



ORIGINAL PAPER

Overview of fluid and macronutrient intake, knowledge and attitudes and eating behavior among private university medical students in Jakarta

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Abstract

Background: Adequate intake of micronutrients and fluids are important for study performance of students

Objective: To obtain an overview of macronutrient and fluid intake, also knowledge, attitudes, and healthy eating behavior of medical students from Krida Wacana Christian University (UKRIDA)

Methods: This is a cross sectional study conducted in October 2021 based on consecutive sampling. Height and weight was self-recorded, while the food and fluid intake was assessed via a phone interview using a 3-day diary. There were 97 students who met the inclusion and exclusion study's criteria who participated in macronutrient and fluid intake data, and 90 of them for the knowledge, attitudes, and healthy eating behavior data.

Results: As much as 10.3% of the study participants were underweight, 41.2% normal, and 48.5% overweight-obese. For macronutrient intake, compared to the RDA, 95.9% of subjects had inadequate energy intake, 100% had inadequate carbohydrates intake, 85.6% for fat intake and 55.7% for protein intake. For fluid intake, 76.3% of respondents had less, 18.6% had adequate, 5.1% had more than RDA. For the nutrition knowledge, 85.6% of respondents had good, 12.2% had sufficient, and 2.2% had inadequate nutrition knowledge. For the respondents' eating habits, 91.1% of respondents reported good, 7.8% adequate, and 1% non-healthy

Conclusion: Most of the subject had inadequate intake of energy, macronutrients, and fluids. Knowledge and attitudes towards healthy eating are mostly good, while healthy eating behavior can be further improved.

Keywords: Balance diet, food intake, medical student, knowledge-attitude-behavior

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Introduction

Macronutrients are essential nutrients which consist of carbohydrates, proteins and fats which affect the nutritional status of a person. The 2018 National Report on Basic Health Research Results (Riskesdas) regarding nutritional status of those older than >18 years reported that 9.3% were thin, 55.3% normal, 13.6% overweight 21.8% obese.¹

The Indonesian Regional Hydration Study (THIRST) 2009 reported that 46.1% of the population in Indonesia experienced mild dehydration.²

While a study among medical students from a public university in Yogyakarta, Indonesia reported a higher prevalence of dehydration of 60.9%.³ Fluids are also the largest component of the body. Intake of fluids can come from food, drink and results of the metabolic process. In men, about 70% of their body weight is water, while in women, it is only around 60%.

The 2014 Indonesia Nutrition Guidelines recommend the composition of nutrients based on the type and amount of food according to the body's needs by taking into account the principle of food diversity.¹ The Indonesian recommended daily allowance (RDA) for 19-29 years old in 2019 is as follows: carbohydrates for men 430 g and women 360 g per day, protein: men 65 g and women 60 g per day, fat-men 75 g and women 60 g per day, fluid intake: men 2,500 ml and women 2,350 ml per day.⁴

Healthy eating behavior that can meet macronutrient and fluid intake is very important for young adults, including university students, who have various activities both academic and non-academic.⁵⁻⁷ There are some expectations that university students, especially medical students, have a good knowledge and attitudes on nutrition knowledge which will be translated into healthy eating behaviour. However, there are only limited information is available for medical students in Indonesia. Thus the study aims to obtain an overview of macronutrient and fluid intake, also knowledge, attitudes, and healthy eating behavior of medical students from Krida Wacana Christian University (UKRIDA)

Methods

This is a descriptive, cross-sectional study, conducted at the Faculty of Medicine and Health Sciences (FKIK) UKRIDA, West Jakarta in October 2021. The number of respondents was 97 based on the minimum required sample using formula for population proportion estimation. The respondents were selected based on a consecutive sampling method. The inclusion criteria were active medical students, aged 19-22 years, and signed informed consent. Exclusion criteria were fasting, participating in a weight loss program, experiencing eating disorders, being sick, having a history of illness, or circumstances requiring a certain dietary pattern.

Information about nutrient intake (energy, carbohydrate, protein, fat and fluid) was obtained via interviews using 3-day food and drink intake diary by data collectors who have been trained and supervised by the research team. Analysis of food intake was done using the NutriSurvey Software. The result of the calculation is the average intake of energy, carbohydrates, protein, fat and fluids consumed from the intake for 3 consecutive days. The outcome was then classified into insufficient: intake <80% of the 2019 RDA, sufficient: 80% - 100% and excess: >100%.

The data was collected via an online questionnaire on weight, height, body mass index (BMI), and knowledge, attitudes, and behavior on healthy eating. The BMI criteria were used based on World Health Organization (WHO) recommendations for the West Pacific region, as follows: underweight: BMI <18.5 kg/m², normal: 18.5-22.9 kg/m², overweight: 23-24.9 kg/m², and obese: > 25 kg/m².⁽⁸⁾

The results on knowledge and healthy eating behaviour are grouped into good: 76-100% of the answers are correct, adequate: 56-75%, and poor: < 55%.

The study protocol was approved by the Komite Etik Penelitian Medis dan Kesehatan Fakultas Kedokteran dan Ilmu Kesehatan Universitas Kristen Krida Wacana (UKRIDA) No. SLKE: 1185/SLKE-IM/UKKW/FKIK/KE/XI/2021

Results

There were 97 subjects who participated in the first data collection (energy, macronutrient, and fluid intake), of which 90 of them (93%) also participated in the second data collection

(knowledge, attitudes, and behavior regarding healthy eating) (**Table 1**).

Table 2 shows the adequacy of dietary intakes compared to RDA. Furthermore, the subject's knowledge, attitudes and behavior towards healthy eating is shown in **Table 3**.

Table 1. Participants' characteristics

Variable	n (%)
	97 (100)
Gender	
- Female	68 (70.1)
- Male	29 (29.9)
Residential	
- with parents/family	31 (32.0)
- without parents/family	66 (68.0)
Origin	
- DKI Jakarta	50 (51.5)
- Java-Bali	3 (3.1)
- Others	44 (45.4)
Meal allowance (Rp)	
- < 3.000.000/month	79 (81.4)
- ≥Rp. 3.000.000/month	18 (18.6)
Nutrition status based on BMI	
- Underweight	10 (10.3)
- Normal	40 (41.2)
- Overweight	16 (16.5)
- Obese	31 (32.0)

Table 2. Dietary intake (Energy, Macronutrient and Fluid) vs Recommended Daily Allowance (RDA) 2019

Variable	n (%)
	97 (100)
Energy Intake	
- Inadequate	93 (95.9)
- Adequate	4 (4.1)
- Over	-
Carbohydrate Intake	
- Inadequate	97 (100.0)
- Adequate	-
- Over	-
Fat Intake	
- Inadequate	83 (85.6)
- Adequate	7 (7.2)
- Over	7 (7.2)
Protein Intake	
- Inadequate	54 (55.7)
- Adequate	25 (25.8)
- Over	18 (18.5)
Fluid Intake	
- Inadequate	74 (76.3)
- Adequate	18 (18.6)
- Over	5 (5.1)

Table 3. Knowledge, Attitude and Behavior on Healthy Eating

Variable	n (%)
	90 (100)
Knowledge on Healthy Eating	
• Good	77 (85.6)
• Adequate	11 (12.2)
• Poor	2 (2.2)
Attitude on Healthy Eating	
• Good	82 (91.1)
• Adequate	7 (7.8)
• Poor	1 (1.0)
Behavior on Healthy Eating	
• Good	35 (38.9)
• Adequate	45 (50.0)
• Poor	11 (11.1)

Discussion

From the demographic data, most of the research's participants were women, did not live with their parents/family and the amount of food allowance was less than Rp. 3,000,000/month. Most of them are coming from DKI Jakarta. This socio-economic status reflected by the place of residency and the allowance for food influences food intake and eating behavior, especially in developing countries.⁹⁻¹¹

Based on the BMI of the study's participants, 60% of participated reported non-normal range either underweight or overweight/obese (**Table 1**). The percentage of participants who are overweight and obese was almost similar to those with normal-weight (48% vs 40%). The proportion of overweight and obesity in this study was higher as compared to those of 2018 RISKESDAS (Riset Kesehatan Dasar/National Health Survey) results (48% vs 38.5%, respectively). This could be due to differences in the BMI criteria used (BMI > 23 vs BMI > 25).⁸ However, using BMI > 25, the proportion of overweight and obesity was almost similar (32%:35.4%, respectively). This high proportion of overweight and obese young adults, especially those with high education levels, needs special attention from various parties to prevent metabolic diseases in later life.

This study reported that the total energy intake was adequately met by almost all study participants (93%). (**Table 2**). However, all study participants had inadequate carbohydrate intake, and most of them had inadequate protein and fat intake. This, suggesting an imbalanced diet consumed by these students.^{5,12} In addition, the Indonesian RDA was based on the reference values of average Indonesian people's height, weight and level of activities across wide areas of Indonesia.⁴ Several studies have reported higher food intake among those living in urban compared to those in rural areas.¹³⁻¹⁵ In addition, there are around 7% of study participants who have high fat intake. This could contribute to overweight and obesity in the future.¹⁶⁻¹⁷ When compared between nutritional status based on BMI and energy intake based on the 2019 Indonesian RDA, there are inconsistent

results, namely most subjects have insufficient energy and macronutrient intake, but most subjects do not have normal BMI. This could be due to various reasons such as inaccuracy of recalling food intake from the interview,^{18,19} or due to very low physical activity. In this study, no measurements of physical activity were carried out and no history of weight gain was recorded. As the study was conducted towards the end of COVID-19 pandemic, most people are still quite hesitant to go out and to do routine exercise, hence limiting the physical activity that they had.^{20,21}

Most of the research subjects' fluid intake was inadequate. When compared with the THIRST national research and other local studies, the inadequate fluid intake in this study was much higher.^{2,3,22,23}

Knowledge, attitudes, and behavior regarding healthy eating research subjects showed that most of them had good knowledge and attitudes, however, around 11% had poor eating behavior (**Table 3**). Thus, it seems that healthy eating behavior is not implemented despite having good knowledge and attitudes toward healthy eating behavior, which was similar with findings from other studies.^{7,24,25} The support to increase adoption of good knowledge into healthy eating habits needs to get support from various parties, for example increasing the availability of balanced nutritional food in canteens, increasing health information, especially healthy eating behavior on-campus social media/communications.

Even though this study provides insights on nutritional status and understanding of healthy eating habits among young, educated adults which could be beneficial for other research in the future, there are some limitations such as analytical statistics to determine the relationship was not carried out. Thus, it is not possible to draw any associations between the variables. In addition, there is no information on the fiber intake and physical activity of the respondent which could provide more holistic insights. Last, the sample size for knowledge, behavior and attitude of healthy eating habits may not be sufficient as the minimum required sample was 97.

Conclusion

Medical students from a private university in Jakarta had less energy, macronutrient, and fluid intake as compared to the RDA 2019. Although knowledge and attitudes on healthy eating were mostly good, their healthy eating behaviors can be further improved to have a better balanced diet.

Conflict of interest

The authors declare that they have no conflict of interests.

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