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Research Article

Relationship Between Internet Addiction, Risk of Eating Disorders and Body Mass Index Among Students in Universiti Kebangsaan Malaysia

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Abstract

Background and Objective: Internet use among university students has increased dramatically in recent years leading to internet addiction for some students. The study was conducted to determine the internet addiction, the risk of eating disorders among students in UKM and to identify the relationship between internet addiction, risk of eating disorders and body mass index.

Materials and Methods: A total of 351 undergraduate students between 19 and 27 years old were selected using a convenience sampling method. The data collection process was done through anthropometric measurement and questionnaire. Anthropometric measurement was performed to determine the body mass index (BMI) which is determined by body weight and height. The questionnaires included socio-demographic information and health status. Internet addiction was assessed using the Internet Addiction Test (IAT) while eating disorder was assessed using the EAT-26. **Results:** The results showed that IAT mean scores for male (39.6 ± 10.0) and female (38.3 ± 10.2) subjects did not differ significantly ($p > 0.05$). Most subjects had mild levels of internet addiction (66.7%), while some had a moderate (13.4%) level and the rest had no internet addiction (19.9%). The risk of eating disorders was 16.5% (male: 18.9%, female: 14.2%). The IAT scores was significant and positively correlated with the EAT-26 scores ($r = 0.120$, $p < 0.05$) for female and all subjects. In addition, there was a significant positive correlation between IAT scores and BMI for males ($r = 0.218$, $p < 0.01$) and all subjects ($r = 0.157$, $p < 0.01$) and between EAT-26 scores and BMI for male subjects ($r = 0.260$, $p < 0.01$) and all subjects ($r = 0.207$, $p < 0.01$). **Conclusion:** The internet addiction levels were found to be at mild levels. A significant positive correlation between IAT and EAT-26 scores for female and all subjects and between IAT scores and BMI was observed for male and all subjects.

Key words: Internet addiction, eating disorders, body mass index, Malaysia, eating behavior

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Internet is one the most important means of communication in the modern society and is deemed as a vital feature in daily lives of most people. Internet usage has increased over the years¹ and is required for many daily activities. According to the World Internet Usage Statistics², the number of internet users worldwide until 30 September 2020 has reached almost 4.9 billion. There are 28.7 million internet users in Malaysia. And 64% of them were between 20 and 30 years of age in 2016³. A study conducted in a private Malaysia medical school, showed that the average total daily internet use is 6.56 ± 3.73 h⁴.

Internet addiction is defined as a psychological addiction that is risky especially for young people, which can lead to health and relationship problems and a lack of time management⁵. In addition to serving as a necessity in daily life, the excessive use of the internet may also cause many problems. According to Sari and Aydin⁶, the internet is used for various purposes and is especially widely used by university students. Fast and easy internet access at the university, the need to complete assignments, obtain course information and conduct online research can make university students internet users who were not otherwise using the internet. However, high dependency on the internet and resulting internet addiction can have a negative impact on the well-being of individuals and society, especially among young adults. This situation has the potential to influence the academic performance and social interaction of university students⁷.

As university students are more likely to have psychosocial and economic problems⁸, they are at risk of developing internet addiction and eating disorders⁹. The study of Çelik *et al.*⁹ showed a positive correlation between internet addiction and eating disorders. In Malaysia, the prevalence of anorexia nervosa and bulimia nervosa is estimated to be 1% and 3% of the population respectively¹⁰. Eating disorders, especially among adolescents and young adults, have become a global concern. Additionally, increased obesity among adolescents and young adults in most countries of the world can be a contributing factor to the development of eating disorders among this age group¹¹. According to the study by Bozkurt *et al.*¹² on young adults in Turkey, young adults with obesity have higher rates of internet addiction. A significant and positive correlation has also been found between internet addiction and body mass index (BMI) among healthy young adults. Individuals with internet addiction often have an irregular diet, snacking between meals and drinking unhealthy drinks, which in turn lead to obesity¹³.

In general, studies on the relationship between internet addiction and the risk of eating disorders among university students in Malaysia have yet to be conducted. This study was therefore conducted to assess the level of internet addiction and the risk of eating disorders. This study also aimed to identify the relationship between internet addiction, the risk of eating disorders and body mass index (BMI) among UKM students.

MATERIALS AND METHODS

Ethical approval: This study is approved by the Research and Innovation Secretariat Committee, Chancellor Tuanku Muhriz Hospital (reference UKM.PPI.800-1/1/5-JEP- 2019-514).

Subjects and study location: This cross-sectional study was conducted at UKM, Bangi. This study involved undergraduate students (male and female) between 19-27 years of age. The subjects were selected using convenient sampling method from different majors or residential colleges. The sample size was determined using the method described by Daniel¹⁴. The selected subjects were healthy without any chronic illness. This study was conducted from September to December 2019. The subjects were briefed on the purpose of the study and the questionnaire prior to the study. The participation in the study was voluntarily.

Sociodemographic and internet usage pattern information: A set of questionnaires was used to collect data regarding the socio-demographic information such as age, year of study and gender.

Anthropometric measurements: All anthropometric measurements were performed in accordance with the standard procedure. Height was measured with the subjects standing upright without wearing shoes using a SECA Body Metre 208 (SECA, Germany) to the closest 0.1 cm. The TANITA Digital Lithium Scale (HD319; TANITA Corporation, Tokyo, Japan) was used to measure weight to the nearest 0.1 kg. The subjects were measured while wearing light clothing and being barefoot. Body weight and height were required to determine the BMI and were calculated based on weight (kg) height⁻¹ (m)². BMI is an indicator of nutritional status that is used in adults; the categories were based on WHO¹⁵ criteria and were defined as follows: underweight: BMI <18.5 kg m⁻²; normal: BMI 18.5-24.9 kg m⁻²; pre-obese: BMI 25.0-29.9 kg m⁻²; class one obese: BMI 30.0-34.9 kg m⁻²; class two obese: BMI 35.0-39.9 kg m⁻² and class three obese: BMI > 40.0 kg m⁻².

Questionnaires: The questionnaire consisted of two main parts: the Internet Addiction Test (IAT) and Eating Attitude Test (EAT 26).

Internet addiction test (IAT): As shown in Table 1, the problematic internet use are evaluated using IAT¹⁶, namely, salience, excessive use, neglect of work, anticipation, self-control and neglect of social life. IAT consists of 20 questions using a 5-point Likert type scale. Based on Table 2, the subjects were asked to rate each of the 20 items on a 5-point Likert scale, from 0 (Not applicable) to 4 (Often). Total scores ranging from 0-30 points were considered to reflect a normal level of internet usage; 31-49 points indicate the presence of a mild level of internet addiction; 50-79 points reflect the presence of a moderate level of internet addiction; and scores of 80-100 indicate a severe addiction of the internet¹⁶ (Table 3).

Eating attitude test (EAT-26): The Eating Attitude Test (EAT-26)¹⁷ was used to determine if the subject was at risk of eating disorders. The EAT-26 consists of 26 questions related to the subject's attitudes towards eating. The score is calculated by summing the values from the subject's responses. The included questions examine the risk of eating disorders, the tendency towards bulimia and the perception of body image. Table 4 shows the scores for items 1-25 and item 26 of the frequency degree ranging from always to never. The final score was then divided into two categories as in Table 5. Subjects with a score of 20 or more were considered to be at risk of eating disorders while scores less than 20 showed a lower risk¹⁸.

Data analysis: Collected data were analysed using Statistical Package of Social Sciences (SPSS) version 21.0 software (Inc, Chicago, IL, USA). Descriptive tests including mean, standard deviation and percentage were used for the socio-demographic data, anthropometric measurement, IAT and physical activity levels. The independent t-test was used to determine the differences in the mean scores of anthropometric measurements, IAT and EAT-26 by gender. Associations between male and female subjects with BMI categories, IAT level and risk of eating disorder category were evaluated using the chi-square test. Pearson correlation test

was used to determine the relationship between IAT, EAT-26 and BMI. For all data analyses, significant levels were set at $p < 0.05$.

RESULTS AND DISCUSSION

Subject profile: A total of 351 undergraduate students from various majors at UKM, Bangi were involved in this study. The subjects involved consisted of 175 male and 176 female students between 19-27 years of age with a mean age of 21.3 ± 1.5 years for male subjects and $21.1-1.4$ years for female subjects. Furthermore, most of the subjects involved in this study were the students of 3rd year (42.2%), followed by 2nd year (22.5%), 1st year (20.2%) and 4th year (15.1%). For marital status, 99.4% of the subjects were single and only 0.6% were married.

Table 1: Factors, domains and item numbers of IAT

| Factors | Domains | Item No. |
|---------|---------------------|--------------------|
| 1 | Salience | 10, 12, 13, 15, 19 |
| 2 | Excessive use | 1, 2, 14, 18, 20 |
| 3 | Neglect work | 6, 8, 9 |
| 4 | Anticipation | 7, 11 |
| 5 | Self-control | 5, 16, 17 |
| 6 | Neglect social life | 3, 4 |

Source: Young¹⁶

Table 2: Frequency degree and scoring scale

| Frequency degree | Scale |
|------------------|-------|
| Not applicable | 0 |
| Rarely | 1 |
| Occasionally | 2 |
| Frequently | 3 |
| Often | 4 |

Source: Young¹⁶

Table 3: IAT score range

| Level | Score | Explanation |
|----------|--------|---------------------------------|
| Normal | 0-30 | Normal level of Internet usage |
| Mild | 31-49 | Mild or minor problems |
| Moderate | 50-79 | Occasional or frequent problems |
| Severe | 80-100 | More significant problems |

Source: Young¹⁶

Table 4: Scoring for EAT-26 method

| Frequency degree | Item 1-25 | Item 26 |
|------------------|-----------|---------|
| Always | 3 | 0 |
| Usually | 2 | 0 |
| Often | 1 | 0 |
| Sometimes | 0 | 1 |
| Rarely | 0 | 2 |
| Never | 0 | 3 |

Garner *et al.*¹⁷

Table 5: EAT-26 score range

| Score range | Indicators |
|-------------|---|
| ≥ 20 | High concerns of body weight, body shape and eating behaviour. Shows the risk of eating disorders |
| < 20 | Low concerns of body weight, body shape and eating behaviour. Shows less risk of eating disorders |

Garner *et al.*¹⁷

Table 6: Gender wise internet addiction pattern

| Criteria | Number (%) | | | χ^2 -value | p value |
|--|----------------|------------------|-----------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | | |
| Internet usage for learning | | | | | |
| Yes | 175 (100.0) | 176 (100.0) | 351 (100.0) | - | - |
| No | 0 (0.0) | 0 (0.0) | 0 (0.0) | | |
| No. of hours for internet usage per day | | | | | |
| Less than 2 h per day | 4 (2.3) | 8 (4.5) | 12 (3.4) | -2.780 | 0.427 |
| 3-4 h per day | 30 (17.1) | 37 (21.0) | 67 (19.1) | | |
| 4-5 h per day | 50 (28.6) | 42 (23.9) | 92 (26.2) | | |
| More than 5 h per day | 91 (52.0) | 89 (50.6) | 180 (51.3) | | |
| Internet usage frequency per weeks | | | | | |
| Less than 2 times per weeks | 1 (0.6) | 2 (1.1) | 3 (0.9) | 18.565 | <0.001* |
| 3-4 times per weeks | 8 (4.6) | 3 (1.7) | 11 (3.1) | | |
| 4-5 times per weeks | 34 (19.4) | 10 (5.7) | 44 (12.5) | | |
| More than 5 times per weeks | 132 (75.4) | 161 (91.5) | 293 (83.5) | | |

*Significant difference between male and female (p<0.001)

Table 7: Mean of anthropometric characteristics of subjects

| Anthropometric measurement | Mean \pm standard deviation | | | p-value |
|---------------------------------------|-------------------------------|------------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | |
| Weight (kg) | 69.7 \pm 13.8 | 54.5 \pm 11.4 | 62.1 \pm 14.7 | <0.001* |
| Height (m) | 1.7 \pm 0.1 | 1.6 \pm 0.1 | 1.6 \pm 0.1 | <0.001* |
| Body mass index (kg m ⁻²) | 24.3 \pm 4.6 | 22.0 \pm 4.2 | 23.1 \pm 4.5 | <0.001* |

*Significant difference between male and female (p<0.001)

Internet usage pattern: Internet usage patterns were assessed to determine the level of internet use, time and frequency that subjects surfed the internet, as shown in Table 6. The prevalence of internet usage for learning by the subjects was 100.0%. This result is indeed expected because as university students, the usage of internet is mainly for learning. Furthermore, the number of hours of internet usage shows that only a small number of subjects (3.4%) use the internet less than two hours in a day. However, more than half of the subjects (51.3%) used the internet for more than five hours a day, with a slightly higher prevalence of male subjects (52.0%) than female subjects (50.6%). Therefore, there was no significant difference in the number of hours of internet use in a day between male and female subjects (p>0.05). The results of this study are supported by Kapahi *et al.*¹⁸ who reported that male subjects (59.0%) used the internet more than five hours a day compared to female subjects (57.0%) and there was no significant difference between the two groups.

The frequency of male subjects used the internet for four to five times a week was 19.4% whereas that of female subjects was 5.7%. Furthermore, most of the subjects of this study used the internet more than five times a week (83.5%). These results show that female subjects have a higher percentage (91.5%) of internet usage frequency more than five times a week compared to male subjects (75.4%) which may be because the female subjects are less socialized than that of the male subjects, therefore the frequency of internet

use of female subject is much higher than that of the male subjects. Thus, there was a significant difference in the frequency of internet use in a week between male and female subjects (p<0.001). The results of this study contradict with those of Gordon *et al.*¹⁹ who found that male subjects use the internet more often in a week than female subjects because men often use the internet in their free time but women often use the internet for communication purposes only. Overall, 83.5% of the subjects in this study use the internet more than five times a week followed by 12.5% (four to five times a week), 3.1% (three to four times a week) and 0.9% (less than twice a week).

Anthropometric data: Table 7 shows the anthropometric characteristics of the subject by gender. The overall mean weight of the subjects was 62.1 \pm 14.7 kg. Comparison of the subjects by gender showed that the mean weight, height and BMI of male subjects was significantly higher than that of female subjects (p<0.001). Table 8 shows the classification of the body weight status by gender of the subjects based on BMI classification according to WHO¹⁵. The gender comparison showed that the majority of male and female subjects were classified as having normal weight with a prevalence of 55.4% and 64.2%, respectively. Furthermore, the prevalence of female subjects classified as underweight was much higher (17.0%) than that of the male subjects (6.3%). However, for the prevalence of overweight or obesity, male subjects was much

Table 8: Gender wise classification of body weight status

| BMI classification | No. (%) | | | χ^2 -value | p-value |
|--------------------|----------------|------------------|-----------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | | |
| Underweight | 11 (6.3) | 30 (17.0) | 41 (11.7) | 29.615 | <0.001* |
| Normal | 97 (55.4) | 113 (64.2) | 210 (59.8) | | |
| Overweight | 52 (29.7) | 20 (11.4) | 72 (20.5) | | |
| Obese | 15 (8.6) | 13 (6.8) | 28 (8.0) | | |

*Significant difference between male and female (p<0.001)

Table 9: Gender wise mean total score of IAT

| Internet addiction | Mean \pm standard deviation | | | p-value |
|--------------------|-------------------------------|------------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | |
| Total score | 39.6 \pm 10.0 | 38.3 \pm 10.2 | 38.9 \pm 10.1 | 0.224 |

No significant difference between male and female (p>0.05)

higher (38.3%) compared with female subjects (18.2%). Thus, there was a significant difference between male and female subjects for BMI classification (p<0.001). The findings of this study are consistent with the study by Gopalakrishnan *et al.*²⁰ on medical students in Malaysia which showed a much higher prevalence of being underweight in female subjects (17.0%) than that of the male subjects (12.2%), while the prevalence of overweight or obese was higher among male subjects (41.2%) compared to female subjects (31.4%). The study by Pengpid and Peltzer²¹ also showed that the prevalence of overweight among male students was higher (28.8%) compared to female students (22.4%).

Overall, the majority of subjects involved in this study were of normal weight (59.8%) followed by overweight (20.5%) and underweight (11.7%). Overall, the lowest prevalence was in the obese category which is only 8.0%. The study by Yusoff *et al.*²² on university students in Terengganu showed that 14.7% of the subjects were classified as underweight, 57.8% as normal weight, 16.8% as overweight and 10.6% of the subjects were classified as obese. Meanwhile, compared to the study by Yusof *et al.*²², the prevalence of overweight subjects in this study was higher by 3.7%, although, the percentage of obese subjects in this study was lower by 2.6%, comparatively. These findings are consistent with the previous study conducted by Gan *et al.*²³ who showed that there was a significant difference in weight status between male and female university students in Malaysia (p<0.05).

Internet addiction test (IAT)

Mean score of internet addiction test (IAT): Internet addiction includes some symptoms of chemical addiction, however, there is no consumption of harmful as in drug and alcohol addiction¹⁸. Internet addiction involve changes in daily life, social life, life performance, feelings, emotions and others.

Table 9 shows the total mean scores of internet addiction by gender. The total mean scores of internet addiction for male subjects are 39.6 \pm 10.0 and 38.3 \pm 10.2 for female subjects. The total mean score of male subjects were slightly higher but non significantly different from female subjects, demonstrating that male and female subjects had the same level of internet addiction (p>0.05).

This finding is supported by Teong and Ang²⁴ who conducted the study on students at four universities in Sabah and Sarawak and showed that the mean scores of male and female subjects did differ significantly because the use of the internet by university students is now increasing among both genders. Due to the advancement of technology, easy access to the internet and the daily use of notification tools through the internet in various forms, such as for education, entertainment, communication and shopping, the internet has become a very important tool for both male and female students²⁵.

Furthermore, these results are also consistent with a previous study conducted by Kittinger *et al.*²⁶ on university students in the United States which reported that the mean score of internet addiction for male subjects (37.76 \pm 9.92) was slightly lower than female subjects (38.60 \pm 10.36), although there was no significant difference (p>0.05). However, these findings are inconsistent with Bui *et al.*²⁷ who conducted a study on young adults in France and found that the mean score of internet addiction for male subjects was higher (35.51 \pm 11.83) than female subjects (32.29 \pm 11.32) and there were significant differences (p<0.05).

In a study involving university students in Turkey, Chou *et al.*²⁸ found that male are at risk for internet addiction due to their stereotypical use of sexual content while women may not have such use. This finding is supported by Morahan-Martin and Schumacher²⁹ who reported that the

Table 10 : Gender wise classification according to internet addiction level

| Internet addiction level | No. (%) | | | χ^2 -value | p-value |
|--------------------------|----------------|------------------|-----------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | | |
| Normal | 33 (18.9) | 37 (21.0) | 70 (19.9) | 0.775 | 0.679 |
| Mild | 116 (66.3) | 118 (67.0) | 234 (66.7) | | |
| Moderate | 26 (14.9) | 21 (11.9) | 47 (13.4) | | |
| Severe | 0 (0.0) | 0 (0.0) | 0 (0.0) | | |

No significant difference between male and female ($p > 0.05$)

Table 11: Gender wise mean of total score EAT-26

| EAT-26 | Mean \pm standard deviation | | | p value |
|-------------|-------------------------------|------------------|-----------------|---------|
| | Male (n = 175) | Female (n = 176) | Total (n = 351) | |
| Total score | 12.5 \pm 9.3 | 11.3 \pm 9.4 | 11.9 \pm 9.3 | 0.222 |

No significant difference between male and female ($p > 0.05$)

difference between male and female is due to online activities such as gaming, pornography and gambling, which are more frequently associated with male than female.

Classification of subjects by level of internet addiction:

The level of internet addiction is categorized into four parts namely normal, mild, moderate and severe¹⁶. Table 10 shows the classification of subjects based on the level of internet addiction by gender. Overall, the prevalence of internet addiction in this study was 80.1%, in which 66.7% (male: 66.3%, female: 67.0%) of the subjects involved in this study had a mild level of internet addiction. Meanwhile, 19.9% (male: 18.9%, female: 21.0%) are categorized as having normal internet addiction and as many as 13.4% had a moderate level of internet addiction (male: 14.9%, female: 11.9%). However, none of the subject were categorized as having a severe level of internet addiction.

The study by Rosliza *et al.*⁷ on the students of Universiti Putra Malaysia showed that the prevalence of a mild, moderate and severe level of internet addiction was 35.71%, 56.52 and 7.76%, respectively demonstrating that moderate and severe levels of internet addiction in that study were much higher than in the present study. This finding is probably because the subjects of their study had sufficient financial resources, as Mazhari³⁰ reported that subjects with better financial resources, either through educational loan or family contributions; had better opportunities to access the internet, thus the risk of excessive internet usage was higher. The study by Eren *et al.*³¹ on students of Erzurum Atatürk University in Turkey showed that the prevalence of internet addiction was 78.5% (mild: 52.6%; moderate: 24.2%; severe 1.7%). The difference in this prevalence may be related to several factors such as the heterogeneity of the sample, the sample size, socio-cultural differences and access to the internet³².

Eating attitude test-26 (EAT-26)

Min skor EAT-26: Assessment of eating disorder risk in this study was determined using the EAT-26 questionnaire. Table 11 shows the total mean scores of the EAT-26 by gender. Comparison between the genders showed that the total mean score for male subjects was higher (12.5 \pm 9.3) compared to female subjects (11.3 \pm 9.4) but there was no significant difference between them ($p > 0.05$).

The results of this study are consistent with a previous study conducted by Jie and Sivapathy³³ on students of UCSI University, Malaysia, who reported that there was no significant difference in the EAT-26 scores between male and female students. This finding is due to the fact that advertisements promote lean bodies, as reported by Swami *et al.*³⁴, thus thin body is liked by females and muscular body frame is preferred by males.

Subject classification based on eating disorders risk:

The classification of subjects based on the risk of eating disorders by gender is shown in Fig. 1. These results indicate that the risk of eating disorders is higher in men (18.9%) than women (14.2%), however, there was no significant difference between the genders ($p > 0.05$). Musaiger *et al.*³⁵ conducted a study on university students in Kuwait also found that the prevalence of eating disorders is higher (33.6%) in male students than female students (31.8%). This is because male students are highly involved in physical activities and researchers reported that high levels of physical activity are associated with eating disorders³⁶. However, in contrast Ahmed and Uddin³⁷ reported that female university students were more likely to have eating disorders than males with 96 (80.7%) females compared to 23 (19.3%) male experiencing eating disorders. Overall, a total of 16.5% of subjects in this study were at risk of eating disorders. The study by Musaiger *et al.*³⁵ reported a higher risk of eating disorders (32.7%) compared to the present study.

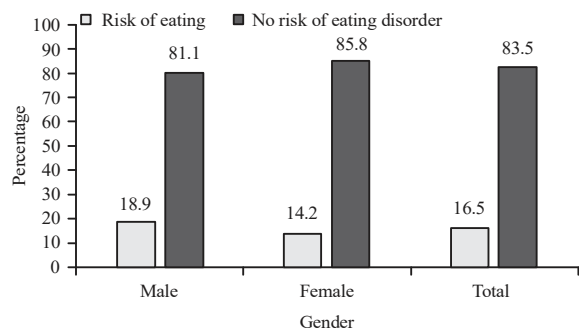


Fig. 1: Gender wise classification according to eating disorder risk
 $\chi^2 = 1.377, p = 0.241$

Higher level of stress in males increased the psychological problems, which in turn leads to eating disorders²³. Additionally, male students desire larger muscle mass while female students want to be leaner³⁸. This study is also supported by Ebrahim *et al.*³⁹, who found that among male students, the desire to increase muscle mass and reduce body fat was associated with the risk of eating disorders. Furthermore, muscular bodies are more attractive among males as their participation in body building has increased and this practice can lead to negative perception related to body image⁴⁰. Muscle dysmorphia can force male to use steroids which leads to substance abuse and thus leading to an increased risk of eating disorders^{41,42}.

Relationship between IAT and risk of eating disorders:

Excessive or inappropriate use of the internet is referred to as internet addiction. As university students are more likely to have psychosocial and economic problems⁸, they are at risk of internet addiction and eating disorders⁹. Correlation tests were conducted to determine the relationship between IAT and the risk of eating disorders among the subjects. The strength of the relationship between the variables can be determined based on three levels: namely, weak ($r = 0.10-0.29$), moderate ($r = 0.30-0.49$) and strong ($r = 0.50-1.00$)⁴³.

Table 12 shows the relationship between IAT and EAT-26 scores by gender. The results of this study showed no significant correlation between IAT v and EAT-26 scores for male subjects ($p > 0.05$). However, there was a weakly significant and positive correlation between IAT and eating disorder risk for female subjects ($r = 0.187, p < 0.05$). These findings are consistent with the study by Bui *et al.*²⁷ on young adults in France who reported that there was no correlation between internet addiction and eating disorder risk for male subjects but there was a correlation for female subjects ($r = 0.33, p < 0.001$). These findings are supported by

Table 12: Gender wise correlation between IAT with EAT-26

| EAT-26 | IAT | |
|--------|---------|---------|
| | r-value | p-value |
| Male | 0.044 | 0.562 |
| Female | 0.187* | 0.013 |
| Total | 0.120* | 0.024 |

*Significant correlation between IAT and EAT-26 ($p < 0.05$)

Table 13: Gender wise correlation between BMI and IAT

| IAT | BMI | |
|--------|---------|---------|
| | r-value | p-value |
| Male | 0.218** | 0.004 |
| Female | 0.069 | 0.365 |
| Total | 0.157** | 0.003 |

**Significant correlation between BMI and IAT ($p < 0.01$)

Rodgers *et al.*⁴⁴ who reported that the gender differences may be due to several factors such as differences in body image perception and risk of eating disorders. Consistent with previous findings³², female students with severe internet addiction obtained higher scores in the EAT-40 subscale compared to those without internet addiction. This is because internet addiction such as spending time on social media sites (Facebook, MSN) and body image perception is found to be an important predictor of eating disorders among women²⁷.

Furthermore, there is a significant and positive correlation between internet addiction and the risk of eating disorders in all subjects ($r = 0.120, p < 0.05$). This finding is supported by Çelik *et al.*⁹ who conducted a study on university students in Turkey and found that individuals with internet addiction inadvertently skip meals or suffer from weight problems due to eating unhealthy snacks. This can lead to more serious conditions such as eating disorders, including vomiting what they eat or are eating only in small quantities. In addition, individuals with serious body image problems and eating disorders may use the internet as a mechanism to overcome their problems³³.

Relationship between BMI and Internet addiction (IAT):

The problem of obesity among young adults is often discussed by determining the relationship between BMI and internet addiction. Table 13 shows the relationship between BMI and IAT by gender. Gender comparisons showed that female subjects did not show any correlation between BMI and IAT ($p > 0.05$). However, there was a significant but weak positive correlation between BMI and IAT for male subjects ($r = 0.218, p < 0.01$) and overall subjects ($r = 0.157, p < 0.01$). These findings are consistent with a previous study conducted by Sari and Aydin⁶ on university students in Turkey which showed that there is a positive relationship between the level of internet addiction and a student's BMI ($r = 0.39, p < 0.01$). The research

proved that subjects tend to have minimum movement while using the internet, resulting in low energy expenditure within a day. Therefore, the subjects tend to gain excess weight or obesity. In addition, this result is also supported by Kim *et al.*⁴⁵ who conducted a study on university students in Hong Kong and found that individuals who are addicted to the internet were more likely to be overweight.

CONCLUSION

In this study, the overall prevalence of internet addiction was 80.1% where as two-thirds of the subjects had a mild level of internet addiction. Meanwhile, the mean IAT score was not significantly different between male and female subjects. The risk of eating disorders between male and female subjects was 16.5% and did not show significant difference. There was a significant and weak positive correlation between IAT and EAT-26 for female subjects and overall subjects. Furthermore, there was a significant and weak positive correlation of BMI with IAT and EAT-26 for male subjects and overall subjects.

SIGNIFICANCE STATEMENT

This study could be useful for the Ministry of Health Malaysia as they would be able to initiate comprehensive programmes to prevent internet addiction to avoid eating disorders among university students. This study will help the researcher to uncover the critical areas of internet addiction issues faced by university students that many researchers were not able to explore. Thus, a new theory on the relationship between internet addiction and the risk of the eating disorders may be arrived at.

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