IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ASSESSMENT OF HAND AND WRIST DISCOMFORT IN PHARMACY STUDENTS USING CORNELL HAND DISCOMFORT QUESTIONNAIRE

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Abstract: Nowadays mobile smartphones are used everyday by almost everyone making it the basic needed commodity. Covid 19 pandemic caused increased usage of mobile smartphone in everyday life. Hand and wrist discomfort and pain is observed in many students due to overuse of mobile smartphones as seen in the recent studies. This study was undertaken to assess the hand and wrist discomfort in pharmacy students. Survey based study was conducted to assess the dimensions and features of smartphones. Usage of smartphones at a stretch as well as in everyday life along with hand dominance while using smartphones in specific domains like scrolling, taking selfies, educational purposes, etc. was analysed.. Purposive sampling was done and descriptive statistics is used to analyze the data. It was observed that 36.5% students were having hand and wrist discomfort hence the ergonomic advices like taking frequent breaks, stretching, mobility and strengthening of hand and wrist musculature was suggested to be inculcated.

Index Terms - **Smartphones, Overuse, hand and wrist discomfort, Pharmacy Students**

INTRODUCTION

The evolution of mobile phones in the last two decades has changed the lifestyle of people a lot [1, 2]. Now mobile phones are part of our everyday living; people who are using mobile phones are at risk of repeated stress injury due to strain on soft tissues [4]. Use of the smartphones into the workplaces have created new opportunities as well as challenges for occupational health and safety [5, 6].The persistent downfall in the price of the smartphones explains that the use of this devices will increase[8,10,14].

Smartphone functions are giving access to the students as well as the doctors to have better decision making at the point of care; but it is seen that excessive use of smartphones results in pain in thumb, wrist, neck and is also associated with sleep and anxiety disorders [1]. The problems related to Extensor Pollicis Longus is observed in smartphone users due to messaging; showing symptoms like pain while abduction of thumb, decreased grip strength [3, 4, 5]. In the recent studies of university students it is observed that the students who are using the smartphones more than 3.5 hours daily for texting, emailing, scrolling, scheduling have more pain at the base of the thumb as it causes individual to seize more repetition of flexion/extension of wrists leading to carpal tunnel syndrome as it is narrowing of carpal tunnel and rise in pressure in the tunnel.[9,13,15]

India has now second largest wireless network in the world overhauling the USA and second to China with addition of 8 million subscribers every month[15].Recent studies shows there is relationship between high keystrokes and first carpometacarpal osteoarthritis and de quervain tenosynovitis[14]. Increased biomechanical risk, particularly for the neck, wrist and thumb was caused by inappropriate posture, continuous and irregular muscle tension and/or repetitive movements [1, 3, 5, 6]. The addiction of mobile phones is increased due to cheap internet packages and gaming [7, 8, 9]. Research addressing distinct risk for smartphones and tablets used in various environment are scanty [5, 6].

Therefore, this study is to assess the hand discomfort caused by excessive use of mobile smartphones.

NEED FOR STUDY

This study was undertaken to discuss and locate the painful areas of hand due to overuse of mobile smartphones in undergraduate students using Cornell Hand Discomfort Questionnaire.

Almost every undergraduate student have their own mobile smartphone which is used for messaging, scrolling, studying, etc. and hence the number of hours spent on mobile smartphones usage varies with individuals. Therefore the pain will also vary according to the number of hours the smartphone is used.

The study will help to assess the pain in the various parts of hand in undergraduate students and the risk factor for the same.

REVIEW OF LITERATURE

- A " In vivo measurement of thumb joint reaction forces during smartphone manipulation : A biomechanical analysis" (November 2019) by Wanlim Kim , Yusung Kim, Hyung –Soon Park reported that mechanical concentration and increased joint reaction forces at the carpometacarpal joint may lead to osteoarthritis and muscle tendon overuse may lead to repeated stress injuries such as De Quervain disease. Traditionally the primary functional role of the thumb is to stabilize the hand while other digits perform dextrous activities or grasp objects. Interestingly, the role of thumb during smartphone use has changed as people use their thumbs to touch or manipulate the screen while other digits stabilizes the device.

- A study "The association between smart phone addiction and thumb/wrist pain" by Ayman Baabdullah, Diyaa Bhokhary , Yousuf Kabli , Omar Saggaf , Motaz Daiwali , Amre Hamdi (10 January 2020) concluded that students who are heavy users of smartphones have mild pain and stiffness in thumb/wrist while some students have positive Finkelstein test.

- A study "Tenosynovitis caused by Texting: An emerging disease" by John Ashurst, Domenic Turco, Brian Liab (December 3, 2009) reported that bilateral de Quervain tenosynovitis was caused by excessive text messaging by the patients on their mobile phones.

- A study "Extensor Pollicis Longus injury in addition to De quervain's with text messaging on mobile phones" by Charu Eapen, Bhaskaranand Kumar, Anil Bhat, Anand Venugopal (November 2014) resulted that tenderness was found in extensor compartment of wrist , resisted movements were also painful , Tip as well as Pinch grip were significantly reduced in the people who are using the smartphones.

- A study " Frequency of De Quervain's tenosynovitis and its association with SMS texting" by Maryam Ali , Muhammad Asim , Syed Hasan Danish, Farah Ahmad, Afsheen Iqbal (year 2014) noted that as frequency of mobile phone usage increased progressively more people showed positive Finkelstein test. Almost half of the students use their mobile phones for texting more than 50 SMS per day and because of their mobile key pads and high speed of texting they experienced pain and weakness over the base of thumb/wrist which shows the De Quervain's positive in that students and there is positive association between the thumb pain and frequent text messaging.

- A study "Musculoskeletal disorders of the upper extremities due to extensive usage of hand held devices" by Deepak Sharan, Mathankumar Mohandoss, Rameshkumar Ranganathan, Jeena Jose (year 2014) stated that the posture of thumb working near extreme range of motion was perhaps the main triggering factor for the development of tendinosis of extensor of pollicis longus.

AIM

To assess the discomfort in the hand of smartphone users of Pharmacy Department undergraduate students of Tilak Maharashtra Vidyapeeth, Kharghar Campus using Cornell Hand Discomfort Questionnaire.

OBJECTIVES

1. To identify the students having hand discomfort due to overuse of smartphone mobiles.
2. To localize the location of discomfort in undergraduate students.
3. To identify the duration of discomfort in the hand in undergraduate students.

METHODOLOGY

Study Design : Cross Sectional Survey
Sampling Method : Purposive Sampling Technique
Sample Size : 200 Undergraduate Pharmacy students
Study Setup : Tilak Maharashtra Vidyapeeth's Kharghar Campus
Inclusion Criteria : 1.People using smartphones for at least 1 hour at a stretch in a day.
2.Undergraduate Pharmacy students.
3.Age group between 18 to 25 years.
4.Males as well as Females.

Exclusion Criteria : 1. Age more than 25 years.
2. People not using smartphones.
3. Recent diagnosed wrist and hand injuries; Cervical Radiculopathy , Upper limb fractures , Tennis elbow , Brachial plexus injuries , etc.

Materials : Consent Form, Information Sheet, Data Collection Sheet, Self made Questionnaire

Outcome Measures : Cornell Hand Discomfort Questionnaire: Validity- 0.71
Reliability – 0.69

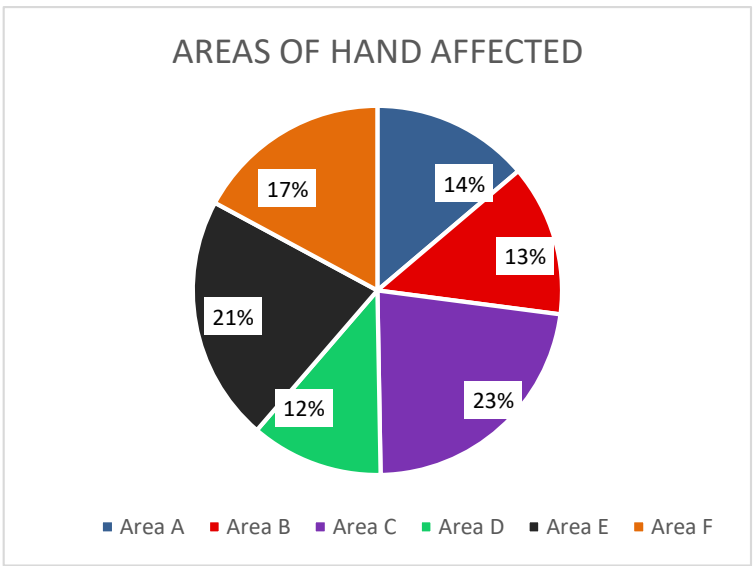
PROCEDURE

- Approval will be taken from the ethical committee of TMV'S Lokmanya Tilak Medical College of Physiotherapy, Kharghar, Navi Mumbai
- The study include 200 undergraduate Pharmacy students of age group between 18 to 25 years both males as well as females of Tilak Maharashtra Vidyapeeth, Kharghar, Navi Mumbai.
- Explanation of the study to the undergraduate students will be done.
- Demographic data of the participants will be taken. However confidentiality will be maintained.
- Information sheet and consent form will be given to the students.
- All the students then will be given the validated self made questionnaire along with Cornell Hand Discomfort Questionnaire and they have to answer the questions which are asked in the questionnaire.
- Data will be collected by the investigator and statistical analysis will be done.

DATA ANALYSIS AND RESULT

Descriptive statistics was used to summarize the data collected in simple numerical form using MS Excel.
The data collected was statistically analyzed and presented in the form of pie charts and bar diagrams.
Total of 200 responses were collected from pharmacy students of 1st year, 2nd year, 3rd year.

Figure 1



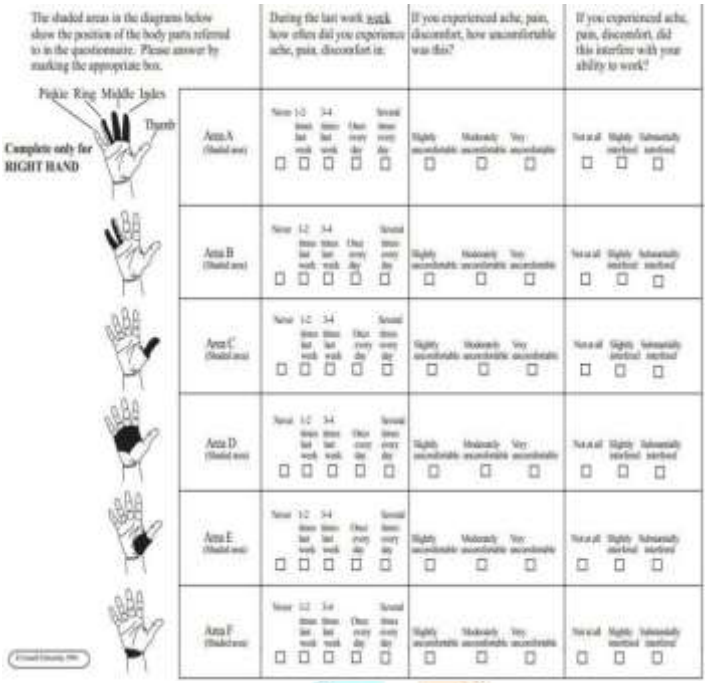


Chart 1 Illustrates the areas of hand affected of all pharmacy students at Tilak Maharashtra Vidyapeeth's Lokmanya Institute of Pharmacy Students due to mobile overuse showing more affection of area C(23%) and area E(21%)

Figure 2

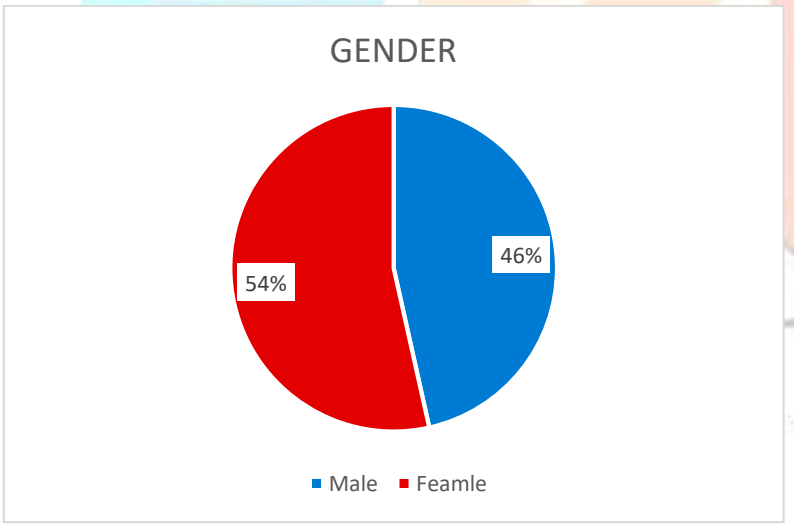


Chart 2 Illustrates Male students were less participated than Female students

Figure 3

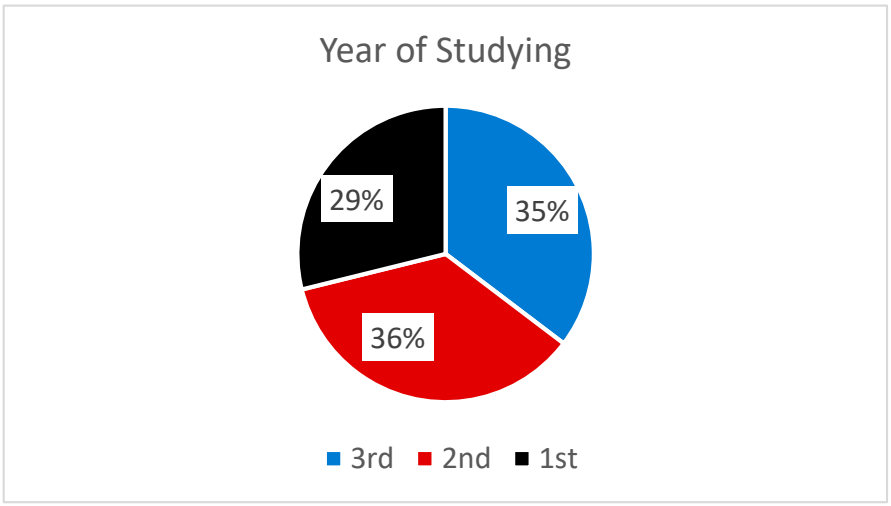


Chart 3 Illustrates Academic year of students, all the pharmacy students at Tilak Maharashtra Vidyapeeth's Lokmanya Institute of Pharmacy have participated in the study.

Figure 4

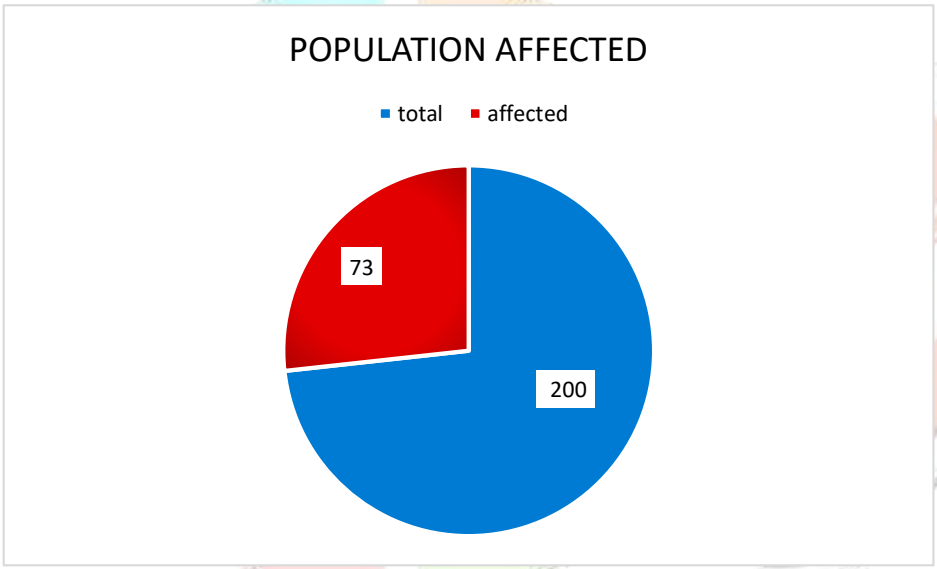


Chart 4 Illustrates that 73 out of total 200 students have hand and wrist discomfort.

Figure 5

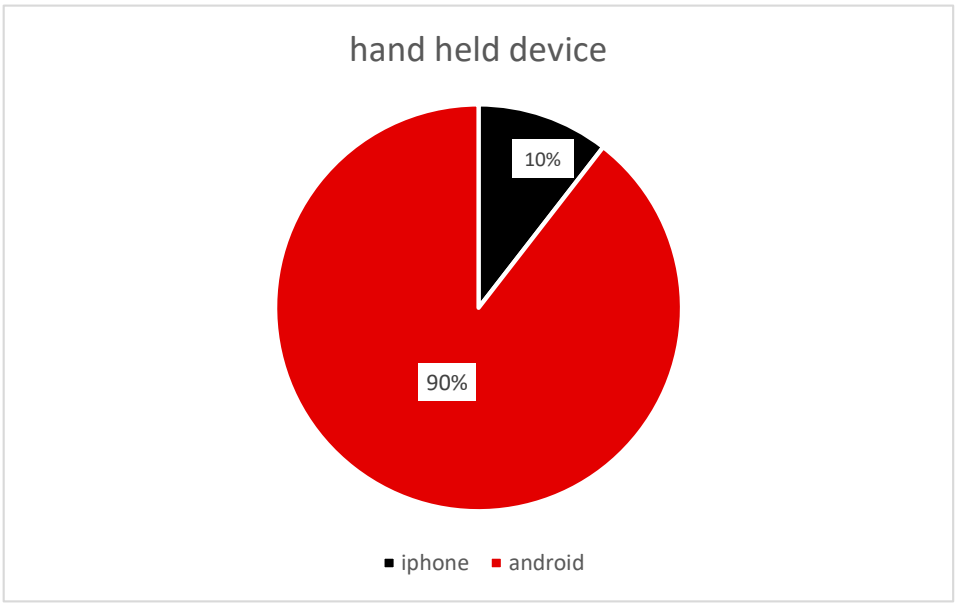


Chart 5 shows that 90% of the total students are using Android phone over I phone.

Figure 6

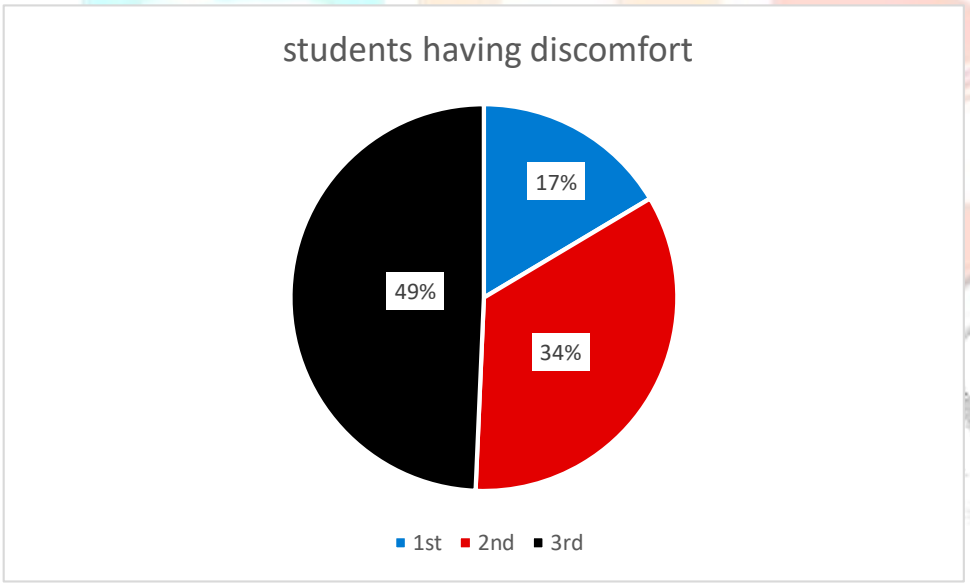


Chart 6 Illustrates the percentage of every year who are having discomfort i.e 17% affected students in first year, 34% in second year, 49% in third year.

Figure 7

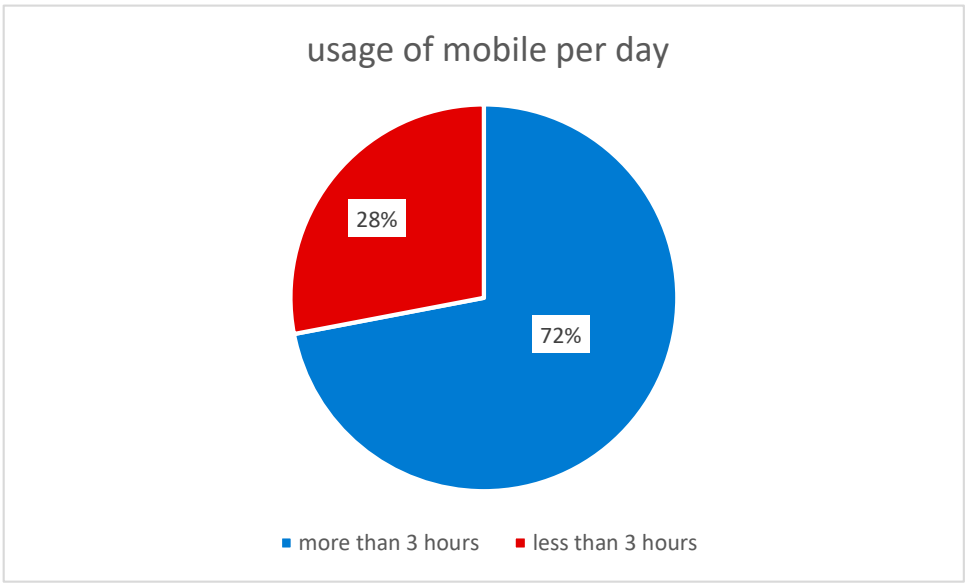


Chart 7 Illustrates 72% of the students are using smartphones for more than 3 hours.

Figure 8

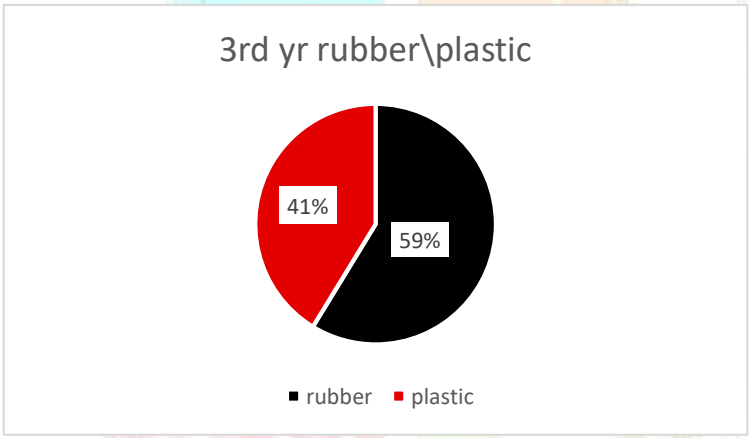


Chart 8 Illustrates that there are 59% students of third year who are using rubber cover more than plastic cover.

Figure 9

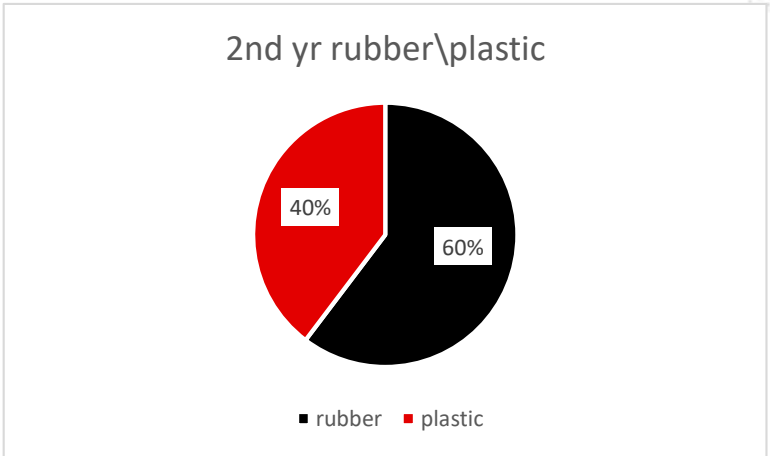


Chart 9 Illustrates that there 60% students of second year who are using rubber cover instead of plastic cover.

Figure 10

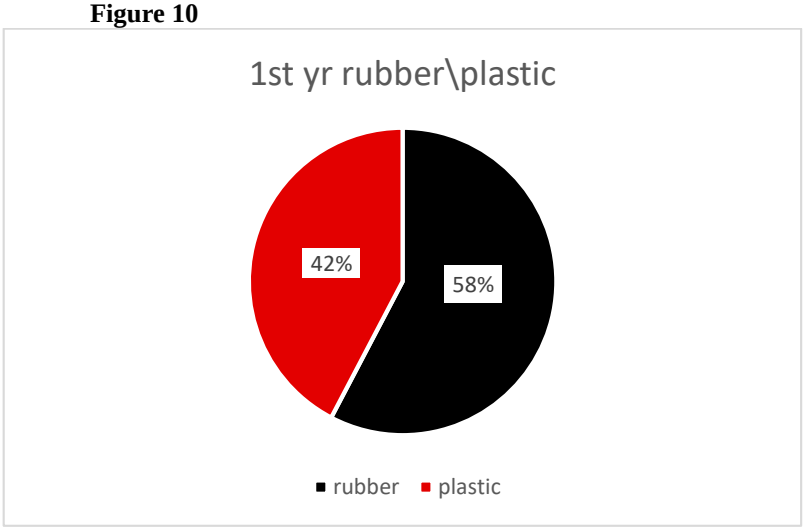


Chart 10 Illustrates that there are 58% students of first year who are using rubber cover instead of plastic cover.

Figure 11

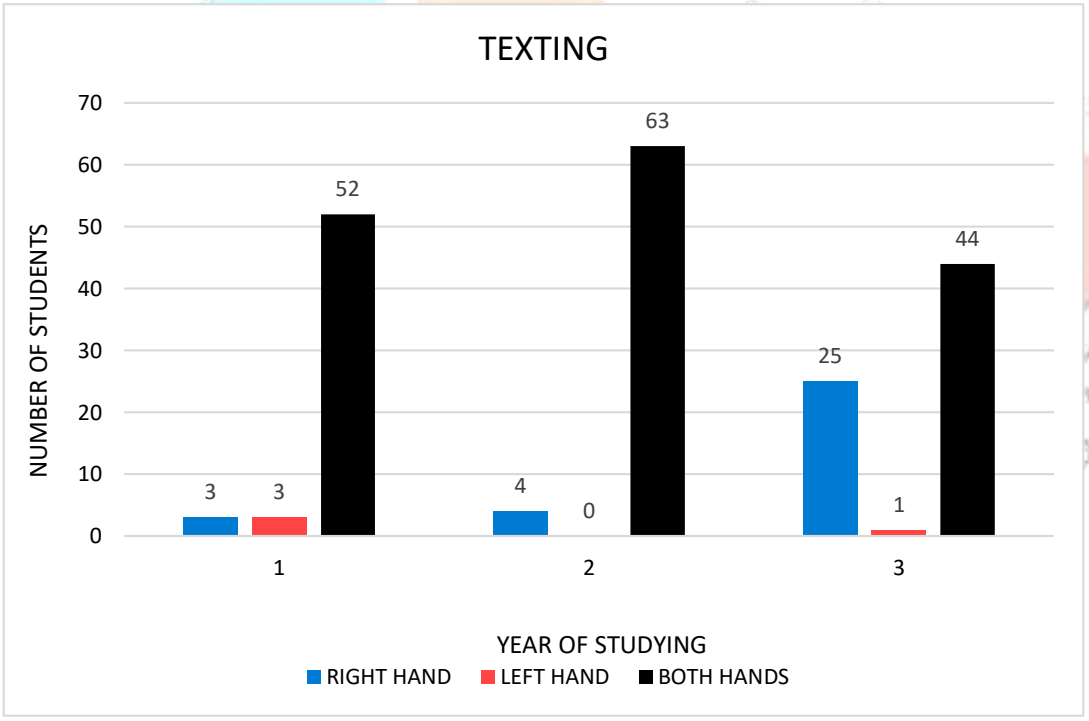


Chart 11 explains hand dominance while using smartphones for texting. It is showing bilateral hands are used in the Texting as compared to right and left hand. 2nd year students are more using more both hands as compared to 1st and 3rd year students.

Figure 12

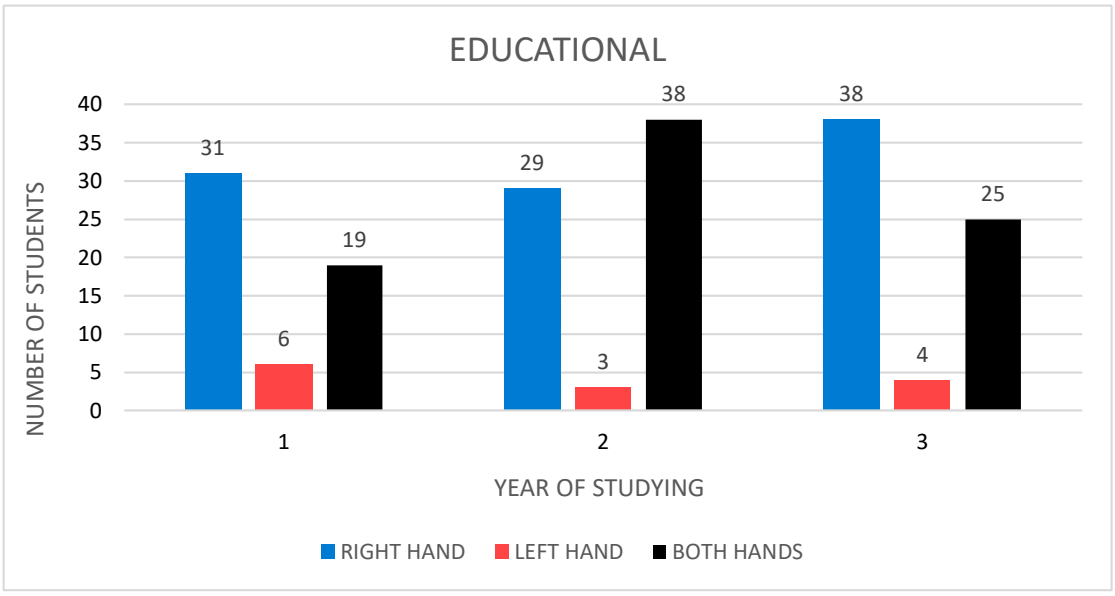


Chart 12 shows hand dominance while using smartphones for Educational purposes. It explains: in 1st year students use Right hand more as compared to bilateral / left hand.in 2nd year bilateral hands are more used as compared to Right and Left hand.

Figure 13

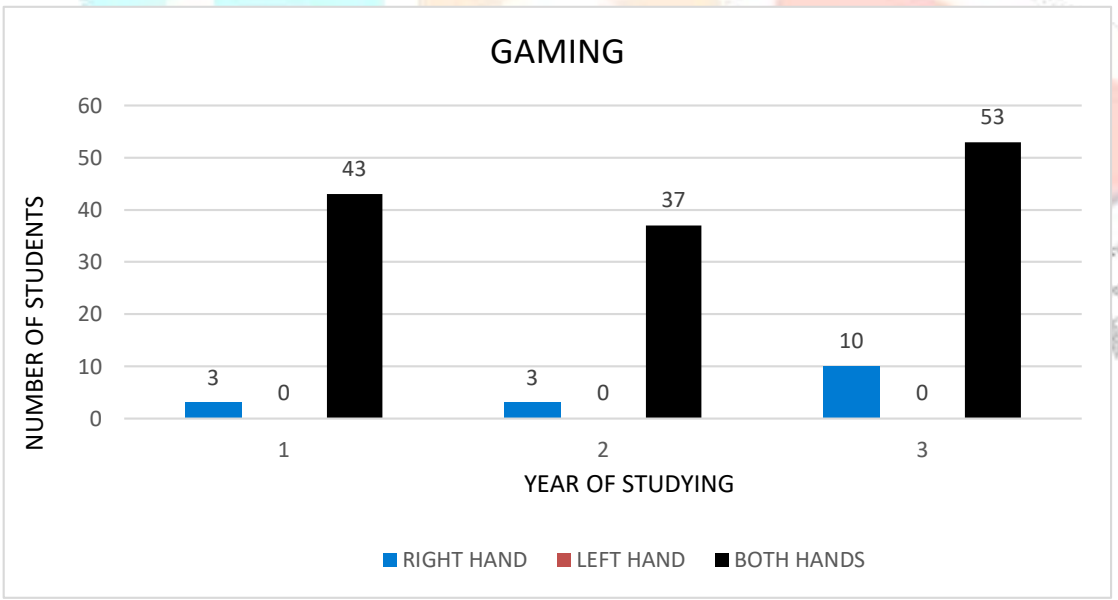


Chart 13 Illustrates Hand dominance while Gaming. It shows there is more use of bilateral the hands as compared to right and left. Third year students are using more smartphone for Gaming.

Figure 14

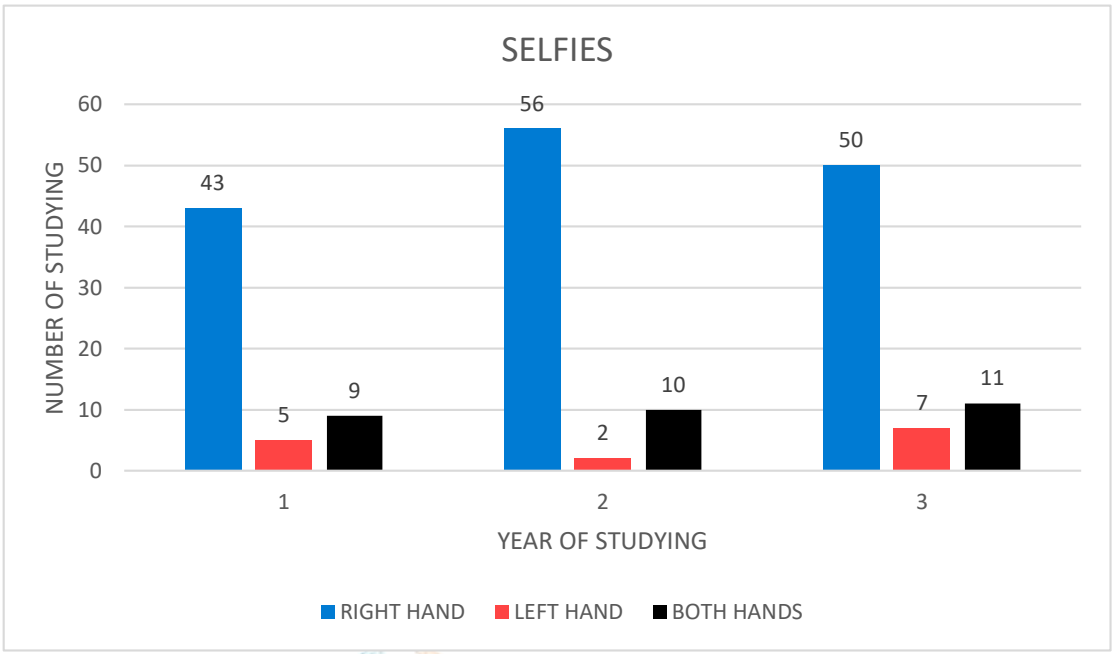


Chart 14 shows hand dominance while taking Selfies. There are more right hand usage for selfies than left hand. Second year students are using smartphones for taking Selfies.

Figure 15

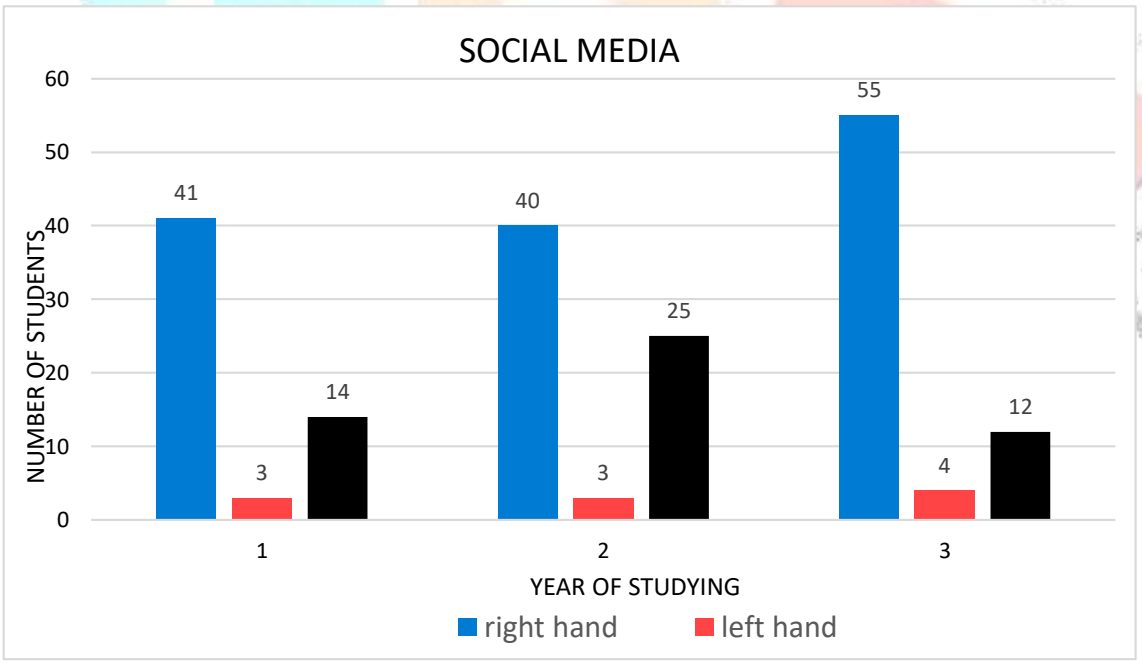


Chart 15 Illustrates that right hand is more used while using Social Media. Third year students are using Social Media more than second and first year students.

DISCUSSION

This study is done to assess the discomfort in hand and wrist in undergraduate Pharmacy students using Cornell hand Discomfort Questionnaire. The interview based study was done in which the students have to fill the questionnaire which was handed over to them. 200 students participated in the study.The age of participants was between 18 to 25 years. Out of 200 participants, 107(54%) were Female and 93(46%) were Male. 73 participants (36.5%) reported having Hand and Wrist discomfort while 127 participants (63.5%) have not experienced Hand and Wrist discomfort.

The type of hand held devices, dimensions, weight , use of mobile covers as well as pop sockets, dominance of hand and usage of smartphone per day were taken into consideration in this study.

For this study, the hand was divided into six areas to have better view of discomfort and it was observed Area C and E have more percentage i.e. 23% and 21%. Previous studies have shown that there is increased pain at the base of the thumb in the university

students who are using smartphones for more than 3.5 hours. This study observed that out of 200 participants; 144 participants (72%) who are using smartphones for more than 3 hours while 56 participants (28%) are using smartphones for less than 3 hours.

Previous study have shown that there is relationship between increased frequency of keystroke and first carpometacarpal osteoarthritis and de quervain disease[11-15]. In the study it is observed that there are more participants who are using Right hand compared to Left hand and only for Texting there is increased use of both the hands.

The problems related to Extensor Pollicis Longus showing symptoms like decreased grip strength and pain at abduction of thumb is observed in previous study[7,8] while in the recent study it is analysed that there more participants who are using rubber cover more than plastic cover i.e 59% in 3rd year, 60% in 2nd year and 58% in 1st year.

Identifying risk factors early will minimize the prevalence of hand and wrist discomfort and progression to a chronic disease like de quervain, thereby improving an individuals way of handling and time of usage of the smartphones.

The knowledge of the presence of Hand and Wrist Discomfort can be used to plan exercise program as well as ergonomic advises. This can be done by organizing exercises classes or providing designated exercise plan for an individual.

This study can be used to educate students about de quervain's disease , decreased grip strength , pain, fatigue and discomfort on prolonged usage of mobile phones and strengthening of hand muscles if already suffering from any of the mentioned symptoms.

CLINICAL IMPLICATIONS

1. Ergonomics can be adviced while using smartphones.
2. Taking frequent rest pauses is essential while using smartphones.
3. On prolonged usage of smartphones for academic purposes stretching, strengthening as well as mobility of hand and wrist should be inculcated.

CONCLUSION

It can be concluded that 36.5% of the total population of Pharmacy students at TMV's Lokmanya Tilak Institute of Pharmacy are having wrist and hand discomfort.

LIMITATIONS

- As the study is done at a specific college; we can do further study in other universities as well.
- Use of larger segments of participants, both males as well as females can also be added in further investigation.
- The inclusion criteria for the Age can be extend to different ages.
- As the questionnaire has to be filled individually by the students; Intentionally or unintentionally they might not have been frank about the use, duration and content used on smartphones.

Future studies can investigate the difference between self reported and technological records of smartphones; which can provide thorough clarification about smartphone usage pattern.

ACKNOWLEDGEMENT

I am grateful to The Almighty God without whose blessings this research would not have been possible. It is a genuine pleasure to express my deep sense of thanks & gratitude to my guide, Dr. Sabina Salim Kazi Hakim. Her timely advice & scientific approach have helped me to a very great extent to accomplish this task. My deepest appreciation with greatest debt of gratitude belongs to my father Mr. Avinash Dattatray Pol & mother Mrs. Mangala Avinash Pol for their patience, unceasing support & encouragement.

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