ORIGINAL ARTICLE

PREVALENCE OF OBESITY AND ITS ASSOCIATE RISK FACTORS AMONG POST-BASIC RENAL CARE NURSING STUDENTS

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ABSTRACT

Obesity is one of the most common, yet among the most neglected, public health problems around the world and it is strongly associated with various non-communicable diseases such as hypertension, diabetes mellitus and coronary artery diseases. Health care personal especially nurses play an important role in educating public to have healthy lifestyle. However, there is an alarming rate of increase in number of obesity among nursing students as well as staff nurses. Therefore, the aim of this study was to determine the anthropometric measurements and its associated risks among post-basic renal care nursing students. Total of 142 post-basic renal care nursing students of five intakes were included in this cross-sectional study. The result of the study showed that 52% of participants were either overweight or obese although most of them were below 40 years of age. Majority of overweight or obese students were Malays and 78% of them being female. We also observed an association of systolic blood pressure (SBP), diastolic blood pressure (DBP) and waist circumference (WC)with increasing body mass index (BMI) (P= 0.001, P= 0.001 and P<0.001) which were statistically significant. Wald criterion estimated that WC and DBP were the most important predictors of BMI in present study. Our study concluded that obesity is prevalent among post-basic renal care nursing students. Urgent and appropriate action should be taken to deter the growing problem of obesity among nursing students and to avoid its subsequent complications in Malaysia.

Keywords: Obesity, Lifestyle, BMI, Waist circumference, Blood pressure.

INTRODUCTION

Obesity is notoriously associated with various diseases particularly cardiovascular diseases, type 2 diabetes mellitus, certain types of cancer, osteoarthritis and asthma. Out of 1.9 billion adults who were overweight, 650 million were obese as reported in 2016 by World Health Organization (WHO)[1]. Asian Development Bank Institute estimated that approximately one billion people in Asia-pacific region were overweight or obese. Among them South East Asia had relatively low rate (26.3%) of overweight and obese adults compared to East Asia (33.06 %) and South Asia (28.85%)[2]. Although there is low rate of obesity in South East Asia, Malaysia has the highest prevalence of obesity. The Asia Roundtable on Food Innovation for Improved Nutrition reported that the growing number of obesity had cost between RM4.26 billion

and 8.53 billion. The report also mentioned that only a third of Malaysian had ever exercised while only 14% of adult population exercised adequately[3].

Nurses play crucial role in promoting health and educating public on the maintenance of healthy lifestyle. Despite the wealth of evidence supporting the positive effect of exercise and balanced diet on health, the practicing nurses in many countries found to be overweight or obese. A cross sectional analysis study carried out by Bogossian FE and members found that nurses and midwives to have a higher prevalence of overweight and obesity compared to the general population. The outcome of these studies implied that nurses themselves, as part of the population, are at risk of developing non-communicable diseases and are subsequently contributing to the increase in mortality and morbidity rates[4]. National Health and Morbidity

Survey highlighted that obese Malaysians make up of 17.7 percent of the population while 30 percent are categorized as overweight. In other words, nearly half of the Malaysians are having unhealthy body weight among 30 million populations[5].

Geok SK and colleagues from University Putra Malaysia carried out 'physical activity and health promoting lifestyle of student nurses in Malaysia and they found that majority of the participants did achieve the average step of 8275.97 steps/day which is lower than the 10,000 steps/day as suggested by the Ministry of Health, the equivalent of the optimum level of physical activity. They concluded that nursing students in Malaysia do not walk enough and, therefore, are not able to gain the benefits of walking[6]. According to the study conducted by Jeya Devi Coomarasamy, 50.6% of registered nurses were either pre-obese or obese[7]. If the role of nurse is to explain the community about healthy lifestyles, then nurses themselves must embrace healthy behaviors. They would become the role models only if nurses maintain their body weight by having balanced diet and daily physical activities. Therefore, the aim of this study was to determine the anthropometric measurements and its associated risks among post-basic renal care nursing students and to motivate them to have active lifestyle.

MATERIALS AND METHODS

A cross sectional descriptive study was conducted between 2015 and 2018 in Lincoln University College, Selangor, Malaysia. Total of 142 post-basic renal care nursing students of five intakes were included in the present study. Post-basic renal care nursing is a certificate program where the students are taught basic science knowledge related to renal function. Students were given briefing about the purpose of the study and those who volunteered to participate were included in our study.

According to WHO, the cut off points for overweight and obesity are 25 and 30 kg/m2 respectively. However, evidence has shown that there is a high prevalence of type 2 DM and cardiovascular risk factors in parts of Asia below these cut off points. The risk of co-morbidities begins to rise at lower BMI values. Many Asian populations have a higher body fat percent at similar BMI, compared with Caucasian/European populations[8,9]. The BMI used in this study is based on the obesity classification mentioned in Malaysia Clinical Practice Guideline (CPG) for Obesity[10] while the reference for waist circumference is based on International Diabetes Federation guideline for Waist Circumference and Waist–Hip Ratio for Asians[11]. Waist 1 is defined as ≤ 90cm for male and ≤80 cm for female. However, the definition for waist 2 and waist 3 are as follow waist 2 (90-102cm for male and 80-88cm for female) and waist 3 (>102cm for male and >88cm for female).

The weight was measured to the nearest 0.1kg and the height was measured to the nearest 0.1cm by using stadiometer attached to the same medical balance weighing scale. The BMI was calculated by using the formula weight in kg/ height in m^2. Waist circumference was measured by a non-stretchable tape measure at a level of midpoint between the lowest rib and iliac crest to the nearest 0.1 cm (umbilical line). Blood pressure was recorded by using sphygmomanometer and classified based on the recent guidelines by American Colleague of Cardiology (ACC) and American Heart Association (AHA) guideline are:

- Normal: Less than 120/80 mm Hg;
- Elevated: Systolic between 120-129 *and* diastolic less than 80;
- Stage 1: Systolic between 130-139 *or* diastolic between 80-89;
- Stage 2: Systolic at least 140 *or* diastolic at least 90 mm Hg [12]

Other information such as the amount of daily consumption of soft drink and daily physical activity were recorded by using questionnaire. A developed questionnaire was used for this study after doing a content and expert validation. It has two parts including the socio-demographic section and lifestyle section. Data was analyzed by using SPSS version 21 comprising the descriptive, bivariate and multivariate analysis. Frequency and percentage were presented by using descriptive analysis as both are categorical variables. Bivariate analysis was performed for all included variables by using Chi square test in the level of significant 0.05. Multiple logistic regression was run for all significant variables from bivariate analysis.

RESULTS

Descriptive analysis
Table 1 and 2 showed that the majority of our participants were aged less than 40 years old, being female (76.8%), being Malay (83.1%), with SBP in between 100-129 (79.6%), with DBP in between 60-79 (71.8%), with normal waist circumference (59.9%), normal BMI in between 18-23.5 (48.6%), not having soft drink (71.8%), not doing exercises at all (38.7%).

Table 1: Descriptive analysis for demographic variables

Variable	Frequency	Percentage %
Age		
Less than 40	140	98.6
40-60	2	1.4
Sex		
Male	33	23.2
Female	109	76.8
Race		
Malay	118	83.1
Chinese	8	5.6
Indians	8	5.6
Others	8	5.6

Table 2: Descriptive analysis for the related variables

Variable	Frequency	Percentage %
SBP		
100-129	113	79.6
130-139	20	14.1
140 & above	9	6.3
DBP		
60-79	102	71.8
80-89	25	17.6
90 & above	15	10.6
Waist		
1	85	59.9
2	36	25.4
3	21	14.8
BMI		
18-23.5	69	48.6
23.6-28	34	23.9
28.1-35	26	18.3
More than 35	13	9.2
Soft drink		
Non	102	71.8
3-5 cans weekly	38	26.8
1 can & more/day	2	1.4
Exercise		
More than 30 min/day	35	24.6
Less than 30 min/day	52	36.6
Not at all	55	38.7

Bivariate analysis

BMI was categorized to 4 groups following the modified obesity classification mentioned in Malaysia Clinical Practice Guideline (CPG) Obesity but for this analysis, we combined it to two groups as normal weight and overweight/obese. Chi square test was performed for this analysis between BMI Dichotomous variables (Normal and Overweight/ obese) and all included factors (categorical variables) as shown in table 3. It was found that SBP, DBP and waist circumference were statistically significant with BMI (P= 0.001, P= 0.001 & P<0.001) respectively. These factors have an association with increasing BMI. On the other hand, age, sex, soft drink and exercise were found statistically non-significant and have no association with increasing or decreasing BMI (P= 0.166, P= 0.681, P- 0.828, P= 0.076 & P= 0.199) respectively.

Table 3: Bivariate analysis between BMI and associated risk factors

Variable		BMI (Normal) N (%)	BMI (Overweight/obese) N (%)	X²	P value
Age				1.917	0.166
	Less than 40	69 (49.3)	71 (50.7)		
	40-60	0	2 (100.0)		
Sex				0.169	0.681
	Male	15 (45.5)	18 (54.5)		
	Female	54 (49.5)	55 (50.5)		
Race				0.888	0.828
	Malay	59 (50.0)	59 (50.0)		
	Chinese	3 (37.5)	5 (62.5)		
	Indians	3 (37.5)	5 (62.5)		
	Others	4 (50.0)	4 (50.0)		
SBP				14.468	**0.001**
	100-129	64 (56.6)	49 (43.4)		
	130-139	3 (15.0)	17 (85.9)		
	140 & above	2 (22.2)	7 (77.8)		
DBP				12.434	**0.002**
	60-79	59 (57.8)	43 (42.2)		
	80-89	6 (24.0)	19 (76.0)		
	90 & above	4 (26.7)	11 (73.3)		
Waist				77.640	**< 0.001**
	1	67 (78.8)	18 (21.2)		
	2	2 (5.6)	34 (94.4)		
	3	0 (0.0)	21 (100.0)		
Soft drink				5.150	0.076
	Non	55 (53.9)	47 (46.1)		
	3-5 cans weekly	14 (36.8)	24 (63.2)		
	1 can & more/day	0 (0.0)	2 (100.0)		
Exercise				3.231	0.199
	More than 30 min/day	21 (60.0)	14 (40.0)		
	Less than 30 min/day	21 (40.4)	31 (59.6)		
	Not at all	27 (48.6)	28 (50.9)		

As shown in Table 3, multiple logistic regression analysis was used to predict the most important factors that have an association with BMI after controlling other confounders (P < 0.05) by using stepwise backward logistic regression method. It was demonstrated that DBP (*P= 0.017)* and waist (P < 0.001) made a significant contribution to prediction, whereas other variables were not. The most important factors responsible for increasing the BMI were identified by using Wald criterion, which gave the 'importance' of the contribution of each variable in the model. The Wald test estimated that waist and DBP were the most important predictors of BMI.

Table 3: Multivariate analysis for the most predictable factors for BMI

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
DBP			8.2	2	0.017			
60-79	0.1	1.2	0.1	1	0.937	1.1	0.1	9.6
80-89	1.9	1.3	2.6	1	0.112	6.9	0.6	77.1
Waist			27.5	2	0.000			
1	4.5	0.9	27.5	1	0.000	87.1	16.4	462.5
2	3.1	0.9	20.4	1	0.143	105.7	33.7	359.2
Sex (Male)	1.0	0.6	3.2	1	0.1	2.8	0.9	8.6
Constant	-2.1	1.2	3.7	1	0.1	0.2		

a. Variable(s) entered on step 1: DBP, Waist, Sex

DISCUSSION

Obesity is a growing health problem not only in developed countries but also in developing ones. Obesity-related health problems are increasing day to day in Malaysia. Studies conducted by Nutrition Society of Malaysia found out that almost 30% of children and teenagers age between six and seventeen years were either overweight or obese. Researchers also warned that proper action should be taken immediately to lessen or deter the problem otherwise it may not only hamper the quality of life but also lead to risk of having secondary complications like type 2 DM and cardiovascular problems[13].

Our study has found that nearly 52% of post-basic renal care nursing students were either overweight or obese although most of the students were below 40 years of age and majority was not drinking sugary drinks. It may be due to lack of regular exercise, not adhering to a healthy lifestyle and eating habits of nursing students. Only 25% of participants were exercising adequately but the remaining were not doing any exercise or inadequately exercise. The reason for lack of exercise may be busy schedule of the curriculum, tiredness after whole day classes, lack of convenient place to do exercise and unfriendly environment as they are staying in student hostel away from hometown. It is not surprising that the increasing rate of overweight and obesity among student nurses due to urbanization and spending more time in electronic gadgets. Inactive lifestyle and unhealthy BMI among nurses would be the barriers to encourage patients to do exercise.

Our finding is consistent with other study conducted by a group of researchers from New Delhi, India. They have observed that 80% of nurses participated were overweight or obese compared to control group (p=<0.001). Similarly, they found that central obesity was significantly higher in nurses compared to controls (p=<0.001). The researchers concluded that unhealthy diet pattern, exposure to hospital infection, prolonged working hours and work stress were likely contributors of obesity among nurses[14]. Likewise, a study done in Saudi Arabia also found similar result mentioning 59% of nursing students were above normal BMI[15]. It is worrisome for the country that the healthcare personals themselves are having unhealthy body weight which might affect their wellbeing in the future. Thus, the burden of non-communicable diseases would be contributing not only from general public but also from healthcare staffs in the future if the current trend of rising obesity is not managed properly. In the present study, the bivariate analysis has shown that the factors such as systolic blood pressure (SBP), diastolic blood pressure (DBP) and waist circumference were significantly associated with increasing BMI (P= 0.001, P= 0.001& P<0.001 respectively). The reason for high BP in overweight and obese students could be increased consumption of junk food which contains high sodium content, excessive calorie intake which cause fat accumulation in adipocytes and subsequently increased production of cytokines which lead to endothelial injury and vasoconstriction. Lack of exercise also contributes fat accumulation in abdomen which may lead to increased leptin production and subsequent sympathetic system activation.

Many other studies reported similar findings (Dua et al[16] and Frederick Vuvor[17]. Dua and co-workers found that there was a significant positive correlation between BMI and both SBP and DBP. A study done by Hirose et al found that serum leptin levels were highly correlated with mean arterial pressure and BMI in male Japanese adolescents[18].

Sympathetic nervous system (SNS) activation has been considered to have a crucial function in the pathogenesis of hypertension among obese individuals. High-caloric intake increases norepinephrine turnover in peripheral tissues, raises resting plasma norepinephrine concentrations— an indirect measurement of SNS activity—and amplifies the rise of plasma norepinephrine in response to stimuli such as upright posture. High dietary content in fat and carbohydrate has been suggested to acutely stimulate peripheral α1- and ß-adrenergic receptors, leading to elevated sympathetic activity and hypertension[19,20].

CONCLUSION AND RECOMMENDATION

The result of our study concluded that more than majority of the post- basic renal care nursing students in this study were having unhealthy body weight which is really a big issue since the healthcare personals are the frontier to educate public. It would be difficult for them to educate public to stay active if they themselves are obese. The awareness campaigns and preventive measures for weight control among nursing students and registered nurses should be carried out time to time. Furthermore, the government should come out with strategies to prevent or reduce the obesity for not only the nurses but also for all students and community. However, our study had several limitations such as sample population is restricted to fewer number of students from a private university. Future study should include sampling of students not only from private institutions but also from public ones as well as nurses from hospital settings for better outcomes.

CONFLICT OF INTEREST
All authors have no conflict of interest to declare.

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