

The Contribution among Physical Activity, Type of Transportation, Distance of Residence, and BMI in Adolescents : Cross-Sectional study in College Student

Mesa Rahmi Stephani^{1(*)}, Adang Suherman, and Kuston Sultoni

¹Universitas Pendidikan Indonesia, Bandung, Indonesia

(*)✉ (e-mail) mesarahmistephani@gmail.com

Abstract

Body weight in adolescents, especially among college students, has generally increased. It is feared to increase the risk of obesity. The purpose of this study was to determine the relationship between Physical Activity, Type of Transportation, and Distance of Residence of the students and their Body Mass Index. This study used a cross-sectional study design. The participants were 322 students (92 Male, 230 Female). International Physical Activity Questionnaire was used to measure students' physical activity by asking vigorous activity, moderate activity, walking activity, and sitting time in the last 7 days. The data was analyzed by using Multinomial Regression Logistics. The results show that 69.05% students with overweight category had low physical activity level. The data also show that 64.57% students with overweight category lived less than 1km from campus. Moreover, 68.87% students who walked to campus were in overweight category. The findings indicate that, overall, there is no relationship between Physical Activity, Transportation Type, and Distance of Residence with BMI. Individual factors are not enough to control normal BMI. However, environmental factors are considered to have contribution on BMI. So it is necessary to do research and policy that encourage students to be able to control their weight.

Keywords: Body Mass Index, College Students, Distance of Residence, Physical Activity, Type of Transportation.

Introduction

The proportion of overweight and obese in adults over 18 age years old from 2007 to 2018 has increased (Kesehatan, 2018). Eight in 10 adults are not physically active at recommended levels and <30 % of adults eat the recommended amounts of vegetable each day (US Dept. Health and Human Services, 2014; Downes, 2015). Student's has a transition of experience in terms of active and eating behaviors which certainly experience changes in health status. Body weight in students tends to increase from year to year, given the proportion of assignments and courses taken is more burdensome in the first years compared to the end of the study.

Distance of residence and type of transportation also contribute to active lifestyle behaviors in students. For the effectiveness of travel time from residence to campus, most students choose to stay closer to campus, by staying in a dormitory. In general, those who live close to campus, choose to walk. The transition of life before becoming a student who still lives with parents, living alone away from parents, has an influence on changes in routine as well as daily eating behavior. Reuter, et al (2012) stated that college students are still in the age group of mineral acquisition and, therefore, their lifestyles may influence this process. It empirically known that medicine (MED) students have an "unhealthy" lifestyle, as they have their free time reduces due to an intense load academic activities (full time), with less available time to practice physical activities and to have balanced meals. On the other hand, physical education (PE) students have lower course load (part time) with syllabus that contains practical classes of sport and mandatorily represent the practice of regular physical activities. Additionally, many of them practice other activities in their free time, usually related to physical exercises. Health at the student level is certainly very important, in an effort to improve learning productivity and concentration, amidst the many demands of tasks and activities carried out while

being students. In this period of life overweight, running to fat, “normal-weight obesity”. As to diet, erratic consumption of meals and less than desirable intake of vegetables and fruit may become dominant. Social life on campus brings with it an increase of alcohol consumption and smoking. The impact of studying may also be a reason for a decrease in physical activity (Breitenbach et al., 2016). A higher proportion of vigorous physical activity was associated with even lower levels of adiposity. These results suggest that exercise intensity may be associated with body size and composition, beyond the influence of exercise frequency and duration (Bs, Bradbury, Reeves, & Key, 2015).

In general, students with a residence status are not with parents. This certainly requires adequate dietary control, so students can achieve good learning performance. National College Health Assessment identified that 1 in 5 college students were overweight, and 1 in 10 were obese. (Jr, Johnson, & Tudor-locke, 2013) identified strong linear relationships between step-based movement/non-movement dimensions and cardio-metabolic risk factors. Keating, et al (2005; Downes, 2015) described a variety of determinant related to personal, social, cognitive, and environmental factors in their meta-analysis. (Pope, Hansen, & Harvey, 2016) was examining the weight trajectory of college students. This study suggests that students gain weight throughout college which highlights the need for weight control interventions to target more than just freshman college students. For this reason, this study aims to determine the relationship between, physical activity, distance of residence, type of transportation, and Body Mass Index (BMI) for students.

Method

This study using cross-sectional method. The participants were 322 second years non-Physical Education undergraduate students (92 Male, 230 Female) (Age Average = 19.05; SD = ±0.71) in Universitas Pendidikan Indonesia. Physical activity was measured by *International Physical Activity Questionnaire - Short Form (IPAQ-SF)*. The data of weight and height calculated to determine BMI status with (kg/m²). Formula (World Health Organization Expert Committee 1995) in which weight is divided by height in square (kg/m²). The classifications of BMI using WHO standard (Very thin < -3,0 SD; Thin -3,0 SD to < -2,0 SD; Normal -2,0 SD to 2,0 SD; Fat > 2,0 SD to 3.0; Obese > 3) (WHO). The body weight and height were measured by administrator in Sport Science Laboratory. Transportation was divided into 2 categories, namely driving and walking. The distance of residence was categorized into 3 categories <1 km, 1 - 5 km, > 5 Km. Data were analyzed using STATA 13 (Stata Corp, 2013) with significant level at p < 0.05. Bivariate comparisons were tested by Chi-Square.

Results and Discussion

As many as 322 participants with the status of students have filled out the questionnaire. The majority of the sample was walking to campus 51.86%, and 54.35% has <1km distance of residence to campus. BMI status of students 67.70% were overweight, 9.01% in obesity, 15.84% Normal, and 7.45% had low BMI levels. Students physical activity in level moderate are 49.07%, 26.09% in high level and 24.84% had low physical activity level. The descriptive data show in Table.1.

Table 1. Data Descriptive of Physical Activity, Type of Transportation, Distance of Residence, and Body Mass Index (BMI)

	Categorized	Description		Cum
		Frequency	Percentage (%)	
BMI	Obese	29	9.01	9.01
	Overweight	218	67.70	76.71
	Normal	51	15.84	92.55
	Low	24	7.45	100.00
	Total	322	100.00	
Table 1. Cont				
Physical Activity	Low	84	26.09	26.09

	Moderate	158	49.07	75.16
	High	80	24.84	100.00
	Total	322	100.00	
Type of Transportation	Walking	167	51.86	51.86
	Riding	155	48.14	100.00
	Total	322	100.00	
Distance of Residence	< 1 km	175	54.35	54.35
	1 – 5 km	58	18.01	72.36
	> 5 km	58	27.64	100.00
Total		322	100	

In Table 2, showing the level of significance among physical activity, type of transportation, distance of residence to BMI status. The obesity students who were moderate and high physical activity level hasn't significant different with students in normal BMI status (0.904; 0.828). The overweight students with moderate and high physical activity hasn't significant differences with normal BMI status (0.728; 0.591). There is no significant differences among obesity status with distance of residence (1-5 km) compared with students with normal BMI status (0.699). The type of transportation (driving) with obesity and overweight level hasn't significant differences with student in normal BMI who walked to campus (0.447; 0.071).

Table 2. Correlation Physical Activity, Distance of Residence, Type of Transportation, and BMI

	RRR	Std. Err	z	p>z	95% Conf. Interval)	
Obesity						
Physical Activity						
Moderate	.9314803	.545667	-0.12	0.904	.2954843	2.936384
High	.863802	.5826931	-0.22	0.828	.2302613	3.240466
Distance of Residence						
1-5	.7439595	.5693029	-0.39	0.699	.1660279	3.33363
> 5km	2.146037	1.608875	1.02	0.308	.4927363	9.327808
Type of Transportation						
	.6143201	.3936786	-0.76	0.447	.17495	2.157126
	.6456304	.3613226	-0.78	0.434	.2155832	1.933539
Overweight						
Moderate	.8722504	.3426358	-0.35	0.728	.4038999	1.883686
High	.7863194	.3514441	-0.54	0.591	.3274582	1.888174
Distance of Residence						
1-5 km	1.609886	.7214744	1.06	0.288	.6688474	3.874924
>5km	3.153843	1.563513,	2.32	0.021	1.193598	8.333396
Type of Transportation						
Riding	.4845216	.1941868	-1.81	0.071	.220886	1.062816
	4.752897	1.792561	4.13	0.000	2.269481	9.953828
Normal (base outcome)						
Low						
Phys_act	.7886257	.4742573	-0.39	0.693	.2426511	2.563065
Moderate						
High	.7944162	.5497358	-0.33	0.739	.2046524	3.083751
Distance of Residence						
1-5 km	1.664547	1.107851	0.77	0.444	.45162	6.135064
>5 km	1.415978	1.059978	0.46	0.642	.3264833	6.141184
Type of Transportation						
Riding	1.157874	.7128131	0.24	0.812	.3464517	3.869724
_cons	.4294942	.2549439	-1.42	0.155	.1341812	1.374747

Overall, there is no significant correlation among physical activity, type of transportation, distance of residence, with BMI level (Bassett-gunter, Mcewan, & Kamarhie, 2017). Many study has investigate

the correlation of physical activity level in BMI level. Physical activity was positively related to body image among men and boys with various moderator variables warranting further investigation. The transition of student status to being a student not only has an impact on academic change, but also has an impact on lifestyle. The majority of students live far from parents, which of course students are required to be able to live independently. Changes in diet occur in the majority of students. This is difficult to avoid, because students who are still living with their parents are not too difficult to maintain their diet and nutritional balance. For some students who do not succeed in controlling themselves, they often experience weight problems which are increasingly rising.

The majority of female university students are sedentary and they do not have a good enough level of physical activity. The university should organize information sessions about the benefits of physical activity on health and, at the same time, it should to promote the practice of all forms of physical activities in the free time. Future strategies may help students to adopt an active lifestyle, but it is known that changing the physical activity behavior is a battle that cannot be easily won (Zaja, 2016). Pragmatic implications are discussed as well as the limitations within existing research and need for additional research to further understand moderator and mediator variables. Another study was examine the correlation of physical activity and dietary habits in 106 college students. The finding show that PA was significantly by correlated motivating factors. Poor Dietary Habits (DH) was significantly correlated with inhibiting factors(Downes, 2015). The condition of students who live in dormitories is far from their parents, which certainly has its own impact on changing patterns and eating habits of students.(Small et al., 2013) encouraging parents to communicate with their college-aged children could improve these students' daily eating and physical activity behaviors and should be explored as a relatively easy and affordable component of a student preventive intervention.

The type of transportation especially walking should be effect to BMI level, with regards for how much steps which reach, and level of intensity. World Health Organization (2010; Stepwise, n.d.) adults should at least 150 minutes of moderate-intensity aerobic physical activity weekly, and to use in effort a large number of the body muscles. Most study participants reached daily step goal of 10.000 steps and thus fulfilled the ACSM recommendations for the quantity and quality of cardiorespiratory exercise(Zaja, 2016). Highly negative correlations between the number of steps per day and body adiposity markers, serum insulin and HOMA-IR confirmed that vigorous physical activity at the recommended level was associated with better body composition and lower levels of risk markers of coronary heart disease and diabetes. Most of the U3A students were characterized by a favorable lipid profile, prevalence of normal blood pressure, low rates of HOMA-estimated insulin resistance and normal cognitive function.

The internal conditions of students such as Physical Activity at moderate to high levels are still quite large(Bs et al., 2015)a higher proportion of vigorous physical activity was associated with even lower levels off adiposity. There results suggest that exercise intensity may be associated with body size and composition, beyond the influence of exercise frequency and duration.However, this is not significant enough to influence the condition of student BMI status, which in this study is still very large, more than half of the samples are in overweight conditions. As many as 54.35% of students located close enough to the campus (<1km), 51.86% of them chose to walk.Although most students have performed moderate-high in level physical activity, BMI at the level of overweight and obesity did not differ significantly compared to those who had a normal BMI status. External factors such as eating behavior, food available in the canteen, and Parents Social Economy Status need to be known further research. (Yan, Cardinal, & Acock, 2013) stated that environmental resources and support are important, but these resources alone may not influence PA behavior directly. Instead, colleges and universities should focus on providing both environmental and social resources to increase the predisposing factors within this group.

In conclusion the majority of female university students are sedentary and they do not have a good enough level of physical activity. The university should organize information sessions about the benefits of physical activity on health and, at the same time, it should to promote the practice of all forms of physical activities in the free time. Future strategies may help students to adopt an active

lifestyle, but it is known that changing the physical activity behavior is a battle that cannot be easily won (Zaja, 2016). Understanding factors that influence PA among Chinese international students is an important step in process of promoting their long-term health and wellbeing. Designing program that address the identified key factors may help colleges and universities achieve this goal. The predisposing factors, including perceived competence, self-efficacy, positive attitude, and enjoyment of PA, are the most important and direct factors influencing PA participation (Yan et al., 2013).

Significant associations between eating regulation and BMI, weight, and/or percent body fat were shown mostly in females. In females, higher BMI, weight, and/or percent body fat at the end of the second year of college were found in those with low levels autonomous, intrinsic motivation, and identified regulation, and high levels of amotivation, while lower BMI, weight, and/or percent body fat were associated with high levels of autonomous, intrinsic motivation, and identified regulation, and low levels of amotivation. The findings that specific eating behaviors in females during the first two years of college influence BMI, weight, and/or percent body fat may be useful for inclusion in university programs focused on college student health to help decrease the risk of obesity and disordered eating/eating disorders in female college students (Gropper et al., 2014). Physical activity and amount of steps in every single day, need to measure by accelerometer to more accurate measurement. Some research findings pertinent to the general population, particularly users of commercial physical activity monitors. Moving forward, physical activity monitoring devices and their software developers might consider presenting these step-related movement/non-movement dimensions in an integrated way (Jr et al., 2013). A number of objectively monitored physical activity indicators varied significantly between self-reported MVPA, UODA, and LTSB categories, while objectively monitored sedentary time only varied between UODA and LTSB categories. Cross-classifications of self-reported MVPA, UODA, and LTSB responses depict a greater range of physical activity than viewing dichotomous responses for these variables one-at-a-time (Jr et al., 2013)

Conclusions

BMI status in students is very important to know, so that weight can be controlled as an effort to prevent students from the dangers of chronic and degenerative diseases that can arise due to overweight and obesity. Physical activity moderate-high level can improve status and health degrees. But, the intensity level of walking should be examined in further research. The results of this study are expected to provide preliminary data to describe the status of health conditions and active lifestyle of students, to be used as a consideration to improve the quality of health of students.

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