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Disordered Eating Behaviour among School-going Adolescents: Prevalence and Associated Factors

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Abstract

Eating disorder commonly occurs among adolescents due to weight concern and body dissatisfaction. It is important to screen for eating disorders among school-going adolescents as it can lead to early treatment, thereby reducing serious complication affecting their education. This study aimed to determine the prevalence of disordered eating behaviour and its associated factors among school-going adolescents. A cross-sectional survey was conducted among 732 school-adolescents aged between 14 and 18 years from 12 secondary schools in Terengganu. Cluster sampling was applied and a self-administered validated questionnaire was used. Eating Attitude Test (EAT-26) was used to assess disordered eating behaviour. Psychological factors were measured using validated Malay version of Strength and Difficulties Questionnaires (SDQ). Prevalence of disordered eating behaviour was 30.1%. Disordered eating among adolescents was independently associated with emotional problem (p=0.014, OR 1.16, 95%CI 1.03, 1.31), peer pressure (p=0.001, OR 1.26, 95%CI 1.10, 1.44) and increasing age (p=0.006, OR 1.21, 95%CI 1.06, 1.39). Binary logistic regression showed body mass index (BMI) or any forms of substance use were not significantly associated with disordered eating among adolescents. This study showed that screening for disordered eating is important as it is associated with emotional and peer problems among school-going adolescents. Vice-versa, adolescents with emotional and peer problems have a tendency to develop disordered eating which is important to be screened to evade its effects towards their education and reduce the potential harmful complications associated with it.

Keywords: Emotional Problem, Peer Problem, Disordered Eating, School-Going Adolescents

Introduction

Eating disorders frequently occur among adolescent due to body image perception and weight obsession amongst them. According to the american psychiatric association diagnostic statistical manual 5th revision (DSM-5; APA, 2013), eating disorders are classified into three categories; anorexia nervosa, bulimia nervosa and other specified feeding or eating disorder (OSFED). Previous studies found that clinicians and researchers firmly agreed on eating

disorders being biologically based psychiatric disorders (Easter, 2012). Disordered eating is a cluster of unhealthy eating habits and weight behaviors, with a negative impact on psychologically and physical health. The assessment of disordered eating attitudes and behaviors in the community is important to supervise the changes in its prevalence and thus help in preventive and treatment programs (Jones et al., 2001; Khalid, Islam & Ahmed; 2019).

There are multiple factors that contribute to disordered eating behaviours. Behavioural, socio-cultural environment, psychological and environmental factors such as gender, socioeconomic status, personality factors, and family are among the contributing factors (Thatcher & Rhea, 2003). McCabe & Vincent (2003) reported that bio-developmental factors such as age, puberty and body mass index (BMI) are also likely correspondent to the expression of disordered eating among adolescents. A study in German found that 30% of girls and 15% of boys have disordered eating behaviours and attitudes (Dahlmann et al., 2008; Alzgool, 2019; Umrani, Ahmed & Memon, 2015). Consequently, studies have revealed that girls are generally more negative about their bodies, develop lower self-esteem, and are concerned more with having an ideal, thin shape than boys (Marcotte et al., 2002; O'Dea & Abraham, 2001).

Screening for eating disorder is based on early identification of disordered eating behaviour and can lead to early treatment, thereby reducing serious complication and psychological complications or even death. There are a few common eating disorder practices such as binge eating, bulimia nervosa, use of dietary products such as diet pills, herbal product, diet drinks and excessive exercising which could give long-term effect toward adolescent's health if an early screening of eating disorder risk is not be carried out (Sharmini, 2016). National Eating Disorder Association (NEDA)(2008) stated that the adverse effects of eating disorder attitudes in adolescents could be harmful on student's cognitive growth, student's behaviour and academic performance, deficit in particular nutrients, at risk to illnesses and increased absenteeism .

In Malaysia, the most at risk group to disordered eating are adolescents (Leng, 2008; Pon et al., 2004; Muhammad, Saoula, Issa & Ahmed; 2019). Growing knowledge on disordered eating showed by findings in several studies stated that Malaysians who having normal weight being afraid with the thought of being overweight and having desire to be thinner (Mellor et al.,2009;Edman & Yates,2004.;Pon et al.,2004). Therefore, this thought lead them for practicing disordered eating practices such as meal-skipping, excessive dieting and binge eating (Edman & Yates,2004; Pon et al.,2004) which could give negative impact on their health in a prolonged time. Previous literature on eating disorders have not really focused on factors involving mental health of the adolescents. Weighing the seriousness of eating disorder and its risk factors, this study focus on studying the prevalence of eating disorder risk among Malaysian secondary school students and the factors associated with mental health such as emotional problems. The outcome of this study could help in early detection of eating disorder behaviour and formulating appropriate intervention strategies. Adolescents found to be at risk may be counselled or referred for further assessment to determine if they have eating disorder pathology.

Objectives

This present study aimed is to determine the prevalence of disordered eating behaviour and its associated factors among secondary school adolescents in Terengganu, Malaysia. The

associated factors encompasses sociodemographic, family risk factors, body mass index (BMI), psychological problems and substance use among adolescents.

Materials and Methods

Study Design and Participants

This is a cross-sectional study done from December 2018 to September 2019. Approval to conduct research activities in schools was obtained from Ministry of Education Malaysia, Terengganu Department of Education, and the selected schools authorities. Ethical approval was obtained from The Universiti Sultan Zainal Abidin Human Research Ethics Committee (UHREC) (UniSZA/UHREC/2019/104). The sample size of 708 was obtained using the following single proportion formula to determine the prevalence of eating disorder among school-going adolescent:

$n = (Z / \Delta)^2 P(1-P)$

n = Minimum required sample size

Z = 1.96 (95% CI)

Δ = Precision = 0.05

P = Prevalence of eating disorder in Malaysia=19.8% [12]

$n = (Z / \Delta)^2 P(1-P) = (1.96/0.05)^2\ 0.198(1-0.198)$

$n \approx 295$

Considering effect of cluster sampling, the sample size was doubled (295x2=590) and to cover the missing data and non-response, another 20% was added making the total required subjects were n=708.

Inclusion criteria was students aged 13 to 18 years who can read and write. Those who were illiterate and had any mental illness were excluded from the study. The participants were recruited from twelve selected secondary schools in Terengganu, Malaysia. Cluster sampling was done to select a total of eleven public schools and one private school. The schools were randomly selected from a list of secondary schools from Terengganu State Education Department, Malaysia for both cluster of public and private schools. A pre-visit to each school was done to brief the Principals of the schools regarding the study and to distribute the research information to selected classes of Form One, Form Two and Form Four students. A total of 36 classes were included in the study. The classes were selected randomly based on a list of classes provided by school administration offices. All the students in the selected classes were given research information sheets together with the study consent forms to be brought back and signed by their parents. During the data collection visit, self-administered questionnaires were distributed to students whom their parents consented. Data collection was done from December 2018 to May 2019. Data from the questionnaires were entered into SPSS version 22. Data was then checked for completeness. Those with any missing data were excluded (n=42), leaving completed ones for analysis (n = 732). Written informed consents were obtained from the participants and their parents prior to data collection.

Measures

A self-administered questionnaire in Malay language was used to collect data and was completed by the participants in their classrooms with the assistance of the researchers. The validated Malay versions of the Eating Attitude Test-26, Substance Drug Misuse Index and Strength and Difficult Questionnaires were tools incorporated in the questionnaire.

Demographic and Socioeconomic Characteristics. Information regarding demographic and socioeconomic characteristics included age, gender, race, household income, household sizes, marital status, and parent's occupation. Participant's BMI was taken from students' most recent (less than 6 months) health check at schools and categorized into four categories by referring to WHO BMI-for- age growth reference (WHO, 2007).

*Eating Attitude Test (EAT-26).*The Malay version of Eating Attitudes Test-26 (EAT-26) has been validated in Malay language with Cronbach's alpha values of 0.864 (Chin Y.S. et al., 2008). The EAT has been a particularly useful screening tool to assess "eating disorder risk" or disordered eating behaviour in non-clinical samples. The items in EAT-26 scale have shown desirable internal consistency values, with Cronbach's alpha values ranging from 0.77 to 0.83. It has three subscales assessing individual behaviours and thoughts regarding dieting, bulimia and food preoccupation, and oral control. For each item in the scale, rating is done on a 6-point Likert scale: ''always (1)'', ''usually (2)'', ''often (3)'', ''sometimes (4)'', ''rarely (5)'', and ''never (6)''. The final score is the sum of all the 26 items with possible scores ranging from 0 to 78. In this scale, respondents who scored 20 or more were classified as having a high level of concern about dieting, body weight or eating and those who scored less than 20 were classified as having no symptoms of disordered eating behaviour.

*Substance and Drug Misuse Index (SDMI).*In SDMI, drug use is divided into two main categories (licit and illicit) and for illicit drugs it will be further divided into three subcategories: amphetamine type, cannabis, and heroin. Different values were assigned to indicate the severity of drug use. For those using licit substances such as cigarette, pipe or cigar a score is assigned according to the frequency of use. If they never tried these substance the score is "0", for "tried once" a score of "1" is assigned; for "need sometimes" a score of "2" is assigned; and for "often use" a score of "4" is assigned. For illegal substance, a factor of 2 and 4 is applied according to the category of the substance. Thus gives a level of substance and drug use with a range of scores between zero (i.e. never tried any substances) to a maximum of 54 (who tried all substances listed on the index and often used these substances all the time). The weightage of the misuse of these substances and drugs were assigned according to the level of its seriousness, an indicator of scores that was concluded through discussions between the researchers and officers of National Anti-Drugs Agency (NADA) and Ministry of Education (Mahmood et al., 2008).

*Strength and Difficult Questionnaires (SDQ).*Strength and Difficult Questionnaire was used to assess adolescent's mental health. The 25 items in the SDQ give rise to five scales of 5 items each. The five scales of SDQ comprises of Prosocial, Peer Pressure, Emotional Problem, Conduct Problem and Hyperactivity scale. 'Somewhat True' is always scored as 1, but the scoring of 'Not True' and 'Certainly True' varies with the item. For each of the 5 scales the score can range from 0 to 10 if all items were completed. The SDQ is generally considered to be an instrument with good psychometric properties and the construct validity has been supported in the literature (Björnsdotter et al., 2013; Dickey & Blumberg, 2004). SDQ has been validated in Malay version with reliable internal consistency, a Cronbach's alpha coefficient of 0.70 for the self-report version. (Nurulhuda et al., 2019).

Data Analysis

All the data from the completed questionnaires were entered into IBM SPSS Statistics 22.0 (IBM Corp., Armonk, NY, USA).Descriptive statistics was done using means and standard deviations for continuous data and frequencies (n) and percentages (%) for categorical data.

Simple and Multiple Logistic Regression was used to determine the associated factors of disordered eating behaviour. Dependent variable was disordered eating behaviour (positive or negative), and independent variables analysed were age, gender, family income, SDQ scores by subscales, body mass index (BMI) and SDMI scores.

Results

A total of 732 out of 774 adolescents completed the questionnaires, yielding a response rate of 95%. Demographic characteristics of the participants are shown in Table 1. The mean age was 14.7 years (SD = 1.39 years). Majority of the participants were females (56%), and Malays (92.9%). The participants came from mid-range economic status.

As shown in Table 1, 67.5% of secondary school adolescents in Terengganu have normal BMI. The prevalence of overweight and obesity participants in this study were 15% and 9.6% respectively. About 14.6% of the boys were overweight and 9.6% were obese. It was found that prevalence of overweight girls was higher compared to boys. Overweight girls reported to be 15.5% respectively.

Table 1:
Demographic And Socioeconomic Characteristics of Participants (N=732)

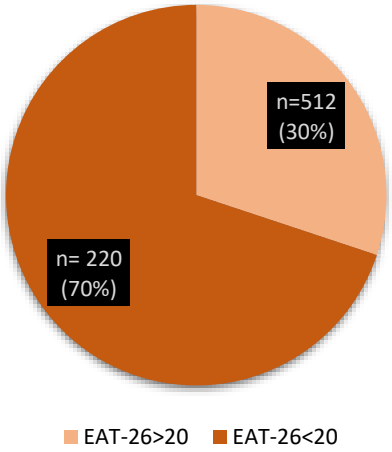
	n=732	
	n	**%**
Variable		
Gender		
Male	322	44
Female	410	56
Age(years)		
13	176	24
14	245	33.5
16	283	38.7
18	28	3.8
Race		
Malay	679	92.9
Chinese	50	6.8
Indian	1	0.1
Others	1	0.1
Household Income		
<RM1000	183	25.4
RM1000 to RM3000	249	34.5
RM3000 to RM10000	234	32.5
Above RM10000	55	7.6
Housing		
Flat	22	3
Semi-D or Bungalow	351	48
Terrace	142	19.4
Parent Marital Status		
Married and lived together	651	88.9
Married but didn't live together	18	2.5
Divorce	30	4.1
Widow or Widower	28	3.8
Others	4	0.5
Body Mass Index (BMI)		
Thinness	58	7.9
Normal	494	67.5
Overweight	110	15
Obesity	70	9.6

RM-Ringgit Malaysia
BMI-Body Mass Index

Prevalence of disordered eating behaviour was determined based on the scoring guidelines in EAT-26, where a score of more than 20 indicates high concern about body weight, body shape, eating, and hence, possibly having risk of disordered eating behaviour.

Overall, the prevalence of disordered eating behaviour among secondary school adolescents in Terengganu was 30.1% ((0.27, 0.33) (Picture 1).

Picture 1: Prevalence of disordered eating behaviour among adolescents in Terengganu



EAT-26>20- Indicates HIGH concerns about weight, body shape and eating. Indicates risk of disordered eating.
EAT-26<20- Indicates LOW concerns about body weight, body shape and eating.

The associated factors with the risk of disordered eating among adolescents shown in Table 2. There was no significant association between gender, race, marital status, housing, household income with eating disordered behaviour among adolescents. However, student's age and psychological factors were significantly associated with the risk of disordered eating behaviour among adolescents.

Table 2:
Factors Associated with the risk of Disordered Eating among adolescents by Simple Logistic Regression Model

Variable	Regression coefficient (b)	Crude Odds Ratio (95%CI)	Wald statistic	*p*-value
Age (years)	0.20	1.22 (1.09,1.37)	12.00	0.001
Gender				
Male	0.26	1.30 (0.94,1.79)	2.52	0.113
Female	0	1		
Race				
Malay	0	1		
Chinese	-0.33	0.72 (0.37,1.41)	0.91	0.339
Indian	0.83	2.29 (0.14, 36.71)	0.34	0.560
Household Income				

<RM 1000	0	1		
RM1000 to RM2999	-1.71	0.84 (0.56, 1.27)	0.68	0.411
RM3000 to RM10000	-0.16	0.59 (0.56, 1.29)	0.59	0.441
Above RM10000	-0.44	0.64 (0.33, 1.26)	1.67	0.197
Housing				
Flat	0	1		
Semi D or Bungalow	-0.30	0.74 (0.32, 1.75)	0.47	0.494
Terrace	-0.40	0.67 (0.27, 1.65)	0.76	0.384
Others	-0.51	0.68 (0.28, 1.63)	0.75	0.385
Parent Marital Status				
Married and lived together	0	1		
Married but didn't lived together	0.90	2.45 (0.96, 6.27)	3.50	0.062
Divorce	0.50	1.63 (0.77, 3.46)	1.64	0.200
Widow or widower	0.15	1.16 (0.52, 2.61)	0.13	0.719
Others	-0.20	0.82 (0.08, 7.90)	0.03	0.861
BMI (kg/m^2)	0.01	1.01 (0.98, 1.05)	0.61	0.435
Psychological Factors				
Peer Pressure	0.25	1.29 (1.13, 1.46)	14.35	<0.001
Emotional Problem	0.17	1.18 (1.05, 1.32)	8.13	0.04
Prosocial	0.11	1.11 (1.01, 1.22)	4.60	0.032
Conduct Problem	0.10	1.10 (0.97, 1.27)	2.16	0.142
Hyperactivity scale	0.13	1.14 (1.03, 1.27)	6.23	0.013

The variables that produced $p < 0.25$ in the simple logistic regression model were chosen to be included in the multiple logistic regression analysis.

Disordered eating behaviour was independently associated with emotional problem (p=0.014, Adjusted OR 1.16, CI 1.03, 1.31) and peer pressure (p=0.001, Adjusted OR 1.26, CI 1.10, 1.44) identified using SDQ after adjusting other variables. Increasing age also increased the risk for having disorder eating (p=0.006, Adjusted OR 1.21, CI 1.06, 1.39). It was not significantly associated with body mass index (BMI), or any history of any form of substance abuse. (Table 3)

Table 3:
Factors Associated with the risk of Disordered Eating Behaviour among Adolescents by Multiple Logistic Regression model

Variable	*Regression coefficient (b)*	*Adjusted OR* (95% CI)	*Wald Statistics(df)*	*P* Value
Age	0.19	1.21 (1.06,1.39)	7.59(1)	**0.006**
Emotional Problem	0.15	1.16 (1.03,1.31)	11.22(1)	**0.014**
Peer Pressure	0.23	1.26 (1.10,1.44)	6.03(1)	**0.001**

Multiple logistic regression; Forward LR Multiple Logistic Regression model was applied. Multicollinearity and interaction term were checked and not found. Hosmer-Lemeshow test (p=0.986) and classification table (overall correctly classified percentage=70%) were applied to check the model fitness.

Discussion

This study found a moderate number of adolescents in the secondary schools in Terengganu had disordered eating behaviour and provided the evidence of persisting risk of eating disorder among adolescents. This resonates with a 10-years longitudinal study which found that disordered eating behaviours were prevalent in non-clinical samples of adolescents and young adult females and that behaviours from adolescent were constant or increase until young adult (Neumark-Sztainer et al.,2012). The finding of prevalence rate of disordered eating behaviour among adolescents in this study is higher (30.1%) compared to a previous study in Malaysia reported eight years back with only 18.2% prevalence (Gan et al., 2011).

More adolescents girls (18.2%) in this study were engaging in disordered eating behaviours compared to adolescents boys (11.9%). Previous studies had shown that female Malaysian adolescents had concern on being thin and felt some level of dissatisfaction towards their body weight by comparing them with image of thin women in media, even though their weight are normal and healthy (Pon et al.,2004; Leong et al.,2004). Meanwhile, a study among Malaysian female undergraduates found that those with low self-esteem were prone to practice some form of dieting (Khor et al.,2002).Their desire to be thin led them to frequently skip meals and practice yo-yo dieting which is an abnormal pattern of eating (Monir et al.,2010). Hence, this made them a vulnerable group to have eating disorders.

Some of the respondents with disordered eating behaviour were of normal weight (30%) while 35% were overweight. There were several studies showed that normal and overweight adolescents are associated with disordered eating behaviours, while there some the reported overweight and obesity adolescents found to be associated with disordered eating behaviours (Monir et al., 2010; Neumark-Sztainer et al.,2002). As they felt the need to reduce weight, overweight adolescent may engage with disordered eating behaviours while trying to lose weight (Golden et al., 2016) .The findings from this study also shown that normal weight adolescents were engaging with disordered eating behaviours. The same result also reported in a previous study among university students which discovered that 61% who were within a healthy weight range have desire to lose weight and aim to be thinner (Khawaja & Sweid ,2004).

The present study found that an increasing age contributed to disordered eating behaviours among adolescents. Our finding is consistent with a previous literature that suggested increasing age raised weight concern and body image problems during adolescents from one in 10 among 11 years old, to one in five among 15 to 16 years old (Cooper & Goodyear ,1997). Another study involving school-girls aged between 12 and 18 years old in Toronto, Hamilton and Ottawa found that disordered eating attitudes and behaviours gradually increase throughout adolescents (Jones et al., 2001). Thus, this highlights the concern of risk to disordered eating behaviours among adolescents as they go through the phase to adulthood and the need of preventive measures especially in the early phase of adolescence.

Emotional problems were also associated with disordered eating behaviours among adolescents in this study. Emotion disturbances influence disordered eating behaviours among adolescents was not just recently concede since there were several studies indicating emotional problems as contributing factor toward disordered eating behaviour. The findings consistent with findings in a semi-structured interview with females having bulimia nervosa where the participants described that binge eating and purging is a way to escape or release from negative internal emotions included shame, anger, guilt, anger , depression and anxiety, feeling of rejection (Jeppson et al.,2003). In addition, a review study reported that when some people felt over powered with negative emotions they started to binge eating as an instant regulatory effect (Haedt-Matt & Keel, 2011). However, there was unpredicted finding revealing that positive emotional states also triggered binge eating as the person perceive eating a way to express cheerful feelings like excitement or enjoyment (Hamilton-Wasson,2011). As found in other study, difficulties in emotional regulation initiate uncontrolled eating behaviour, which lead to disordered eating (Prefit & Szentagotai-Tătar, 2018).

The result of this study also found peer problems associated with disordered eating behaviour among adolescents. This may be due to the social cultural factors which play an influencing role in disordered eating behaviours among adolescents (Stice, 1994; Stice et al., 1996).The three main sources of sociocultural factors are family, peers and media. In addition, previous studies conducted in Malaysia did indicate that these sociocultural factors influence disordered eating behaviour (Gan, 2011; Mellor et al., 2009). Peer group usually had the same concern on body weight, dietary restriction and desire to have great loss of weight. Indeed, in a study conducted among female aged 11 to 17 years old described that peers may influence internal desire to be thin and body image criticism correlated with body dissatisfaction and disordered eating attitude among themselves (Vincent & McCabe, 2000). Therefore, this may be the reason disordered eating attitudes and behaviours were affected by the quality of peer relationship.

The current study has several limitations. One of the main limitations is the study design itself. Cross-sectional study does provide strong support for the theoretical framework but cannot be utilised to analyse behaviours over time. This also does not allow production of causal-effect relationship toward predictor factors such as demographic, child's mental health, substance misuse and body weight status with disordered eating. Future longitudinal study should be conducted to determine the onset of disordered eating behaviours and propose strong causal relationship between predictor factors toward disordered eating. The other limitation in the current study is the reliance on self-report measures. Although all the procedures in collecting data are confidential, but there could be social desirability bias and

lack of flexibility in answers on fixed questions. There may be also possibility of underreporting. Lastly, the sample used in this study was limited to school-going Terengganu adolescents thus may affect generalizability. Future studies should include bigger sample size and national representative samples. Hence, a more comprehensive prevention and treatment program could be proposed on disordered eating behaviour of adolescents and prevent eating disorder among them.

Conclusions

The outcome of this study supported the evidence of disordered eating behaviours in adolescents who were having emotional problem and peer problems. This study also highlighting that increasing age positively contribute to disordered eating behaviours among adolescents. Thus, it is crucial to screen adolescents with peer and emotional problems for eating disorders and vice-versa. Therefore, this study provide support for the importance of prevention programs disordered eating focused on adolescents. It is vital to educate parents, peer groups and teachers on negative effects of weight and body image criticism on their emotional wellbeing that potentially contribute to disordered eating behaviours among adolescents. Thus, intervention programs in schools should inculcate healthy eating habit, acceptance of diversity body weight and image and promote active living among adolescents. Public Health Prevention Program should involve nutritionist, psychologist and school counsellor or teachers to raise awareness on adolescent's mental health, eating attitudes and behaviours as well as improving their nutritional status. Early prevention will preclude eating disorder among adolescents as well as avoid serious complications on mental health and physical health.

Disclosure of Interest

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

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