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SOCIAL MEDIA USE, BODY IMAGE, AND BODY WEIGHT STATUS: COMPARISON BETWEEN UNIVERSITY STUDENTS WITH AND WITHOUT DISORDERED EATING IN UNIVERSITI PUTRA MALAYSIA

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ABSTRACT

Background: Disordered eating, body dissatisfaction, and social media use are increasingly common among university students. This cross-sectional study aimed to compare social media use, body image, and body weight status between disordered eating (DE) and non-disordered eating (NDE) university students.

Materials and Methods: There were two phases of data collection. In Phase I, a total of 505 university students (22.6% males and 77.4% females) with a mean age of 21.26 ± 1.41 years from three randomly selected faculties in UPM were screened for disordered eating using the Eating Attitude Test (EAT-26). Sociodemographic background and anthropometric measurements including weight, height, waist circumference, and body fat percentage of respondents were measured. In Phase II, those respondents with DE were matched with those without DE by sex, age, and ethnicity. They answered an online survey on body image and social media use.

Result: Out of 505 university students in Phase I, 21.8% were engaged in DE with no sex difference observed (χ^2=0.738, p=0.390). In Phase II, 106 DE respondents were matched with 106 NDE respondents. No significant differences were found in body image, social media use (duration, volume, frequency, engagement, selfie sharing, photo investment, and photo manipulation) and body weight status between DE and NDE groups. However, DE respondents reported to have a significantly higher frequency of selfie-taking as compared to NDE respondents (t=-2.338, p=0.020).

Conclusion: High prevalence of disordered eating was observed in this study. The contribution of social media use to disordered eating needs to be further studied.

Keywords: Disordered eating, Social media use, Body image, Body weight status, University students

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1.0 Introduction

Disordered eating (for example, dieting, fasting, laxative use, and binge eating) begins to emerge in non-Western countries especially in Asia (Pike & Dunne, 2015). It was found that Asian university students were equally susceptible or even at a higher risk of disordered eating as compared to those in the Western countries (Madanat, Hawks, & Novilla, 2006). Previous studies have shown that the prevalence of disordered eating among young adults in Asian countries was high, for example, 37.6% in Bangladesh (Brown, Schiraldi, & Wrobleski, 2009), 26.7% in Philippines (Madanat et al., 2006), 13.3% in India (Pengpid & Peltzer, 2015), and 12.2% in Singapore (Chen, Mond, & Kumar, 2010). Studies on disordered eating among university students in Malaysia showed that the prevalence rate ranged from 10.1% to 25.6%, in which no difference was found between the sexes (Gan, Mohd Nasir, Zalilah, & Hazizi, 2011; Kuan, Ho, Shuhaili, Siti, & Gudum, 2011; Yeoh & Gan, 2017). These findings indicate that disordered eating is not a problem in females as previously believed but also a problem in males, who were found to have an increasing trend in eating problems due to increasing social and media pressure regarding the male's ideal body shape (Dominé, Berchtold, Akré, Michaud, & Suris, 2009). Therefore, it is important to examine disordered eating among young adults.

According to the Digital in 2017 Report (Kemp, 2017), more than 3.8 billion people around the world use the internet, in which 2.9 billion people are active social media users. Facebook is currently the most visited social media website in the world, where most of the Facebook users are those between the age of 18 and 24 who are considered as young adults. In Malaysia with a total population of 30.96 million, 22 million of them are Internet users and active social media users as in January 2017, and 20 million are active mobile social users (Kemp, 2017). The Internet users, active social media users, and active mobile users increase by 7%, 22%, and 25%, respectively since January 2016 (Kemp, 2017). The most active social media platforms among Malaysian Internet users are YouTube (68%), Facebook (67%), Whatsapp (60%), Instagram (47%), Facebook Messenger (45%), WeChat (42%), Google+ (41%), and Twitter (41%) (Kemp, 2017).

The Internet Users Survey 2016 conducted by the Malaysian Communications and Multimedia Commission (MCMC, 2017) showed that female Internet users spent more time online than male users. Approximately nine in ten of internet users shared their own photos over the social media (85.0%) and 61.4% shared photos of others. A high proportion of Malaysian Internet users (80.0%) visited social media sites, of that 96.5% claimed that they owned a Facebook account. Half of them accessed their accounts on a daily basis. On average, one user registered for four types of social media account. In terms of the usage frequency in a day, these social media users were mostly connected for four hours or less. There were 4.1% users who browsed the social media for more than 12 hours in a day (MCMC, 2017).

Individuals with eating concerns reported of having a higher social media engagement on appearance-focused activities, such as manipulating photos of themselves prior to sharing and investing more in their photos, as compared to those without eating concerns (McLean, Paxton, Wertheim, & Masters, 2015). Mabe, Forney and Keel (2014) showed that individuals with disordered eating had a higher Facebook score. This finding reflected the importance and frequency of using Facebook features, posited to heighten weight and shape concerns compared with their counterparts without disordered eating. In general, individuals who

develop eating concerns may consequently use more social media compared with those who do not (Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016).

Studies showed contradicting findings in body dissatisfaction between those with and without disordered eating. Women with disordered eating rated body shapes as more aversive than did healthy women (Uher, Yoganathan, Mogg, Eranti, Treasure, & Campbell, 2005). Another study found that the groups with disordered eating showed significantly elevated disturbances in most body image dimensions relative to those without disordered eating (Hrabosky et al., 2009). In contrast, a previous study done by Ackard et al. (2008) showed that those with unhealthy weight control practices reported less weight dissatisfaction and were less likely to use any unhealthy weight control behaviours and more likely to report regular meal consumption than those with healthy weight control practices.

Similarly, previous studies showed conflicting findings in body weight status between the disordered eating group and non-disordered eating group. Mangweth et al. (2004) found that males with disordered eating had a lower current body mass index (BMI) compared with their counterparts without disordered eating. Mendelson, McLaren, Gauvin, and Steiger (2002) reported that women with clinically diagnosed eating disorders had a lower BMI than their non-eating disorder counterparts. However, Brown, Schiraldi, and Wrobleski (2009) found that young adults with disordered eating had a higher BMI than their counterparts without disordered eating. Therefore, there is a need to study the difference in body weight status between the disordered eating group and the non-disordered eating group.

It is important to determine disordered eating, body image, and social media use among university students due to the increasing prevalence rates. To date, there is no published study comparing social media use and body image between university students with and without disordered eating in the local context. Therefore, this study aimed to compare social media use, body image and body weight status between university students with and without disordered eating.

2.0 Materials and Methods

2.1 Study settings and respondents

This was a cross-sectional study involving university students aged 18 to 25 years old from Universiti Putra Malaysia (UPM). A multistage random sampling method was used in this study. There are 16 faculties in UPM, with three different fields of study, namely arts and social sciences (n=4), sciences (n=10), and technical (n=2). One faculty was randomly selected from each field of study. In each selected faculty, one academic program was randomly selected. All students in the three randomly selected programs were invited to participate in this study. Out of 753 students who were eligible for this study, 505 of them agreed to participate in this study, giving a response rate of 67.1%.

This study was divided into two phases of data collection. In Phase I, 505 university students in the three randomly selected programs were screened on disordered eating and their anthropometric measurements were measured by the researchers. In Phase II, university students with disordered eating, who were being identified in Phase I, were matched by sex,

age, and ethnicity with those without disordered eating. These two groups of respondents were compared in terms of their social media use, body image, and body weight status.

2.2 Phase I: Health screening

2.2.1 Sociodemographic background

Respondents were required to self-report their information on their date of birth, age, sex, ethnicity, current year of study, current living arrangement, monthly pocket money, highest education level of parents, and monthly household income.

2.2.2 Disordered eating

Disordered eating was measured using the Eating Attitudes Test-26 (EAT-26) (Garner, Olmstead, Bohr, & Garfinkel, 1982). It has 26 items with three subscales: dieting, bulimia and food preoccupation, and oral control. The items were rated along a 6-point Likert scale: "always (1)", "usually (2)", "often (3)", "sometimes (4)", "rarely (5)", and "never (6)". For all items except for item 26, the responses "sometimes", "rarely", and "never" registered a score of 0 and the responses "always", "usually", and "often" registered a score of 3, 2, and 1, respectively. Scoring for item 26 was in a reverse manner. The total EAT-26 score ranged from 0 to 78. Respondents who scored a total score at or above 20 on the EAT-26 indicated a high level of concern about dieting, body weight or problematic eating behaviours, which were classified as disordered eating (DE) group, whereas, for respondents who scored less than 20 were classified as non-disordered eating (NDE) group. In this study, the Cronbach's alpha coefficient of the EAT-26 was 0.83, indicating good internal consistency reliability.

2.2.3 Anthropometric measurements

Body weight of the respondents was measured by researchers using a TANITA digital weighing scale THD 306 (TANITA Corporation, USA) to the nearest 0.1kg and their height was measured using a SECA portable stadiometer 213 (SECA, Germany) to the nearest 0.1cm. All these measurements were taken twice to obtain the average values. The results obtained were used in the calculation of BMI using the formula BMI = weight (kg)/ height^2 (m^2). The BMI classification of World Health Organization (2000) was used. Waist circumference (WC) was measured by using a SECA 201 Ergonomic Circumference Measuring Tape (SECA, Germany) to the nearest 0.1cm. The classification of WHO/IASO/IOTF (2000) was used to provide estimates of abdominal obesity. Body fat percentage of the respondents was measured using an OMRON HBF-306 body fat analyser (Omron, Japan) to the nearest 0.1%. The classification of body fat percentage was based on the guidelines of Lee and Nieman (2013) to determine the respondents' level of body fat percentage.

2.3 Phase II: Self-administered questionnaire (internet-based)

Phase II was conducted using an online questionnaire. The link of the questionnaire was sent to the respondents by email. Information on body image and social media use were obtained.

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2.3.1 Body image

Body image was assessed by using the Contour Drawing Rating Scale (Thompson & Gray, 1995). It consists of 9 silhouette figures, which vary from very thin (value 1) to very obese (value 9). Respondents were required to select their current body size (self body size) and their ideal body size. The discrepancy between one's self body size and ideal body size was calculated and body satisfaction was reached when self body size was equal to ideal body size.The difference in self body size and ideal body size was considered as body dissatisfaction.

2.3.2 Social media use

Social media use in this study encompassed duration, volume, frequency and engagement of social media use, selfie-taking, selfie sharing, photo investment and photo manipulation.

2.3.2.1 Duration, volume, frequency and engagement of social media use

Respondents were asked to estimate their duration (in years) and volume (time per day, in hours and minutes) of social media use and also to estimate their frequency of use to indicate how often they visited the following social media platforms each week: Facebook, Facebook Messenger, Instagram, Twitter, YouTube, LinkedIn, Google +, Whatsapp, WeChat, Flickr, LINE, and Skype (Sidani et al., 2016). Seven response categories for each of these items were used, including "I don't use this platform (0)," "less than once a week (1)," "1-2 days a week (2)," "3-6 days a week (3)," "about once a day (4)," "2-4 times a day (5)," and "5 or more times a day (6)". These data were used to estimate respondents' summary of frequency (visits per week) by converting the response categories into numeric averages. For example, "1-2 days a week" was recoded as 1.5 and "2-4 times a day" was recoded as 21 (three times per day, or 21 times per week). The volume and frequency of social media use items were collapsed into quartiles for analyses (Sidani et al., 2016).

Social media engagement was assessed by using the Social Media and Digital Communications Scale (McLean et al., 2015) to indicate which forms of communication they used, including text messages, email, social networking, instant messaging, virtual worlds, online video sharing, and online photo sharing. Respondents' responses were recorded as 1 (yes) or 0 (no), in which higher scores indicating the use of more forms of social media.

2.3.2.2 Selfie taking

The frequency of taking self-images of the respondents in this study was assessed with two items on the frequency of taking "selfies" with only themselves in the photo, and "usies" with themselves and others in the photo (McLean et al., 2015). These two items were rated from 1 (less than once a month) to 8 (more than twice a day). The mean of the two items was calculated, in which higher scores indicate higher frequency of taking photos of self. In this study, the Spearman-Brown (internal consistency) coefficient for this two-item scale was 0.81.

2.3.2.3 Selfie sharing

The frequency of respondents sharing photos of self through social media was assessed with two items: (a) "*Do you post photos of yourself online or share them through services like 'Facebook' or 'Instagram'?*" and (b) "*Do you avoid putting photos of yourself on social media?*" (McLean et al., 2015). The items were rated from 1 (never) to 5 (always) and the second item was in reverse score. The mean of these two items was calculated with higher scores reflecting more frequent photo-posting activity. Respondents who shared photos of themselves at least sometimes (3, 4, or 5 on the response scale) were considered as regular self-photo sharers and were asked further questions on photo sharing activities which were photo investment and photo manipulation. Respondents who were either never or rarely (1 and 2 on the response scale) shared images of self were considered as non-sharers. In this study, the Spearman-Brown (internal consistency) coefficient for this two-item scale was 0.70.

2.3.2.4 Photo investment

The Self Photo Investment Scale (McLean et al., 2015) was an 8-item scale used in this study to assess investment and effort of the respondents in choosing photos of themselves to share on social media and concern they have about such posts. Items were anchored by opposing statements such as "*It's easy to choose the photo*" and "*It's hard to choose the photo*", with a 5-point scale rated from 1 (agree with the statement on the left) to 5 (agree with the statement on the right). Total score ranged from 8 to 40 and the mean was calculated with higher scores reflecting higher investment in photo sharing via social media. In this study, the Cronbach's alpha coefficient of the scale was 0.67.

2.3.2.5 Photo manipulation

The 10-item of the Self Photo Manipulation Scale was used in this study to indicate the extent to which respondents manipulated or edited photos of themselves prior to sharing (McLean et al., 2015). All items were rated on a 5-point scale ranging from 1 (never) to 5 (always). The total score ranged from 10 to 50, with higher scores reflecting more frequent photo manipulation. In this study, the Cronbach's alpha coefficient of the Self Photo Manipulation Scale was 0.86.

2.4 Ethical considerations

Ethical approval for this study was obtained from the Ethics Committee for Research involving Human Subjects of Universiti Putra Malaysia (JKEUPM) (Reference No.: FPSK[EXP16-Nutrition]U003). Permission to conduct the study was obtained from the deans of the selected faculties prior to data collection. Respondents were given an information sheet and written informed consent was obtained for each respondent.

2.5 Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 23.0. All variables were checked for normality, missing values and outliers using descriptive frequencies and graphs. Descriptive statistics including mean, standard deviation, frequency, and percentage were presented for variables such as socio-demographic variables. Independent-samples t-test and

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Chi-square test were used to compare variables between university students with and without disordered eating. The acceptable level of statistical significance for all tests was set at $p<0.05$.

3.0 Results

Table 1 illustrates that in Phase I of the data collection, about one-fifth (21.8%) of the respondents (n=110) were at risk of disordered eating, with the prevalence of 18.4% in males and 22.8% in females ($\chi^2=0.738$, $p=0.390$).

Table 1: Prevalence of disordered eating by sex ($n=505$)

Disordered eating	**n (%)**			χ^2	***p*-value**
	Male (*n*=114)	**Female (*n*=391)**	**Total (*n*=505)**		
Not at risk	93 (81.6)	302 (77.2)	395 (78.2)	0.738	0.390
At risk	21 (18.4)	89 (22.8)	110 (21.8)		

Note: Out of 110 respondents who were at risk of disordered eating, 4 of them (2 males and 2 females) were excluded in Phase II of data collection due to non-response.

In Phase II of the data collection, four respondents with disordered eating were excluded due to non-response. Therefore, a total of 106 respondents with disordered eating were matched with another 106 respondents without disordered eating in terms of sex, age, and ethnicity. Table 2 shows that field of study, current year of study, current living arrangement and parents' educational level were significantly different between DE and NDE respondents ($p<0.05$). Fewer DE respondents (34.0%) were from science stream as compared to NDE respondents (71.7%), while more DE respondents were from art stream (DE=28.3%, NDE=16.0%) and technical stream (DE=37.7%, NDE=12.3%) as compared to NDE respondents. More DE respondents (42.5%) were in their first year of university life as compared to NDE respondents (19.8%; $\chi^2=15.967$, $p=0.001$). More DE respondents (20.7%) stayed out-campus as compared to NDE respondents (5.7%; $\chi^2=10.547$, $p=0.005$). More fathers (36.8%) and mothers (23.6%) of DE respondents attained tertiary education than NDE parents (24.5% vs. 16.9%).

Table 2: Socio-demographic background of the respondents (DE: $n=106$; NDE: $n=106$)

Variables	**DE (*n*=106) n (%)**	**NDE (*n* =106) n (%)**	χ^2	***p*-value**
Field of Study			31.636	<0.001
Science Stream	36 (34.0)	76 (71.7)		
Art Stream	30 (28.3)	17 (16.0)		
Technical Stream	40 (37.7)	13 (12.3)		
Current Year of Study			15.967	0.001
First Year	45 (42.5)	21 (19.8)		
Second Year	18 (17.0)	26 (24.5)		
Third Year	31 (29.2)	32 (30.2)		
Fourth Year	12 (11.3)	27 (25.5)		
Current Living Arrangement			10.547	0.005

College Dormitory	84 (79.3)	100 (94.3)		
Rented House	14 (13.2)	4 (3.8)		
Own House	8 (7.5)	2 (1.9)		
Monthly Pocket Money			2.366	0.796
≤ RM 100.00	14 (13.2)	14 (13.2)		
RM 100.01 - RM300.00	38 (35.8)	42 (39.6)		
RM 300.01 - RM500.00	36 (34.0)	35 (33.0)		
RM 500.01 - RM700.00	11 (10.4)	9 (8.5)		
RM 700.01 - RM900.00	2 (1.9)	4 (3.8)		
> RM 900.00	5 (4.7)	2 (1.9)		
Highest Education Level of Father			16.275	0.003
Tertiary Education	39 (36.8)	26 (24.5)		
Post-secondary Education	11 (10.4)	16 (15.1)		
Secondary Education	36 (34.0)	58 (54.7)		
Primary Education	12 (11.3)	4 (3.8)		
No Formal Education	8 (7.5)	2 (1.9)		
Father's Monthly Income			2.931	0.231
≤ RM 1000.00	14 (13.2)	21 (19.8)		
RM 1000.01 – RM5000.00	42 (39.6)	40 (37.8)		
> RM 5000.00	50 (47.2)	45 (42.4)		
Highest Education Level of Mother			17.065	0.009
Tertiary Education	25 (23.6)	18 (16.9)		
Post-secondary Education	14 (13.2)	10 (9.4)		
Secondary Education	46 (43.4)	71 (67.0)		
Primary Education	15 (14.2)	4 (3.8)		
No Formal Education	6 (5.7)	3 (2.8)		
Mother's Monthly Income			5.465	0.065
≤ RM 1000.00	50 (47.2)	63 (59.4)		
RM 1000.01 – RM5000.00	19 (17.9)	23 (21.7)		
> RM 5000.00	37 (35.0)	20 (18.8)		
Monthly Household Income			2.424	0.298
≤ RM 1000.00	9 (8.5)	11 (10.4)		
RM 1000.01 – RM5000.00	51 (48.1)	60 (56.6)		
> RM 5000.00	46 (43.4)	35 (33.0)		

DE = Disordered eating; NDE = Non disordered eating

Social media use between DE and NDE respondents is presented in Table 3. There was no significant difference in duration of using social media between DE (M=7.05 years, SD=2.26) and NDE respondents (M=7.42 years, SD=2.05; t=1.242, p=0.215). A significant difference was found in selfie-taking (t=-2.338, p=0.020) between DE and NDE groups, in which DE group (7.53 ± 4.00) was more frequently engaged in selfie-taking than NDE group (6.35 ± 3.31). However, there were no significant differences in the mean scores of the volume of

social media use, the frequency of social media use, social media engagement, selfie sharing, photo investment and photo manipulation between DE and NDE groups (p>0.05). More than two-third of the respondents (DE=75.5%, NDE=60.4%) were photo sharers.

Table 3: Comparison of social media use between DE and NDE respondents

Social Media Use	Mean ± SD / n (%)		*t*-value	*p*-value
	DE (*n*=106)	NDE (*n*=106)		
Duration using social media (years)	7.05 ± 2.26	7.42 ± 2.05	1.242	0.215
<4	5 (4.7)	3 (2.8)		
4-6	38 (35.8)	31 (29.2)		
7-10	60 (56.6)	68 (64.2)		
>10	3 (2.8)	4 (3.8)		
Volume of social media use (minutes)	321.46 ± 270.03	290.84 ± 269.87	-0.826	0.410
Quartile 1: 0 – 15 minutes	3 (2.8)	2 (1.9)		
Quartile 2: 31 – 60 minutes	6 (5.7)	5 (4.7)		
Quartile 3: 61 – 120 minutes	15 (14.2)	25 (23.6)		
Quartile 4: ≥ 121 minutes	82 (77.4)	74 (69.8)		
Frequency of using social media (points)	94.79 ± 51.17	81.69 ± 48.46	-1.913	0.057
Quartile 1: <9 points	0	0		
Quartile 2: 9 – 30 points	10 (9.4)	15 (14.2)		
Quartile 3: 31-57 points	16 (15.1)	19 (17.9)		
Quartile 4: ≥58 points	80 (75.5)	72 (67.9)		
Social media engagement	4.13 ± 2.32	3.99 ± 1.55	-0.410	0.682
Text messages				
Yes	78 (73.6)	82 (77.4)		
No	28 (26.4)	24 (22.6)		
Email				
Yes	76 (71.7)	90 (84.9)		
No	30 (28.3)	16 (15.1)		
Social networking				
Yes	89 (84.0)	90 (84.9)		
No	17 (16.0)	16 (15.1)		
Instant Messaging				
Yes	63 (59.4)	59 (55.7)		
No	43 (40.6)	47 (44.3)		
Virtual worlds				
Yes	28 (26.4)	20 (18.9)		
No	78 (73.6)	86 (81.1)		
Online video sharing				
Yes	34 (32.1)	28 (26.4)		
No	72 (67.9)	78 (73.6)		
Online photo sharing				
Yes	56 (52.8)	55 (51.9)		
No	50 (47.2)	51 (48.1)		
Selfie taking	7.53 ± 4.00	6.35 ± 3.31	-2.338	0.020

Selfie sharing	6.24 ± 1.84	5.95 ± 1.85	-1.116	0.266
Photo sharer	80 (75.5)	64 (60.4)		
Non-photo sharer	26 (24.5)	42 (39.6)		
Photo investment*	26.19 ± 4.45	25.83 ± 4.40	-0.484	0.629
Photo manipulation*	19.31 ± 7.54	18.59 ± 6.47	-0.605	0.546

DE = Disordered eating; NDE = Non disordered eating
*only for those photo sharers (n=144): DE, n=80; NDE, n=64

Table 4 shows that three in four of the respondents (76.4%) were dissatisfied with their body size, in which more DE respondents (59.4%) than NDE respondents (52.8%) desired a smaller body size. In contrast, more NDE respondents (21.7%) than DE respondents (18.9%) desired a larger body size. However, no significant difference in body dissatisfaction between DE and NDE respondents was observed (χ^2=4.780, p=0.781). In terms of body weight status, Table 5 shows that no differences in mean values of BMI, waist circumference, and body fat percentage between DE and NDE respondents were found (p>0.05).

Table 4: Classification of body image perception of the respondents by sex

Body image perception	**n (%)**		χ^2	***p*-value**
	DE	**NDE**		
Male			7.711	0.260
Dissatisfaction, desired a smaller body size	11 (57.9)	4 (21.1)		
Satisfaction	4 (21.1)	5 (26.3)		
Dissatisfaction, desired a larger body size	4 (21.0)	10 (52.6)		
Female			4.829	0.776
Dissatisfaction, desired a smaller body size	52 (59.8)	52 (59.8)		
Satisfaction	19 (21.8)	22 (25.3)		
Dissatisfaction, desired a larger body size	16 (18.4)	13 (14.9)		
All			4.780	0.781
Dissatisfaction, desired a smaller body size	63 (59.4)	56 (52.8)		
Satisfaction	23 (21.7)	27 (25.5)		
Dissatisfaction, desired a larger body size	20 (18.9)	23 (21.7)		

DE = Disordered eating; NDE = Non disordered eating

Table 5: Means and distribution of body weight status between DE and NDE respondents

Variables	**Mean ± SD / n (%)**		***t*-value**	***p*-value**
	DE (*n*=106)	**NDE (*n*=106)**		
Body weight (kg)	57.64 ± 13.01	55.86 ± 10.61	-1.090	0.277
Body height (m)	1.59 ± 0.10	1.59 ± 0.08	-0.734	0.464

Body mass index (BMI; kg/m^2)	22.81 ± 5.80	22.11 ± 3.49	-1.053	0.294
Underweight	10 (9.4)	52 (49.1)		
Normal weight	73 (68.9)	33 (31.1)		
Overweight	17 (16.0)	12 (13.3)		
Obesity	6 (5.7)	9 (8.5)		
Waist circumference (WC; cm)	72.20 ± 10.04	71.49 ± 9.06	-0.544	0.587
Normal	92 (86.8)	93 (87.7)		
Abdominal obesity	14 (13.2)	13 (12.3)		
Body fat percentage (%)	27.57 ± 6.31	27.52 ± 6.37	-0.055	0.956
Acceptable (lower end)	25 (23.6)	18 (17.0)		
Acceptable (upper end)	51 (48.1)	61 (57.5)		
Unhealthy (too high)	30 (28.3)	27 (25.5)		

DE = Disordered eating; NDE = Non disordered eating
BMI classification: Underweight <18.5 kg/m^2, Normal 18.5-24.9 kg/m^2, Overweight 25-29.9 kg/m^2, Obesity ≥30 kg/m^2 (WHO, 2000)
WC classification: ≥90 cm for men and ≥80 cm for women as abdominal obesity (WHO/IASO/IOTF, 2000)
Body fat percentage classification: lower end (male 6–15%, female 9–23%), upper end (male 16–24%, female 24–31%), too high (male ≥25%, female ≥32%) (Lee & Nieman, 2013)

4.0 Discussion

This study presents the differences in social media use, body image and body weight status between university students with and without disordered eating. The prevalence of disordered eating in the present study was high, in which 21.8% of the university students had the problem of disordered eating. This finding is coherent with a recent local study done by Yeoh and Gan (2017) which reported that the prevalence of disordered eating among university students in UPM was 21.0%. Another local study conducted among 281 university students in UPM showed that 25.6% of them were prone to disordered eating problem (Dev & Henry, 2016). The prevalence of disordered eating in the current study, however, is much lower as compared to 37.6% in Bangladesh (Pengpid & Peltzer, 2015) and 26.7% in the Philippines (Madanat et al., 2006). The prevalence rate, nevertheless, is higher as compared to 13.3% in India (Brown et al., 2009) and 12.2% in Singapore (Chen et al., 2010). The difference in prevalence rates of disordered eating is due to the diversity and distinctiveness of the individual countries, in which these individual countries vary in terms of socio-demography, culture, the influence of Western culture, and the degree of urbanisation and industrialisation (Pike & Dunne, 2015). No sex difference was found in the current study, in which the finding highlights that disordered eating is no longer, a problem only for females but also a problem that requires attention among males.

Findings in the present study demonstrate that students from science background had a lower risk of disordered eating as compared to other fields of study. A previous study reported that fewer health sciences students had disordered eating problem as compared to the non-health sciences students (Korinth, Schiess, & Westenhoefer, 2010). One of the possible reasons may

be due to the science students having more knowledge of healthy eating and adopting a slightly healthier food choices, thus decreasing their tendency to be at risk of disordered eating as compared to non-science students (Korinth et al., 2010; Yu & Tan, 2016). Majority of the DE university students in the current study were in their first year of study. This could be due to a stressful transition period of first-year students from school to a new environment of university life (Gonidakis et al., 2009; Someah, 2012). University life is considered a high-risk period for the development of eating problems due to unhealthy dieting, high intake of fast food, and body dissatisfaction among university students (Gan et al., 2011). On the other hand, more DE respondents in this study stayed out-campus as compared to their NDE counterparts. This finding contradicts a previous study which showed that university students living on campus would be more likely to gain weight and this might trigger their unhealthy eating behaviours (Pliner & Saunders, 2008). Interestingly, university students in this study were more likely to have disordered eating if their parents have higher education levels. This finding is consistent with a previous study which showed that disordered eating behaviours were less frequent among university students from families whose head had only low level of education (Alvarenga, Lourenco, Philippi, & Scagliusi, 2013). One of the possible reasons may be that parents with higher education were more concerned about their child's eating behaviours and imposed more restrictions on their food intake.

The present study reported that three in four of the university students (76.4%) were dissatisfied with their body size. This finding is consistent with a previous study (As-Sa'edi et al., 2011) which found that 73.6% of university students were dissatisfied with their body size. Alipour, Farhangi, Dehghan, and Alipour (2015) found that 51.6% of female university students had body dissatisfaction and only 35.9% of them perceived their body image correctly. Another study done by Khan, Khalid, and Jabeen (2011) showed that 54.4% of Pakistani university students had body dissatisfaction. These findings indicate that body dissatisfaction is a common problem among university students and needs to be addressed to prevent disordered eating.

Higher levels of body-related and eating concerns were reported in those engaging in more social media-related self-photo activities (Holland & Tiggemann, 2016; McLean et al., 2015). Holland and Tiggemann (2016) found that women who post "fitspiration" (fitness and inspiration) images scored higher on the disordered eating scores. McLean, Paxton, Werthiem, and Masters (2015) showed that those who shared self photos frequently in social media and manipulated photos frequently for online posting had high scores for eating concerns. Mabe, Forney, and Keel (2014) found that university students with disordered eating not only reported spending more time on Facebook, but also reported engaging in appearance-focused behaviours, such as comparing their appearance to friends' pictures and untagging photographs of themselves in order to remove unflattering photographs and minimize their opportunities to become the target of downward social comparison. Similarly, a recent study done by Sidani et al. (2016) found that young adults who develop eating concerns may consequently use more social media to connect with others who also have eating concerns. However, in the present study, no difference was found between DE and NDE respondents in terms of social media use except for selfie taking. This could be due to both DE and NDE respondents having similar tendencies towards the social comparison of photo of peers on social media (Mangweth et al., 2004).

In the present study, DE respondents had similar body weight status as compared to their NDE counterparts. A previous study by Mendelson et al. (2002) found that women with disordered eating had a lower BMI than their counterparts without disordered eating.

However, a study by Brown, Schiraldi, and Wrobleski (2009) reported opposite findings, in which they found that young adults with disordered eating had a higher BMI than those without. To date, there is no published study comparing WC and body fat percentage between university students with and without disordered eating.

There are several limitations in the present study. Firstly, this study was a cross-sectional study, in which the temporal relationship between the variables could not be determined. Longitudinal studies should be conducted in the future. Secondly, this sample consisted of university students in UPM only, hence, results cannot be generalized to university students in Malaysia. Thirdly, all measures apart from body weight status were self-reported by the respondents. Social desirability bias may influence respondents on the measures as the results might not reflect their actual perception of body image, social media use, and disordered eating behaviours.

5.0 Conclusion and recommendation

The present study showed a high prevalence of disordered eating among university students, thus suggesting that disordered eating is a health problem that requires attention for both males and females. The provision of early screening and timely treatment for university students with disordered eating are highly recommended. It is important to conduct intervention programs on healthy eating and healthy lifestyle behaviours targeting both sexes to prevent the development of disordered eating. With the increasing social media use among all age groups worldwide, future research needs to study the influence of social media use on disordered eating.

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Declaration

The authors hereby declare that there is no conflict of interest in this study.

Authors' contribution

Author 1: Information gathering, preparation and editing of manuscript
Author 2: Initiation of idea, review and final editing of manuscript

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