Case Report

Prevalence and Characteristics of Internet Addiction among University Students in Mauritius

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Abstract

Background: In recent years, internet penetration in the island of Mauritius has increased substantially. However, increasing internet use is also associated with adverse effects especially amongst the young internet users and there is a scarcity of research in this area.

Objectives: To assess the prevalence and characteristics of internet addiction in the student population of the University of Mauritius.

Methodology: A cross-sectional study using a shortened and contextualized Internet Addiction Test (IAT) (Young, 1998) was carried out amongst 372 participants.

Results: It was observed that 5.1% of all students (4.9% males and 5.4% females) showed features of severe internet addiction. Although 42.5% perceived themselves to be addicted to the internet, they did not have significantly higher IAT scores than those who did not. There was no statistically significant difference between the prevalence of internet addiction in males and females. Main online activities comprised preferentially of information searching (94.9%) chatting/communicating (90.6%) and downloading media content (87.9%). The mean daily time online was 4.9 hours (standard deviation=3.1 hours). The mean years of internet use was 7.1 years (standard deviation=2.7 years). Results of simple linear regression showed a negative correlation and a small effect size of years of internet use on IAT scores and daily time online was positively correlated with and had a mild effect on IAT scores.

Conclusion: This study provides useful information on prevalence rates and characteristics of internet addiction in young people in Mauritius. Further studies are required to follow-up the evolution of this condition to assess its impact on young people's health over time.

Introduction

The term "internet addiction" first evoked by Goldberg in 1995 [1], is not a clearly delineated condition with well-defined boundaries. From a survey of the literature, internet addiction encompasses a number of overlapping conditions including addictive use of the internet [2], excessive [3] or compulsive [4] internet use which is problematic [5] or pathological [6] or simply internet activity abuse [7]. It englobes maladaptive patterns of internet use [8] resulting in health risks and causing internet dependency to such an extent that normal activities are disrupted. Whilst some authors believe that the internet intrinsically has addictive potential, others [9] have postulated that the source of addiction is the nature of online activities. With the increased popularity of the internet, people are using this as a medium for activities with potential addictive potential such as online gaming [10], internet gambling [11], online sexual activities [12], for accessing social networking sites [13] and for other leisure-oriented internet activities [14].

The distribution of prevalence rates of internet addiction varies world-wide. Variables include contextual factors such as geographical region studied, internet penetration in the study area and accessibility of the internet as well as availability of devices used to access the internet. The time frame in which the study is being carried out is crucial given the rapidly evolving rate and nature of internet usage. Of special relevance are the characteristics of the sample selected, the age group and socio-economic class of participants and the nature of assessment tool used. In recent years, cultural factors are also emerging as important parameters [15].

The following selected studies have reported on the prevalence of internet addiction in young people: a2016 study of 11931 European students (mean age of 14.89 years) showed a prevalence of pathological internet use of 5.2% in males and 3.9% in females [6]; a 2015 study in China comprising 6468 students (mean age of 13.78 years) showed a severe addiction prevalence of 0.96% [16]; a study reported in 2017 in Jordan comprising 716 students (age range of 12-18 years) showed that 6.3% had severe internet addiction [17]; a 2010/2011 study amongst 982 students in Tunisia (mean age of 17.10 years) showed that the prevalence of internet addiction was 11.6% [18]; a 2009 study carried out amongst students in Mumbai (India) comprising 987 college students (mean age 16.82

years) showed the prevalence of internet addiction to be 0.7% [19]. A study reported in 2013 consisting of 2257 English university students (mean age of 22.67 years) showed an internet addiction prevalence of 3.2% [20]. A 2006 study in Korea involving 1217 middle school students (age range of 13 to 15 years) showed an internet addiction prevalence of 2.38% [21]. However, it is challenging to compare the studies as different assessment tools have been used to measure internet addiction. Meta-analysis studies have also been useful in giving an overview of prevalence rates across the world, which vary widely from 0.8% in Italian adolescent students to approximately 27% in Hong Kong adolescent students [22]; prevalence rates of problematic internet use in the United States have been reported to range from 0% to 26.3% [23]. Although a recent study has highlighted the few numbers of published studies in Oceania and Africa [15], a South African study comprising 1795 participants (age range of 19-35 years) had reported in 2005 the prevalence of problematic internet use to be between 1.67% and 5.29% depending on the assessment criteria used [24].

Risk factors reported to be associated with internet addiction include personality traits such as high neuroticism and low agreeableness [20]. Risk behaviors such as sensation-seeking and poor sleeping habits have also been shown to relate to pathological internet use [6]. Co-morbid psychiatric disorders including depression, anxiety and attention-deficit hyperactivity disorder have been observed to occur more frequently in problematic internet use [5,21,25,26]. Parental and family factors such as quality of communication, parental support, family cohesion or conflict, academic achievement as well as internet usage habits have also been reported to be risk factors for internet addiction [26]. Gender differences have been explored in several studies indicating mainly that the male gender is associated with internet addiction [6,16,18,19,21,22].

Detrimental effects of internet addiction impact at the personal, family, social, academic or occupational levels. At the personal level, there is neglect of activities of daily living and neglect of household duties [18] and poor sleep habits due to excessive time online [8,18]. Neglect of family life and relationship problems have also been also reported [27]. Regarding social relationships, while some studies have reported social isolation to be a consequence of excessive internet use [18]; other studies have shown that people had enhanced social relationships online [8]. Some studies have reported increased risk behaviors [6] which include increased substance use, indulging in sensation seeking activities and poor lifestyle habits such as being physically inactive, having poor nutrition and poor sleeping habits. Health effects of internet addiction also include psychological and mental health effects with an increase in mood and behavior disturbances [18] and an increased risk of depression [19,26]. Adverse mental effects have also included negative life impairment, suicide ideation and suicide attempts [28]. In young people, internet addiction has been reported to impact negatively on academic performance [18,27] and work performance in people in employment [7,27].

Mauritius is a small island developing state in the Indian Ocean and is considered part of Africa. It has a population of 1,281,353 and an internet penetration of 62.7% in 2017 [29]. The University of Mauritius is the main university of the island with a student population of around 12,000. Given the paucity of studies in Africa

on internet addiction [15], a cross-sectional study was carried out amongst students of the University of Mauritius in February 2013 to investigate the prevalence of internet addiction, gender differences and characteristics of internet use. The relationship of internet addiction versus years of internet use and daily time online was also studied.

Materials and methods

Participants were randomly selected with a target sample size of 370 which was calculated at 95% confidence level. This study obtained the approval of the Ethics committee of the Ministry of Health and Quality of Life, Mauritius. Participation was voluntary and participants gave informed consent.

The questionnaire used consisted of the following parts: the first part consisted of demographic details and location, duration, daily use, nature of online activities and the presence of self-reported internet addiction; the second part comprised an assessment tool. This was an adjusted, shortened and contextualized measure of internet addiction derived from the Young's Internet Addiction Test (IAT) [27]. The adjusted IAT consisted of ten most relevant questions for the age group under study from the Young's IAT [27]. The questions are tabulated in Table 1.There were 5 responses for each question ranging from 1(rarely) to 5(always). The scores for the ten questions were then added with the minimum score being 10 and the maximum score being 50. Using Young's classification of the score as a model, in our study a score of 10-24 points indicated an average online user whose internet usage is completely under control (the "Controlled" group); a score of 25-39 indicated a user facing occasional or frequent problems because of his internet usage (the "Mildly Addicted" group); and a score of 40-50 suggested that the user is facing significant problems due to internet use (the "Severely Addicted" group). The data collected was analyzed using Microsoft Excel 2007. Relationships between categorical variables were evaluated using the Chi-square test at a confidence level of 95%. A p value of less than 0.05 was considered significant for the statistical test of association of two variables. Simple linear regression was also used to find the relationship of adjusted IAT scores versus years of internet use and daily time online respectively.

Results

Sample characteristics

There were 372 participants comprising 49.7% males and 50.5% females. All the participants were aged between 19 and 24 years with a mean age was of 21.1 years and standard deviation of 1.09.

Characteristics of internet use

93.8% accessed the internet at home, 4.3% at the university and 1.9% accessed the internet by the use of mobile devices. With regards to duration of internet use, 14.2% has been using the internet for less than 5 years, 80.1% between 5 to 10 years and 5.7% for more than 10 years. The mean years of internet use was 7.1 years with a standard deviation of 2.7 years. Regarding daily time spent online, 48.1% of participants spent between 4 to 8 hours whilst 39.8% spent less than 4 hours online. 8.9% of participants spent more between 8 to 12 hours and 1.1% spent more than 12 hours online. 2.1% did not give any information regarding this. The mean hours spent online everyday

Table 1: Results of adjusted Internet Addiction Test [27] questionnaire.

Questions: How often	Mean	SD
1. Do you find that you stay online longer than you intended?	3.13	1.29
2. Do others in your life complain to you about the amount of time you spend online?	2.07	1.31
3. Do you form relationships with fellow online users?	2.29	1.20
4. Do your grades or university works suffer because of the amount of time you spend online?	2.02	1.28
5. Do you check your mail before something else you need to do?	3.12	1.50
6. Do you lose sleep due to late-night log-ins?	2.34	1.39
7. Do you find yourself saying "just a few more minutes" when online?	3.05	1.47
8. Do you try to hide from your parent or teachers how long you have been online?	1.67	1.21
9. Do you prefer to spend more time online over going out with others?	1.83	1.16
10. Do you try to cut down the amount of time you spend online and fail?	2.16	1.28

was 4.9 hours with a standard deviation of 3.1 hours. Out of all the activities online, information searching, chatting/communicating and downloading media content were the most preferred activities with 94.9%, 90.6% and 87.9% of the respondents respectively stating that these were among their main activities online. Gaming, online shopping and online gambling comprised activities carried out by 45.2%, 25.6% and 6.7% of the participants respectively. 42.5% perceived that they were addicted to the internet.

Results of adjusted IAT scores

The distribution of the adjusted IAT scores is shown in Figure 1 and the frequency of adjusted IAT scores is shown in Figure 2. The mean adjusted IAT score was 23.7 with a standard deviation of 7.9. The mean scores of the individual questions are shown in Table 1. The question "How often do you find that you stay online longer than you intended?" had the highest mean score of 3.13 with a standard deviation of 1.29 whereas the question "How often do you try to hide from your parent or teachers how long you have been online?" had the lowest mean score of 1.67 and a standard deviation of 1.21.

Classification of internet addiction

The proportion of participants in the "Severely Addicted", "Mildly Addicted" and "Controlled" groups were as follows: 5.1% (4.9% males and 5.4% females); 32.8% (37.2% males and 28.3% females); 62.1% (57.9% males and 66.3% females).

## Relationship between gender and adjusted IAT score

A chi-square test of independence was performed to examine the relation between gender and adjusted IAT scores. The difference was not statistically significant at $p < 0.05$.

Relationship between perception of internet addiction and adjusted IAT score

A chi-square test of independence was also performed to examine the relation between the perception of internet addiction and adjusted IAT scores. Again the difference was not statistically significant at $p<0.05$. Hence those participants who perceived themselves as having internet addiction did not have significantly higher adjusted IAT scores than those who did not.

Simple linear regression was performed to study the relationship between adjusted IAT score versus years of internet use (Figure 3). Although the model was significant at $p<0.05$ and showed a negative correlation of -0.12, the model R^2 was 0.0156 indicating the small effect size of years of internet use on adjusted IAT.

Simple linear regression was performed to study the relationship between adjusted IAT score versus daily time online (Figure 4). This showed a positive correlation of 0.36. The model was significant at $p<0.05$ and the model R^2 was 0.1297 indicating that daily time online had a mild effect on adjusted IAT.

Figure 1: Distribution of adjusted IAT score per participant.

Figure 2: Frequency of adjusted IAT scores.

Figure 3: Relationship between adjusted IAT score versus years of internet use.

Figure 4: Relationship between adjusted IAT score versus daily time online.
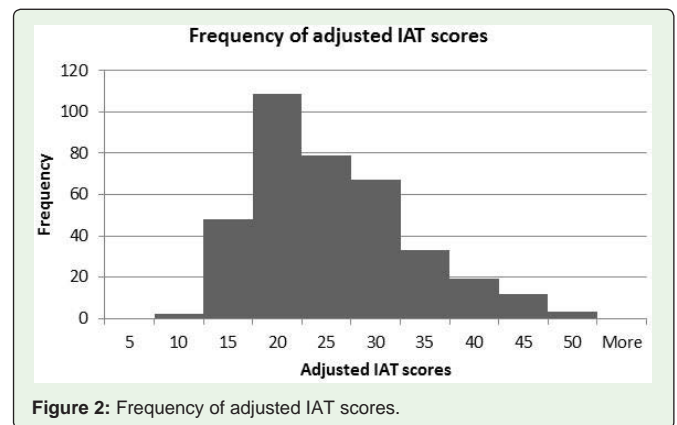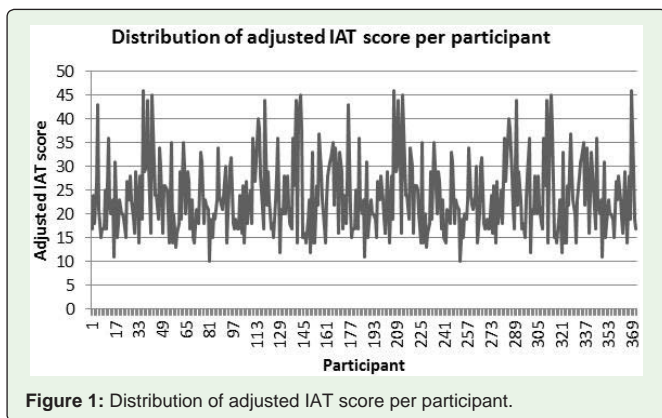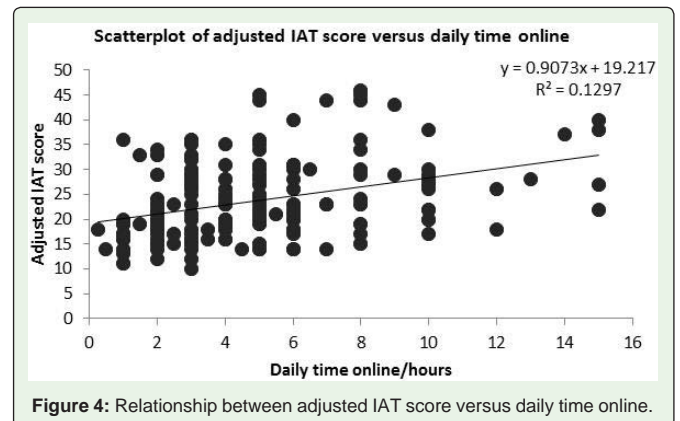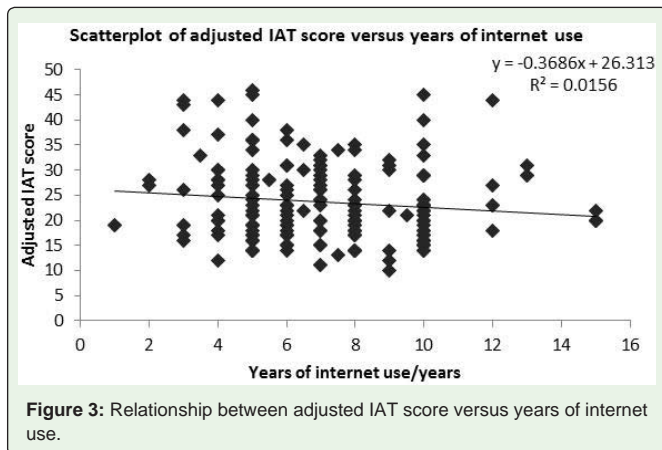
Discussion

This study provided useful baseline data on internet addiction for Mauritius. However as this study was carried out amongst university students, results may not be generalized to the population and must be interpreted with caution. Another limitation of the study was that total time online was assessed whereas it would have been more relevant to extract that component of online time not devoted to necessary or productive online activities. Also, an adjusted and shortened version of Young's IAT [27] was used and scores obtained were used to categorize the students. It is plausible that different results could have been obtained by using the full Young's IAT [27]. In addition, it has recently been reported that IAT scores should be interpreted cautiously as the scores were not found to be associated with clinical duration and severity [30]. Finally, the questionnaire administered was self-administered and could be subject to social desirability bias.

The prevalence of internet addiction as reported by this study was 5.1% overall (4.9% males and 5.4% females). This prevalence is comparable to rates worldwide and is also close to the rates reported for South Africa [24]. In our study, 93.8% of the participants accessed the internet at home, 4.3% at the university and 1.9% accessed the internet by the use of mobile devices. This contrasted with findings from another study [19] where the workplace was used to access the internet. The low rate of accessing the internet by using mobile devices was a surprising finding as mobile penetration is high in Mauritius with a penetration of 146% in 2017 [31].

The main online activities reported in this study comprised preferentially of information searching (94.9%) chatting/communicating (90.6%) and downloading media content (87.9%). This is similar to other studies. The main online activities in a study of young Indian people [19] also involved social networking, chatting, and downloading media files. Similarly, a study carried out in China [16] showed that the five most popular online activities were social networking, school work, entertainment, internet gaming and online shopping and a study carried out in Jordan showed that chatting was the main online activity [17]. Though results from these studies are culturally and age dependent, it is interesting to note that the main focus of online activities involve online relationships and social networking.

Although many studies have reported that the male gender is associated with internet addiction [6,16,18,19,21,22], this was not found to be the case in our study. We also did not find any relationship between self-perception of internet addiction and the measured scores of internet addiction indicating that some participants had an erroneous perception that they might be addicted to the internet. It is to be noted that there is currently a lack of research on self-perception of internet addiction and its consequences.

Regarding mean years of use, a study [21] showed that the younger the age of first internet use showed a higher tendency to internet addiction. Early internet exposure was also noted to be associated with internet addiction in a recent systematic review [22].This contrasted with findings of this present study which showed a small negative correlation between years of use and internet addiction.

Mean daily time online has been shown to influence internet addiction though people who are addicted to the internet also spend more time online. In this study there was a small positive correlation between mean daily time online and internet addiction. A recent study in Taiwan showed that an increased in time spent online was an independent predictor for internet addiction [28] whilst a review reported that people at risk of internet addiction spent significantly more time online [8]. This is corroborated by another study [22] where internet addiction was found to be associated with daily use of the internet, its use for leisure purposes and increased time online. Interestingly another study showed a linear relationship between the number of hours online per day and the number of risk-behaviors in adolescents [6]. These findings however contrasted with a study [19] where no significant relationship was found between internet addiction and the hours of use per day.

Conclusion

Though useful data was gathered in this present study, it was not possible to research many relevant aspects of internet addiction due to limited time. These included risk factors, psychiatric co-morbidities, physical and psychological impacts, associated risk-taking behaviors, clinical course over time, adverse effects and management issues. As the internet becomes more ingrained in people's daily lives and young people are especially exposed to cumulative use over time, future studies are needed to investigate the health aspects of excessive internet use.

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