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Impact of Smartphone Usage on Quality of Treatment Provided by the Physiotherapists and the Physiotherapy Interns in Out Patient Department

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ABSTRACT

Introduction: Smartphones have become an essential part of our lives. There is anecdotal evidence that health professionals are increasingly using Smartphones during their work. Smartphone use in healthcare work settings presents both opportunities and challenges. Using smartphone during clinical practice causes lack of attention, diminished capacity to remember important information and a decrement in performance which might impact the quality of treatment provided.

Aims: The objective of the study is to determine the impact of smartphone usage on quality of treatment provided by the physiotherapists and the physiotherapy interns between the treatment sessions in OPD's.

Methodology: A descriptive design with convenience sampling and a self-designed questionnaire with close ended questions were used to survey 120 PTs and PT interns working in various health care sector. The questionnaire was based on various validated instruments for assessing the frequency and purpose, perception and opinion regarding the usage of smartphone during treatment.

Results: In the present study, the statistical analysis showed that there is a significance difference in the frequency and purpose of smartphone usage during treatment among the groups with p value <0.002 and the perception and opinion regarding the usage of smartphone among the two groups with p value <0.001. The physiotherapy interns scored higher in both the sections. A positive correlation is found between frequency/purpose and perception/attitude among physiotherapy interns.

Conclusion: The study concluded that smartphone usage while giving treatment can alter the quality of treatment provided to the patient by the physiotherapy interns. Majority of the physiotherapy interns believe that smartphone usage while giving treatment may impact the quality of treatment during the treatment sessions in OPDs.

Key Words: Smartphone, Health care, Physiotherapists, Health professionals, Distraction, Interruption, Workplace, Health consequences, Mobile phone dependence

INTRODUCTION

Smartphones have become inextricably linked to our daily lives. Smartphones are preferred by users due to their accessibility, utility, multitasking, and mobility. They are now more than just a means of communication among persons because they allow us to use various programmes to access the internet, banking services, entertainment, and social networks.

Smartphones are preferred by users due to their accessibility, utility, multitasking, and mobility. According to a survey, people spend 3 to 5 hours per day on their smartphones and touch them 2617 times each day on average. Many people

believe that this technology will have a large positive impact in the healthcare field. As a result, they can assist healthcare practitioners in a variety of ways. Smartphones provide clinicians with internet access for medication references and professional guidelines, as well as the ability to utilize them as bedside medical calculators. Sharing a range of images, such as x-rays, ultrasound, Computed Tomography/Magnetic Resonance Imaging scans, and photos displaying a patient's wounds or condition, using instant messaging could increase communication between practitioners.¹⁻³ However, data on the detrimental physical and psychological implications of excessive usage of mobile phones is already starting to emerge.³ Smartphones are thought to cause in attentional

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blindness and inattentiveness in users. Smartphone distraction has also been linked to attentional impulsivity, which is reinforced by rewarding persistent checking behaviors. The degree to which a person multitasks media is connected to attentional impulsiveness. Multitasking not only lengthens the time it takes to finish a task, but it also causes shallow thinking to take precedence over deep, thoughtful reflection and analysis⁴⁻⁶

The use of a smartphone for extended periods of time, as well as repeated movements of the upper extremities in an unnatural posture, have been demonstrated to be the leading causes of musculoskeletal issues. The muscular and nerve tissue in the hand may be severely impacted by the prolonged changed static posture and repetitive use of the wrist and thumb during smartphone operation. Excessive repetitive or static wrist and thumb movements when using a smartphone might raise joint strain, increase carpal tunnel pressure, and reduce the available room for the median nerve to move. As a result, acute trauma occurs, causing the median nerve and muscle tendon to expand.⁷

In situations where such disruptions should be avoided, physicians in hospitals are unnecessarily interrupted by cell phones. Using a smartphone in a healthcare context could jeopardise a patient's privacy, which is known because it is a person's right to govern, utilize, and share their health-related data and confidentially. Some even believe it is impolite to use a smartphone in front of a patient.¹⁰ Patients have an unfavourable opinion of resident doctors who take up phone calls, check or compose messages while interacting with patients or observing a treatment. According to a study in house staff, smartphones can undermine interprofessional behaviour because they prefer texting to direct communication with nurses, which leads to unprofessional behavior⁸⁻¹¹

Increased smartphone use has also been linked to mental health issues¹²Smartphones have also been labelled as possibly addicting and detrimental to people's work and personal lives. Individuals are exhibiting addicted behavior towards smartphone usage, according to existing literature, resulting in serious negative emotional and societal consequences. In adults and adolescents, a poor ability to regulate emotional responses to bad experiences appears to be linked to more problematic smartphone use.¹³ People who are stressed are more prone to smartphone addiction and are more likely to engage in addictive behaviour to reduce stress. Smartphone addicts also had poor communication skills, according to the study. Self-control is a key component of smartphone addiction, and it's closely linked to the compulsive usage of social media sites like Facebook. As a result, people should find a means to improve their self-discipline and detect and manage inappropriate behaviour.¹⁴

Internal thoughts or external cues appear to activate smartphone use distraction, which may be fueled by online vigi-

lance—a persistent obsession with online information that leads to salience monitoring and encouraging cravings to check. As a result, habitual behaviour develops.²² They create tolerance, which means that users feel compelled to spend more time on their phones in order to be satisfied, and they encourage constant, compulsive checking habits. The term 'nomophobia' was coined to describe an uncontrolled dread of leaving home without a mobile phone, which manifests as anxiety, emotional instability, hostility, and difficulties concentrating.¹⁵

Although smartphones provide considerable convenience in our daily lives, their continual use may interfere with work. Physical therapists conduct intricate duties that frequently necessitate their complete attention. As a result, dividing attention between one or more tasks may result in a drop in performance, which could lead to clinical errors. If the therapist is preoccupied, the treatment will take longer to complete. It's also worth noting that a smartphone or other technology interrupting a physical therapist's primary duty creates a communication barrier between the patient and the therapist. Communication is critical for a physiotherapist to gain a better knowledge and diagnosis of the patient's condition.

OBJECTIVES

To determine the impact of smartphone usage on quality of treatment provided by the physiotherapists and the physiotherapy interns between the treatment sessions in OPD's.

METHODOLOGY

Source of data:

Physiotherapists and physiotherapy interns in and around Bangalore.

Method of collection of data

Population: Physiotherapists and physical therapy interns

Sample design : Convenience Sampling

Sample size: 120

Type of study: Descriptive study

Duration: 6months

Materials required : Questionnaire

Inclusion criteria:

- Certified Physiotherapists
- Physiotherapy interns
- Age ranging from 22 to 35years
- Both gender

- Subjects who know local language/English for communication

Exclusion Criteria:

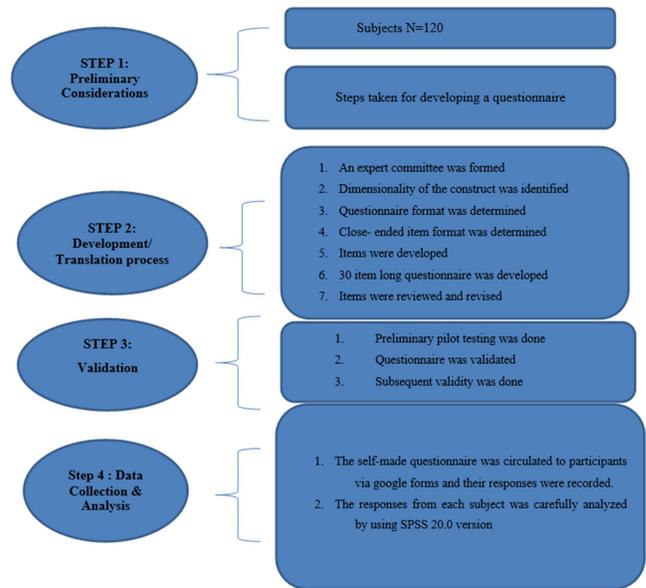
- Non-co-operating physiotherapists and physiotherapy interns.
- Subjects who cannot comprehend/complete the Questionnaire

METHODOLOGY

Subjects who fulfill the inclusion criteria were included in the study. A prior informed consent was taken from the participants and permission was obtained from the institution’s ethical committee.

Institutional Ethical Committee Padmashree Institute of Physiotherapy vide Ref No: PIP/EC/

10-6/03-2020 dated 10.03.2020 has reviewed the research proposal and certifies that research proposal is ethically satisfactory. Ref: Ethical Guidelines for biomedical research on Human subjects – ICMR New Delhi 2000.



RESULTS

Table 1: Age distribution of physiotherapists and physiotherapy interns

S. No	Age in years	Physiotherapists n=72(60.0%)	Physiotherapy interns n=48(40.0%)	Chi-square value	p-value
1	< 25 years	18(25.0)	47(97.9)		
2	25-30 years	38(52.3)	1(2.1)	24.848, df=1, S	P<0.001
3	>30 years	16(22.2)	0		
	Mean±SD	28.21±4.64	23.94±1.47	t=6.162, S	P<0.001

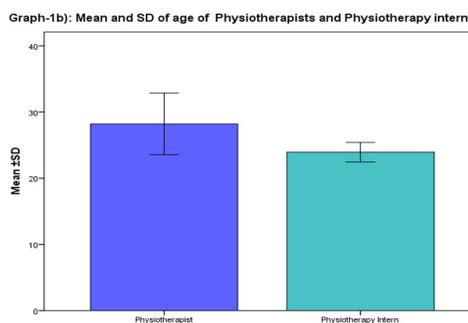
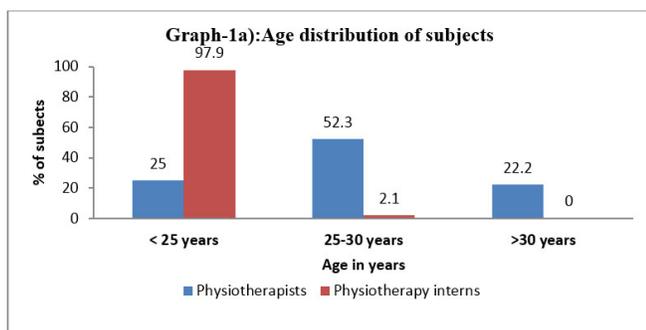
S- significant(p<0.05)

Table 1 shows the age distribution of physiotherapists and physiotherapy interns using Chi-Square test. Among 120 subjects, the number of physiotherapists were 72 (60%) and number of physiotherapy interns were 48(40%) with 18(25%) physiother-

apists and 97.9% (97.9%) physiotherapy interns below 25 years, 38(52.3%) physiotherapists and 1(2.1%) physiotherapy interns between 25-30 years, 11(22.2%) physiotherapists and 0 physiotherapy intern above 30 years. The Chi-Square value was 24.848 and p-value was P<0.001. Since p-value was less than 0.05 (the significant level), it can be concluded that there was a significant difference in age distribution over the two groups. The mean standard deviation of age in years

of the physiotherapists was 28.21±4.64 and physiotherapy interns were 23.94±1.47. The t-test was carried to compare the means, which was found to be statistically significant P<0.001.

Table 2: Gender distribution of physiotherapists and physiotherapy interns



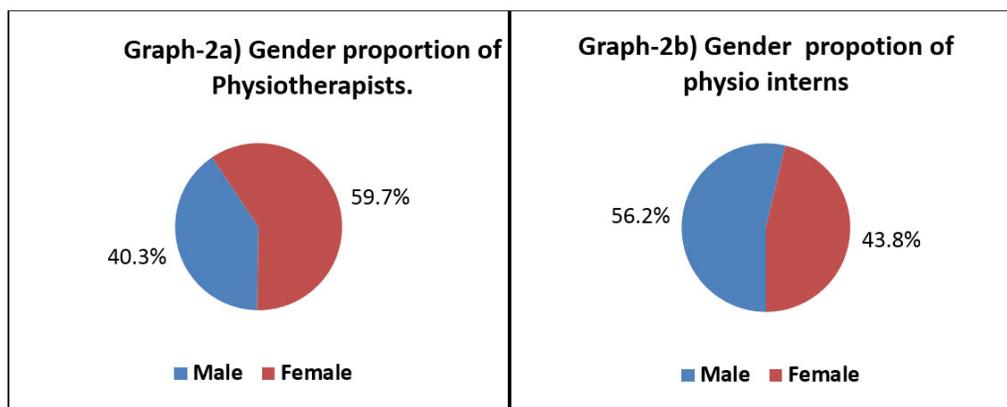
S. No	Gender	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
1	Male	29(40.3)	27(56.2)	2.952, df=1, NS	p>0.05
2	Female	43(59.7)	21(43.8)		

NS- Not significant (p>0.05)

Table 2 depicts the gender distribution of physiotherapists and physiotherapy interns using Chi-Square test. In the study the number of male physiotherapists who participated were 29 (40.3%) and male physiotherapy interns were 23(56.2%). The number of female physiotherapists and physiotherapy interns were 43(59.7%) and 21(43.8%), with Chi-Square value 0.250 and p value>0.05, which was found to be non-significant i.e. there was no significant difference between

the gender proportions over the groups. The following pie diagram shows the gender distribution of physiotherapists and physiotherapy interns.

Table 3: Distribution of physiotherapists and physiotherapy interns according to registered practice.



S. No	Registered practice of physiotherapy	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
1	No	13(18.1)	7(14.6)	0.250, df=1, NS	p>0.05
2	Yes	59(81.9)	41(85.4)		

NS- Not significant(p>0.05)

Table 3 shows the distribution of physiotherapists and physiotherapy interns according to their registration for practice using the Chi-Square test. Out of 120 subjects, 59(81.9%) physiotherapists and 41(85.4%) physiotherapy interns were registered to practice in Bangalore/India. 13(18.1%) physiotherapists and 17(14.6%) physiotherapy interns were not

registered to practice in Bangalore/India. Their Chi-Square value is 0.250 with P>0.05. Therefore, it was concluded that there was no significant difference between registrations for practice over the groups. The following pie diagrams showed the distribution of physiotherapists and physiotherapy interns according to their registration for practice.

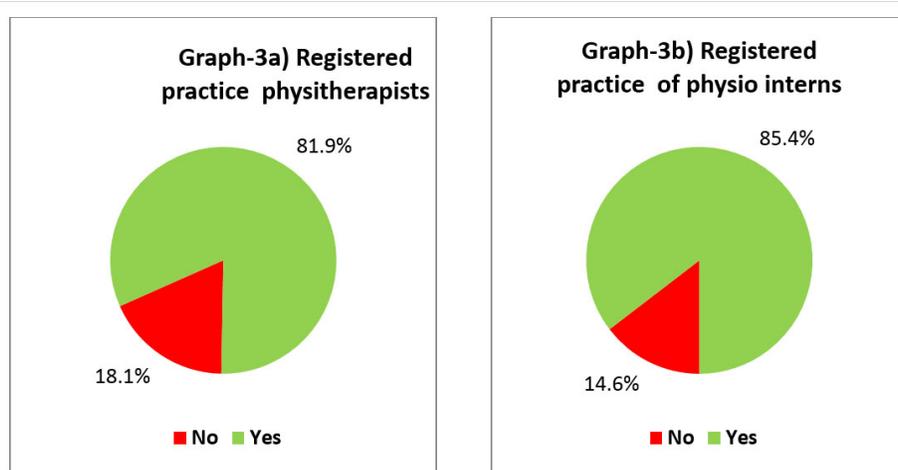


Table 4: Distribution of physiotherapists and physiotherapy intern according to type of work.

S. No	Type of work	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
a.	Exclusively in the public health system	4(5.6)	8(16.7)	4.585, df=2, NS	p>0.05
b.	Exclusively in private health setting	46(63.9)	30(62.5)		
c.	In a combination of public health and non-public health settings	22(30.5)	10(20.8)		

NS- Not significant(p>0.05)

Table 4 presents the distribution of physiotherapists at physiotherapy interns according to the type of work using Chi-Square test. In the study, 4(5.6%) physiotherapists work exclusively in the public health care setting, while 46(63.9%) physiotherapists work in private health care setting, rest 22(30.5%) physiotherapists work in a combination of public health and non-public health care settings. Similarly, 8(16.7%) physiotherapy interns were working in public health care setting, 30(62.5%) physiotherapy interns were working in private health care setting and 10(20.8%) were working in a combination of public health and non-public health care setting. Their Chi-Square value was 4.585 with p>0.05. Therefore there was no significance difference in type of work between the groups.

Table 5 presents the distribution of physiotherapists and physiotherapy interns according to hours engaged in their physiotherapy practice per week using Chi-Square test. 20(27.8%) physiotherapists and 4(8.3%) physiotherapy interns were engaged less than 30 hours of clinical practice per week. 21(29.2%) physiotherapists and 20(41.7%) physiotherapy interns work between 30-40 hours per week and 31(43.1%) physiotherapists and 24(50.0%) physiotherapy interns works more than 40 hours per week. The Chi-Square value was 7.065 with P<0.03, which was found to be significant. Therefore, there was a significant difference in the hours engaged in physiotherapy practice per week among the two groups.

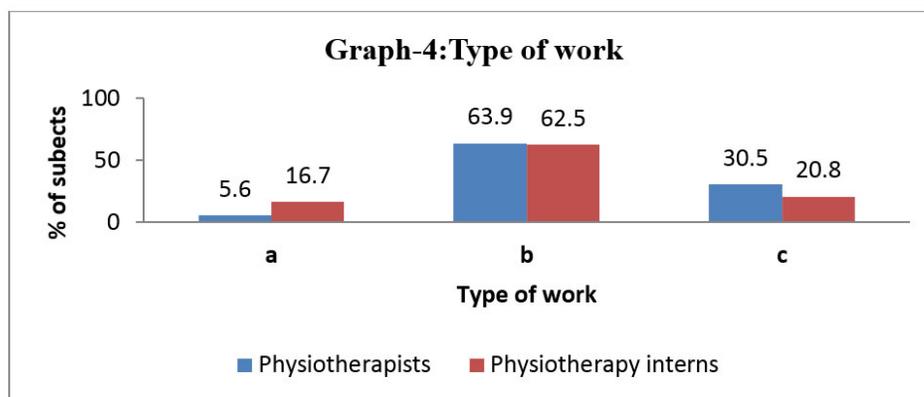


Table 5: Distribution of physiotherapists and physiotherapy intern according to hours engaged in physiotherapy practice per week.

S. No	Hours of work/week	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
1	<30 hours	20(27.8)	4(8.3)	7.065, df=1, S	P<0.03
2	30-40 hours	21(29.2)	20(41.7)		
3	>40 hours	31(43.1)	24(50.0)		

S-Significant(p<0.05)

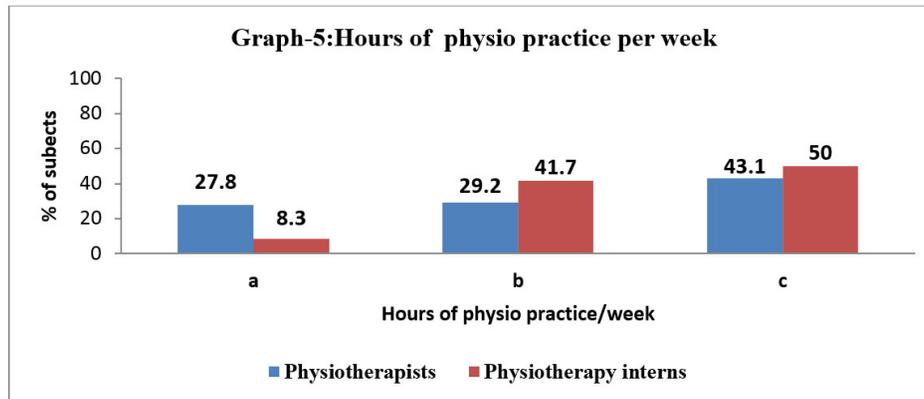


Table 6: Distribution of physiotherapists and physiotherapy intern according to frequency and purpose of using mobile phone during treatment.

S. No	Frequency and purpose of using mobile phone during treatment.	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
1	Less frequent use	42(58.3)	14(29.2)	12.361, df=1, S	P<0.002
2	More frequent use	29(40.3)	29(60.4)		
3	Most frequent use	1(1.4)	5(10.4)		

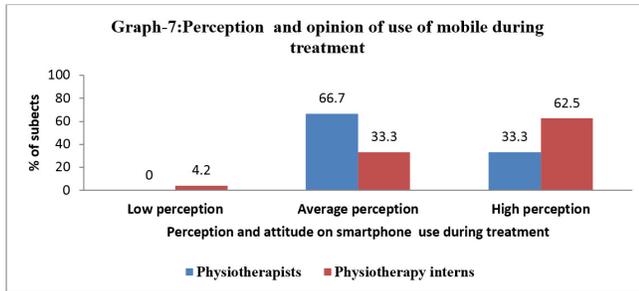
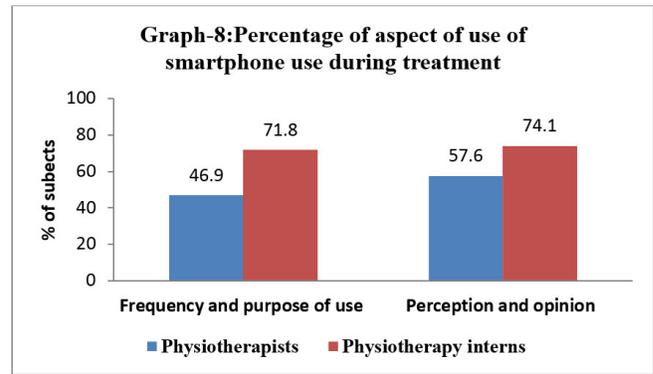
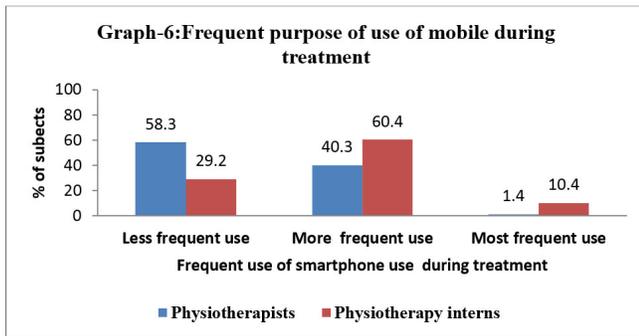
S- Significant(p<0.05)

Table 6 depicts the distribution of physiotherapists and physiotherapy interns according to frequency and purpose of using mobile phone during treatment using Chi-Square test. 42(58.3%) physiotherapists and 14(29.2%) physiotherapy interns reported using smartphone less frequently during treatment. 29(40.3%) physiotherapists and 29(60.4%) physiotherapist interns used smartphones during treatment more frequently. While 1(1.4%) physiotherapists and 5(10.6%) physiotherapist interns reported using smartphones most frequently. The Chi-Square value was 12.361 with P<0.002. The P value was less than 0.05, which evidences that there was a significant difference in the frequency and purpose of smartphone usage during treatment among the groups.

Table 7: Distribution of physiotherapists and physiotherapy intern according to perception and opinion about smartphone usage during treatment

S. No.	Perception and opinion about smartphone usage during treatment	Physiotherapists	Physiotherapy interns	Chi-square value	p-value
1	Low perception	0	2(4.2)	14.444, df=2, S	p<0.001
2	Average perception	48(66.7)	16(33.3)		
3	High perception	24(33.3)	30(62.5)		

S-Significant(p<0.05)



opinion regarding the smartphone usage during treatment using Chi-Square test, 0 physiotherapists and 2(4.2%) physiotherapy interns have a low perception, 48(66.7%) physiotherapists and 16(33.3%) physiotherapy interns have a average perception, and 24(33.3%) physiotherapists and 30(62.5%) physiotherapy interns have high perception and opinion regarding the effects of smartphone usage during treatment. The Chi-square value was 14.444 with $P < 0.001$. Therefore, there was a significant difference in the perception and opinion among the physiotherapists and physiotherapy interns.

Table 7 presents the distribution of physiotherapists and physiotherapy interns according to their perception and

Table 8: Range, mean and SD of aspect of smartphone use during treatment.

S.no.	Aspect of smartphone use during treatment	Max score	Physiotherapists			Physiotherapy interns		
			Range	Mean±SD	Mean %	Range	Mean±SD	Mean %
I.	Frequency and purpose of use	60	12-47	28.17±7.36	46.9%	31-52	43.10±5.31	71.8%
II.	Perception and opinion	60	17-49	34.56±8.89	57.6%	25-54	44.44±5.72	74.1%

Table 8 shows the Range, Mean and SD of the two aspects of smartphone usage during treatment. The max Score was 60 in each aspect. Higher the scores obtained in frequency and purpose of using smartphone aspect indicates higher proneness to use smartphone while giving treatment. The physiotherapists scores ranges from 12-47, mean and standard deviation was 28.17±7.36 with mean percentage 46.9%. The physiotherapy interns scores ranges from 31-52, the mean score and standard deviation was 43±5.31 and mean percentage was 71.8%.

Higher the scores indicates higher perception regarding the negative effects of smartphone usage during treatment. The physiotherapist’s scores ranges from 17-49, mean and standard deviation was 34.56±8.84, and mean percentage was 74%. While the physiotherapy interns scores ranges from 25-54 with mean and standard deviation 44.44±5.72 and mean percentage 74.1%.

Table 9: Correlation between frequency /purpose and perception /opinion about smartphone use during treatment

S. No	Correlation	r	p-value
1	Physiotherapists	0.046	p>0.05
2	Physiotherapy interns	0.749	P<0.001

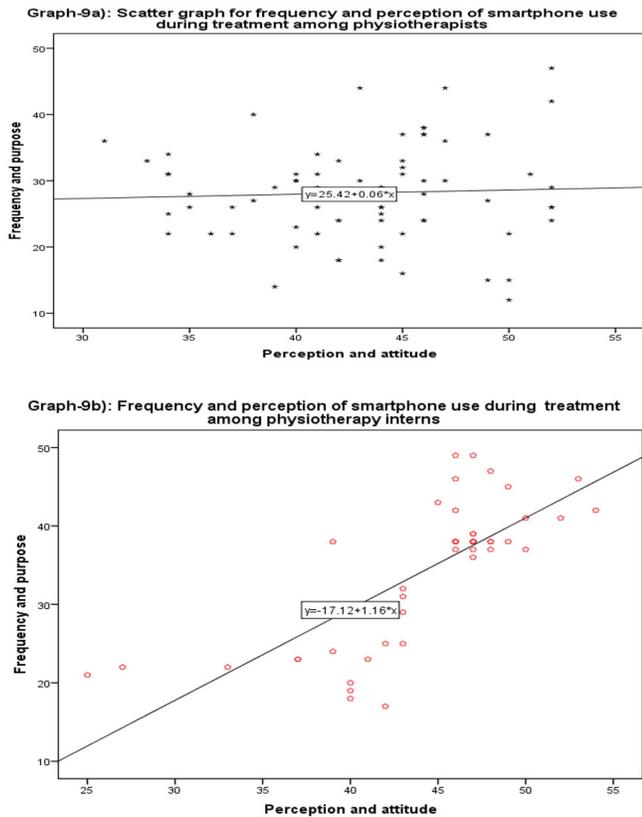
S-Significant (p<0.05)

Table 9 shows the correlation between frequency/purpose and perception/opinion about smartphone usage during treatment provided by the physiotherapists and physiotherapy interns. The physiotherapists correlates positively with frequency/purpose and perception/opinion regarding the usage of smartphone ($r=0.046$) with $p > 0.05$. Therefore, there was no significant difference between the frequency/purpose and perception/opinion.

The physiotherapy interns also correlate positively with frequency/purpose and perception/opinion regarding the smartphone

usage during treatment with $r=0.749$ and $p<0.001$. There was a significance difference between frequency/purpose and perception/opinion about using smartphones among the physiotherapy interns.

The scatter graphs also evidenced the co-relation between these domains.



DISCUSSION

Smartphones are becoming increasingly important in our daily lives. They are used to do duties at work and at home. Smartphone use in the healthcare setting has both advantages and disadvantages. Having access to such modern gadgets in physical therapy, as in other health care professions, allows practitioners to improve patient treatment through easily available reference tools and applications, but cellphones also have the potential to distract physiotherapists in their professional settings. The goal of this study is to see how smartphone usage affects the quality of treatment offered by physiotherapists and physiotherapy interns in outpatient clinics.

There were a total of 120 physiotherapists and physiotherapy interns that took part in the study. The subjects were interviewed over the phone. After giving their oral consent, the individuals were instructed on how to complete the question-

naire. After that, the consent form and questionnaire were emailed to them. After then, the data was statistically determined.

Age, gender, registration to practice, work set-up, and hours engaged in clinical physiotherapy practice were among the background variables of the physiotherapists and physiotherapy interns in this study, with 18 (25 percent) physiotherapists and 47 (97.9%) physiotherapy interns being under the age of 25. 38 (52.3%) physiotherapists and 1 (2.1%) physiotherapy interns were between the ages of 25 and 30. There were 16 (22.2%) physiotherapists and no physiotherapy interns above the age of 30. The study included 29 (40.3%) male and 43 (59.7%) female physiotherapists, as well as 27 (56.2%) male and 21 (43.8%) female physiotherapy interns. There was a substantial disparity in age distribution between the groups, according to the findings. 59 (81.9%) physiotherapists and 41 (85.4%) physiotherapy interns were registered to practise in Bangalore, India, out of a total of 120 physiotherapists and physiotherapy interns.

The baseline parameters for practice were found to be similar in both physiotherapists and physiotherapy interns. Physiotherapists and physiotherapy interns were classified according to their type of employment, with 4 (5.6%) physiotherapists and 8 (16.7%) physiotherapy interns working exclusively in the public health care system. 46 (63.9%) physiotherapists and 30 (62.5%) physiotherapy interns work exclusively in the private health care system, while 22 (30.5%) physiotherapists and 10 (20.8%) physiotherapy interns work in both public and private health care settings. In both groups, the baseline characteristics were similar.

Furthermore, 20 (27.8%) physiotherapists and 4 (8.1%) physiotherapy interns work less than 30 hours per week among 120 physiotherapists and physiotherapy interns. Physiotherapists (29.2%) and physiotherapy interns (41.7%), on average, work 30-40 hours per week. Physiotherapists and physiotherapy interns both work more than 40 hours per week, with 31 (43.1%) and 24 (50%) working more than 40 hours per week, respectively. There was a substantial difference in the number of hours spent practising physiotherapy between the two groups.

The study's findings are consistent with those of Anne Kilpatrick Lorio et al. (2018), who found that lower age and smartphone comfort are moderately associated. The majority of physiotherapy interns said that turning off their phones while at work or during treatment made them nervous about missing something, which could be one of the reasons for their frequent use. This can lead to healthcare issues. If a doctor is forced to turn off his phone in order to prevent being distracted while performing an operation on a patient, this may be distressing to the doctor and distract him from the process, forcing him to rush through it.

The mean and standard deviation of frequency and purpose of smartphone use, as well as perception and opinion on smartphone use during treatment for physiotherapists, were 287.36 and 34.568, respectively, with mean score percentages of 46.9% and 57.9%. Physiotherapy interns had a mean and standard deviation of 43.105.31 and 44.445.72, respectively, with a mean score percentage of 71.8 percent and 74.1 percent. The physiotherapy interns outperformed the physiotherapists in both areas. This is because the majority of physiotherapy interns agreed with the statement that using a smartphone during treatment causes inattentiveness. They frequently feel compelled to check their phones during therapy, which may compromise the quality of care offered to the patient.

Because physiotherapy interns scored higher on the frequency and purpose sections, it may be assumed that they use their smartphones more frequently during treatment, which may have an impact on the quality of care they deliver to patients. This finding is consistent with a study by King AL et al. (2020), which stated that health professionals in patient care must be attentive to the performance of their activities, and because smartphones are elements of distraction, their use in service can cause inattention and errors in procedures, resulting in harm to their patients. Many smartphone users, according to Oulasvirta. A et al. (2012), engage in short, frequent use.¹⁶

This finding is also consistent with Duke, E., and Montag, C. (2017), who found that smartphone usage was viewed as having a negative impact on both work-related and non-work-related productivity by participants. As a result, the quality of treatment may be harmed since a user preoccupied with a cell phone is diverted from the primary task at hand. Gill PS et al., (2012)¹⁷

Similarly, the physiotherapy intern holds a favourable perspective and perception of smartphone use during treatment. According to a recent study by Martina Bientzle, et al. (2021),¹⁸ smartphones should only be used by therapists and patients for therapeutic purposes.

As a result, it can be inferred that physiotherapy interns use smartphones more frequently than physiotherapists when delivering treatment to patients in outpatient clinics, which may have an impact on the quality of care delivered.

LIMITATIONS

- The participants might have randomly responded to the questions as the data were collected by a questionnaire method due to which the results could not be generalized.
- The responses and interpretation of the questionnaire varies among the physiotherapist and physiotherapy

interns because of the lack of proper understanding due to which it would have limited the result of the study.

RECOMMENDATIONS

1. The study can be done in different job settings.
2. The study recommends using smartphone for various health related apps that help in providing therapeutic exercises and home-care programs to the patient.
3. There was a difficulty in determining the exact purpose of smartphone usage.

CONCLUSION

The study found preliminary evidence of the impact of smartphone use on the quality of care provided by physiotherapists and physiotherapy interns in an outpatient physical therapy clinic. According to the findings, physiotherapy interns are more likely than physiotherapists to use their smartphones while providing treatment.

Smartphone use causes attentional diversion, which can affect the quality of the patient's treatment. However, physiotherapy interns were aware of the dangers of smartphone use, and the majority of them thought that using a smartphone at work or while providing treatment could affect the quality of care.

Young physiotherapists entering the field of physiotherapy must be mindful of the implications of smartphone usage, minimise personal use, and respond more quickly to technology. As a result, throughout therapy, a smartphone should only be used when absolutely essential.

Conflict of Interest: None

Source of Funding: Nil

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