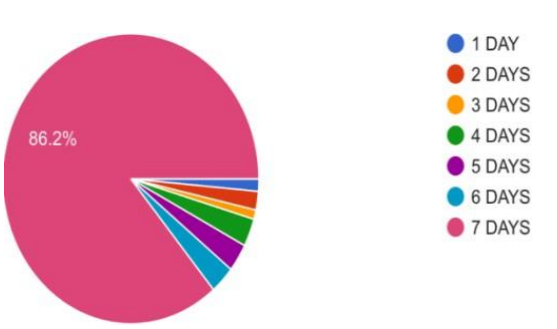

Figure 1: Frequency (Days/week)

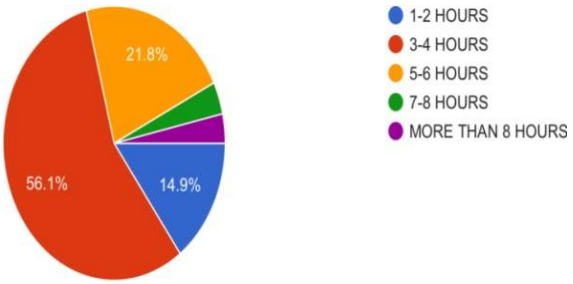

Figure 2: Duration (Hours/day)

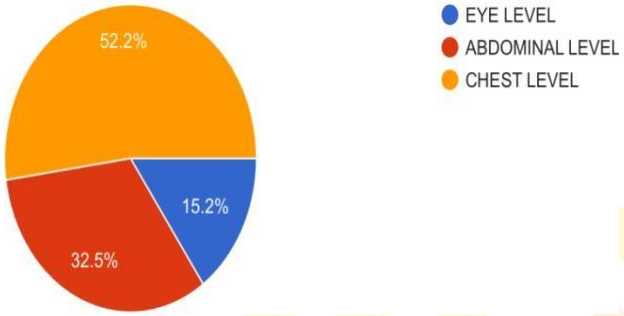

Figure 3: Level of use

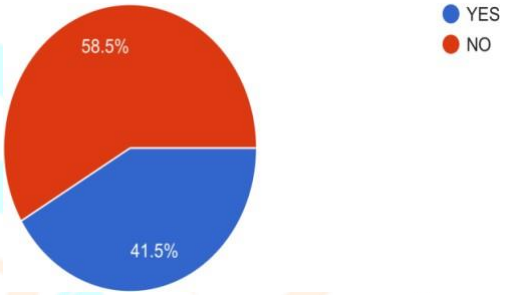

Figure 4: Sleep affection

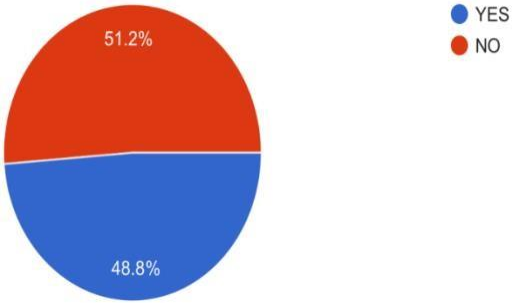

Figure 5: Affected physical activity

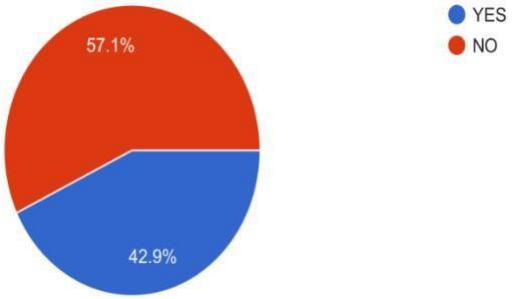

Figure 6: Presence of pain

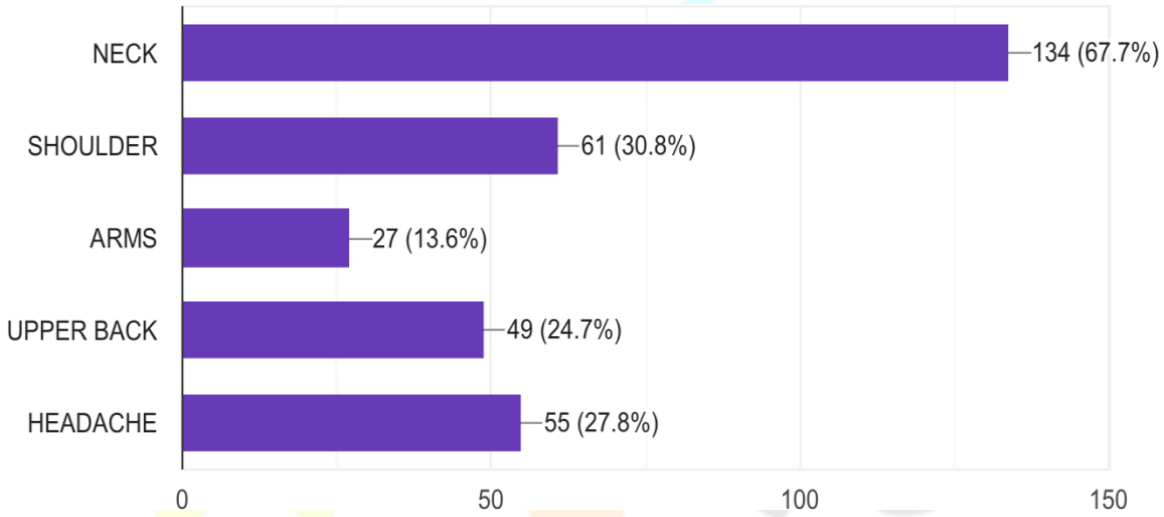

Figure 7: Area of pain

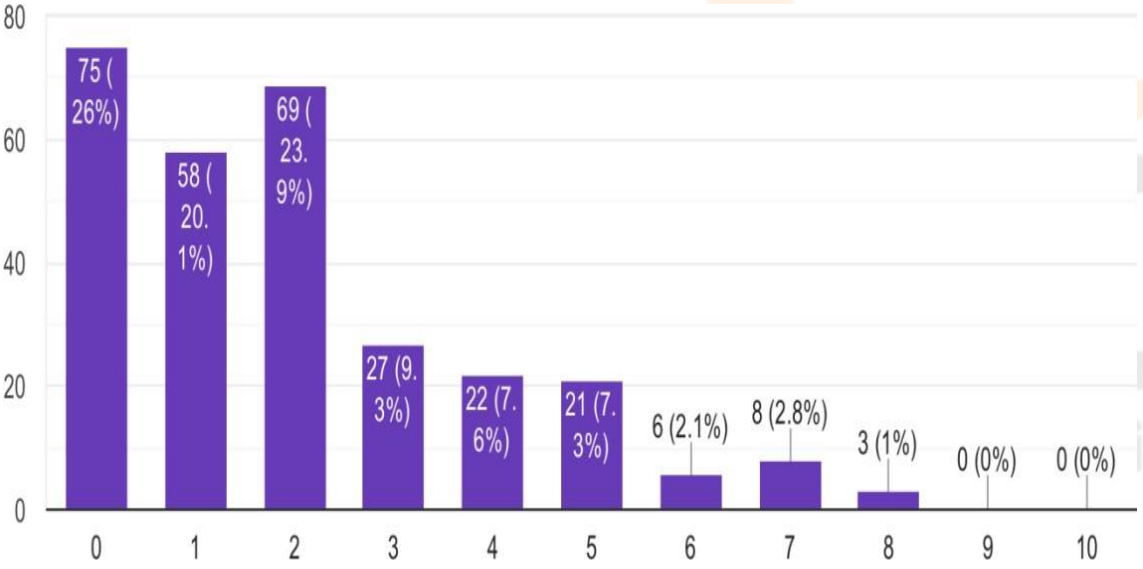

Figure 8: Severity of pain (Visual analogue scale)

DISCUSSION

In this study we tried to find the different risk factors in undergraduate physiotherapy students who use smart phones for their educational and personal use. In this study among 289 participants 87.2% were females and 12.8% were males. Their duration, frequency of use and purpose of using mobile phone in daily life was studied. We have also reviewed position adopted and holding level of smart phone amongrespondents.

2/3rd of users surveyed are suffering from neck pain sometimes. 28.4% never suffered while less than 2% suffer always.50% of users never suffered from neck stiffness. About 47% of participants complained of stiffness sometimes. Majority of usersnever experienced radiating pain that is 72%. 4/5th of respondent are suffering from pain during night time while pain in the morning was experienced by remaining 1/5th of participants.

About half of the participants have rated their pain due to smart phone use as mildin the VAS while 20% has moderate pain. The smallest minority experienced severe pain. Whereas 1/4thof them do not have pain.

In this study, nearly 60% admitted that they have difficulty in mobile phone withdrawal. Around 45% of participants have sleep and physical activity affection due to over use of smart phone. In spite of using smart phone for a longer period of time almost 90% of participants denied of gaining weight.

The neck disability among smart phone users might be related to frequent neck flexion posture, which changes the natural curve of the cervical spine and increases the amount of stress on the cervical spine, leading to irritation and spasm in the surrounding skeletal structures and ligaments. Excessive use of smart phones can lead to habitual repetitive and continuous movements of the head and neck toward the screen throughout the day. Such movements are associated with a high risk of chronic neck pain. (3)

Texting on the smart phone is an activity, which requires looking into mobile screens in a flexed position of the neck with a forward head posture and with a rounding of shoulder and movement of the thumb and arms in a continuous pattern. When a personmaintains this position for extended period of time, then head is pushed forward. This imbalance is counterbalanced by constant contraction of musculature of neck giving rise to text neck syndrome with symptoms such as neck pain, shoulder pain, upper back pain, forward head posture, and muscle spasm. (11) In this study undergraduate physiotherapy students were included since mobile phone usage were increased between college going students.

Aside from psychological effects, excessive usage of the smart phone also had a lot of negative effect on our physical health. Several studies had shown harmful effect of smart phone to our physical health.(6)Awareness about exercise and break-way during prolong use or use with stress was also noted. Smart phones have replaced the laptops and tablets in our daily life. They used them frequently for different communication and reading purpose. The contagious forward bending poses risk for early arthritis and change in the neck alignment and may result into permanent damage. (15)

Al-Hadidi F et al found that severity of the pain in the neck is directly and significantly associated with age and duration of use of gadgets. Duration of pain was found to be associated with duration of use of gadgets. The authors divided the participants based on the pain score in two groups. 5.8% Subjects in severe pain category went for medical help in emergency department. 44.6% subjects in severe pain category used analgesics compared to only 12.1% in the other category. (28)

Visnjic A et al noted that anxiety was more in younger age group and those who were more involved in sending the SMS and those who used the internet more and more. The odds of stress were 1.28 in those who spent more time on mobile phones. The oddsof high stress levels were 1.48 among those who kept mobile phone very near to theirbody while sleeping. (29)

Xie Y et al carried out a systematic review on "prevalence and risk factors for musculoskeletal complaints associated with mobile handled device use". They found that the prevalence ranged from 1-67.8%. The prevalence of the pain in the neck ranged from 17.3% to 67.8%. They also noted that musculoskeletal complaints were related with number of calls made, degree of flexion of the neck, more use of texting and more tendency of gaming etc. but duration of use was not found to be associated with. (30)

It was single centre study, Male participants were less, Result is drawn on the basis of the only those who have submitted the responses were some limitations of the study. Future studies be carried out at multiple centres, targeting different under and post graduate students, Study can be done with equal ratio of male and female.

CONCLUSION

The result of present study concludes that near the half of the undergraduate physiotherapy students are suffering from text neck pain that is pain due to smart phone use. The factors which are responsible for development of text neck syndrome are faulty adopted position, inappropriate holding level of phone, increased duration and frequency of smart phone use. Due to prolong smart phone participants admitted of having affected sleep, weight gain, affected physical activity and withdrawal difficulty. Consequently, itis proposed that this physiotherapy institute could take appropriate steps for prevention text neck syndrome and its risk factors.

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