DEVELOPMENT & STANDARDIZATION OF A SCALE TO MEASURE SMARTPHONE ADDICTION AMONG COLLEGE STUDENTS

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ABSTRACT

BACKGROUND & OBJECTIVE

In today's lifestyle due to increased use of smartphone, problems related to mental health is also increasing day by day. Thus there is urgent need to measure the addiction of smartphone in college going students who are considered more susceptible to the addiction. As in India, there are fewer tools available for measuring addiction in young adults so there is a need to develop a scale for measuring the addiction of smartphone users.

METHODS

For developing the scale, 26 items were selected on the basis of expert's agreement and content validity was established. After analysis of items total 16 items were included in final scale with 3 point rating. The split-half method was used for measuring the reliability of the scale. The final addiction scale was administered on 100 (50 Boys & 50 Girls) randomly selected college going students of 18-24 years to measure the smartphone addiction.

RESULTS

The reliability of the scale was high with the correlation coefficient of 0.97. For internal consistency Reliability of the final smartphone scale, Cronbach's alpha correlation coefficient 0.924 was obtained. Majority of students 48 percent were having low addiction and only 9 percent students were highly addicted and there was significant difference between addiction level of boys and girls, boys are more addicted than girls.

CONCLUSION

The Smartphone Addiction Scale showed good reliability and validity for the assessment of smartphone addiction in college students which can be used efficiently for the assessment of smartphone addiction in clinical and research areas.

KEYWORDS: Addiction, College Students, Reliability, Smartphone & Validity

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INTRODUCTION

Nowadays, Smartphone has become the latest fashion in the youngster's life because of many features such as phone calls, text messaging, camera, internet and many more. As India is the second most populous country in the world having 340 million smartphone users in 2017 that is more than the smartphone users of U.S. (Acc. to Statista.com). With the greater availability and many exclusive features of smartphone, its use is excessively increased among

adolescents and young adults leading to many psychological problems and smartphone addiction is one of them. As per India's Census 2011, Youth (15-24 years) in India constitutes one-fifth (19.1%) of India's total population. According to **Bianchi and Phillips (2005)**, younger people are more likely to spend an excessive amount of time on their mobile phones than older people which makes them more vulnerable to mobile phone-related problems. **Nielsen informed mobile insights** also reported that In India half of the smartphone users i.e. 48 percent, younger than 25 years means a majority of smartphone users comes under the 18-24 years of age group. Maximum times this kind of addiction is never taken as the serious problem. It is simply becoming a habit of the user and it is ignored. The addiction of smartphone is increasing day by day and creating alarming situation especially for the college going students.

Smartphone Addiction is becoming very popular term these days because it is similar to the other drug addiction. Various researchers give various terms for the addiction. Addiction is considered by WHO (WHO Expert Committee - 1964) as dependence, as the continuous use of something for the sake of relief, comfort, or stimulation, which often causes cravings when it is absent. The two major categories of addiction involve either substance addiction, e.g. "drugs or alcohol addiction" or "behavioral addiction such as mobile phone addiction." Addiction is a dangerous psychological problem that can be caused by using smartphone continuously for a long and periods of time. Such influence is similar to using drugs for a longer period of time. The previous literature also found that excessive usage and habitual checking on missed calls or messages may result in compulsive usage and even lead to mobile phone addiction for smartphone users (**Bianchi & Phillips, 2005; Oulasvirta et al., 2012; Takao, Takahashi, & Kitamura, 2009**).

As smartphone seeks excessive attention by the college students for their desire for finding new information or different current agendas, and the excessive use of it can not only damage interpersonal skills but also it can lead to negative health risks and harmful psychological effects. For these reasons, the need arises for the instruments that can measure addiction of smartphone in college students so that best prevention and treatment strategies can be detected.

Previous Smartphone Addiction Scales

In previous literature some addiction scale were also developed but in India, there are still less instrument/tool for measuring the smartphone addiction so considering the need this addiction scale was developed so that it can be easily applicable to the college going students.

Fernandez et.al(2012) adapted and validated the Mobile Phone Problem Use Scale (MPPUS) for Spanish adolescents. In this version, the scale only has one dimension and the scores of reliability and validity were comparable to those obtained in the adult population. **Guzeller&Cosguner(2012)**, adapted the Problematic Mobile Phone Use Scale (PMPUS) for the adolescent population in Turkey and shortly after **Kwon et.al, 2013** explored an abbreviated and adapted version of the Smartphone Addiction Scale (SAS).

Merlo et al. (2013) developed and assessed the 20-item scale named self-report Problematic Use of Mobile Phones (PUMP) in adults, with excellent internal consistency with a Cronbach's alpha of 0.94.

Lin et al.(2014) developed and validated the Smartphone Addiction Inventory (SPAI) on a sample of 283 participants. The scale comprises 26 items, modified from the Chinese Internet Addiction Scale. Four factors were identified: Compulsive behavior, functional impairment, withdrawal, and tolerance. The coefficients of internal consistency and reliability were satisfactory, with a Cronbach's alpha of 0.94.

D. Kimet *al.* (2014) gave another scale that has been recently put together is the Korean Smartphone Addiction Proneness Scale for youth (SAPS). With 15 items, 4 subscales were obtained: Disturbance of adaptive function, virtual life orientation, withdrawal, and tolerance. This scale had an higher reliability, with a Cronbach's alpha of 0.880.

Mazaheri&Karbasi(2014) revised and validated the Persian Version of the Mobile Phone Addiction Scale (adapted from the English version of the Mobile Phone Addiction Inventory) in the Middle East on a sample of 1.180 students, obtaining a Cronbach's alpha of 0.86.

MATERIAL & METHODS

The Smartphone addiction scale was developed and validated through following standard procedure:

Item Collection

As the first step in developing addiction scale, a large number of statements related to smartphone usage were gathered from literature, articles, and journals and by holding discussions with the subject matter experts. A tentative list of the items was drafted keeping in view the applicability or item suited to the area of the study. In this way, finally a total of 59 statements were collected. These statements were framed in such a way that they could express the positive or negative addiction.

Item Selection

For the content validity Statements were selected for inclusion in the scale was based on judgements of 9 experts in the same field. They were asked to review the statements after completely understanding the operational definitions. To evaluate the content validity, the judges rated the clarity of each item using the 3 point rating scale (1 "unclear item", 2 "ambiguous means item revision" and 3 "clear item").

Content Validity of the Scale

According to **Lindquist(1951)** validity of the test is the accuracy with which it measures that what is intended to measure. **Kerlinger (1964)** defined content validity as the representativeness or sampling adequacy of the content of the measuring instrument. The actual CVI was a proportion of the items that received a rating of 3 or 2 by the judges. They were requested to add or delete any statement which they deemed fit for the conclusion or deletion. Based on the validity reviewed by judges, 26 out of 59 statements have been selected. The statements were selected by at least 8 experts and showed more than CVI of 0.78. The mean I-CVI was 0.935 and the S-CVI/UA was 0.46.

Item Analysis

The final scale consisting 26 items were administered on a random sample of 33 college students who were more a less identical to the main sample. Their reactions to each item were marked on the three alternative response categories "Agree" (A) "Disagree (DA)" "Neutral" (N) and the numerical values were assigned to the three categories of responses for the items.

Agree = 3, Neutral = 2, Disagree = 1

The total score obtained by all 33 respondents were arranged in descending order. Thirty -three percent (11 respondents), each from top and bottom scores was selected for item analysis as the high and low groups. These were taken as criterion group to evaluate individual statements. Then each item was analyzed to determine how effectively it differentiated

between the high and low groups. The 't' value for each item was computed to find the discriminating power of each item in scale.

Item Selection after Item Analysis

Item selection is an important step in constructing valid and reliable scale (Edward, 1957). After calculating 't' value of each statement those statements which showed significant t-value (more than 1.75) were retained in the addition scale after item analysis. Out of the total 26 items included in this scale, 10 items were discarded and only 16 items were retained in the scale for the assessment of the addiction in smartphone users.

Reliability of the Scale

Reliability is the ability of a scale or instrument to give a consistently similar score on repeated measurement. In short, reliability refers to the precision or accuracy of the measurement or score (Kerlinger, 1964). A well-defined scientific instrument should yield accurate results, both at present, as well as, over time. The Spearman Brown split half reliability method was applied. The item of the scale was split into two halves on the basis of odd and even number of items were determined by the correlation coefficient between them which was found to be highly significant. The 'r' value of 0.97 was found to be significant, thereby indicating the evidence of high reliability.

RESULTS & DISCUSSIONS

Statement Selection for the Final Smartphone Addiction Scale

Based on the validity reviewed by judges and analysis of items 16 statements were selected for the final scale. For internal consistency Reliability of the final smartphone scale, Cronbach's alpha correlation coefficient 0.924 was obtained.

Table 1: Demographic Profile of the Respondents

N=100

Sl. No.			Girls (n ¹ =50) f(%)	Boys (n ² =50) f (%)
1.	Age	i. 18 -20 years ii. 21-22 years iii. 23 – 24 years	11 (22) 21 (42) 18 (36)	29(42) 13 (26) 8 (16)
2.	College	i. College of Home Science ii. College of Technology iii. College of Agriculture	18 (36) 17 (34) 15 (30)	12 (24) 23 (46) 15 (30)
3.	Course	i. UG ii. PG	14 (28) 36 (72)	42 (84) 8 (16)
4.	Relationship Status	i. Unmarried ii. Married iii. In a relationship	47 (94) 2 (4) 1 (2)	38 (76) 1 (2) 11 (22)
5.	Settlement Types	i. Urban ii. Semi urban iii. Rural	24 (48) 16 (32) 10 (20)	22 (44) 15 (30) 13 (26)

In demographic profile, Majority of girls 42 percent comes under 21- 22 years age group, 36 percent girls from home science college, 72 percent postgraduate, 94 percent were unmarried and 48 percent belong to an urban area. Whereas maximum boys i.e. 42 percent were 18-20 years, 46 percent from Technology College, 42 percent were undergraduate, 76 percent were unmarried and 44 percent boys belonged to the urban area.

Table 2: Usage of Smartphone by the Respondents

N=100

Sl. No.			Girls (n ¹ =50) f(%)	Boys (n ² =50) f(%)
1.	Smartphone use per Day	i. Less than 2 hours ii. 2-4 hours iii. 4-6 hours iv. More than 6 hours	6(12) 10 (20) 19 (38) 15(30)	10 (20) 10 (20) 13 (26) 17 (34)
8.	Time spend on voice call	i. Less than 1 hours ii. 1-2 hours iii. 2-4 hours iv. More than 4 hours	17 (34) 10 (20) 18 (36) 5 (10)	20 (40) 21 (42) 6 (12) 3 (6)
9.	Time spend on Social Networking Site	i. Less than 1 hours ii. 1-3 hours iii. 4-6 hours iv. More than 6 hours	5 (10) 15 (30) 26 (52) 4 (8)	4 (8) 26 (52) 18 (36) 2 (4)
6.	Smartphone use mostly for	i. Social Networking ii. Music & games iii. Texts and calls iv. Educational purpose	26 (52) 16 (32) 8 (16) -	14 (28) 28 (56) 5 (10) 3 (6)

As shown in Table 2, the majority of girls 38 percent use smartphone 4- 6 hours and 34 percent boys use 4- 6 hours per day. Maximum girls (36 %) spend 2-4 hours per day where maximum (42%) boys use 1-2 hours per day. Maximum (52 %) girls spend 4-6 hours and 52 % boys spend 1-3 hours per day on social networking site. Maximum girls (52 %) mostly use smartphone for social networking where most of the boys (56 %) use smartphone for music and games mostly. **Lenhart et al., 2010** also reported that males tend to use their phones for business or professional purpose whereas females prefer to use smartphone for social networking. **Markowetz et al. (2016)** also found that women spend more time in communication and social apps while men spend more time playing games on average.

Table 3: Smartphone Addiction Level among College Students on the Basis of Severity

Sl. No.	Addiction Level	Scores	Girls f(%)	Boys f(%)	Total f(%)
1.	Low	16-26	26 (52)	22 (44)	48 (48)
2.	Medium	27-37	22 (44)	21 (42)	43 (43)
3.	High	38-48	2 (4)	7 (14)	9 (9)
		Total	50 (100)	50 (100)	100

Table 3 depicts that 52 percent girls were low, 44 percent medium and only 4 percent were highly addicted. Majority of boys 44 percent were low, 42 percent medium and 14 percent were highly addicted. Overall only 9 percent students were showing a high addictive tendency towards smartphone. This proves that majority of the respondents use their smartphones under reasonable limits and do not tend towards extreme addictive behaviors regarding smartphone usage. The results are in accordance with the study conducted by **Ahmed et al. (2011)** in which results revealed that very few students (4.8 - 18.5%) exhibited extreme addictive behavior in Pakistan. Thus, they concluded that university students used their mobile phones within reasonable limits and did not move towards extreme behaviors that lead to addictive mobile phone use.

Hypotheses

H₀₁: There is no significant effect of age on the Smartphone Addiction level of the respondents.

H₀₂: There is no significant effect of course on the Smartphone Addiction level of the respondents.

H₀₃: There is no significant effect of settlement type on the Smartphone Addiction level of the respondents.

H₀₄: There is no significant difference in Smartphone Addiction level of girls and boys.

Table 4: Effect of Age on the Smartphone Addiction Level

Sl. No.	Age	Addition Level & Scores	N=100 f	X ²
i.	18 -20 years	Low (16-26)	40	13.82*
ii.	21-22 years	Medium (27-37)	34	
iii.	23 – 24 years	High (38-48)	26	

χ^2 denotes the chi -square value,*Significant (P=0.05)

The above table indicates that age of the respondents has a significant effect on smartphone addiction level.

Table 5: Effect of Course on the Smartphone Addiction Level

Sl. No.	Course	Addition Level & Scores	N=100 f	X ²
i.	UG	Low (16-26)	56	31.81*
ii.	PG	Medium (27-37)	44	
		High (38-48)		

χ^2 denotes the chi- square value,*Significant (P=0.05)

The above table indicates that course of the respondents has a significant effect on smartphone addiction level.

Table 6: Effect of Settlement Type on the Smartphone Addiction Level

Sl. No.	Settlement Types	Addition Level & Scores	N=100 f	X ²
i.	Urban	Low (16-26)	46	0.51
ii.	Semi urban	Medium (27-37)	31	
iii.	Rural	High (38-48)	23	

χ^2 denotes the chi -square value

The above table indicates that settlement type of the respondents has no significant effect on smart phone addiction level.

Table 7: Difference between Smartphone Addiction level of Girls and Boys

Sl. No.	Addition Level	Scores	Girls f	Boys f	Total f	X ²
1.	Low	16-26	26	22	48	3.13*
2.	Medium	27-37	22	21	43	
3.	High	38-48	2	7	9	
		Total	50	50	100	

χ^2 denotes the chi -square value,*Significant (P=0.05)

The above table indicates that there is a significant difference between smartphone addiction level of girls and boys. Boys are highly addicted than girls and the music and games are the main reason for using smartphone. In girls, the main predictor of addiction was social networking sites.

CONCLUSIONS

The advantage of having kinds of statements represented in the final scale was that it can find out the level of addiction. The above Smartphone Addiction Scale showed good reliability and validity and it can be applied efficiently for the assessment of smartphone addiction of college- going students in research areas.

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