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Internet Addiction: Influencing Academic, Non-academic and Psychological Aspects in Offshore Malaysian Medical Students

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ABSTRACT

Excessive internet usage creates abundant problems like dependency and addictive behaviour. Internet addiction (IA) is becoming a universal public health concern. The isolated group of Malaysian students studying in offshore campuses in India is more susceptible to IA due to language, culture, ethnicity, and food habit differences, leading to a lack of communication with native students. The study aims to determine the prevalence of IA and its influence on academic, non-academic, and psychological aspects in Malaysian medical students. A cross-sectional study was conducted on 170 offshore Malaysian medical students using Young's Internet Addiction Test (Y-IAT) questionnaire of 20 items. The difference was tested by student's *t*-test and the association between IA and other factors by chi-square test with a statistical significance at 5%. The study observed a 46% prevalence of IA in offshore Malaysian medical students. Male students were more prone to IA compared to females. The amount of time spent on entertainment per day was significantly ($p = 0.004$) associated with IA. The present study revealed that the prevalence of IA was significantly associated with academic performance ($\chi^2 = 33.670$, $p = 0.001$) and psychological disturbances like sleep disturbance due to late-night log-ins ($\chi^2 = 41.013$, $p = 0.001$), felt life would always be joyless ($\chi^2 = 27.272$, $p = 0.001$) and, depressed moody without internet ($\chi^2 = 33.347$, $p = 0.001$). The present study revealed that IA has an adverse impact on students' academic activities as well as on psychological health. Medical teachers and schools should identify students who are prone to and affected by IA and recommend

interventions based on their needs. This study recommends that students utilise their valuable time in offline activities like regular sports, cultural exchange programmes, fun activities, yoga, meditation, and learning new skills and languages. These activities may help students prevent overindulgence with the internet, encourage the overall growth of promising doctors, and build a healthy society.

Keywords: *Internet addiction, Young's internet addiction test, Malaysian medical students, Psychological effects, Academic activities*

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INTRODUCTION

Over the last two decades, internet usage has grown exponentially worldwide, including in developing nations. According to Internet World Stats' (1) Usage and Population Statistics 2023 estimation, the internet has penetrated 68% of the 7.93 billion world population. Asian population contributes more than half (55%) of the world population and has 54% of users with a 67% internet penetration rate. From 2000 to 2022, internet usage has grown to 1,392% worldwide, while 2,452% growth is seen in Asia. India contributes 28.0%, while Malaysia only accounts for 1.1% of the total population of Asia. The internet penetration rate in India is 60%, and in Malaysia, it is 94%, which is remarkably much higher (1).

After the COVID era, the internet has developed into an indispensable source for learning, communication, business, and entertainment worldwide, connecting people without delay. It has become a two-edged sword, as it helps to acquire and update knowledge, on the other hand, its uncontrolled, undisciplined use promotes addiction. Young (2, 3) considered internet addiction (IA) as a new emerging clinical disorder that has shown similarities with alcohol and drug addictions. Currently, IA is turning into a universal public health concern. IA is also known as problematic or pathological internet use and is included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) by the American Psychiatric Association (3, 4).

A meta-analysis report confirms that IA is increasing in young adults and the new generation (or digital natives) with implications such as increased individualism, lower sociability, and enculturation (5). Gender, online chatting, decreased interaction with parents/friends, staying at the hostel, time and money spent on the internet (6), intensive surfing (7), spending more time on entertainment, increased frequency of internet usage (8), and lack of physical activities (9) are potential risk factors of IA.

Excessive internet usage has led to various physical, mental, social, and behavioural problems, negatively affecting quality of life (2, 10, 11). Studies conducted on university students disclosed that IA has led to psychological distress like anxiety, depression, stress, poor mental health (10, 12), social adjustment (13), and sleep disturbance (14). IA had a negative impact on their academic performance (15, 16) and psychological health (12, 17, 18). Even evidence from neuroimaging confirms that IA has shown neuroanatomical and neurocognitive changes in brain regions (19, 20).

According to a meta-analysis (21), the pooled prevalence of IA among medical students from different countries is 30%. It is approximately five times higher than in the general population. Studies conducted on medical students with IA on Malaysian campuses reported a prevalence of 37.0% (8), 50.0% of possibly addicts, 6.7% addicted (12), 56.0% of problematic users and 7.8% of severe addicts (15). A similar prevalence rate of 36% and 57% was also noted in medical students in India (16, 22). These studies have emphasised the need to address the problem through proper intervention. However, these studies lack focus on medical students studied on offshore campuses.

Many Malaysian students study at Indian medical universities that are well-equipped and provide free Wi-Fi to students. Due to communication barriers caused by language, culture, ethnicity, and food habits, this group of students tends to feel lonely on the Indian campus, which makes them more vulnerable to developing IA rather unknowingly. There is a dearth of literature on IA-prone medical students studying on offshore campuses. Hence, this study considered investigating the prevalence of IA and whether it affects the academic, non-academic, and psychological aspects of medical students studying on offshore campuses in India. This will help the academicians to suggest and provide appropriate interventions to the IA-affected students as per their needs. The study aims to determine the prevalence of IA and its influence on academic, non-academic, and psychological aspects in Malaysian medical students.

METHODS

This cross-sectional study was conducted from March to October 2019 on Malaysian medical students studying at the USM-KLE International Medical Programme, Belgaum, Karnataka, India. A pilot study was conducted by taking a convenient sample of 30 students, and the prevalence of IA was 31.8%. Based on this, the sample size was estimated as 170 using the formula $n = Z^2 pq/d^2$ with 95% confidence and 7% margin of error. The nature of the study was explained to the students clearly, and consent was obtained from those who wished to participate. Confidentiality was maintained during the entire process of this study.

The study population included 170 students with an average age of 22 years old, consisting of 33% male and 67% female students. Demographic data such as age, gender, parents' working status, hometown, and activities used with and without the internet were obtained by a self-administered questionnaire. IA was tested using Young's Internet Addiction Test (Y-IAT) questionnaire, which is one of the most accepted, validated, and reliable tools for the evaluation of IA with an overall Cronbach's alpha coefficient of 0.889 (95% CI, 0.884–0.895) (23). The Y-IAT consists of 20 items, measured on a 5-point Likert scale (1 = rarely, 2 = occasionally, 3 = frequently, 4 = often, and 5 = always). Its questions cover how their internet use affects their daily personal life, social life, productivity, academic performance, and emotional feelings among study participants. The score ranges from 20 to 100, and a higher score signifies IA. Based on the analysis of Y-IAT with 20 items using all 170 samples, a mean Y-IAT score of 45 was calculated and taken as a cut-off point (8). Accordingly, students who scored less than 45 were categorised as students without IA, while those with more or equal to 45 were classified as students with IA. Severity can be rated as mild, moderate, and severe. A score of 20–39 points is a mild online user with control over their activities. A 40–69 and 70–100 score means the internet is causing problems, and students are considered moderate and severe internet addicts, respectively (23, 24). Individual Y-IAT item numbers 6, 8, 12, 14, and 20 were analysed further to understand the effects of IA on academic and psychological aspects.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 20.0 (IBM Corp., Armonk, NY, US). Mean and standard deviation (SD) were used for continuous data and percentages for categorical data. The students' *t*-test was applied to see the difference between the groups. The chi-square test was used to establish the associations between academic, non-academic, and psychological factors and the prevalence of IA as an outcome. A statistical significance was set at a 5% level ($p < 0.05$).

RESULTS

Table 1 shows the prevalence of IA based on students' demography and non-academic activities. Based on the cut-off point of the Y-IAT score, 46% (78 out of 170) of students have been addicted to the internet. Further study has noticed that out of 46% (78) students with IA, 42% (71) had a score of 45–69 and were considered moderate internet addicts, and 4% (7) who had a score over 70 were considered severe internet addicts. The difference in the mean Y-IAT score of students with and without IA was statistically significant ($p = 0.001$).

The study population consisted of 33% male and 67% female students, with an average age of 22 years old. About 40% of female and 57% of male students were internet addicts, and the difference was statistically significant ($p = 0.039$). Male students are more prone to IA than female students. The parents' working status and hometown (urban/rural) of the students did not show any effect on IA.

Most students in both groups accessed the internet for academic and non-academic purposes. Next, which non-academic activities (Table 1) students do with and without the internet were analysed. More students without IA spend 60 minutes to 90 minutes daily interacting with their parents online compared to students with IA, and the association was statistically significant ($p = 0.031$). The amount of time spent on entertainment per day was higher in students with IA, and the association was statistically significant ($p = 0.004$). Similarly, statistically significant associations were observed between using mobile devices while walking ($p = 0.001$) and eating ($p = 0.001$) with the prevalence of IA. The study observed that in gaming and social media, the number of students with IA increased along with the amount of time consumed compared to students without IA, but did not find statistically significant associations. The study did not observe any significant correlation between the prevalence of IA with physical activities and hobbies. Interestingly, it was noticed that regarding physical activities and hobbies, the percentage of students increased from 0 to 60 minutes in students without IA, whereas it decreased in students with IA.

Table 1: Prevalence of IA based on students' demography and non-academic activities

Variable	Without IA n = 92 (%)	With IA n = 78 (%)	Total n = 170 (%)	Chi-square value	*p*-value
Mean Y-IAT score ± SD	35.75 ± 5.24	54.95 ± 8.81	45.00 ± 11.92	–17.570#	0.001*
Age in years ± SD	22.03 ± 1.79	21.62 ± 1.58	21.84 ± 1.71	1.595#	0.113
Gender					
Male	24 (43.0)	32 (57.0)	56 (100)	4.264	0.039*
Female	68 (60.0)	46 (40.0)	114 (100)		
Parents' working status					
Single	43 (52.0)	40 (48.0)	83 (100)	0.349	0.555
Both	49 (56.0)	38 (44.0)	87 (100)		
Hometown					
Urban	75 (56.0)	58 (44.0)	133 (100)	1.272	0.259
Rural	17 (46.0)	20 (54.0)	37 (100)		
Online interaction with parents per day (minutes)					
None	11 (44.0)	14 (56.0)	25 (100)	10.642	0.031*
<30	45 (48.0)	49 (52.0)	94 (100)		
<60	26 (70.0)	11 (30.0)	37 (100)		
<90	5 (56.0)	4 (44.0)	9 (100)		
>120	5 (100.0)	0 (0)	5 (100)		
Entertainment time per day (minutes)					
None	10 (71.0)	4 (29.0)	14 (100)	15.424	
<30	25 (51.0)	24 (49.0)	49 (100)		
<60	32 (71.0)	13 (29.0)	45 (100)		
<90	17 (52.0)	16 (48.0)	33 (100)		
>120	8 (28.0)	21 (72.0)	29 (100)		
Gaming time per day (minutes)					
None	60 (58.0)	44 (42.0)	104 (100)	4.882	0.300
<30	13 (52.0)	12 (48.0)	25 (100)		
<60	13 (59.0)	9 (40.0)	22 (100)		
<90	3 (37.5)	5 (62.5)	8 (100)		
>120	3 (27.0)	8 (73.0)	11 (100)		
Social media time per day (minutes)					
None	2 (50.0)	2 (50.0)	4 (100)	9.075	0.059
<30	15 (65.0)	8 (35.0)	23 (100)		
<60	30 (68.0)	14 (31.0)	44 (100)		
<90	22 (52.0)	20 (47.0)	42 (100)		
>120	23 (40.0)	34 (60.0)	57 (100)		

(*Continued on next page*)

Table 1: (*Continued*)

Variable	Without IA n = 92 (%)	With IA n = 78 (%)	Total n = 170 (%)	Chi-square value	*p*-value
Mobile while walking					
Nil	13 (93.0)	1 (7.0)	14 (100)	30.604	0.001*
Occasionally	58 (65.0)	31 (35.0)	89(100)		
Frequently	15 (42.0)	21 (58.0)	36 (100)		
Often	3 (15.0)	17 (85.0)	20 (100)		
Always	3 (27.0)	8 (73.0)	11 (100)		
Mobile while eating					
No	23 (79.0)	6 (21.0)	29 (100)	22.414	0.001*
Occasionally	45 (62.0)	28 (38.0)	73 (100)		
Frequently	13 (46.0)	15 (54.0)	28 (100)		
Often	10 (32.0)	21 (68.0)	31 (100)		
Always	1 (11.0)	8 (89.0)	9 (100)		
Physical activities time per day (minutes)					
None	5 (31.0)	11 (69.0)	16 (100)	6.396	0.094
<30	41 (60.0)	27 (40.0)	68 (100)		
60	23 (62.0)	14 (38.0)	37 (100)		
90	23 (47.0)	26 (53.0)	49 (100)		
Hobbies time per day (minutes)					
None	4 (36.0)	7 (64.0)	11 (100)	7.412	0.116
<30	13 (45.0)	16 (55.0)	29 (100)		
60	34 (69.0)	15 (31.0)	49 (100)		
90	14 (50.0)	14 (50.0)	28 (100)		
120	27 (51.0)	26 (49.0)	53 (100)		

Note: # = *t*-test; * = *p*-value significant <0.05.

Table 2 shows the association between the prevalence of IA and academic activities. Students use the internet for academic activities, such as watching videos, browsing, reading PowerPoint presentations, and reading e-books. About 76% of students used the internet for all modes; no difference was noticed. Regarding time spent on the net daily, out of 99, 57% of students with IA spend more than 4 hours compared to 43% of students without IA. The association between time spent on net per day and the prevalence of IA was statistically significant ($p = 0.002$), and a similar result was observed with net consumption ($p = 0.033$).

Regarding Y-IAT item number 6, most students with IA responded about college work. They often described their college work suffering because of the amount of time spent online, and its association with the prevalence of IA was found to be statistically significant ($p = 0.001$). Similarly, significant associations were observed between Y-IAT item number 8, academic performance affected by internet usage ($p = 0.001$) and missed classes because of late-night internet use ($p = 0.004$) with the prevalence of IA.

Figures 1–3 show the association between the prevalence of IA and the psychological health of students. Item number 12 in Y-IAT revealed that 76% of students with IA always felt that life would be joyless or boring without the internet compared to 24% of students without IA, presented in Figure 1. The association between Y-IAT item number 12 and the prevalence of IA was statistically significant (χ^2 = 27.272, p = 0.001). Similarly, statistically significant associations were observed between Y-IAT item number 14, sleep disturbance due to late-night log-ins (χ^2 = 41.013, p = 0.001) with the prevalence of IA presented in Figure 2. A greater number of students with IA felt depressed, moody, or nervous without the internet (Y-IAT item number 20) than students without IA, which is presented in Figure 3. This association was statistically significant (χ^2 = 33.347, p = 0.001) hence, more students with IA showed dependency on the internet.

Table 2: Association between prevalence of IA and academic activities of students

Variable	Without IA n = 92 (%)	With IA n = 78 (%)	Total n = 170 (%)	Chi-square value	*p*-value
Purpose of internet access					
Academics	1 (100)	0 (0)	1 (100)	0.973	0.615
Non academics	9 (50)	9 (50)	18 (100)		
Both	82 (54)	69 (46)	151 (100)		
Mode of internet access for academic purpose					
Watching videos	5 (71)	2 (29)	7 (100)	6.441	0.169
Browsing	3 (43)	4 (57)	7 (100)		
Reading PowerPoint	10 (67)	5 (33)	15 (100)		
Reading e-books	9 (82)	2 (18)	11 (100)		
All	65 (50)	65 (50)	130 (100)		
Time spent on net per day (hours)					
Nil	0 (0)	0 (0)	0 (100)	15.164	0.002*
<1	6 (75)	2 (25)	8 (100)		
2	21 (84)	4 (16)	25 (100)		
3	22 (58)	16 (42)	38 (100)		
>4	43 (43)	56 (57)	99 (100)		
Net consumption per day (GB)					
<1	11 (65)	6 (35)	17 (100)	10.491	0.033*
1	31 (65)	17 (35)	48 (100)		
2	39 (51)	37 (49)	76 (100)		
3	7 (29)	17 (71)	24 (100)		
>4	4 (80)	1 (20)	5 (100)		

(*Continued on next page*)

Table 2: (*Continued*)

Variable	Without IA n = 92 (%)	With IA n = 78 (%)	Total n = 170 (%)	Chi-square value	*p*-value
Y-IAT item number 6: How often do your college work/ grades suffer because of the amount of time you spend online?					
Rarely	60 (73)	22 (27)	82 (100)	38.628	0.001*
Occasionally	25 (51)	24 (49)	49 (100)		
Frequently	7 (39)	11 (61)	18 (100)		
Often	0 (0)	15 (100)	15 (100)		
Always	0 (0)	6 (100)	6 (100)		
Y-IAT item number 8: How often does your academic performance suffer because of internet?					
Rarely	42 (78)	12 (22)	54 (100)	33.670	0.001*
Occasionally	35 (57)	26 (43)	61 (100)		
Frequently	12 (40)	18 (60)	30 (100)		
Often	3 (20)	12 (80)	15 (100)		
Always	0 (0)	10 (100)	10 (100)		
Missed classes because of late night internet use					
Rarely	90 (57)	67 (43)	157 (100)	8.505	0.004*
Occasionally	2 (15)	11 (85)	13 (100)		
Frequently	0 (0)	0 (0)	0 (100)		
Often	0 (0)	0 (0)	0 (100)		
Always	0 (0)	0 (0)	0 (100)		

Note: * = *p*-value significant <0.05.

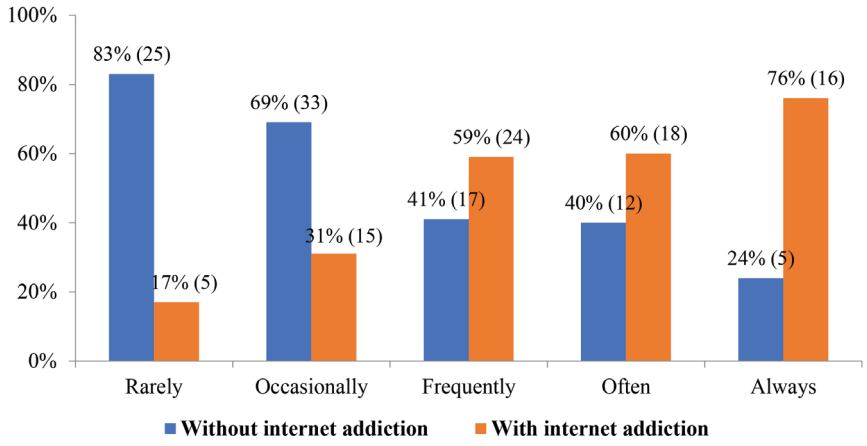

Figure 1: Between two groups showing item number 12 of Young's IAT: How often do you fear that life without internet would be boring, empty and joyless?

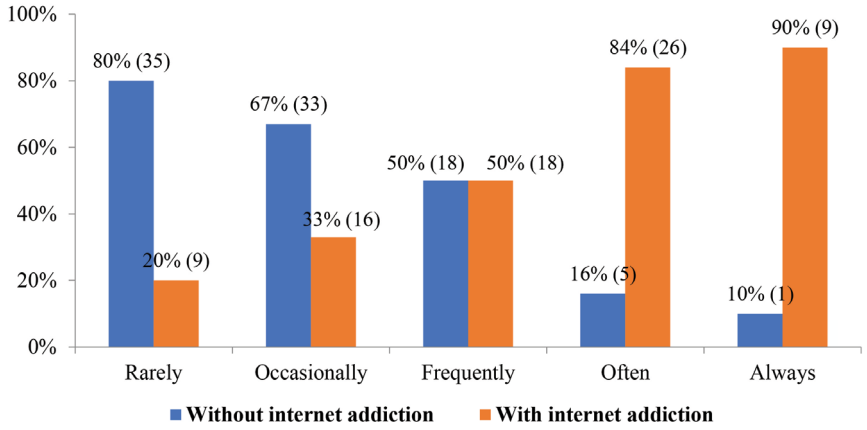

Figure 2: Between two groups showing item number 14 of Young's IAT: How often do you lose sleep due to late-night logins?

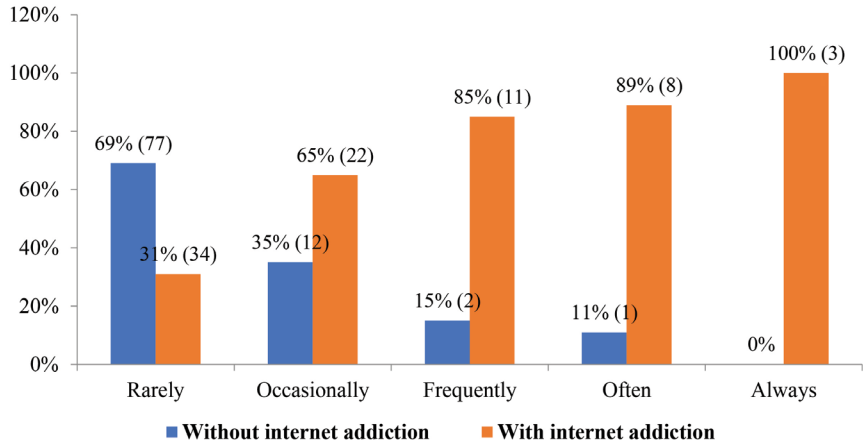

Figure 3: Between two groups showing item number 20 of Young's IAT: How often do you feel depressed and moody when you are offline, which goes away once you are back online?

DISCUSSION

The technological revolution has resulted in an exponential rise in internet usage recently, which benefits society but also creates abundant problems like dependency and addictive behaviour, especially in youngsters. A meta-analysis estimated the pooled prevalence of IA to be 30% among medical students in different countries, approximately five times more than the general population (21). Various studies carried out on IA using Y-IAT at Malaysian medical campuses on Malaysian students showed a prevalence of 37.0% (8), 50.0% possibly addicted, 6.7% addicted (12), 56.0% problematic users and 7.8% severe addicts (15). However, these studies have lacked focus on medical students studied on offshore campuses. Thus, the present study has filled this gap and found a 46% prevalence of IA in Malaysian medical students studying on an offshore campus. The prevalence rate in different studies ranged from 37%–56%. Even though all studies used Y-IAT for testing IA, this difference may be due to variations in grouping structure based on Y-IAT scores (8, 12, 15) and different settings (environment) of the students in the present study.

A study conducted on-campus at a Medical School in Malaysia during pre-COVID-19 time revealed the prevalence of IA in different ethnic groups of medical students (12). It showed that the highest prevalence of IA (including possibly addicted and addicted) was recorded in other ethnic student groups (67%), followed by local Malays (63%), Chinese (45%), and Indian (32%) students. Similar findings were also noted in another study conducted in Universiti Putra Malaysia (8). These studies have shown that different ethnicities and cultures from those of native students affect the prevalence of IA. It is worth noting that the present study's data were collected just before the COVID-19 pandemic hit India in December 2019. The authors assume that the prevalence of IA might increase after the COVID-19 period since the internet has become an inevitable source for most teaching and learning activities. And now it has become the new norm.

Free Wi-Fi on medical campuses and easy access to various Internet of Things devices allow medical students to utilise the internet for surfing, communication, entertainment, education, and other activities (6–8). Male gender, increased frequency of internet usage (8), using the smartphone for social communication, visiting new sites (7, 25), spending more money on the internet, staying online for a longer time, online chatting, decreased interaction with parents (6), and lack of physical activities (9) are determinants of IA. Students who use the internet for entertainment are 3.5 times more likely to get IA (8). Students who stay away from home are more susceptible to IA because of privacy, and the absence of parental supervision exacerbates the situation (6). The present study confirms that students who spend more time interacting online with their parents are prevented from the adverse effects of the internet. The current study also noted similar factors like male gender and entertainment are associated with the increased prevalence of IA. This study observed that students with IA used mobile even while eating and walking, and showed behavioural changes such as dependency.

Medical students commonly use the internet for educational purposes after social networking and entertainment (7, 15). Medical students who used the internet more frequently and stayed online longer were significantly correlated with IA (8, 15). This affects their sleep (14), increasing their chances of missing classes and adversely affecting their academic performance (10, 15, 16). The current study revealed that spending more time and data on the internet and late-night logins led to sleep disturbances, missed classes, and ultimately affected their academic performance, corroborating previous studies. In the present study, it was observed that most students were more dependent on the internet and gadgets for most of their academic activities in the classroom than textbooks, pens, and paper.

Block (4, 26) mentioned features of IA, mainly dependency, excessive use with loss of time sense, feelings of anxiety, tension in non-availability of the internet, poor achievement, social isolation, and neglecting basic urges. The research which involved medical students with IA established a positive relationship with depression, anxiety, and stress symptoms, and an inverse association with social interaction (12, 13, 17, 18, 27). The present study revealed that psychological disturbances such as sleep disturbances due to late-night logins, feeling life would always be joyless, and depression without the internet were significantly experienced by students with IA than without IA.

Alarming evidence from neuroimaging studies (19, 20) showed that IA also had an impact, even on the neurobiological level. A study (19) revealed that functional impairment in the reward (striatum, insula, amygdala) and executive (frontal/parietal/occipital lobes of brain) systems was seen in young adults with IA. Another neuroimaging study (20) showed that internet addicts struggle to shift their attention from distracting stimuli. This was because of lower activation levels in the frontopolar cortex in people with IA.

As the global prevalence of IA grows, its effect is alarming on overall health, particularly for medical students, and indirectly, the community's wellness. Researchers have advised interventions to prevent IA (10, 17, 18, 21). Cognitive behavioural therapy (CBT) is one of the psychological interventions suggested as a comprehensive and effective treatment in IA. CBT involves identifying causes and challenges in setting goals and modifying cognitive distortions that induce and promote addictive behaviour (28). Other complementary therapies, like traditional yoga practices, including posture, mindful breathing, and meditation, are beneficial in treating and preventing addictive behaviour (29–31).

As a part of the psychiatry postings for Phase II, Year 4 Malaysian medical students in the USM-KLE International Medical Programme, Belgaum, the school offers counselling and Jacobson's progressive muscle relaxation (JPMR) sessions. Along with these, Indian traditional breathing techniques like alternate nostril breathing (*anulom vilom pranayama*), fast breathing (*kapalbathi*), and open-eye meditation are taught by one of the authors (RDN). This helps to develop the mental and psychological endurance of the students. After the sessions, students had lower anxiety levels, and it was observed on the Galvanic Skin Response biofeedback machine.

Today, the internet is an inevitable source for teaching and learning. It has established its role well in the present scenario, and undeniably, its use will expand in the future. The real challenge is to prevent IA by conducting awareness programmes on the responsible use of the internet and creating support groups to assist students in overcoming the problem in the initial stage. This study recommends that students utilise their valuable time in offline activities like regular sports, cultural exchange programmes, fun activities, yoga, meditation, and learning new skills and languages. These activities may help students prevent overindulgence with the internet, encourage the overall growth of promising doctors, and build a healthy society.

To the best of our knowledge, the present study is the first to assess the prevalence of IA among offshore medical students. The study also further investigated the influence of IA on academic, non-academic, and psychological aspects. The study's limitation is that it is conducted in a single centre. A multicentric study is highly recommended to generalise the results to the population. Since the study is based on a questionnaire, responses are subjective.

CONCLUSION

The present study investigated the prevalence of IA and its effect on academic, non-academic, and psychological aspects in offshore Malaysian medical students. Medical students access the internet for educational, personal, and social needs. Malaysian medical students are an isolated group studying away from home in India. Their ethnicity, language, culture, and food habits differ from native students, leading to a lack of communication. Because of these risk factors, they have a higher chance of developing IA. Other factors noted with IA in the present study are utilising more data and spending more time on the internet for entertainment purposes, late-night logins made them miss classes and suffer from college work, ultimately affecting their academic performances. Psychological disturbances like sleep disturbances due to late-night logins, feeling like life would be joyless, and depression without the internet are significantly associated with IA. IA has an adverse impact on students' academic activities as well as psychological health. The overall health of medical students is essential in quality learning and becoming competent physicians to serve the community. Medical teachers and schools should identify students who are prone to and affected by IA and recommend interventions (CBT programmes) based on their needs.

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ETHICAL APPROVAL

This study obtained approval from the Institutional Ethics Committee, USM-KLE International Medical Programme, Belgaum (reference number USM-KLE/IEC/02-2019-11).

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