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Prevalence of internet addiction, its association with psychological distress, coping strategies among undergraduate students

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ABSTRACT

Purpose: This study aimed to describe the prevalence of Internet addiction (IA) among undergraduate students, and its impact on psychological distress and coping strategies.
Methods: Data were collected using a convenience sample of 163 student nurses.
Findings: The results showed that there was high prevalence rate of IA among students. In addition, the use of avoidance and problem-solving coping mechanism was statistically significant among the IA group compared with the non-IA group ($p < 0.05$). This was associated with a more negative impact on psychological distress and self-efficacy ($p < 0.05$).
Conclusions: IA is an increasing problem in the general population and among university students. It can affect many aspects of a student's life and performance.
Practical implications: The results will raise awareness of the deleterious effects of IA on a wide range of student life.

1. Background

Shaw and Black (2015) defined Internet Addiction (IA) as excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and Internet access that lead to impairment or distress. Another consensus definition by Spada (2014) conceptualized Problematic Internet Use (PIU) as an inability to control one's use of the Internet which leads to negative consequences in daily life. This definition states Internet use in general, whether on mobiles, tablets or computers, and for the purposes of gaming, social media or other different uses. Spada concluded that several studies have stressed both similarities and disagreements between PIU, addictive behaviours and impulse-control disorders in relation to diagnosis and assessment tools. The disagreements regarding diagnostic criteria and the lack of large epidemiological studies make it difficult to establish prevalence estimates of PIU in the general population.

The Tokyo WHO report (2014, p. 10–11) concluded that studies of IA and of epidemiology based on the available data are limited by several factors, including the complexity of longitudinal and qualitative studies, and the fact that much of the research is on specific population groups and cannot be generalized. The report concluded that better instruments or scales are needed to provide valid and reliable data, since the instruments currently used have no international consensus and have not been validated internationally. Although there is still controversy about the diagnosis of IA, Internet gaming disorder, which contributes to estimates of IA, is now included in DSM 5 under conditions for further study (American Psychiatric Association, 2013).

Another study by Al-Gamal et al. (2016) showed in a study among university students in Jordan that prevalence of IA was 40%, and that IA was associated with a high level of mental distress. The study concluded that coping strategies, specifically the use of problem solving, resulted in students being more likely to experience a lower level of IA. The high prevalence of IA in this study, compared to previous studies, may be explained first by the fact that it was done with a specific age group (university students), and second by the overall growth in Internet use. 80% of young people in 104 countries now use the Internet, a large increase over previous years, resulting from the rapid spread of broadband mobile services, and the decrease in cost of these services and mobiles themselves. According to the International Telecommunications Union (ITU) (ICT Facts and Figures 2017. P1) half the world's population are now Internet users, reflected in the incremental use by specific sub-groups confirming the reasons for the discrepancy between Al-Gamal et al.'s (2016) study and earlier research. According to the same ITU report ITU, there are 12% fewer female users of the Internet worldwide than men, again explaining the differential cited above (Tripathi, 2017).

Anew study by Sharma et al. (2017) of the general adult population (18–65 year old) recruiting a large sample from a house-to-house

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survey, found the total prevalence of IA to be 1.3% for Internet use (2% males, 0.6% females) and for mobile phone overuse 4.1% (2.5% males, 1.5% females). The study found negative correlations between age, number of family members and years of marriage with IA and mobile overuse. From the previous discussion, and building on the WHO report of 2014, in implementing this study we shall include several areas of investigation: psychological distress and coping strategies of the sample of study, using both qualitative and quantitative approaches, with well-validated instruments in order to gain a good understanding of the topic. Th aim is to describe the prevalence of IA among undergraduate students, its possible relationship with psychological distress and coping strategies, and possible gender differences in prevalence.

2. Methods

2.1. Study design

This study uses a descriptive correlational design to identify the prevalence of IA among undergraduate students and its relationship with psychological distress and coping strategies.

2.2. Setting

The study was conducted during the second semester of the academic year 2017–2018, at Fakeeh College for Medical Sciences, between September 2017 and June 2018.

2.3. Participants

Power analysis was calculated using the following four input parameters: alpha of 0.05, an effect size (f2) of 0.15, and power of 0.80. The required sample size of 140 was determined with attrition rate of 15%. Then, the required sample size was 164.

The target population was undergraduate nursing students at Fakeeh College for Medical Sciences ($n = 250$); the criterion for inclusion was any undergraduate nursing student on the BSc programme, and a total of 163 students were enrolled.

3. Outcome measure

3.1. Socio-demographic data

All students' demographical data were obtained including age, gender, educational level of study, family type, and income.

3.2. Internet addiction

The Arabic version of the Internet Addiction Test (IAT) was administered to assess the prevalence rate of IA among nursing students. The test was designed by Young (1998) and the Arabic version has been validated in a study conducted in Lebanon by Hawi (2013). It is a self-rated test that contains 20 items. Each item was scored on a scale of 0–5, from 0 (Does not apply) to 5 (Always). Three categories described the level of AI: a score of 20–49 suggests controlled or average use (mild addiction), 50–79 occasional or frequent problems (moderate addiction), and 80–100 significant problems (severe addiction). IA was assessed by summing the scores, and those ≥50 were classified as IA (Young, 1998). IAT is the most widely used instrument for the measurement of IA, the validity and reliability of Chinese, Arabic and English versions confirmed (Cronbach alpha ≥0.90) (Chong Guan et al., 2015; Khazaal et al., 2008).

3.3. Perceived stress

The Perceived Stress Scale (PSS) is used to assess global perceptions of stress. The 14 items indicate how unpredictable, uncontrollable and overloaded respondents find their lives (Cohen, Kamarck & Mermelstein, 1983). Cronbach's alphas range from 0.75 to 0.86 (Cohen et al., 1983). In this study, Cronbach's alpha was 0.72.

3.4. Coping behaviour

The Coping Behaviours Inventory (CBI) was measured with a 19-item scale developed by Sheu et al. (2002). It consists of four categories: avoidance behaviours, problem-solving behaviours, optimistic coping behaviours and transference behaviours. Each item uses a 5-point Likert-type scale from 0 to 4. Higher scores for each factor point out more recurrent use of a certain type of behaviour. The CBI Cronbach's alpha was 0.76 (Sheu et al., 2002), and construct validity was confirmed. In this study, the Cronbach's alpha was 0.79.

3.5. Hamilton Depression Rating Scale

The Hamilton Depression Rating Scale (HDRS) or Hamilton Rating Scale for Depression (HRSD) was developed by (Hamilton, 1986); it is widely use to rate depression and assess its severity, and has high internal consistency with Cronbach's alpha of 0.88 (Rush et al., 2003). The scale is composed of 24 items with different levels of answer, ranging from zero to two, or zero to four according to the specific item, where zero indicates absence of the symptom, and four indicates its most severe form. HDRS encompasses different outcome measurements: mood, suicidal ideation, feelings of guilt, insomnia, agitation, anxiety and weight loss, as well as somatic symptoms.

3.6. Self-Esteem Scale

The Self-Esteem Scale (Rosenberg, 1965) is a 10-item scale that has five levels of answer, ranging from 0 (strongly disagree) to 4 (strongly agree); the higher the sum of all scale items, the higher the self-esteem. The scale has internal consistency that ranges from 0.77 to 0.88, and test-retest reliability ranging from 0.82 to 0.85.

3.7. Ethical consideration and approvals

IRB rules and regulations at FCMS were applied to this study (RSH, 2134); the investigators assured participants that confidentiality was maintained. Informed consent was obtained from all participants; rules and regulations set out by the IRB committee are applied to guarantee the application of a code of ethics to both research on the students and on the educational process, and the investigator guarantees no negative impact or harm shall occur.

3.8. Data analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 for Windows. The level of significance for all analysis was set at $p < 0.05$. The first stage of the quantitative data analysis described the participants' responses to the variables. The second stage employed descriptive statistics such as mean and standard deviation to analyze social demographic characteristics as well as IA level, stress level and ways of coping with stressors. Strength and direction of relationships between students' IA, perceived stress and coping behaviours were determined using Pearson Correlation Coefficients (Field, 2013).

4. Results

4.1. Prevalence of IA

Of the 163 students who returned the completed questionnaires, 110 participants (67.5%) met the criteria for IA, as indicated by scoring > 50 on the IA scale Advanced academic-level students are

Table 1
Sociodemographic data of the study participants.

Element	%
Gender	
Female	100%
Male	0%
Age	
< 20 years	38.5%
21–25 years	55.2%
26–30 year	6.3%
Family type	
Nuclear	81.9%
Extended	18.1%
Family income	
< 10,000 SAR	48.8%
10,0000–29,900 SAR	45.05
> 30,000 SAR	6.3%
Parent employment	
Both parents employed	20.8%
One employed	25.0%
Neither employed	51.0%
Living status	
With family	95.8%
With friend	3.2%
Alone	1.1%
Father education level	
Primary	15.0%
Secondary	51.15
Tertiary or higher	33%
Mother education level	
Primary	29.8%
Secondary	40.4%
Tertiary or higher	29.8%

Table 2
Results of the comparison between IA and not-addicted in total score and subscales.

	Internet Mean ± (SD)	Not addicted Mean ± (SD)	P value
Salience	17.61 (3.10)	11.500 (3.53)	< 0.05
Excessive use	17.66 (3.26)	11.50 (2.12)	< 0.05
Neglect work	11.49 (2.16)	8.01 (1.01)	< 0.05
Anticipation	7.49 (1.62)	5.21 (0.74)	< 0.05
Lack of control	10.67 (2.30)	7.01 (1.41)	< 0.05
Neglect social life	7.01 (1.51)	6.012 (0.21)	< 0.05
Total	70.21 (8.49)	49.36 (6.53)	< 0.001

Table 3
Utilized coping strategies among the study participants.

	Internet addicted Mean ± (SD)	Not addicted Mean ± (SD)	P value
Avoidance	14.75 (5.66)	9.75 (2.13)	< 0.05
Problem Solving	17.24 (4.32)	9.41 (2.32)	< 0.05
Stay Optimistic	11.49 (2.16)	8.01 (1.01)	< 0.05
Transference	7.62 (2.62)	6.50 (3.54)	0.12

self-esteem score, the total self-efficacy score was significantly higher among the IA group: 20.77 versus 14.65 in the non-IA group. This was significant at $p < 0.05$. Furthermore, the depression level was significantly higher among the IA group. Table 3 presents the study participants' scores in relation to self-esteem and depression.

4.2. Relationship between coping strategy, self-esteem, and depression with IA

The results of the relationship between the study outcomes and IA are shown in Table 4. The analysis shows a significant positive correlation between the IA sub-scales and avoidance coping mechanism ($p = 0.04$). This indicates that students with the avoidance coping mechanism were more likely to experience a higher level of IA. There was, however, a significant negative correlation between the problem-solving strategy and total IA scores ($r = -0.36$; $p < 0.05$). This indicates that students who use problem solving as a coping strategy were more likely to experience a lower level of IA. Self-esteem was also negatively correlated with the IA group. This suggests that students who had higher self-esteem were less likely to be IA. Correlation analysis was performed to examine the association between socio-demographic data and IA. There was a negative correlation between students' age and IA ($r = -0.133$, $p < 0.001$), indicating that students who are younger have a higher level of IA (Table 5).

5. Discussion

The purpose of this study was to identify the prevalence of IA and its association with psychological distress, self-esteem and coping strategies among nursing students at FCMS. According to the author's knowledge and based on the literature review, this is the first study to investigate the relationship between psychological distress, self-esteem and coping strategies, with IA, in the Saudi population.

The study found a high prevalence (67.5%) of IA among FCMS

more subject to IA than first- and second-year students. In relation to socio-demographic data, the number of participants who came from nuclear families and had a family income of > 10.000 SAR was significantly higher in the IA group. Conversely, other demographic variables showed no statistical significance varied between IA and non-IA groups. The socio-demographic and clinical characteristics of the study sample are shown in Table 1.

The analysis of the Internet Addiction Scale domains revealed that the salience sub-scale average (17.61 vs 11.50) was significantly higher in the IA group than the non-IA group ($p < 0.5$). In addition, the Internet was used excessively among the IA group at a significantly higher rate than the non-IA group ($p < 0.05$). This result appeared in another domain of the IA scale, as reflected in neglecting work. IA participants were more likely to show work neglected (average 11.49) than the non-IA group (8.01). Similarly, a high rate of anticipation was noted among the IA group with an average of 7.49, in contrast to the non-IA group who felt less compelled to use the Internet when offline, with an average of 5.21 ($p < 0.05$). Moreover, the IA group admitted to trouble in managing their time as they spent a significant proportion of time online, and this was noticed by others. The average for the lack of control sub-scale was 10.67 vs 7.01. This difference was statistically significant at $p < 0.05$. Additionally, IA respondents indicated they were more likely to go online as a coping mechanism to handle external situation problems and/or to reduce mental tension and stress, as reported in Table 1.

Regarding the coping mechanisms, the results indicated a mixture. For instance, avoidance strategy was ranked the highest among the IA group (mean = 14.75) compared with the non-IA group (9.75). This was statistically significant at 0.05. In addition, the problem-solving strategy was statistically significantly higher among the IA group with an average of 17.24 as against 9.41. The stay-optimistic strategy was commonly used among the IA group (mean 11.49 vs 8.01; $p < 0.05$). However, transference was the least used among the study participants and the difference between groups was non-statistically significant. More details are presented in Table 2. With regard to the Rosenberg

Table 4
Total self-esteem and depression scores.

	Internet addicted Mean ± (SD)	Not addicted Mean ± (SD)	P value
Self-esteem	20.77 (4.72)	14.65 (4.75)	< 0.05
Depression	21.24 (4.97)	14.37 (5.69)	< 0.05

Table 5
Correlation between IA with coping behaviours, self-efficacy and depression.

	Pearson correlation (r)	Significance
Salience	0.216	0.03
Excessive Use	0.226	0.02
Neglect work	0.133	0.07
Anticipation	0.219	0.03
Lack of Control	0.214	0.03
Neglect social life	− 0.132	0.01
Avoidance	0.74	0.04
Problem solving	− 0.36	0.03
Stay optimistic	− 0.092	0.15
Transference	− 0.116	0.21
Self-efficacy	− 0.36	0.03
Depression	0.24	0.04
Age	− 0.64	0.02

students; this is consistent with Al-Gamal et al.'s (2016) findings, although ours is even higher (67.5% vs 40%). Again, this could be explained by the recent rapid increase in Internet and mobile use in both academic and non-academic settings (ICT, 2017), as well as the increased use of the Internet and advanced technology in academic institutions, including blackboard learning (at FCMS), and blended, interactive and distance learning. The findings of socio-demographic characteristics in the IA group are consistent with those of Rao et al. (2017) as regards the negative correlation between age and number of family members with IA. This could be related to the decreased interest in the Internet and with decreased power and the senses that come with age.

The findings of this study, that advanced-level students are more Internet addicted than first- and second-year students is in accordance with the results of Al-Gamal et al. (2016) and Bakken et al. (2009). This can be explained from different aspects. For example, Sharma et al. (2017) despite the current negative correlation between age and IA, it is expected that IA prevalence will increase among younger people, including the more specific group of university students. At present, the beginning students have more time, a lower study workload, and fewer requirements to meet. The effect of IA on the study outcome is illustrated in Fig. 1.

The IA group was found to spend longer on the Internet, with greater lack of control, than the non-addicted group. However, this finding disagrees with Al-Gamal et al. (2016), who found no association between the time that students spend on the Internet and IA; this could be explained by the nature of Internet technology available today, with the nature of exposure different from previous years and leading eventually to IA. This study found that income of > 10,000 SAR is associated with higher levels of IA, again disagreeing with Al-Gamal and colleagues, who found no association between income and IA. This

might be explained by the ability to purchase advanced technology, offering faster and easier access to the Internet than was possible three years ago; and also, because the mean income in Saudi Arabia (this study) is higher than that of Jordan (Al-Gamal's study).

As a member of a nuclear family, more resources are available to an individual than in an extended family, and there would be less competition for access to the Internet, which might explain the higher prevalence of IA among students from nuclear families. The finding agrees with those of (Sharma et al., 2017). The study found that students in the IA group used all coping strategies, but with a preference for avoidance and problem solving rather than staying optimistic; the transference coping strategy was used almost equally by both groups. The negative correlation between problem solving and IA agrees with Al-Gamal et al. (2016). The more problem-solving behaviours are employed, the less IA is found; this can be explained by the student's ability to find different strategies, solutions, and thoughts if they face problems, rather than simply searching the Internet, which could lead to IA. The greater the avoidance strategy, the higher level of IA; this could be explained by low self-esteem and low problem-solving skills and behaviours, which might drive the student to use the easiest way to respond to stressors, by avoiding them and using the Internet instead, thus increasing their IA. The study found no significant difference between the two groups in terms of staying optimistic as a coping strategy; that staying optimistic has no association with IA agrees with Al-Gamal et al. (2016); the low level of use of transference by both groups also agrees with these authors.

For self-esteem, the findings showed that students with higher self-esteem had lower prevalence of IA, agreeing with (Shaw and Black, 2015; Skues et al., 2016). Many factors contribute to a good understanding of stressors and positive behaviours; understanding oneself and having a higher self-esteem may contribute to positive coping behaviours, in turn leading to less dependent and addictive behaviours, and conversely explaining the negative correlation between self-esteem and IA.

Depression was found to be positively and significantly correlated with IA, as indicated in Fig. 1, agrees with the previous findings of Shaw and Black (2015). Skues et al. (2016) also found that boredom and loneliness were significantly and positively correlated with IA, while with the study of Adib-Hajbaghery et al. (2012) on university students found an association between IA and depression, somatization, aggression, and psychosis, excluding paranoia. Lee (2014) also considered the social interaction anxiety to be a predictor of IA. Moreover, our study finding of the association between depression and IA agrees with Younes et al. (2016), Ha and Hwang (2014) and Bakken et al. (2009). Although a large proportion of the accessible population was recruited for the study, a bigger sample would offer greater understanding of the problem, as would conducting the study over different points of time.
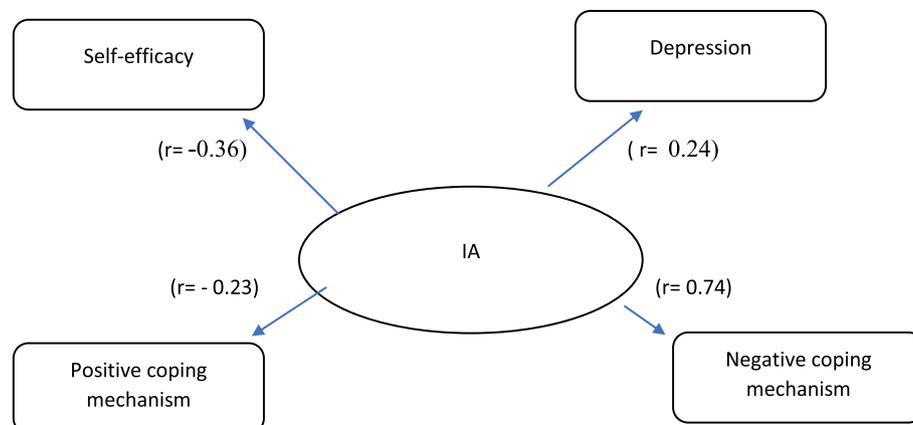

Fig. 1. The internet addiction impact on the study outcomes.

6. Conclusion

IA is a growing problem, in both the general population and university students. It can affect many aspects of student life and performance. Knowing the prevalence of the problem among students, and its relationship with stress, coping behaviours and depression, is important for both the academic staff and the students themselves, to help in preventing its occurrence and to resolve any psychological problems that may accompany it. This study found a high prevalence of IA among FCMS students, especially among younger ones, and it was associated with a negative coping behaviours of avoidance; low self-esteem was common in the IA group of students, together with depression.

7. Recommendations

This study recommends the engagement of IA orientation programmes for high-risk students, especially in the early stages of study, to include the teaching of coping behaviours and policies for the use of the Internet, together with activation and spread of social interaction activities. Although, almost all the accessible population was recruited in the study sample, a bigger sample and a qualitative study may be helpful in understanding why the non-addicted group employed fewer problem-solving behaviours although they showed more self-efficacy, and less IA.

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