

## ORIGINAL ARTICLE

### Relationship between Fat Intakes and Other Risk Factors with Overweight and Obesity among Medical Students of UniKL RCMP.

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#### Abstract

**Background:** Obesity is one of the biggest challenges that Malaysians need to overcome especially among medical students.

**Aim:** To determine the relationship between fat intake and other risk factors with overweight and obesity among medical students in the Universiti Kuala Lumpur, Royal College of Medicine Perak (UniKL RCMP).

**Material & Method:** This cross-sectional study was conducted among year 2 MBBS students of UniKL RCMP. A total of 97 students were randomly selected from 151 students in that batch. The data was collected using online survey. Three set of questionnaires which consist of sociodemographic profiles, food intake frequency and behaviour of fat intake were distributed to selected participants. The data were analysed using SPSS software and appropriate statistical tests were applied to test the hypothesis.

**Results:** Out of 97 respondents, 34 (35.1%) were males and 63 (64.9%) were females. 34.0% of participants had a family history of obesity and 49.5% perceived themselves as physically active. The prevalence of overweight and obesity among the students was 19.6% and 7.2% respectively. The study showed that half of students (50.5%) were taking high fat diet and majority of them frequently taking food higher in saturated fats. No association found between fat intakes, active lifestyle, and fatty food preference with body mass index (BMI) status ( $p > 0.05$ ). The only significant association found was between family history of obesity and BMI status ( $p < 0.05$ ).

**Conclusion:** In conclusion, the prevalence of overweight and obesity in this study was 26.8% which is lower than the national average. However, the pattern of food intake shown that the medical students in RCMP have tendencies to eat more foods with high saturated fat. The fat intake seems not associated with overweight and obesity. Other risk factors such as active lifestyle perception and fatty food preference were also not associated with BMI status in this study ( $p > 0.05$ ). Only the family history of obesity seems to be strongly related to obesity ( $p < 0.05$ ).

**Keywords:** fat intake, food frequency, obesity, overweight, medical students.

## Introduction

The increased prevalence of people being overweight, and obesity shows great concerns around the world. Nearly half of Malaysian population are overweight or obese and Malaysia has the highest rate of overweight and obesity among all Southeast Asian countries.<sup>[1]</sup> Students in professional course including medical students are at high risk for obesity due to sedentary lifestyle and unhealthy eating pattern.<sup>[2]</sup> Previous study indicated that protein and carbohydrate intakes are inversely related to BMI, while intake of fat contributes more to obesity.<sup>[3]</sup> High stress due to work overload such as assignments, lectures, clinical works, and seminars tend to increase the consumption of high calorie and fatty foods.

Risk factors such as family history of obesity, fatty food preference and physical activities are known to be associated with the occurrence of obesity. With high workload, medical students are prone to lessen their time for physical activities such as sports and regular exercise. Since they will become a public role model as physician in the future, obesity should not be an image projected by a medical profession.

This study was done to determine the prevalence of overweight and obesity among year 2 medical students at University of Kuala Lumpur, Royal College of Medicine Perak and to find out the relationship between these condition with fat intakes and other risk factors.

## Materials and methods

This cross-sectional study was conducted among Year 2 students of MBBS program in UniKL RCMP. The simple random sampling was used to select 97 samples from the name list of 151 students in that batch. The batch of year 2 has been conveniently selected for logistic reason. The sample size for this study was calculated by using the sample size calculator on OpenEpi software using the estimated proportion of overweight and obesity of 21.1%, and confidence

limit of 5%.<sup>[4]</sup> Only students giving consent to participate were accepted as samples.

All participants were given a survey form through on-line. There were three sets of questionnaires which consist of sociodemographic variables, fatty food preference and food frequency questionnaire. All questionnaires were pretested. Participating students were expected to fill in the questionnaire their gender, weight, height, family history of obesity and perception on their physical activity. For calculating the BMI, the formula used was  $\text{weight/height}^2$ . The status of BMI was based on the WHO classification of which BMI below 18.5 for underweight, "18.5-24.9" for normal, "25.0-29.9" for overweight and "30.0 and above" for obese. For fatty food preference, students were asked to answer 10 questions on their behaviour toward fatty food. The response was in Likert scale from strongly disagree to strongly agree and scored from 5-50. Score of 40 or more was considered high preference for fatty food. For food frequency questionnaire, participants were asked to tick the frequency of food consumed (daily, 3-4 times weekly, once in 2-3 week or never) and the quantities (cup, spoon, or pieces). Total fat intakes were calculated using Malaysian Food Composition Database.<sup>[5]</sup>

Analysis of data was done by using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive analysis was performed to determine the sample profiles, mean fat intake and prevalence of overweight and obesity. ANOVA test was done to determine the relationship between mean fat intake and BMI status. Chi-Square Test was executed to find out the relationship between fat intakes and other risk factors with BMI status.

### *Ethical consideration*

The study was approved by the institutional ethical review committee of UniKL RCMP. Each respondent was informed about the purpose of the study and consent regarding their agreement to be a part of the research was also obtained before the study is conducted. The identity and information

of the respondents were kept strictly confidential to respect their dignity and privacy.

## Results

### *Sociodemographic Profiles of Respondents*

Based on Table 1, female students comprised of 65.0% of the samples. 34.0% of the respondents having a family history of obesity and 49.5% considered themselves active. In term of fatty food preference, 32% of students had high interests in fat foods while 68.0% had low interests in fat foods.

### *Prevalence of overweight and obesity*

It was found that the prevalence of overweight was 19.6% whilst obesity was 7.2% (Table 2)

### *Pattern of fat intake*

Based on figure 1, the mean of total fat intake was  $1796 \pm 1060$  gm per month (on average 59.9 gm per day) and range between 666-6000 gm. Taking mean (1790 gm) as a cut off between high and low-fat intake, it was shown that 40.2% of students have high fat intake

### *Fatty food preference behaviour*

Table 3 shows the food behaviour of students on their preference of fatty food. Overall, majority of student have low preference for fatty food (68%). Most of students were not preferred eating a take-out food (83.5%) or taking heavy breakfast (72.2%). Only 53.6% easily tempted to eat sweets and fatty foods.

### *Frequency of food intake based on fat content*

#### *i. Food higher in saturated fat*

According to Table 4 and 5, foods with higher saturated fats (based on Malaysian food frequency database) was milk, cheese, butter, yoghurt, ice-cream, bread, white rice, beehoon, *kue tiau*, dry mee, instant mee, cake, *roti canai*, *nasi lemak*, fried mee, fried *kue tiau*, fried rice, beef burger, cheeseburger, chicken burger, beef, satay chicken satay, pizza, fried chicken, french

fries, beef, chicken drumstick, chicken breast and chicken wings. The most frequent food with high saturated fat that students ate daily was white rice, with a total of 96 (98.0%) students, followed by bread, 75 (77.3%), and fresh milk, 64 (65.0%) students.

#### *ii. Food higher in unsaturated fats.*

Table 6 and Table 7 showed the frequency of intake of food higher in unsaturated fat. Foods in this category include sardine, catfish (*keli*), mackerel (*kembung*), pomfret (*bawal*), squid, prawn, margarine, and biscuit. The most frequent unsaturated food consumed by the students was biscuits (49.5%) followed by mackerel (28.9%). Students rarely ate squid and margarine.

Overall, students were more frequent taking food with saturated fats compare to the unsaturated one.

### *The relationship between mean fat intake and BMI*

The study showed that the mean intake of fat (gm) was  $1831.7 \pm 1182.7$  gm in underweight students and  $1829.6 \pm 1089.5$  gm among the normal,  $1830.5 \pm 971.5$  gm among the overweight and  $1360.6 \pm 865.4$  gm among the obese. However, there was no significant different the mean intake of fats in different BMI category (ANOVA,  $F = 1.705$ ,  $p > 0.05$ ).

### *The relationship between frequency of fat intake, family history of obesity, perception on active lifestyles, fatty foods preference with overweight and obesity*

Based on table 8, there was no association between fat intake, perception on active lifestyles and fatty foods preference with overweight and obesity (combined). In this study, it was found that family history of obesity has a significant association with overweight and obesity (combined). Students with no family history of obesity has more likely to be normal or not obese.

## Discussion

The present study found that female students comprised of 65.0% of the samples. 34.02% of the respondents having a family history of obesity and 49.5% perceived themselves as an active person. The prevalence of overweight was 19.6% whilst obesity was 7.2%. The mean of total fat intake per month was 1796 gm (on average 59.9 gm per day). Majority of student have low preference for fatty food (68%). There was no significant different the mean intake of fats in different BMI category. There was no association between fats intake, perception on active lifestyles and fatty foods preference with overweight and obesity (combined). In this study, it was found that family history of obesity has a significant association with overweight and obesity (combined). Students with no family history of obesity has more likely to be normal or not obese.

In this study, the prevalence of overweight and obesity among year 2 medical students was 7.2% and 19.6% respectively. The prevalence was higher compared to a study conducted among medical students from AIMST University in Malaysia of which 5.2% were found obese and 14.8% were overweight.<sup>[6]</sup> However, the prevalence of overweight and obesity among medical students was significantly lower compared to the national average, of 30.6% and 33.4% respectively.<sup>[2]</sup> The lower prevalence probably due to patterns of habits, attitudes, and lifestyles of medical students.

There are multiple causes that lead to obesity such as dietary intake, physical activities, genetics, environment, culture, and food intake behaviour. Dietary fat intake was found strongly associated with obesity.<sup>[7]</sup> In this study the mean fat intake of 1796 gm per month (on average 59.9 gm per day) was considered normal for young people. The recommended daily intake (RDI) for fat varies with different population. The USDA recommends that healthy adults over the age of 19 should consume between 20 and 35 percent of their daily calories from fat. Person who

consumes a diet of 2,000 calories per day, should take between 44 - 77 grams of total fat daily.<sup>[8]</sup> The recommended RDI for saturated fat is 30 gm per day for male and 20 gm for female.<sup>[9]</sup> However, it was not measured in this study.

It was found that there was no significant difference between mean fat intake and BMI category. A previous study stating that dietary fat intake strongly associated in the development of obesity. Possibly in this study, the use of BMI does not estimate body fat precisely.<sup>[10]</sup> High BMI does not mean high fat mass especially among muscular person who are taking more protein and less fat diet. One of the factors that was significant with obesity was family history of obesity. Research done in 2012 found the relationship between genetic variations in PRDX3 gene with the dietary fat intake which contribute to obesity.<sup>[11]</sup> However, in this study, the person without a family history of obesity is more likely to have a normal BMI.

BMI was not found to be associated with an active lifestyle perception among students in this study. Many studies reported a strong correlation between low physical activity with overweight and obesity.<sup>[12,13]</sup> Previous study showed that 62% of the students had reduced physical activities when entering college.<sup>[14]</sup> The work burden was the possible reason for this lifestyle. Medical students tend to spend their leisure time for studying and revising the lessons.<sup>[15]</sup> In this study, only student's perception on their lifestyle were asked. No direct measurement of activity was measured. This limitation may affect the result of the study.

This study has demonstrated that there was no association between fatty food preferences and BMI. It is well known fact that a person's interests and perception in fat foods has a relation with one's eating behaviour. Although there was a trend that students took food higher in saturated fat, but the fat intake did not show significant association with BMI.

Although some findings were not consistent with previous research, there is a need to do further research in this area among the special group such

as medical students. The inconsistency exists probably due to small sample size, confined to a specific group, self-reported weight and height, lack of reliability in food frequency measurement and online survey. Improved research design and method of data collection may be able to provide a reliable and valid conclusion.

## Conclusion

Based on our research, we can conclude the prevalence of obesity is lower among medical students as compared to the general population. The mean fat intake of 59.9 gm per day is considered normal for this population. Overall, students tend to take food containing high saturated fat more frequently than the unsaturated one. However, no significant difference shown

between mean fat intake, frequency of fat intake, student's perception on active lifestyles and fatty foods preference with obesity status. The study also found that the person without family history of obesity is more likely to have normal BMI. The inconsistencies observed in this special group probably require future research with improved designs and measurements.

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Table 1. Sociodemographic profiles of respondents

Variables	Category	Frequency	Percentage (%)
Gender	Male	34	35.1
	Female	63	65.0
Family history of obesity	Yes	33	34.0
	No	64	66.0
Active lifestyle	Yes	48	49.5
	No	49	50.5
Fatty food preference	High Interest	31	32.0
	Low Interest	66	68.0

Table 2. Prevalence of overweight and obesity

variable	category	frequency (n)	percentage (%)
Body Mass Index (kg/m <sup>2</sup> )	below 18.5	15	15.5
	18.5-24.9	56	57.7
	25.0-29.9	19	19.6
	30.0 and above	7	7.2

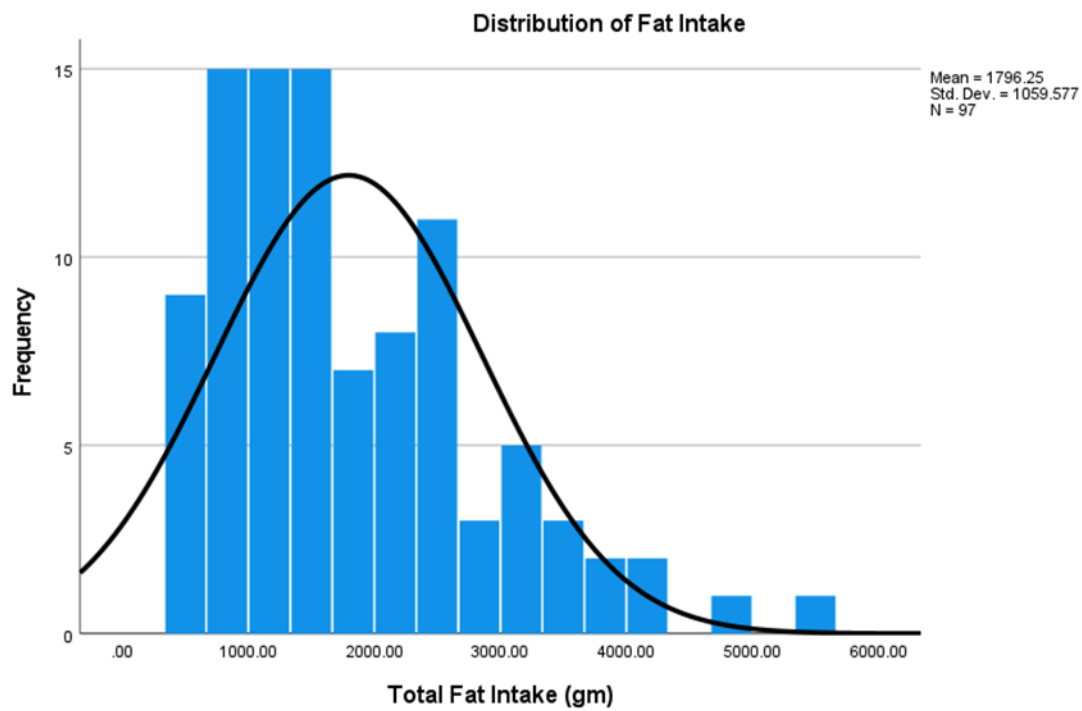


Figure 1. Distribution of Fat Intake

Table 3. Scoring of fatty's food preference

Statements	Low preference		High preference	
	n	%	n	%
I use high-fat products when cooking (e.g., cheese, butter, coconut cream)	64	66.0	33	34.0
I am not conscious of how much fats is in the food I eat.	62	64.0	37	36.0
I am easily tempted to eat sweets and fatty foods.	45	46.4	52	53.6
I would rather eat take-out food than home-cooked meals.	81	83.5	16	16.5
If I am bored, I will snack more. (e.g., potato chips, candy bars)	58	59.8	29	40.2
When I am in a bad mood, I eat whatever I feel like eating.	45	46.4	52	53.6
I sometimes snack even when I am not hungry.	49	50.5	48	49.5
When I don't plan meals, I eat fast food.	50	51.5	47	48.5
I rather eat instant foods to save my time in preparing meals. (e.g., instant noodles, nuggets, sausage)	58	59.8	29	40.2
I often eat heavy breakfasts. (e.g., nasi lemak, roti canai, lontong)	70	72.2	27	27.8
Average score	66	68.0	31	32

Table 4. Frequency of food intake high in saturated fats (n=97)

Food	Frequency				
	Everyday	3-4 times a week	Every 2-3 weeks	Once a month	Never
Saturated fat					
Milk	21(21.7%)	43(43.3%)	23(23.7%)	9(9.3%)	1(1.0%)
Cheese	4(4.1%)	20(20.6%)	43(44.3%)	26(26.8%)	4(4.1%)
Butter	5(5.2%)	25(25.8%)	42(43.3%)	22(22.7%)	3(3.1%)
Yoghurt	4(4.1%)	13(13.4%)	32(33.0%)	27(27.8%)	21(21.7%)
Ice-cream	3(3.1%)	24(24.7%)	43(43.3%)	26(26.8%)	2(2.1%)
Bread	26(26.8%)	49(50.5%)	20(20.6%)	2(2.1%)	0(0%)
Rice, white	76(78.4%)	19(19.6%)	2(2.1%)	0(0%)	0(0%)
Beehoon	0(0%)	25(25.8%)	51(52.6%)	16(16.5%)	5(5.2%)
Kau tiau	0(0%)	26(26.8%)	49(50.5%)	17(17.5%)	4(4.1%)
Mi kering	0(0%)	15(15.5%)	50(51.0%)	24(24.7%)	9(9.3%)
Instant mi	1(1.0%)	23(23.7%)	44(45.4%)	24(24.7%)	5(5.2%)
Cake	1(1.0%)	8(8.3%)	33(34.0%)	51(52.6%)	4(4.1%)
Roti canai	0(0%)	21(21.7%)	46(47.4%)	23(23.7%)	7(7.2%)
Nasi Lemak	1(1.0%)	25(25.8%)	45(46.4%)	24(24.7%)	2(2.1%)
Mi Goreng	0(0%)	14(14.4%)	44(45.4%)	32(33.0%)	7(7.2%)
Kue tiau goreng	0(0%)	18(18.6%)	40(41.2%)	33(34.0%)	6(6.2%)
Nasi goreng	7(7.2%)	37(38.1%)	44(45.4%)	8(8.3%)	1(1.0%)
Beef Burger	1(1.0%)	10(10.3%)	43(44.3%)	35(36.1%)	9(9.3%)
Cheeseburger	0(0%)	5(5.2%)	38(39.2%)	41(42.3%)	13(13.4%)
Chicken burger	0(0%)	6(6.2%)	46(47.4%)	39(40.2%)	6(6.2%)
Satay, beef	0(0%)	1(1.0%)	20(20.6%)	58(59.8%)	18(18.6%)
Satay, chicken	0(0%)	4(4.1%)	19(19.6%)	65(67.0%)	9(9.3%)
Pizza	0(0%)	1(1.0%)	30(30.9%)	63(65.0%)	3(3.1%)
Fried chicken	7(7.2%)	38(39.2%)	34(35.1%)	16(16.5%)	0(0%)
French fries	0(0%)	7(7.2%)	54(55.7%)	33(34.0%)	3(3.1%)
Beef, Chopped	1(1.0%)	25(25.8%)	38(39.2%)	24(24.7%)	3(3.1%)
Chicken, breast	19(19.6%)	50(51.6%)	19(19.6%)	7(7.2%)	8(8.3%)
Chicken, drumstick	6(6.2%)	48(49.5%)	26(26.8%)	8(8.3%)	7(7.2%)
Chicken, wings	4(4.1%)	48(49.5%)	25(25.8%)	11(11.3%)	10(10.3%)



Table 5. Frequency of saturated fats intake

Food	Higher Saturated Fat	
	Frequent intake	Not frequent intake
Milk, Fresh	64(65.0%)	33(34.0%)
Cheese	24(24.7%)	73(75.3%)
Butter	30(30.9%)	67(69.1%)
Yoghurt	17(17.5%)	80(82.5%)
Ice-cream	27(27.8%)	70(72.2%)
Bread	75(77.3%)	22(22.7%)
Rice, White	95(97.9%)	2(2.1%)
Bihun, Noodle	25(25.8%)	72(74.2%)
Kue Tiau, Noodle	26(26.8%)	71(73.2%)
Mi Kering, Noodle	15(15.5%)	82(84.5%)
Instant mi, Noodle	24(24.7%)	73(75.3%)
Cake	9(9.3%)	88(90.7%)
Roti Canai	21(21.7%)	76(78.4%)
Nasi Lemak	26(26.8%)	71(73.2%)
Mi Goreng	14(14.4%)	83(85.6%)
Kue Tiau Goreng	18(18.6%)	79(81.4%)
Nasi Goreng	44(45.4%)	53(54.6%)
Beef Burger	11(11.3%)	86(88.7%)
Cheeseburger	5(5.2%)	92(94.9%)
Chicken Burger	6(6.2%)	91(93.8%)
Satay, Beef	1(1.0%)	96(99.0%)
Satay, Chicken	4(4.1%)	93(95.9%)
Pizza	1(1.0%)	96(99.0%)
Fried chicken	45(46.4%)	52(53.6%)
French fries	7(7.2%)	90(92.8%)
Beef, Chopped	26(26.8%)	71(73.2%)
Chicken, Breast	69(71.1%)	28(28.9%)
Chicken, Drumstick	54(55.7%)	43(44.3%)
Chicken, Wings	52(53.6%)	45(46.4%)

Table 6. Frequency of food intake based on food higher in unsaturated fats

Food	Food higher in unsaturated fat				
	everyday	3-4 times a week	every 2-3 weeks	once a month	never
Fish, sardine	0(0%)	22(22.7%)	37(38.1%)	24(24.7%)	22(22.7%)
Fish, keli	0(0%)	18(18.6%)	36(37.1%)	25(25.8%)	12(12.4%)
Fish, mackerel	1(1.0%)	27(27.8%)	38(39.2%)	16(16.5%)	18(18.6%)
Fish, bawal	0(0%)	19(19.6%)	32(33.0%)	26(26.8%)	13(13.4%)
Squid	0(0%)	12(12.4%)	35(36.1%)	41(42.3%)	6(6.2%)
Prawn	0(0%)	17(17.5%)	46(47.4%)	41(42.3%)	9(9.3%)
Margarine	1(1.0%)	15(15.5%)	34(35.1%)	28(28.9%)	19(19.6%)
Biscuit	10(10.3%)	38(39.2%)	24(24.7%)	19(19.6%)	7(7.2%)

Table 7. Frequency of unsaturated fats intake

Food	Food higher in unsaturated fat	
	Frequent intake	not frequent intake
Fish, sardine	22(22.7%)	75(77.3%)
Fish, keli (catfish)	18(18.6%)	79(81.4%)
Fish, kembung (mackerel)	28(28.9%)	69(71.1%)
Fish, bawal	19(19.6%)	78(80.4%)
Squid	12(12.4%)	85(87.6%)
Prawn	17(17.5%)	80(82.5%)
Margarine	16(16.5%)	81(83.5%)
Biscuit	48(49.5%)	49(50.5%)

Table 8. The relationship between family history of obesity, perception on active lifestyles, fatty foods preference with BMI

Risk factors		BMI				*P value
		24.9 and below		25.0 and above		
		n	%	n	%	
fats intake	low fat intake	36	50.7	12	46.2	p= 0.691
	high fat intake	35	49.3	14	53.8	
family history of obesity	has history	20	28.2	13	50.0	p= 0.044
	no history	51	71.8	13	50.0	
active lifestyles perception	active	39	54.9	9	34.6	p= 0.076
	not active	32	45.1	17	65.4	
fatty food preferences	high interest	23	32.4	8	30.8	p= 0.879
	low interest	48	67.6	18	69.2	

- Chi square test,  $p < 0.05$  is significant.

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