Nutrition Knowledge Determinants among Undergraduate Students in Selected University in Jakarta

**Dian Luthfiana Sufyan^{1*}, Yuri Nurdiantami², Utami Wahyuningsih¹,
Ade Fatma Krisdiani¹**

¹ Nutrition Study Program, Health Science Faculty, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia

² Public Health Study Program, Health Science Faculty, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia

* Alamat korespondensi: dian.sufyan@upnvj.ac.id

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Abstract

Malnutrition problem (under and over nutrition), known as the double burden of malnutrition, was a growing concern in developing countries, including Indonesia. The 2018 Indonesia Basic Health Survey noted a substantial increase in the proportion of these nutritional impairments. As a fundamental factor of malnutrition, nutritional knowledge was expected to be occupied not only by vulnerable groups. A transitional age group like youth, in this case undergraduate students, should also be on the radar since they carried a risk of malnutrition from adolescence into adulthood. This study aimed to assess the nutritional knowledge determinants among undergraduate students in Jakarta. This cross-sectional study was conducted among undergraduate students in Universitas Pembangunan Nasional Veteran Jakarta. The nutritional knowledge regarding the Indonesian Guideline for Balance Diet, as well as participants' characteristics questionnaire, was self-administered online by 235 participants using Google Form. Chi-Square, Spearman's rho, and logistics regression tests were used to analyze the data using statistical software. Students who participated in this study were primarily female, aged under 20 years, achieve a GPA above 3.50, and had normal BMI. The bivariate analysis reported a significant association between sex, study field, and parent's income with nutrition knowledge level. Based on logistic regression, the odds of having an adequate nutrition knowledge level is about 2.76 times higher among students whose parents earned 3-5 million IDR per month than students whose parents earned less than 3 million or more than 5 million IDR. Undergraduate students were also a prominent target group to ensure nutritional knowledge occupancy since they may face adolescent nutritional problems and future risk of adult nutritional problems. This study is fostering targeted nutrition education for youth undergraduate students.

Keywords: nutrition education, undergraduate students, malnutrition, Indonesia

INTRODUCTION

Nutrition carries an important role in human life. Adequate nutritional intake impacted human health, while inadequate nutritional intake may lead to the health consequences, such as degenerative diseases and malnutrition [1]. Currently, developing countries including Indonesia are experiencing a double burden of malnutrition where there are underweight and overweight in the same population [2]. According to the 2018 Indonesia Basic Health Survey, there are approximately 37.7% of young adults (19 to 29 years) who are malnourished. The incidence of malnutrition in Indonesia is more prevalent among urban communities (48.4%) as compared to rural areas (40.2%). Jakarta as a metropolitan city has the highest malnutrition proportion among 18 years old age group with the number of prevalence is 53.4% [3]. Disparities in urban and rural dietary patterns are among the rationales of this discrepancy [4,5].

Urban community faces a shifting of dietary patterns from consuming fresh food (traditionally processed food with natural spices) into consuming fully processed foods containing food additives. Furthermore, there has been also a trend of consuming fast foods and beverages that contains high sugar, fat, and salt, especially among youth. Apart from the trend, these trending foods offer cheaper and tastier properties [6]. This condition is compounded by youth inactive physical activities [7]. All of these direct determinants were fundamentally influenced by individual nutritional knowledge.

Nutritional knowledge is one of the basic causes of malnutrition [8]. A study conducted among Irish adult reported those who had lower knowledge score on dietary recommendation and food selection subscale has underweight and overweight BMI, respectively [9].

Nutritional knowledge may give motivation and boost for a healthier dietary pattern. Thus, it will have an impact on good nutritional status [10]. However, only a few people occupy with adequate nutritional knowledge. A study among college students in Michigan, United States reported that the respondents' mean of nutritional knowledge 66 ± 13.4 SD [11]. Meanwhile in Indonesia, only around 11.6% of college students have adequate knowledge of nutrition [12].

College students, mainly undergraduate students are a group that is rarely considered in the nutritional intervention. This may be due to perception toward the group that is considered as invulnerable adults. This group should also be given attention as they are undergoing a transitional period into adulthood. Furthermore, youth also has the same risk of nutritional problems as adolescents, yet on the other hand, also face adult nutritional problems that will have an impact on their future [13]. Proper and adequate nutritional knowledge is vastly required to prevent any nutritional impairment, especially for undergraduate students who live in Jakarta.

As aforementioned, to properly arranging nutrition education among youth, it is necessary to assess the determinants of nutritional knowledge especially among undergraduate students in Jakarta. To the best of the author's knowledge, results from prior study on this field still give limited explanation, therefore this current study aimed to determine the influencing factors of nutritional knowledge among undergraduate students in Jakarta.

METHODS

Study design and population

The study was conducted using a cross-sectional design among undergraduate students of Universitas

Pembangunan Nasional Veteran Jakarta (UPNVJ). This university was located in South Jakarta and was purposively selected as the only public university in the area. The inclusion criteria involved in this study were students aged 18-24 years, had an active student status on university system, had a smartphone with internet connection. While the exclusion criteria were the first-year students since they still had no Grade Point Average (GPA). The recruitment of the participants was conducted online using link of Google Form that was shared through Whatsapp. The minimum sample size was calculated using Lemeshow estimated for proportion formula $n = \frac{NZ^2_{1-\alpha/2} \times p(1-p)}{d^2(N-1) + Z^2_{1-\alpha/2} \times p(1-p)}$ [14]. Quota sampling (sampling technique that based on certain characteristics, in this study by study field) [15] was used as the recruitment was conducted online to fulfill the minimum sample size. A total of 235 undergraduate students participated in this study.

Data collection

Data were collected online using self-administered Google Form Questionnaire. The form consisted of two sections such as participants' characteristics (age, sex, parents' occupation, parent's income, study field, GPA, and body weight, body height) and general nutrition knowledge questionnaire regarding Indonesian Guideline for balanced diet. Body Mass Index (BMI) calculation is body weight in kilograms divided by height in meters squared, and grouped using BMI categorization for Asian Population [16]. The nutrition knowledge questionnaire consisted of 15 questions (four-option multiple-choice questions) concerning the ten-message of balanced diet, food source of certain macro and micro nutrients (fat, carbohydrate, fiber and vitamin), diet induced non-communicable diseases,

physical activities, and portion size. The correct answer was given 10 score, so that the nutrition knowledge score ranged from 0 to 150 and grouped based on the median score. Data collection was undertaken in September 2020.

Ethical consideration

The study was ethically approved by the Health Research Ethics Committee of the Universitas Pembangunan Nasional Veteran Jakarta (approval number 2763/IX/2020/KEPK). Written informed consent was obtained from each participant prior to data collection.

Data analysis

After the online questionnaire submission was closed, the data was converted to comma-separated value (csv) file and subsequently imported to the statistical software for data cleaning. Data cleaning involved the series of response completeness checking to ensure no missing data, no outlier/extreme value on scale variable and no irrelevant response, especially on date of birth questions. If there were any irrelevant response, then the submission was excluded. Data were analyzed using statistical software for univariate, bivariate, and multivariate with confidence interval 95%. Univariate analysis was done to present the proportion of each participants' characteristics and level of nutrition knowledge. The knowledge variable was categorized based on the median score, since it showed a not normal distribution data based on Kolmogorov-Smirnov and Shapiro Wilk test ($p < 0.05$; CI 95%). Knowledge score above the median was defined as adequate and knowledge below the median was defined as inadequate. All characteristics variables were reported using frequencies and percentages. Bivariate analysis was conducted using Chi-square and Spearman's rho correlation coefficient.

Chi-square was used to identify any potential association between explanatory variables and level of knowledge, meanwhile, Spearman's rho was used to obtain correlation between scale variables (nutrition knowledge score, BMI, and GPA). The correlation analysis was conducted to enrich the finding, since it provided a directional association, which

did not reveal in Chi-square. All scale variables were included in correlation analysis (GPA, BMI and knowledge score). Further, multivariate analysis was performed using enter method of logistics regression to assess the odd ratio only for variables that show significant values less than 0.05 on bivariate analysis.

Table 1. Subject Characteristics and Level of Knowledge

Characteristics	N	%
Age (years)		
≤ 20	142	60.4
> 20	93	39.6
Sex		
Female	190	80.9
Male	45	19.1
Body Mass Index (BMI)		
Underweight	51	21.7
Normal weight	113	48.1
Overweight	50	21.3
Obese	21	8.9
Study field		
Health science	168	71.5
Non-health science	67	28.5
GPA		
< 3.50	66	28.1
≥ 3.50	169	71.9
Father's working status		
Working	194	82.6
Not working	41	17.4
Mother's working status		
Working	68	29.8
Not working	165	70.2
Parent's total income (IDR)		
< 3 million	66	28.1
3 – 5 million	81	34.5
> 5 million	88	37.4
Level of knowledge		
Adequate	120	51.1
Inadequate	115	48.9

RESULTS

Initially, a total of 243 participants filled the online questionnaire. However, from those obtained, 8 were excluded due to irrelevant responses on the date of birth question (born in 2020). Thus, the final

analytical sample involving 235 respondents.

In our analysis, out of 235 respondents, 115 students had inadequate level of nutrition knowledge with the proportion of 48.9% (95% CI). This proportion was close to its inverse, the

adequate level of knowledge was 51.1%. In terms of nutritional status, most respondent's BMI was normal (48.1%). Table 1 shows the subject characteristics. Most undergraduate students were female, aged under 20 years, from health science faculty with GPA more than 3.50 (out of 4.0 scale). Respondents' study field varied from health science faculty

(nutrition, nursing, community health and physiotherapy study program) and non-health science faculty (economy, computer, law, social science and engineering). Most of their father was working, while the mother was housewives, the parent's income was more than 5 million IDR.

Table 2. Association of Subject Characteristics and Level of Knowledge

Independent variables	Level of knowledge				P
	Inadequate (n)	%	Adequate (n)	%	
Age (years)					
≤ 20	76	53.5	66	46.5	0.082
> 20	39	41.9	54	58.1	
Sex					
Male	36	80.0	9	20.0	<0.001
Female	79	41.6	111	58.4	
BMI (kg/m ²)					
Underweight	19	37.3	32	62.7	0.082
Normal weight	60	53.1	53	46.9	
Overweight	22	44.0	28	56.0	
Obese	14	66.7	7	33.3	
Study field					
Non-health science	62	93.5	5	7.5	<0.001
Health science	53	31.5	115	68.5	
GPA					
< 3.50	34	51.5	32	48.5	0.664
≥ 3.50	81	47.9	88	52.1	
Parent's total income (IDR)					
< 3 million	42	63.6	24	36.4	0.002
3 – 5 million	28	34.6	53	65.4	
> 5 million	45	51.1	43	48.9	
Father's working status					
Not working	19	46.3	22	53.7	0.734
Working	96	49.5	98	50.5	
Mother's working status					
Not Working	85	51.5	80	48.5	0.255
Working	30	42.9	40	57.1	

Table 2 presents a cross-tabulation between all subject characteristics and levels of nutrition knowledge. There was a significant association between sex, study field and parent's income with level of nutrition knowledge. Sex and study field were significantly associated with level of

knowledge ($p < 0.001$). Parents' income was significantly associated with level of knowledge ($p = 0.002$). Table 3 shows the correlation analysis for scale variables (GPA, BMI, and knowledge score). It indicates a significant negative correlation between GPA and BMI,

which means that the higher the student's GPA then the lower the BMI is.

In logistic regression (Table 4) shows there is significant association between study field and parent's income with level of knowledge. The odds for having adequate level of nutrition knowledge is about 0.04 times lower among non-health science students as

compared to health science students. It also shows that the odds for having adequate level of nutrition knowledge is about 2.76 times higher among students whose parents earned 3–5 million IDR per month compared to students whose parents earned less than 3 million or more than 5 million IDR.

Table 3. Correlation Coefficient of GPA, BMI and Knowledge Score

		GPA	BMI	Knowledge Score
GPA	CC	1	-0.182	0.123
	p-value		0.005	0.060
BMI	CC		1	-0.051
	p-value			0.438
Knowledge Score	CC			1
	p-value			

Table 4. Logistics Regression

	OR (95% CI)	P
Study field		
Health science	-	-
Non-health science	0.045 (0.016 – 0.125)	< 0.001
Sex		
Male	-	
Female	0.571 (0.210 – 1.549)	0.271
Parent's income		
< 3 million	-	-
3 – 5 million	2.765 (1.204 – 6.351)	0.016
> 5 million	1.118 (0.515 – 2.426)	0.778

DISCUSSION

Nutritional knowledge plays a very important role in nutritional status. In this study, there were 51.1% of respondents had adequate nutrition knowledge, which was higher than respondents with inadequate nutrition knowledge 48.9%. This result is consistent with a study among young adults (18 to 25 years of aged) in Ghana which states that the young adult group who have adequate nutritional knowledge is greater than those who have inadequate nutrition knowledge with the percentage 52.6% [17]. However, this statement is different from the results of another study

which states that most students (56.2%) have inadequate nutritional knowledge [18]. This difference may occur because all respondents were students with overweight and obese nutritional status. Individual nutritional knowledge level is directly proportional to their nutritional status [11]. Thus, when the nutritional knowledge was measured in the study, it resulted in a low level of nutrition knowledge.

In this study, adequate nutrition knowledge mostly obtained by female students than the males. Similar findings were observed in previous studies [19,20]. It can be explained that female

students are more concerned toward their body image, moreover most participant in this study were health science student who were mostly female [21]. Female students have a stronger interest in nutrition than male students. Female students are more active in seeking information about diet, nutrition and body weight, while male students tend to be more passive [22]. However, a conflicting finding is found in logistics regression, that being female is not the factor to have adequate nutrition. It can be explained that nutrition knowledge is not necessarily adopted into daily basis, meaning that the meals choice and regular consumption did not depend on the students' gender [23]. Nevertheless, different results were shown in another study which stated that there was no relationship between sex and nutritional knowledge [19]. This difference may occur because the respondents in the study were elderly. In the elderly group, there was a decrease in cognitive abilities which made some of the information previously obtained was lost from memory [24].

Another finding was the highest score for nutrition knowledge among normal weight students, compared to those students underweight, overweight and obese. This finding is consistent with that of Yahia [11], who found the highest nutritional knowledge score among US university students with a $18.5 \leq \text{BMI} < 24.9$. This result may be explained by the fact that normal weight individuals attempt to follow nutritional guidance to stay on the ideal body weight by making healthier food choice [25].

In this study, it was found that there was a difference in nutritional knowledge between health science students and non-health science students ($p < 0.001$). Health science students have 0.04 times more adequate nutrition knowledge than non-health science students. The results of this study are in

line with previous studies which stated that the study field of students had an association of nutritional knowledge ($p < 0.001$) [26]. Nutrition students have higher knowledge of nutrition than students with other majors [27]. There is a difference with the results of another study which states that culinary nutrition students and culinary management students do not have adequate nutritional knowledge [28]. This is possible because culinary nutrition students learn more about culinary compared to nutrition which is also studied by culinary management students. Therefore, the nutritional knowledge is not significantly different between the two majors. Health science students have different nutritional knowledge because they are more frequently exposed to nutritional information in their learning process compared to non-health science students [11].

Nutritional knowledge increases linearly with economic status. In this study, there was a correlation between parents' income and students' nutritional knowledge ($p = 0.002$). Students who come from parents with an income of 3–5 million IDR per month have 2.76 times more adequate nutritional knowledge compared to students whose parents earned less than 3 million or more than 5 million IDR. This is in line with previous studies which stated that the nutritional knowledge of respondents from middle-high income families was higher than respondents from low-income families [29]. Different results are stated in another study which states that there is no correlation between parents' income and nutritional knowledge [30]. This difference may occur because all respondents in this study were medical students who often received information related to nutrition through their daily learning processes. Hence, there is no difference in nutritional knowledge between respondents. Parents' income

positively affects nutritional knowledge and the quality of daily food intake which will have an impact on nutritional status. People with low parental income have a greater risk of overweight and obesity [31].

The GPA often determines a general assessment of an individual's abilities. In this study, there was a significant negative correlation between GPA and nutritional status of students as measured using BMI. There is consistency between the results of this study and previous study which states that there is a significant relationship between student academic performance as measured by GPA and BMI. Overweight and obese students have lower academic performance than normal and underweight students [32]. There is different result in another study, that the average ability of intelligence is higher in overweight and obese students. Nonetheless, the study also stated that the ability of intelligence in overweight and obese students does not correlate with good academic performance. Eventually, the GPA in overweight and obese students was lower than others [33]. The nutritional status of students should be given more attention because it can increase the GPA, which is the measurement of successful learning. Of course, this must also be accompanied by a well-regulated learning pattern [34].

This study imply that nutrition education is needed for everyone, not to mention those who seem invulnerable, in this case young adults as they undergo the transitional phase of life into adulthood. It means that general nutrition education curriculum is compulsory in every study field. This study provides the evidence based to advocate the policy maker on enhancing the nutritional education among transitional age group regardless their study field and empower them to become the agent on fostering healthier diet and improving nutritional

status. The possible gap to be filled by the future research is by elaborating more on knowledge and practice on the facets of the Indonesian Balanced Diet (food diversity, physical activity, good hygiene and ideal body weight) to obtain comprehensive views. There are several limitations. As the data collection was conducted online due to force majeure (COVID - 19 outbreak), the anthropometric measurement should rely on self-reported recall body weight and height, that may introduce less accurate result. However, the method used for anthropometric measurement was deemed valid and precise in prior study [35]. In addition, the sampling technique was undertaken by assuming to obtain fair comparison between two study fields. However, a bigger proportion of respondent was found among health science student. Subsequent studies are necessary to follow up the on-field anthropometric measurement using probability sampling technique targeting nutrition knowledge among non-health science students.

CONCLUSION

A proper and adequate nutritional knowledge is not only needed to be occupied by those perceived as a vulnerable group, but also for those who are estimated to face the future risk of the nutritional problem. Undergraduate students are in the transitional age period who expected to be occupied with adequate nutritional knowledge, not only for current lives but also for future circumstances. By addressing factors influencing their nutritional knowledge such as sex, age, GPA, and family income, then a targeted nutritional intervention may contribute to improving nutritional status.

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