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Original Article

Prevalence and Contributing Factors towards Overweight and Obesity among Nursing Students in a Private Healthcare University College in Malaysia

Dharneshaa Balu[1], Annamma K[2], AiniA[3], Roziah A[4], Syamilah M[5]

[1]*Undergraduate Student, School of Nursing, KPJ Healthcare University College, Negeri Sembilan, Malaysia*
[2]*Research and Development coordinator, School of Nursing, KPJ Healthcare University College*
[3]*Post Graduate Supervisor School of Nursing, KPJ Healthcare University College,*
[4]*Post Graduate Supervisor School of Nursing, KPJ Healthcare University College.*
[5]*Post Graduate Supervisor School of Nursing KPJ Healthcare University College.*

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Abstract *— Obesity is now well recognized as a disease in its own right, largely preventable through lifestyle changes, especially diet. Overweight and obesity are commonly classified by calculating body mass index (BMI). According to World Health Organization, more than 1.9 billion adults aged 18 years and older were overweight, and over 650 million adults were obese in 2016. This research aimed to determine the prevalence and factors of overweight and obesity among nursing students at one of the Private Healthcare universities in Malaysia. The research design chosen in this study is a descriptive quantitative design. The suggested method for data collection is an anonymous self-administered questionnaire via goggle forms with close-ended items of the question, distributed to 214 selected registered diploma nursing students. The researcher intends to target the population as all the second and third year of diploma nursing students. The sample size of the population is 214 nursing students selected as calculated. This study used the convenience sampling method to enroll eligible participants. The data was under a frequency or descriptive count. The researcher also used the chi-square test to analyze the relationship between demographic data, factors of obesity which is significant for this study. Out of the study population, obesity was found in 27 individuals and overweight among 50 individuals. There was a significant relationship between family history of Obesity and Body Mass Index (BMI). No significant relationship between physical activity or eating factors on Body Mass Index (BMI).*

Keywords - *eating factors, nursing, obesity, overweight, physical activity, the prevalence*

I. INTRODUCTION

The excessive deposition of fat that may strongly impact health is overweight and obesity. Obesity is the excessive and unhealthy accumulation of fatty tissue that can adversely affect health[1]. It can be induced by various non-controllable social, cultural, behavioral, physiological, metabolic, and genetic factors[2]. Obesity can be avoidable by a healthy lifestyle, particularly diet, which is now well known in its name as a disease. Obesity is also a potential cause for many non-communicable diseases associated with higher morbidity and mortality[3].

Overweight and obesity are commonly classified by calculating body mass index (BMI).BMI is defined as the weight in kilograms divided by the square of the height in meters (kg/m2). World Health Organization classified the BMI of adults to an overweight category as more significant than or equal to 25, and obesity is a BMI greater than or equal to 30.

Obesity can be classified as a significant health indicator that offers a global public health concern. As a result, many people have sought to engage in practices that will help them maintain a healthy weight and reduce the burden of obesity[4]. Obesity was not only limited to one age group as it may affect children as well. The population of overweight and obesity among children and adolescents aged 5-19 has increased rapidly from just 4% in 1975 to just over 18% in 2016. A child's total diet and activity level play an important role in determining a child's weight[5]. It is seen that this age group grossly depends on high-calorie foods which are low in other nutrients[6]. However, some of the lowest prevalence of overweight and Obesity in Asian countries

worldwide, concerning increased rates, have been experienced in recent years. Two in every five adults in the country are either overweight or obese in Asia and the Pacific[7].

Overweight and obesity are frequently related to dietary disorders in recent years despite the awareness of its prevention. Elevated cortisol levels due to stress also encourage overeating, which leads to weight gain[8]. Formula diets provide around 900 calories, with 20% protein, 30% fat, 50% carbohydrate, and vitamins and minerals to meet the necessary dietary allowances[9]. The health consequences and improvements in its treatment appear to be many new cases every year[10]. Over the last 20 years, increased consumption of high-calorie foods and a sedentary life have tripled obesity among young adults in developing nations[11]. On the other hand, adolescents eating behaviors are easily affected by parents' and peers' habits, social relations, and school environment[12]. Availability of fast food in schools is another factor that increases its consumption by adolescence[13].

Media advertisement and marketing promote the intake of fast food, and easy to get, cheap. Fast food delivery services are significant factors that directly affect teenage purchase decisions and consumption[14]. Physical inactivity is one of the main contributors to the obesity epidemic in the U.S. and is often targeted for a solution because it is modifiable at the individual level[15]. Sedentary lifestyle, particularly sedentary occupation and passive recreation such as watching television, promote mortality and morbidity related to overweight and obesity [16]. Insufficiently active people have a 20% to 30% increased risk of death than sufficiently active people [17]. These factors contribute to obesity.

Physical activity relates to all motions caused by energy intake caused by skeletal muscles and is divided into occupational, physical activity, and physical activity for leisure. Exercise is a sub-concept of this physical activity and is included in physical leisure activity and is defined as a scheduled and repeated organized activity[18].

Besides that, obesity is a complex medical problem leading to chronic diseases and plays a central role in the "insulin resistance" or "metabolic" syndrome. Metabolic syndrome includes hyperinsulinemia, hypertension, hyperlipidemia, type 2 diabetes mellitus, and an increased risk of atherosclerotic cardiovascular disease[19]. Around 50% of diabetes, 23% of the burden of ischaemic heart disease, and between 7% and 41% of some cancer burdens lead to overweight and obesity. Overweight and obesity also bear a substantial health burden and can significantly affect spending on health. Obesity is closely correlated with the prevalence of chronic medical conditions, health-related quality of life decline, and increased expenditure on health care and medication. The associated health care costs for obesity-related problems are essential for both patients and health care systems.

Behavior modification is necessary to tackle obesity that has to be on the rise worldwide. Lifestyle change, including diet, physical activity, and behavioral modification, is the cornerstone of the management of obesity, with pharmacological and surgical interventions in appropriate patients[20]. Quality of life and average life expectancy is significantly affected by obesity. Obesity's primary management focuses on lifestyle changes such as diet, physical activity, sleep, and stress reduction. A combination of physical activity and dietary changes is most effective for weight loss and may need treatments, surgery, and other referrals if these interventions are ineffective after six months[21].

Within the health care system, obesity must be treated like every other complex illness, with empathy, and without discrimination. According to studies, adolescents are frequently subjected to social problems, prejudice, and discrimination, not only from the general public but also from health professionals, making them hesitant to seek medical treatment[22]. Both health care providers and patients should give importance and handle complete care as obesity treatment is a lifelong task. Medical students are the community's healthcare providers. Early sensitization of medical students will assist them in making healthy decisions for themselves and allow them to act as facilitators in persuading the community to adopt healthy life[23]. Nurses are vital persons in the health care team, and they play a significant role in health promotion and maintenance in the clinical and community setup[24]. Before beginning care, they should set reasonable targets while bearing in mind that even a slight 5-15 percent weight loss substantially decreases obesity-related health risks[25]. Low-calorie, low-fat diets, increased physical activity, and lifestyle improvement techniques are effective interventions for obesity[26].

II. METHODOLOGY

This research is a quantitative cross-sectional descriptive design with self-administered questionnaires conducted on one of the private universities in Negeri Sembilan, Malaysia. In this study, the target population is diploma nursing students in KPJ Healthcare University College, Nilai. The sample is a diploma nursing student from year one until year three at the private Healthcare University College who had to undergo clinical posting. This is because the student who has exposure in clinical knows and has seen the role of nurses as health promotion and as the image of the hospital. The number of diploma nursing students present in the private Healthcare University College during the data collection is 467. The sample size was determined by using the Krejcie and Morgan (1790) formula. The total sampling was 214.

The researcher referred to research entitled 'Correlation between physical activity, eating behavior and obesity

among Sudanese medical students Sudan' [27]. In that study, they have used sociodemographic, The International Physical Activity Questionnaire (IPAQ), and The Three-Factor Eating Questionnaire-Revised 18(TFEQ-R18). Some modification has been done. The questionnaires consisted of 33 items about the prevalence of overweight and obesity and its factors.

Sociodemographic questions included age, study level, ethnicity, family history of obesity, family income, and stay area. The researcher has requested the respondents to give the latest weight and height. The International Physical Activity Questionnaire (IPAQ) was developed into two short and long versions. In this study, they utilized the short form of the international physical activity questionnaire (SF-IPAQ) to determine the level of physical activity. It contains seven questions covering all types of physical activity. The Three-Factor Eating Questionnaire-Revised 18(TFEQ-R18) has three scales that classify subjects into three main factors: cognitive restraint, emotional eating, and uncontrolled eating. It's consists of 18 items on a 4-point response scale (definitely true/mostly true/ mostly false/ false).

III. VALIDATION

In this study, survey items went through validation stages since it has been modified. One of the postgraduate supervisors has checked this survey and then went through it by three supervisors to validate. The university affiliation and data had approved the study was collected using the Google Form via online survey due to the outbreak of COVID-19. The researcher gave an explanation given before the distribution of the online survey. Respondents were given two days to answer the online questionnaires. The responses rate was 100% (n = 214 respondents). Data were analyzed using SPSS software version 2.0. The analysis included descriptive statistics such as frequency and percentage.

IV. ETHICAL CONSIDERATION

The researcher obtained ethical approval from the Research Management Committee held on 29 November 2019 and approved by university affiliation. The questionnaire was obtained from Google as it was free to assess. The participants were asked to sign consent forms and were told that the survey was anonymous and confidential. The respondents will be considered because they decide to participate in the research by completing the questionnaire.

V. RESULTS

The result showed, out of 214 subjects/respondents, 156 (72.9%) were from the age of 18 to 20 years old, 51 (23.7%) of 21 to 23 years old, and only 7 (3.3%) of 24 to 26 years old. The majority of subjects/respondents were aged 18 to 20 years, and the least is age more than 24 years old. 89 (41.4%) respondents in year one, 92 representing 42.8% were in year 2. Meanwhile, 33 students representing 15.3%, were in year three. The majority of the respondent, which is 184 (85.6 %), were Malay, Indian, and Chinese were 13 (6.0%) and 2 (0.9%), respectively. About 15 respondents (7%) were from other ethnicities. Regarding family history, 38 (17.7%) respondents have a family history obese, and 176, representing 81.9%, don't have any family history of obesity. The highest frequency was respondents staying in the city with 150 (69.8%) respondents, while the total number of respondents staying in the urban area was 64, equivalent to 29.8% respondents. The results are as shown in table 1.

TABLE 1: SOCIODEMOGRAPHIC DATA

Variables	*N*	*%*
Age		
18-20	156	72.9
21-23	51	23.7
24-26	7	3.3
Mean = 1.32		
Year of Study		
Year 1	89	41.4
Year 2	92	42.8
Year 3	33	15.3
Mean = 1.74		
Ethnicity		
Malay	184	85.6
Indian	13	6.0
Chinese	2	.9
Others	15	7.0
Mean: 1.29		
Family history of obese		
Yes	38	17.7
No	176	81.9
Mean: 1.82		
Family income		
Below RM1000	24	11.2
RM1000- RM2000	81	37.7
RM2000- RM3000	41	19.1
More than RM3000	68	31.6
Mean: 2.71		
Area of stay		
Urban	64	29.8
City	150	69.8

Grading of BMI was done according to WHO grading. Obesity was found in 27 (12.6%) individuals and overweight among 50 (23.4%). Nearly half of the respondents were average weight, 111, equivalent to 51.9% of respondents. A total of 26 (12.1%) respondents are in the underweight category.

TABLE II: CLASSIFICATION OF BODY MASS INDEX (BMI)

Classification	BMI (Kg/ m²)	*N*	*%*
Underweight	< 18.5	26	12.1
Normal	18.5–24.9	111	51.9
Overweight	25.0–29.9	50	23.4
Obese	>30	27	12.6

The level of physical activity was classified into high, moderate, and low. Physical activities were calculated in Metabolic Equivalent (MET). 99 (46.3%) were considered with a low level of physical activity practiced. Less than half of respondents, 91 (42.5%), have practiced a moderate level of physical activity. A high level of physical activity has only been practiced by 24 respondents, equivalent to 11.2%.

TABLE III: LEVEL OF PHYSICAL ACTIVITIES

Level of physical activities	*N*	*%*
Low	99	46.3
Moderate	91	42.5
High	24	11.2

The Three-Factor Eating Questionnaire-Revised 18(TFEQ-R18) consists of three scales that classify subjects to cognitive restraint, emotional eating, and uncontrolled eating. Half of the total students were cognitive restraint eaters, which is 86 (40.2%) respondents. Around 54 (25.2%) are uncontrolled eaters, followed by emotional eaters, 74 (34.6%) respondents.

TABLE IV: EATING FACTORS

Classifications of eating behaviors	*n*	*%*
Cognitive Restraint	86	40.2
Uncontrolled eating	54	25.2
Emotional eating	74	34.6
Total	214	100.0

The researchers also assessed any association between sociodemographic data between Body Mass Index (BMI). There was no significant relationship between both variables except for family history. There was a significant relationship between family history of Obesity and Body Mass Index (BMI) using Chi-Square. From this analysis, 14 (6.5%) overweight and 7 (3.3%) respondents in the obese category have a family history of obesity. The total number of overweight and obese is 36 (16.8%) respondents, and 20 (9.3%) respondents have no family history of obesity. The value of Chi-Square is 7.998, and the p-value was 0.046 ($p<0.05$).

TABLE V: ASSOCIATIONS BETWEEN SELECTED VARIABLES AND BODY MASS INDEX (BMI)

Body mass index (BMI)	Variables						
	Age						
	18-20		21-23		23-26		Significance
	N	%	N	%	N	%	
Underwei-ght	22	10.3	4	1.9	0	0.0	$\chi2=7.164$, DF=6, p=0.306 ($p<0.05$)
Normal	83	38.8	25	11.7	3	1.4	
Overweig-ht	31	14.5	17	28.0	2	1.9	
Obese	20	9.3	5	2.3	2	1.9	
TOTAL	156	72.9	51	23.8	7	3.3	
Year of study							
	Year 1		Year 2		Year 3		Significance
Underwe-ight	8	3.7	13	6.1	5	2.3	*$\chi2=7.164$, DF=6, p=0.306 ($p<0.05$)*
Normal	44	20.6	54	25.2	13	6.1	
Overwei-ght	23	10.7	14	6.5	12	6.1	
Obese	14	6.5	11	6.5	2	0.9	
Total	89	41.6	92	43.0	33	15.4	
Family history							
	Yes		No				Significance
underweight	2	0.9	24	11.2			$\chi2=7.998$, df=3, p=0.046 ($p<0.05$)
normal	15	7.0	96	44.9			
overweight	14	6.5	36	16.8			
obese	7	3.3	20	9.3			
Total	38	17.6	92	82.6			

As displayed in Table V, the analysis showed a significant relationship between Body Mass Index (BMI) and family history of obesity.

TABLE VI: ASSOCIATION BETWEEN FAMILY INCOME AND BODY MASS INDEX (BMI)

Body Mass Index	Family income							
	Less than RM1000		RM 1000-RM2000		RM2000-RM 3000		Above than RM3000	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Underwei ght	6	2.8	8	3.7	5	2.3	7	3.3
Normal	1	5.1	4	18.	21	9.8	3	18.2

	1		0	7			9	
Overweight	7	3.3	17	7.9	12	5.6	14	6.5
Obese	0	0.0	16	7.5	3	1.4	8	3.7
Total	24	11.2	81	37.9	41	19.2	68	31.8
significance	χ^2=13.089, df=9, p=0.159(p>0.05)							

The analysis showed no significant relationship between Body Mass Index (BMI) and level of physical activity. From this analysis, 22 (10.3%) respondents are overweight, and 14 (6.5%) respondents practice a low level of physical activity. The total number of respondents who are overweight and obese are 23 (10.3%) respondents, and 12 (5.6%) respondents respectively are practicing a moderate level of physical activity. Five (2.3%) of respondents are overweight, and one (0.5%) respondent in the obese category practices high physical activity levels. The value of Chi-Square is 4.164, and the p-value was 0.655 (p>0.05). This analysis proved that level of physical activity did not influence Body Mass Index (BMI).

TABLE VII: ASSOCIATION BETWEEN LEVEL OF PHYSICAL ACTIVITY AND BODY MASS INDEX

Level of physical activity	Body Mass Index (BMI) Underweight		Normal		Overweight		Obese	
	N	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Low	15	7.0	48	22.4	22	10.3	14	6.5
Moderate	8	3.7	48	22.4	23	10.7	12	5.6
High	3	1.4	15	7.0	5	2.3	1	0.5
Total	26	12.1	111	51.9	50	23.4	27	12.6
Sigificance	χ^2=4.164, df=6, p=0.655 (p<0.05)							

The finding also revealed that there is no significant association between BMI and eating factors. In the cognitive restraint category, 18 (8.4%) respondents are overweight, and 12 (5.6%) are obese. Fifteen respondents are 7.0% overweight, while 6 (2.8%) respondents are obese in uncontrolled eating. The overweight and obese respondents are 17 (7.9%) respondents, and 9 (4.2%) respondents respectively are emotional eaters. The Chi-Square value for this association between BMI and eating factors of diploma nursing students at the private Healthcare University College was that Nilai was 2.629, and the p-value was 0.854 (p>0.05). Therefore, it can conclude that Body Mass Index did not influence by eating factors.

TABLE VIII: ASSOCIATION BETWEEN THREE EATING FACTORS AND BODY MASS INDEX (BMI)

Body Mass Index	Eating factors Cognitive restraint		Uncontrolled eating		Emotional eating	
	N	*%*	*n*	*%*	*n*	*%*
Underweight	13	6.1	4	1.9	9	4.2
Normal	43	20.1	29	13.6	39	18.2
Overweight	18	8.4	15	7.0	17	7.9
Obese	12	5.6	6	2.8	9	4.2
Total	86	40.2	54	25.2	74	34.6

VI. DISCUSSION

In this study, researchers found that obesity was found in 12.6% of individuals and overweight among 23.4%. Similar findings were reported in another study in which 16.8% were obese, and 35.8% were overweight[28]. One of the studies was conducted on young female nursing students aged 18-24 years. The study found the prevalence rate of obesity to be 14.7%, while overweight was 49.2% [29]. The researcher's findings are almost following a study done in India among medical students. They revealed that the overall incidence of overweight was 14.8% and Obesity 21.1%[30]. In a study conducted in Bihar, out of 233 nursing students, the overall prevalence of overweight and obesity was 9.4 and 2.1%, respectively[31]. The researcher's findings align with a research study conducted among nursing students of Public Sector Health University in Karachi, which reported 15.8% and 11.6% were overweight and obese, respectively[32]. In another study among medical students, the prevalence of overweight was 14.5% and was Obesity 1.5% [33]. This difference may be due to variations in dietary practices or sedentary lifestyles.

This study also determined the level of physical activity among diploma nursing students at Private University College, Nilai. The majority of the respondents are practicing a low level of physical activity, 46.3% of respondents. At the same time, respondents practicing a moderate and high level of physical activity are 42.5% and 11.2 %, respectively. This finding was similar to the study where most respondents, 37.8%, practiced low activity, 36.5% moderate activity category, and 25.9% high activity[34].

In another study, the IPAQ scores showed that 26% of the medical students demonstrated a low level of physical activity[35]. The researcher found that most students undertake physical activity only as part of their physical education module. In another cross-sectional study in South India, 10.5% of students were involved in light activity, 20.7% moderate activity, and 68.9% vigorous[36]. In another study, among the obese category, almost 50% of the students do not exercise, 39% do a little exercise, and only 11% are active[37]. Activity can be a challenge for students despite

the awareness of the positive benefits of this behavior because of their busy schedules.

Obesity problem is often associated with unhealthy dietary habits. In this study, the eating pattern among students was analyzed as it is the most common determinant of obesity. This study shows that nearly half of students were cognitive restraint eaters which 40.2% respondents and 25.2% are uncontrolled eaters, followed by emotional eaters, 34.6% of respondents.

A similar study in Sudan revealed that most respondents were uncontrolled eaters, cognitive restraint eaters, and emotional eaters[38]. Another study stated that the highest was uncontrolled eaters and the least was emotional eaters[39]. Students with high emotional awareness are more likely to modulate their emotions more adaptively without turning to food. However, students with low emotional regulation skills will often use food to cope with stress and negative emotions. In this sense, any eating style can regulate mood while also leading to an unhealthy diet.

Being physically active is an essential part of a healthy lifestyle. Health benefits of physical activity include improved fitness, strength, and overall feeling better. This study also analyzed the association between Body Mass Index (BMI) and level of physical activity. This study showed that most respondents who were overweight and obese practiced a low level of physical activity. However, from the analysis result, there was no significant association between Body Mass Index (BMI) and level of physical activity. Therefore it could be concluded that physical activity does not influence the Body Mass Index (BMI).

This finding was similar to a study done[39]. The result revealed no statistically significant difference between Body Mass Index (BMI) and level of physical activity. It's stated that medical students are aware of the importance of healthy lifestyles. Nevertheless, knowledge is only a part of expressing behaviors and providing health promotion. Also, there is no evidence to indicate that this knowledge translates into practice to maintain good health. Similarly, a study showed that the association between inadequate physical activity and overweight or obesity was not significant, where 63.5% of the students were found to have an inadequate physical activity where they used their busy schedule as their obstacle[33].

The transition from high school to college is a critical period for establishing health-related behaviors. From the analysis of this study, it appeared that there was no relationship between eating factors and Body Mass Index (BMI). This study said most respondents are overweight and obese as cognitive restraint categories followed by emotional eaters and uncontrolled eaters; respectively, there were no statistically significant associations of eating behavior scores with subsequent change in weight and BMI[40]. This contrasts with a study in Sudan showing no significant between eating factors and overweight and obese students[38]. Psychological factors associated with overweight/obesity lead to students' desire for weight gain. Although most university students reported knowing the food pyramid well and balanced nutrition, most did not adhere to and practice healthy eating habits. It might be because of their stress or coping management and friends' influence.

VII. LIMITATION AND RECOMMENDATION

The study's limitations are those aspects of design or methodology that have affected or influenced the implementation or understanding of the study's outcomes. These are the restrictions on the generalizability and usefulness of results that are the product of how internal and external validity is defined, like the research or the method used.

The findings of this can be affected by some limitations. It is challenging to generalize the findings of this study for nursing students all over the country because the researcher collected data only from only one private-sector institute. There is a need for research on a larger scale with multiple nursing institutes to make the possibility of generalizability of findings. Next, apart from anthropometric measurements, a disadvantage of the study was that all the other data to be obtained in the study would be based on self-reporting. Hence behaviors would likely be reported higher or lower. For example, physical activity was self-reported and subject to recall and social desirability biases. Third, the dietary instrument purpose was not intended to provide total caloric intake, so it doesn't have details of the impact of individual food products when controlling for caloric intake. To identify potential factors of obesity in non-medical students and even in the general population, further studies are also required to compare and investigate the underlying mechanisms behind obesity among young adults.

VIII. CONCLUSION

This study aimed to determine the prevalence of overweight and obesity and its contributing factors among diploma nursing students. The researchers also want to identify the association between sociodemographic data and the prevalence of overweight and obesity. Physical activity and eating factors also might be the factors of obesity. This study reveals that the prevalence of overweight and obesity among nursing students relatively high should be taken care of.

This study supports that obesity is a multi-factorial problem. It shows that families with a history of obesity are the risk factors, while regular physical activity and eating factor activity are protective factors. The research reinforces the need for students to adopt a balanced lifestyle, healthy eating habits, and a physically active everyday routine. Students with a family history of obesity must be strongly advised to control their Body Mass Index by a healthy lifestyle and diet adjustment.

Globally, overweight and obesity disorders have been a public health problem because they raise diseases like cardiovascular diseases (CVD). It is also said that it can reduce a country's productivity by decreasing people's life expectancy. Therefore, the study reinforces the need to promote healthier behaviors such that it is possible to escape the risks of developing chronic degenerative diseases earlier in life.

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