ORIGINAL ARTICLE

DETERMINANTS AND ASSOCIATED FACTORS AFFECTING BODY MASS INDEX AMONG STUDENTS OF UNIVERSITY AT THAILAND

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Background: There is substantial number of youth's population belong to age group 18–25 years contributes 11% of the total population in Thailand. According to the ASEAN Youth Development Index (AYDI) ranking, Thailand is ranked 8th out of 10 countries in terms of improvement in health and well-being and social participation of youth in the country. Body mass index includes an appropriate weight and height for adult population, that is important indicator for healthy young subjects. The objectives of this study were to assess the prevalence of Body Mass Index (BMI) and affected factors among the university students. **Methods**: This study was conducted on the sample of 300 students by multiple stage random sampling technique. A pretested and piloted questionnaire were used in this study. Factors affected BMI were analyzed by using Multiple Linear Regression (MLR). A written consent was taken prior to conduct the data collection. **Results:** The variables that affected the student's BMI were Socio-demographic factors such as; gender and Body Mass Index of the mothers and health behavioural factors, including physical activity variables had a statistically significant effect on the student's BMI (p<0.001), which could explain 91.10 % of the variation in BMI. The mean of BMI was 21.50±4.655 SD. Lower than half of students (47%) had the normal BMI. However, the BMI of overweight /obese students was up to 26.67%. **Conclusion:** Study concluded that the factors like; gender, maternal BMI, physical activity were significantly effects on the BMI of university students in Thailand.

Keywords: Body Mass Index; Socio-demographic factors; Determinants; Health behaviour factors; Students

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INTRODUCTION

There is substantial number of youth's population belong to age group 18–25 years contributes 11% of the total population in Thailand.[1] According to the ASEAN Youth Development Index (AYDI) ranking, Thailand is ranked 8th out of 10 countries in terms of improvement in health and well-being and social participation of youth in the country.[2] Body mass index includes an appropriate weight and height for adult population, that is important indicator for healthy young subjects. Normal BMI can reduce the risk developing a various chronic disease as well. However, a regular exercise, health food and adequate sleep are major contributing factors of normal BMI.[1] Moreover, it was found that 8% of male and 67% of female adolescents and youth had physical activity and this numbers tends to decrease with increasing age of the respondents.[3] Around 90% of the younger population are currently using the social media applications and they have access to the internet.[1] This social media application can be used for the better health comes for adolescents in the country. In Thailand, around 48% adolescents to ate fast food at least once a week, this shows a huge proportion has negative dietary pattern that could result high BMI among them.[2] Behaviour of eating fruits and vegetables should be promoted among this younger group. Age group of 10–14 years are consuming less than 1 in 4 fresh fruits and vegetables daily in the country.[1] There were 3 out of 4 male teenagers who skipped meals because they didn't have time while more than half of women stop because she didn't have time and resulting lose weight.[3] Among adolescents aged 15–24 years, 15% smoked and 24% drank alcohol.[2]

The method used to calculate the appropriate body weight is to determine BMI is very important where we have to assess body weight and the risk of developing various disease among overweight or obese adolescents.[4] When a person is well aware of the risk factors, causes, possible

dangers, complications and benefits of disease prevention, that person may be more inclined to adjust their health behaviors.[5] Social support especially from friends, family, lovers, both emotional support, appraisal support, information support, and instrumental support will be able to make people change their health behavior.[6] Study shows that the BMI of bachelor students was not normal.[7] Therefore, the researcher is interested in studying factors affecting the BMI in a university student in order to apply the results of the study to change the health care behaviour in the students.

MATERIAL AND METHODS

A cross-sectional study was conducted at Kanchanabhishek Institute of Medical and Public Health Technology, Sai Noi district, Nonthaburi province, Thailand in 2021. A total of 300 students in from the university were enrolled. The participants included through multiple stage random sampling. The questionnaire was divided into 3 parts; general information (9 items), health behaviours (32 items) and student BMI (3 items). The tool was modified according to the comments received from three expert's and piloted on 30 students in the same district, Nonthaburi province. The content validity (IOC) for all questions was measured as 0.67-1.00 and Cronbach's alpha Coefficient[8] was 0.80. This research was approved by the Human Research Ethics Committee of the College of Medical Technology and Public Health, Kanchanapisek, number KMPHT-64020019 on July1, 2021. For an evaluation of the affecting BMI used Multiple Linear Regression.[9]

RESULTS

Total 300 respondents were participated in this study, most (34.67 %) of the them were belong to Northeastern region. The mean age of the participants was 19 years±1.661 (SD). More than three-fifth (65.67%) had bachelor's degree and about two-fifth (41.30%) had income 61–115 USD per month. The majority (93.30%) of students didn't have congenital disease. More than half (57%) reported Body Mass Index of their father's had overweight/obese and their mother's BMI were overweight/obese, (52 %). In term of Body Mass Index in the students showed that less than half (47%) had normal. However, the BMI of overweight/obese students were 26.67 %. The mean of BMI in the students were reported 21.50±4.655 SD (Table 1).

In table 2 shows that gender (p<0.001), maternal BMI (p=.001), type of rice (p=.037), drinking milk (p=.024), frequency of drinking milk (p=.049), smoking (p=.014), and physical activity (p=.028) were found most statistically significantly affected on BMI among university students at the p<0.05.

The results from Multiple Linear Regression analysis as shown in table 3 revealed that three independent variables; gender, maternal BMI and physical activity had predicted on students' BMI at p-value <0.001 at BMI of students of 91.10%.

Table-1: Association between sociodemographic and the factors affected BMI among university students

Variables		n	%	*p*-value*
Body Mass Index, Kg/m^2 (Mean 21.50 ±4.655 SD)	Low/thin	79	26.33	
	Normal	141	47.00	
	Overweight/obese	80	26.67	
Residence	Northern region	39	13.00	.572
	Northeastern region	104	34.67	
	Central region	82	27.33	
	Southern region	75	25.00	
Gender	Male	56	18.70	**.000**
	Female	244	81.30	
Age (Mean 19.00 ± 1.661 SD)	18-20	229	76.33	.272
	21 and over	71	23.67	
Education Level	Diploma	103	34.33	.739
	Bachelor's degree	197	65.67	
Income (USD)	< 60	89	29.70	.605
	61-115	124	41.30	
	>115	87	29.00	
Congenital disease	No	280	93.30	.900
	Yes	20	6.70	
Father BMI (Mean 23.70 ± 3.750 SD)	Low/thin	12	4.00	.158
	Normal	117	39.00	
	Overweight/obese	171	57.00	
Mother BMI (Mean 23.80 ± 4.032 SD)	Low/thin	12	4.00	**.001**
	Normal	132	44.00	
	Overweight/obese	156	52.00	

Table-2: Multivariable Analysis of determinants and the factors affected BMI among university students

Variables		Frequency	Percentage	*p*-value
Number of main meals	1-2 meals a day	126	42.00	.138
	3 meals a day and more	174	58.00	
Type of rice	White rice	232	77.33	**.037**
	Brown rice	19	6.33	
	Sticky rice/others	49	16.34	
Frequency of eating brown rice	No	184	61.33	.277
	1-3 times a week	82	27.33	
	4-6 times a week and more	34	11.33	
Frequency of eating rice and meat	No	1	0.33	.958
	1-3 times a week	57	19.00	
	4-6 times a week and more	242	80.67	
Frequency of eating vegetable	No	10	3.33	.265
	1-3 times a week	108	36.00	
	4-6 times a week and more	182	60.67	
Frequency of eating fruit	No	11	3.67	.479
	1-3 times a week	142	47.33	
	4-6 times a week and more	147	49.00	
Frequency of eating fast food	No	30	10.00	.346
	1-3 times a week	215	71.67	
	4-6 times a week and more	55	18.33	
Drinking milk	No	32	10.67	**.024**
	Yes	268	89.33	
Frequency of drinking milk	No	32	10.67	**.049**
	1-3 times a week	156	52.00	
	4-6 times a week and more	112	37.33	
Sleep time per day	< 6 hours	75	25.00	.913
	6-8 hours	214	71.33	
	>8 hours	11	3.67	
Alcohol drinking	No	189	63.00	.403
	Yes but quit	56	18.67	
	Drinks currently	55	18.33	
Smoking	No	285	95.00	**.014**
	Yes but quit	8	2.67	
	Current smoker	7	2.33	
Physical activity	No	115	38.33	**.028**
	Yes	185	61.65	
Physical activity index	Very little (<15)	56	30.27	
	Little (15-24)	42	22.70	
	Moderate (25-40)	66	35.68	
	A lot (41-60)	10	5.41	
	The most (> 60)	11	5.94	
Drinking sugary drinks	No	26	8.67	.272
	Yes but quit	13	4.33	
	Drink currently	261	87.00	

Table-3: Factors predictive of BMI among university students

Factors	B	Beta	t-value	R	R^2	F	P-value*
Socio-Demographic factors							
Gender	-2.500	-.210	-3.720				**.000**
Mother BMI	.196	.170	3.085				**.000**
Health behavioral factors							
Physical activity	.043	.168	2.990				**.000**
Constant 18.323			11.340	0.333	0.911	12.304	

*Multiple Linear Regression, Method stepwise

DISCUSSION

The prevalence of BMI and factors affected with it in this study, we found that 26.67 % of the students had BMI overweight/obese. In term of food consumption, the findings shown that three-fifth eaten white rice as the main food, eating fast food 71.67 %, and up to 87.00% using sugary drinks. Moreover, the university students did not perform physical activity, 38.33%. It indicating that the students also had unhygienic health practice in food consumption and exercise was not enough with

effect on overweight/obesity. These findings are supported by similar studies from Thailand explained that food consumption and promoting exercise effect on overweight.[10–12] Findings are also consistent with the study conducted in hospital in Thailand found that participants had similar BMI. However, their weight control behaviour was better before participating in the activity and their waist circumference was significantly reduced at the $p<0.05$ level. This confirmed that physical activity training had positive effect on BMI.[13]

We also found that the variables affecting the students' Body Mass Index were gender, maternal BMI, and physical activity variables. It had predicted and could explain BMI of the students about 91%. It was similar with Southern Taiwan study suggests that sex, body shape perception, and exercise with engage in vigorous or moderate in physical activity had an effect on BMI statistically significant at $p<0.05$.[14] Similarly, a study in hospital of China found that maternal BMI had only a slight significant effect on growth of both female and male children. The male child had more weight and height than the female.[15] Develop students to have more hygienic health behaviours such as reducing food consumption (fast food), eating more brown rice as a staple food. Emphasis on eating according to nutritional principles, cut down on sugary drinks, or not at all. Will have a positive effect on health as well as encourage students for exercise more frequently and for longer periods of time, which will affect the exercise activity index to a high or maximum level. There should be a monitoring program for overweight/obesity among students with BMI by organizing students to reduce overweight to achieve the goals set taking into account gender differences, maternal BMI and physical activity of the students.[16,17]

CONCLUSION

Study concluded that the factors like; gender, maternal BMI, physical activity were significantly affects on the BMI of university students in Thailand.

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Ethical consideration:

Ethical approval of the study was taken from the ethical board of Faculty of Public Health and Allied Health Science, Praboromarajchanok Institute, Thailand**.**

AUTHOR'S CONTRIBUTIONS

NS: Research ideas and data collection. PS: Manuscript methodology and analysis. AK, DF support in the data collection process. PE: Data entry, compilation, and analysis. All other authors supervised the research process and reviewed the manuscript.

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