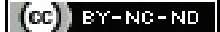


# Smartphone Addiction and Non Suicidal Self-injury among Undergraduate Healthcare Professionals: A Cross-sectional Study from Southern India

NISHA NATARAJAN<sup>1</sup>, AJITH KUMAR<sup>2</sup>, P MAITHREYI<sup>3</sup>, MOHAMED SHAHEEP<sup>4</sup>, DHANRAJ JALINDAR BHORE<sup>5</sup>

## ABSTRACT

**Introduction:** Non Suicidal Self-injury (NSSI) and mobile phone addiction have recently garnered considerable attention, especially among adolescents and young adults. There is significant neglect regarding the impact of each phenomenon on the daily functioning of individuals; however, few studies have explored their correlation, leaving a gap in understanding the relationship between these two phenomena.

**Aim:** To determine the level of smartphone addiction and NSSI behaviours among undergraduate healthcare professionals and to examine the extent of smartphones' influence on the emotional stability of young adults, potentially leading to self-injurious behaviour.

**Materials and Methods:** A cross-sectional survey was conducted at ACS Medical College and Allied Health Sciences, Chennai, Tamil Nadu, India over five months, involving 448 undergraduate healthcare professionals. After applying exclusion criteria, 367 participants were included in the study. Socio-demographic details were collected using a semistructured proforma. The questionnaire included the Smartphone Addiction Scale-Short Version (SAS-SV) and the Inventory of Statements About Self-Injury (ISAS).

The statistical tests used were the Chi-square test for categorical variables, Spearman correlation analysis ( $p$ -value  $<0.05$ ), and frequencies/percentages for some quantitative variables.

**Results:** The study primarily comprised first-year undergraduate students, with 206 (56.1%) female and 161 (43.9%) male participants. Social media (208, 56.7%) and making calls (195, 53.1%) were the most frequently cited reasons for smartphone usage. Among the participants, 114 (31.1%) exhibited addictive smartphone habits, with males outnumbering females. Furthermore, 50 (13.6%) reported intentional self-injury, with females constituting the majority. Common methods included hitting oneself (20, 40%), pulling one's hair (18, 36%), and cutting (16, 32%). Significant correlations were observed between certain intrapersonal and interpersonal functions of NSSI behaviour and smartphone addiction among male individuals engaged in deliberate self-harm ( $p$ -value  $<0.05$ ).

**Conclusion:** In this study, 31.1% of the participants exhibited addictive smartphone habits, and 13.6% reported intentional self-injury. These findings underscore the critical need to investigate smartphone addiction to thoroughly understand NSSI behaviour, particularly among undergraduate students.

**Keywords:** Emotional stability, Medical professionals, Mobile phone addiction, Self-harm, Self-injurious behaviour

## INTRODUCTION

The NSSI encompasses deliberate, repetitive acts of self-harm, such as cutting, burning, or scratching, without suicidal intent. Although not widely accepted by society, NSSI is prevalent and often expressed covertly. The lifetime prevalence of NSSI in clinical and non clinical samples is around 17% and 21%, respectively [1]. Regional disparities suggest varying protective and risk factors. The modern landscape, characterised by a fast-paced society, internet proliferation, escalating stress levels, and increased visibility of NSSI, contributes to its rising incidence [2].

Meanwhile, mobile phones have seamlessly integrated into daily life, offering convenience, entertainment, and social connectivity. However, excessive mobile phone use, or mobile phone addiction, poses health risks, as evidenced by behaviours such as constant phone usage for fulfillment, disruption of personal and social activities, and mood swings when access is restricted [2]. College students constitute a significant portion of mobile phone users, often justifying their usage for academic and social purposes. Mobile phones fulfill the need for individualisation while fostering peer connections [3,4].

Self-harm has become increasingly common among young people and has been linked to excessive use of social media, gaming, and internet technology [5]. Smartphone usage has become inevitable in the lives of young adults due to academic reasons and

peer pressure, with broader implications for mental health. Few previous research studies have shown an association between self-injurious behaviour and smartphone addiction, especially among adolescents [5,6]. Therefore, the present study aimed to assess the severity of smartphone addiction and examine the attributes of NSSI among undergraduate healthcare professionals, to determine the association between smartphone addiction and NSSI, to identify possible intrapersonal and interpersonal factors influencing NSSI behaviour and their correlation with smartphone addiction.

## MATERIALS AND METHODS

This cross-sectional survey was conducted at ACS Medical College and Allied Health Sciences, Chennai, Tamil Nadu, India involving 448 undergraduate health professionals over a period of five months, from May 2023 to September 2023. Ethical approval for the study was obtained from the Institutional Ethics Committee prior to its commencement (IEC Number-622/2022/IEC/ACSMCH Dt. 08.12.2022). The study was performed in accordance with the ethical standards set forth in the 1964 Declaration of Helsinki and its later amendments, or comparable ethical standards. Informed consent was obtained from each participant before their involvement in the study.

**Inclusion criteria:** Undergraduate healthcare professionals, specifically students aged between 18 and 25 years, who consented to participate were included in the study.

**Exclusion criteria:** Individuals who are unwilling to participate, those involved in harmful substance use, and those experiencing ongoing mental illness or persistent frustration due to issues with family, peers, relationships, or academic challenges were excluded from the study.

**Sample size calculation:** Participants were recruited using convenience sampling. The prevalence of smartphone addiction was reported as 44.7% in a previous study conducted by Kumar VA et al., [7]. Based on this prevalence value, the sample size was calculated to be 380, with an  $\alpha$  error of 0.05 and a confidence interval of 95%.

**Methodology:** Socio-demographic details were collected using a semistructured proforma based on the inclusion and exclusion criteria mentioned above. The questionnaires utilised were the SAS-SV and the ISAS.

**Smartphone Addiction Scale (SAS-SV):** This validated scale contains 10 questions assessed using a 6-point Likert scale to evaluate smartphone addiction. The cut-off scores for addiction were above 31 for male respondents and above 33 for female respondents. For the high-risk category, the scores range from 22 to 31 for males and from 22 to 33 for females [8,9]. The items on the scale have a Cronbach's alpha of 0.911 [10,11].

**Inventory of Statements about Self-Injury (ISAS):** The ISAS is a freely available tool that provides information about various NSSI parameters. This 39-item measure assesses 13 different functions related to NSSI and has been cross-culturally validated in many countries. The ISAS contains two sections: the first assesses different methods of NSSI, and the second assesses the 13 functions of NSSI. Participants who admit to having engaged in one or more NSSI behaviours are instructed to complete the second section.

The 13 functions can be categorised into either an intrapersonal composite function (affect regulation, anti-dissociation, anti-suicide, self-punishment, and marking distress) or an interpersonal composite function (self-care, autonomy, interpersonal boundaries, interpersonal influence, peer bonding, revenge, sensation seeking, and toughness). Each function is assessed on a Likert scale using three items, rated as "0- not relevant," "1- somewhat relevant," or "2- very relevant" to the individual's experience of non suicidal self-harm. Thus, scores for each of the 13 ISAS functions can range from 0 to 6. The ISAS is a widely used scale for assessing the functions of NSSI and has consistently demonstrated strong reliability for the intrapersonal ( $\alpha=0.80$ ) and interpersonal ( $\alpha=0.87$ ) functions [12,13].

**Data collection:** The students were approached without prior notice in the lecture halls at the end of their class, after obtaining permission from the relevant faculty members. The students were seated with appropriate spacing between them to prevent any discussion. The purpose and objectives of the study were explained, and those who were not interested in participating were permitted to leave. Questionnaires were circulated on an online platform to all participants simultaneously. The participants were requested to fill out the questionnaire, beginning with informed consent. The entire process took approximately 15 minutes to complete.

The total number of participants who consented to the study was 448. A semistructured proforma, the SAS-SV, and the ISAS questionnaire were administered, and exclusion criteria were applied, resulting in the filtering of 81 participants. The final number of study participants was 367.

## STATISTICAL ANALYSIS

Data were entered into a Microsoft Excel spreadsheet and analysed using IBM Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM SPSS Science Inc., Chicago, IL). Quantitative

variables were expressed as frequencies and percentages, while categorical variables were compared using the Pearson Chi-square test. Spearman correlation analysis was used to examine the relationship between the interpersonal and intrapersonal functions of NSSI behaviour and smartphone addiction in both genders, with significance set at  $p<0.05$ .

## RESULTS

The study included participants of both genders, with a mean age of  $19.79\pm 1.6$  years [Table/Fig-1]. Among the participants, females, numbering 206 (56.1%), formed a larger proportion compared to males, who numbered 161 (43.9%). Most of the participants were in their first year of an undergraduate course [Table/Fig-2]. Among the reasons for smartphone usage, social media ranked the highest, with 208 (56.7%) participants citing it as the most common reason, followed by calling, mentioned by 195 (53.1%) participants; gaming, by 124 (33.8%); using OTT platforms, by 113 (30.8%); and attending online classes, by 97 (26.4%) participants [Table/Fig-2].

	Mean $\pm$ SD
Present age of participants (In years)	19.79 $\pm$ 1.6
Age of first use of smartphone	15.32 $\pm$ 2.8

[Table/Fig-1]: Mean present age of participants and age of first use of smartphone.

Parameters	n (%)	
Gender	Female	206 (56.1)
	Male	161 (43.9)
MBBS/AHS students- year of graduation course	1 <sup>st</sup> year	136 (37.1)
	2 <sup>nd</sup> year	81 (22.1)
	3 <sup>rd</sup> year	62 (16.9)
	4 <sup>th</sup> year	85 (23.1)
	Intern	3 (0.8)
Reason for use of smartphone	Making calls	195 (53.1)
	Online classes	97 (26.4)
	Social media	208 (56.7)
	OTT platforms	113 (30.8)
	Gaming	124 (33.8)

[Table/Fig-2]: Demographic details of the participants.

Upon analysing participants' responses, it was found that 130 (35.4%) felt upset when their messages were not promptly responded to, and 78 (21.3%) experienced feelings of frustration even without issues related to family, friends, or exam pressure [Table/Fig-3].

	n (%)	
Do you feel upset when your messages are not immediately responded	No	237 (64.6)
	Yes	130 (35.4)
Do you feel frustrated or depressed MOST OF THE TIME in the last few weeks, even without any problems from family/friends/ any other relationship/exam pressure	No	289 (78.7)
	Yes	78 (21.3)

[Table/Fig-3]: Emotional responses of participants to phone messages and stressors.

Notably, 114 (31.1%) of the participants displayed signs of smartphone addiction [Table/Fig-4]. No significant variation in smartphone addiction was detected among students of different years in their undergraduate courses. However, the analysis revealed a statistically significant difference in addictive behaviours between

Category	n (%)	
Addiction	No	253 (68.9)
	Yes	114 (31.1)

[Table/Fig-4]: Addiction among participants.

the sexes (p-value=0.001) [Table/Fig-5]. In the addicted group, males 65 (40.4%) were more numerous than females 49 (23.8%), while females 73 (35%) were more prevalent in the high-risk group compared to males 29 (18%) (p-value <0.001) [Table/Fig-6].

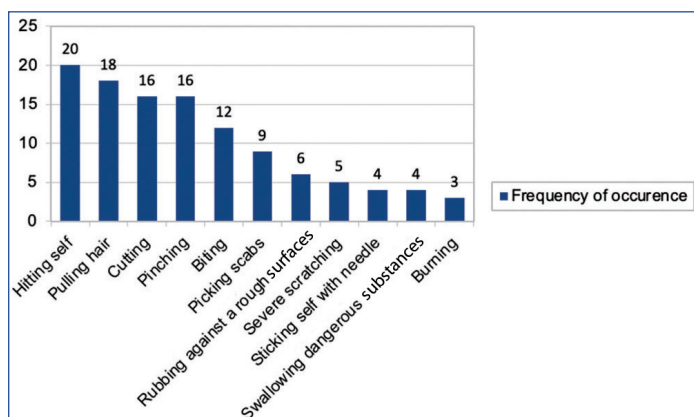
Variables		Addiction		p-value
		No	Yes	
		n (%)	n (%)	
Gender	Female	157 (76.2)	49 (23.8)	0.001*
	Male	96 (59.6)	65 (40.4)	
MBBS/AHS students- year of graduation course	1 <sup>st</sup> year	99 (72.8)	37 (27.2)	0.117
	2 <sup>nd</sup> year	52 (64.2)	29 (35.8)	
	3 <sup>rd</sup> year	48 (77.4)	14 (22.6)	
	4 <sup>th</sup> year	53 (62.4)	32 (37.6)	
	Intern	1 (33.3)	2 (66.7)	

**[Table/Fig-5]:** Gender- and year of graduation course-based analysis of addictive habits. Statistical analysis used: Chi-square test with results significant at p-value <0.05

Category		Male (%)	Female (%)	p-value
Addiction	<22 (not addicted)	67 (41.62)	84 (40.78)	<0.001*
	22-31 (high-risk)	29 (18.01)	73 (35.44)	
	>31 (addicted)	65 (40.37)	49 (23.78)	

**[Table/Fig-6]:** Gender wise distribution based on various categories of smartphone. Chi-square test with results significant at p-value <0.05

Among the 367 participants, 50 (13.6%) reported intentional self-injury without suicidal intent. In these 50 participants, a substantial number engaged in deliberate self-injury using various methods. Hitting oneself emerged as the most frequently reported method, cited by 20 (40%) of participants, closely followed by pulling one's own hair, reported by 18 (36%). Additionally, biting was reported by 12 (24%), pinching by 16 (32%), and cutting by 16 (32%) participants. Other methods included picking scabs (9, 18%), severe scratching (5, 10%), and ingesting harmful substances (4, 8%). A considerable percentage of participants also mentioned burning (3, 6%), rubbing against rough surfaces (6, 12%), and piercing with a needle (4, 8%) [Table/Fig-7].



**[Table/Fig-7]:** Methods adopted for Non Suicidal Self-Injury (NSSI).

Out of the 50 individuals, females were found to engage in self-harm behaviour more than males, and a significant association was observed between the year of graduation and the act of self-injury (p-value=0.008). Most of these individuals were in their early years of undergraduate study (1<sup>st</sup> and 2<sup>nd</sup> year) [Table/Fig-8]. The mean age at which participants reported their first injury was 15.71±4.27 years [Table/Fig-9]. The frequency of self-injury varied by gender, with a median of seven times for males and five times for females [Table/Fig-10].

Most participants reported that their last self-injury occurred more than six months ago. Among them, 32 (64%) indicated that they were alone when injuring themselves, while 10 (20%) stated that

Variables		Have you ever injured yourself intentionally and without suicidal intent by any of the following methods?		p-value
		No	Yes	
		n (%)	n (%)	
Gender	Female	174 (84.5)	32 (15.5)	0.228
	Male	143 (88.8)	18 (11.2)	
MBBS/ AHS students- year of graduation course	1 <sup>st</sup> year	116 (85.3)	20 (14.7)	0.008*
	2 <sup>nd</sup> year	65 (80.2)	16 (19.8)	
	3 <sup>rd</sup> year	56 (90.3)	6 (9.7)	
	4 <sup>th</sup> year	79 (92.9)	6 (7.1)	
	Intern	1 (33.3)	2 (66.7)	

**[Table/Fig-8]:** Gender and year of graduation course-wise distribution of NSSI behaviour. Statistical analysis used: Chi-square test with results significant at p-value <0.05

Category	Mean±SD
Age of injuring oneself for the first time	Overall 15.71±4.27

**[Table/Fig-9]:** Mean age of injuring oneself for the first time.

Category		Median	Percentile 25	Percentile 75
Average number of times a participant engaging in self-injurious behaviour	Males	7.00	5.00	10.00
	Females	5.00	2.00	9.00

**[Table/Fig-10]:** Average frequency of self-injurious behaviour done by a participant.

they were not alone, and 8 (16%) suggested that it might have been the case. Regarding the duration between the urge to self-injure and the act itself, 36 (72%) reported a duration of less than one hour. When asked about their experience of feeling physical pain during self-injury, 22 (44%) responded affirmatively, 21 (42%) responded "maybe," and 7 (14%) responded negatively. Of the 50 individuals who engaged in self-injury, 38 (76%) expressed a desire to stop the behaviour [Table/Fig-11].

Factors	n (%)	
When was the last time of engaging in self-injurious behaviour	<1 month	12 (24)
	1-3 months	9 (18)
	3-6 months	8 (16)
	>6 months	21 (42)
Are you alone when you injure yourself?	May be	8 (16)
	No	10 (20)
What is the time interval between the URGE to injure yourself and the act of injury?	Yes	32 (64)
	<1 hr	36 (72)
	1 to 3 h	4 (8)
	3 to 6 h	3 (6)
Do you feel physical pain when you injure yourself?	>12 h	7 (14)
	Maybe	21 (42)
	No	7 (14)
Have you ever wanted to stop injuring yourself?	Yes	22 (44)
	No	38 (76)
	No	12 (24)

**[Table/Fig-11]:** Factors associated with self-injury.

No significant association was found between smartphone addiction and incidents of NSSI behaviour [Table/Fig-12]. However, a significant correlation was noted between the high-risk group of individuals with smartphone addiction and interpersonal functions such as self-care (p-value: 0.01), as well as intrapersonal functions like affect regulation (p-value: 0.04), self-punishment (p-value: 0.01), and anti-suicide (p-value: 0.008) in males [Table/Fig-13]. Conversely, no significant correlation was found between smartphone addiction and the interpersonal and intrapersonal functions of NSSI in female study participants [Table/Fig-14].

Variables		Have you ever injured yourself intentionally and without suicidal intent by any of the following methods?		p-value
		No	Yes	
		n (%)	n (%)	
Addiction	No	224 (88.5)	29 (11.5)	0.072
	Yes	93 (81.6)	21 (18.4)	
Addiction in female	No	136 (86.6)	21 (13.4)	0.126
	Yes	38 (77.6)	11 (22.4)	
Addiction in male	No	88 (91.7)	8 (8.3)	0.164
	Yes	55 (84.6)	10 (15.4)	

**[Table/Fig-12]:** Analysis of association between smartphone addiction and non suicidal self-injurious behaviour among participants. Statistical analysis used: Chi-square test with results significant at p-value <0.05

Male statistics	Addiction risk category					
	Not addicted		High-risk		Addicted	
Mean SAS Score →	18.4		31.8		46.5	
Intrapersonal/ Interpersonal factors of NSSI behaviour ↓	Correlation coefficient/ Spearman Rho	p-value	Correlation coefficient/ Spearman Rho	p-value	Correlation coefficient/ Spearman Rho	p-value
Affect regulation	0.237	0.7	0.649	<b>0.04*</b>	0.6	0.4
Interpersonal boundaries	-0.7	0.19	0.255	0.47	-0.45	0.55
Self-punishment	-0.15	0.8	0.756	<b>0.01*</b>	0	1
Self-care	0.237	0.7	0.761	<b>0.01*</b>	0	1
Anti-dissociation/ Feeling-generation	-0.03	0.97	0.441	0.2	-0.2	0.8
Anti-suicide	-0.82	0.09	0.779	<b>0.008*</b>	0.6	0.4
Sensation-seeking	-0.36	0.55	0.519	0.12	0.6	0.4
Peer bonding	-0.74	0.15	0.324	0.36	0.211	0.79
Interpersonal influence	-0.15	0.81	0.518	0.13	-0.2	0.8
Toughness	-0.23	0.71	0.614	0.059	0.258	0.74
Marking distress	0.162	0.79	0.571	0.08	0.8	0.2
Revenge	-0.23	0.71	0.608	0.06	0.894	0.11
Autonomy	-0.36	0.55	0.56	0.09	0.738	0.26

**[Table/Fig-13]:** Correlation between Smartphone addiction and interpersonal and intrapersonal functions in ISAS scale- Males. Statistical analysis used: Spearman Correlation analysis with significance set at p-value <0.05

## DISCUSSION

The ubiquity of mobile phones has profoundly influenced every aspect of society, playing a pivotal role in the lives of young individuals, particularly college students. However, concerns about the health consequences of excessive use have recently arisen. Therefore, this study aimed to analyse various aspects of smartphone addiction and NSSI behaviours, as well as the impact of smartphone usage on the emotional stability of young adults, which may potentially lead to self-injurious behaviour.

The majority of the participants in the present study were females, primarily first-year undergraduates, similar to findings in other Indian studies by Aswathi S et al., and Bobby PA et al., [14,15]. The reasons for smartphone usage varied, with social media (56.7%) being the most prevalent, followed by calls (53.1%), gaming (33.8%), OTT platforms (30.8%), and online classes (26.4%).

In the present study, it was found that 31.1% of participants were addicted to their smartphones, underscoring potential dependencies on digital communication platforms. Furthermore, the findings revealed

Female statistics	Addiction risk category					
	Not addicted		High-risk		Addicted	
Mean SAS Score →	15.57		29.19		45	
Intrapersonal/ Interpersonal factors of NSSI behaviour ↓	Correlation coefficient/ Spearman Rho	p-value	Correlation coefficient/ Spearman Rho	p-value	Correlation coefficient/ Spearman Rho	p-value
Affect regulation	0.617	0.14	-0.06	0.81	0.73	0.16
Interpersonal boundaries	-0.45	0.31	-0.28	0.23	0.444	0.45
Self-punishment	0.03	0.95	-0.33	0.15	-0.16	0.8
Self-care	-0.11	0.81	0.053	0.82	0.237	0.7
Anti-dissociation/ feeling-generation	-0.19	0.68	0.038	0.87	0.135	0.83
Anti-suicide	-0.11	0.82	-0.05	0.83	0.544	0.34
Sensation-seeking	0	1	-0.1	0.65	0.363	0.55
Peer bonding	-0.16	0.74	-0.18	0.43	-0.54	0.34
Interpersonal influence	-0.48	0.28	-0.12	0.6	-0.54	0.34
Toughness	-0.19	0.69	-0	0.99	0	1
Marking distress	-0.31	0.5	-0.2	0.39	0	1
Revenge	-0.29	0.53	0.095	0.68	0.296	0.63
Autonomy	0	1	-0.14	0.56	0.658	0.23

**[Table/Fig-14]:** Correlation between smartphone addiction and interpersonal and intrapersonal functions in ISAS scale- Females. Statistical analysis used: Spearman Correlation analysis with significance set at p-value <0.05

that 35.4% of participants felt upset when messages were not promptly responded to, while 21.3% reported feelings of frustration even in the absence of conflicts with family or friends, exam pressures, or other issues. Additionally, in this study, males exhibited a greater addiction to smartphones compared to females, a finding consistent with studies by Awasthi S et al., and Bisen S and Deshpande Y [14,16]. NSSI, defined as the direct and deliberate destruction of one's body tissue using methods that are not socially or culturally sanctioned and without the intent to kill oneself, is receiving increasing attention as a global mental health problem. The pooled lifetime prevalence of NSSI in the general population has been estimated to be 17.2% among adolescents, 13.4% among young adults, and 5.5% among adults [17]. In the present study population, the overall percentage of NSSI behaviour was 13.6% among 367 participants, but no statistically significant difference was found between males and females. Participants reported engaging in self-injury for the first time at an average age of 15.71±4.27 years. Within the subgroup of 50 (13.6%) participants, a significant number engaged in intentional self-injury using various methods, among which hitting oneself (40%), pulling one's own hair (36%), and cutting oneself (32%) were the most common. Other prevalent methods included biting (24%) and pinching (32%). Less common methods included picking scabs (18%), severe scratching (10%), swallowing dangerous substances (8%), burning (6.0%), rubbing against rough surfaces (12%), and puncturing with a needle (8%).

These findings illustrate the diverse array of methods individuals use to intentionally harm themselves, underscoring the complexity of this behaviour. Notably, hitting oneself and pulling hair are the most prevalent forms of NSSI, indicating a preference for less invasive yet still physically harmful methods. Cutting and pinching are also common, possibly because they are easier to conceal compared to other methods. Burning, puncturing with a needle, and swallowing dangerous substances are less common, likely due to the higher perceived risks or more severe consequences.

In the study by Kharsati N and Bhola P on patterns of NSSI behaviours among college students in India, it was found that approximately 31.2% of participants reported engaging in NSSI within the past year, beginning at an average age of around 15.9 years [18]. The most common methods included self-hitting (15.2%) and cutting/carving the skin (13.2%). The findings revealed that NSSI served purposes of internal emotional regulation and social influence, primarily for relaxation and gaining control, with less emphasis on provoking anger or avoiding responsibility.

Although no significant direct association was observed between smartphone addiction and NSSI in this study, there are some common factors- such as poor frustration tolerance and lack of self-control- that may mediate the association between the two, as revealed in a previous study conducted by Mancinelli E et al., [19]. In the study by Qiufeng G et al., it was highlighted that self-control and anxiety significantly influence levels of smartphone addiction [20]. Additionally, in the present study, it was observed that interpersonal functions (self-care) and intrapersonal functions (affect regulation, self-punishment, anti-suicide) of NSSI had a significant correlation with a high-risk group for smartphone addiction among males.

According to the integrated theoretical model, the factors that increase the risk of NSSI can be categorised into two main domains: interpersonal and intrapersonal. Interpersonal factors can trigger NSSI through negative relationships with parents, peer victimisation, low social support, and stressful life events. Conversely, intrapersonal factors- such as low self-esteem, negative affect, depression, anxiety, and problem behaviour- predispose individuals to use NSSI as a response to emotional dysregulation in stressful situations [21].

Furthermore, NSSI serves various functions, primarily related to coping and survival, managing difficult personal experiences, regulating affect, and asserting autonomy and control. Individuals may also use NSSI for self-punishment, to break dissociative states, or to enhance interpersonal boundaries, depending on the severity of disturbances in their sense of self-integrity [22].

The origins of NSSI are complex and multifaceted. Specifically, college students who engage in NSSI and mobile addiction may experience increased psychological distress and resort to these behaviours for perceived relief [23]. The high levels of emotional distress might contribute to or exacerbate the tendency to engage in NSSI and smartphone overuse as maladaptive coping mechanisms. Smartphone addiction often involves seeking immediate gratification and relief from stress, similar to the immediate physical relief some might find through NSSI. Both behaviours might reflect a need to regain a sense of control over one's emotions and environment [19]. There is a possibility of channeling smartphone addiction as a coping strategy for NSSI behaviour, which can be explained by the concept of self-concealment.

Self-concealment refers to the psychological tendency of individuals to actively hide personal information that they perceive as negative or distressing, such as experiences of NSSI, relationship difficulties, or negative thoughts [24,25]. It serves to maintain a positive self-image and to avoid generating negative reactions from others [26]. However, self-concealment also correlates positively with levels of depression, anxiety, and overall distress, leading to greater interpersonal distance [27,28]. In Lazarus's coping model, self-concealment is categorised as an emotion-focused, avoidant coping strategy that involves the deliberate suppression of distressing information, thoughts, and feelings [29,30]. While this may temporarily alleviate discomfort, it can hinder the adoption of proactive problem-solving approaches. Individuals high in self-concealment tend to rely more on internal coping mechanisms, such as fantasy and endurance, rather than seeking external support or solutions [31]. This pattern extends to online behaviours, where the anonymity of the internet can facilitate the disclosure of secrets and provide stress relief, potentially leading

to internet addiction [32,33]. Moreover, individuals who engage in NSSI often face stigma and consequently resort to increased self-concealment to mitigate harm. This heightened tendency toward self-concealment further elevates the risk of developing internet addiction among students dealing with NSSI behaviours.

Numerous previous studies have investigated smartphone addiction and self-injurious behaviour independently [14,18]. However, only a few have examined the association between the two, and most of these have focused on adolescent populations [6,19,23]. In contrast, this study targets young adults, specifically undergraduate medical students.

### Limitation(s)

This study encountered several limitations. Firstly, data was collected solely from a single classroom setting at one time from one cohort. Despite rigorous efforts to space out participants, some form of communication was unavoidable, leading to potential similarities in responses. Secondly, participants might have felt stigmatised or ashamed to disclose self-injurious behaviours, given their future roles as healthcare professionals. Thirdly, all measures were self-reported, which introduces subjective bias. Lastly, the limited sample size underscores the necessity for a multicenter study with a more representative sample to accurately test and summarise the causal relationships between the variables.

### CONCLUSION(S)

The findings of this study highlight the crucial importance of investigating smartphone addiction to better understand NSSI behaviour, particularly among college students. In this study, 31.1% of undergraduate healthcare professionals exhibited signs of smartphone addiction, while 13.6% were found to have engaged in NSSI. The relationship between excessive smartphone use and intentional self-injury is observed to be complex, suggesting a need for developing a holistic treatment approach that addresses both issues, considering their potential correlation and shared emotional drivers. Additionally, targeted educational programs and preventive measures should be designed to mitigate the adverse effects of smartphone addiction on mental health. Providing professional mental health treatment where necessary will foster a healthier environment for undergraduate health professionals and reduce both the prevalence of smartphone addiction and NSSI.

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**PARTICULARS OF CONTRIBUTORS:**

- Associate Professor, Department of Psychiatry, ACS Medical College and Hospital, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India. Orchid ID: **0000-0002-2628-959X**.
- Postgraduate Student, Department of General Medicine, Meenakshi Medical College, Hospital and Research Institute, Kancheepuram, Tamil Nadu, India.
- Professor, Department of Psychiatry, ACS Medical College and Hospital, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India.
- Junior Resident, Department of General Medicine, ACS Medical College and Hospital, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India.
- Postgraduate Student, Department of Psychiatry, ACS Medical College and Hospital, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Nisha Natarajan,  
Flat B, Ground Floor, No. 18/63, Ganapathy Street, West Mambalam,  
Chennai-600033, Tamil Nadu, India.  
E-mail: drnishammc@gmail.com

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