

## Nutrition Knowledge and the use of Nutrition Labels among Undergraduate Students in UiTM Puncak Alam

Emmy Hainida Khairul Ikram<sup>1,3</sup>, Nur Amni Nadhirah Ngah<sup>1</sup>,  
Fazleen Emiza Khairul Ikram<sup>2</sup>, Nur Suraiya Abu Hassan Shaari<sup>1\*</sup>

<sup>1</sup>Centre for Dietetics Studies, Faculty of Health Sciences, Universiti Teknologi MARA Cawangan Selangor  
Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia

<sup>2</sup>Hospital Canselor Tuanku Muhriz, Universiti Kebangsaan Malaysia, 56000 Cheras, Malaysia

<sup>3</sup>Integrated Nutrition Sciences and Therapy Research Group (INSPIRE), Faculty of Health Sciences,  
Universiti Teknologi MARA Cawangan Selangor Kampus Puncak Alam, 42300 Bandar Puncak Alam,  
Selangor, Malaysia

### ABSTRACT

This study aimed to determine the relationship between socio-demographic factors, nutrition knowledge, and the use of nutrition information labels during food purchases among undergraduate students in UiTM Puncak Alam. In this cross-sectional study, 156 undergraduate students between 18 and 25 years old were recruited from different locations in UiTM Puncak Alam. Data collection involved a self-report questionnaire with five sections covering sociodemographic and anthropometric information, nutrition knowledge level, use of food and nutrition labels, factors influencing label usage, and preferences for nutrition information formats. The Fisher's Exact Test revealed no significant association between Body Mass Index (BMI) and nutrition knowledge or nutrition label usage ( $p > 0.05$ ). However, gender is significantly associated with nutrition knowledge ( $p < 0.05$ ). As for nutrition knowledge and nutrition label usage, there was no significant association between the level of nutrition knowledge and the use of nutrition labels during food purchases ( $p > 0.05$ ). To summarize, this research may determine the most recent data on general nutrition knowledge patterns among university students following the COVID-19 outbreak and underscores the importance of nutrition awareness in empowering students to make informed dietary choices, improving their health and well-being, necessitating targeted interventions and further research for a healthier, nutritionally aware generation.

**Keywords:** knowledge, nutrition label, sociodemographic, students

### INTRODUCTION

Healthy eating habits are influenced by nutrition awareness and knowledge of nutrition labels (Rivera Medina *et al.* 2020; Murimi 2013). Consumers often get nutrition and health-related information about food items from nutrition labels because they provide crucial information and serve as interventions with unrivaled population-level reach (Campos *et al.* 2011). Miller & Cassady (2015) mentioned that nutrition knowledge refers to the knowledge and ideas connected to nutrition and health, including understanding diet and health, diet and illness, food as a primary source of nutrients, and dietary guidelines and recommendations. Most chronic illnesses begin early in life and proceed gradually

over decades, making nutrition education necessary for young individuals to begin disease prevention sooner (Al-isa & Alfaddagh 2014). Due to the implementation of the Movement Control Order (MCO), overweight and obesity increased among young people in Malaysia. The psychological effects of lockdown and deviation from typical routines may lead to unhealthy food overconsumption, which may worsen obesity and increase the risk of cardiovascular and metabolic diseases (Bhutani & Cooper 2020; Martinez-Ferran *et al.* 2020; Emmy *et al.* 2023).

Most students are young adults categorizing them between the ages of 18 and 29 (Norimah *et al.* 2010), a time when significant life changes occur, particularly concerning dietary autonomy. Leaving home for an extended period is a new

\*Corresponding Author: email: [nursuraiya@uitm.edu.my](mailto:nursuraiya@uitm.edu.my)

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experience for many college students. There are notable distinctions in various aspects, such as food, individuals, and residential environments (Yasmin *et al.* 2020). Nonetheless, it has been discovered that providing nutritional information at the point of purchase in university settings, in conjunction with the appropriate teaching, improves food choices (Ab Hamid *et al.* 2021). In addition, it has been shown that subsidies for nutritious foods induce positive dietary practices in various settings (Roy *et al.* 2015). According to Norazmir *et al.* (2012), 53.6% of teenagers in Malaysia do not use nutrition labels, and 69.5% of them do not understand what is written on them. In the present society, the lockdown was undoubtedly connected to modifying food choice motives, which indicates that specific individuals are becoming more aware of the necessity of choosing sustainable food choices (Marty *et al.* 2021).

One strategy for combating unhealthy diets is encouraging people to read nutrition labels when buying products. The relationship between nutrition knowledge and label usage is a crucial aspect to explore as it has implications for promoting healthier dietary choices and overall public health. However, statistics on adopting nutrition information labels among Malaysians, especially after MCO and its influencing variables, remain sparse. Therefore, this research aimed to determine the nutrition knowledge and the use of nutrition labels among undergraduate students in UiTM Puncak Alam.

## METHODS

### Design, location, and time

This cross-sectional study was conducted using quantitative techniques among undergraduate students at UiTM Puncak Alam from June to July 2023. This research was carried out at the Selangor campus of the Universiti Teknologi MARA (UiTM) in Puncak Alam, Kuala Selangor, Malaysia. There were eight faculties till 2023, including the Faculty of Accountancy, Art and Design, Build Environment, Business, Education, Health Sciences, Hotel and Tourism Management, and Pharmacy. Ethical approval for this study was obtained from the UiTM Research Ethics Committee, Selangor, Puncak Alam Campus (FERC/FSK/MR/2023/00127) on May 31, 2023, before the study began.

### Sampling

The students in UiTM Puncak Alam were randomly selected using the convenience sampling method. The population size is 18,721 students in UiTM Puncak Alam. Raosoft Sample Calculator is chosen to calculate the sample size with a margin error is 5% and a confidence level of 95%. Response distribution is 50% making the minimum (n=377) sample size required for this study. The eligibility criteria were: 1) A full-time undergraduate student; 2) from different faculties in UiTM Puncak Alam who are; 3) Aged 18–29 years old; 4) Able to read and understand the questionnaire. Students in a weight loss program or consuming weight loss supplements were excluded from the study.

Additionally, the participants' identities were kept confidential, ensuring their information remained anonymous and could not be linked back to them. Initially, only 161 students were successfully recruited throughout the data collection process due to time constraints. However, five respondents who are currently joining weight loss programs or consuming weight loss supplements were excluded making 156 respondents included in the final analysis. The exclusion process was performed to ensure that there would not be any potential risk of confounding factors.

### Data collection

UiTM students who met all the eligibility criteria were invited to participate in the study through an online self-administered questionnaire. The data collection was carried out at various locations within UiTM Puncak Alam such as the faculties and the cafeterias of the hostels. Participants were given the questionnaire and consent form through Google Forms, prepared in a QR Code. Participants were given a short explanation of the research regarding the data collection method. The duration to complete the data collection was less than 10 minutes, including anthropometric measurement and answering the questionnaire for each participant.

Participants' weight and height were collected barefoot and measured twice, and the average was taken. The weight was measured using a digital flat scale (Model: SECA 813) and height using a stadiometer (Model: SECA 213). BMI-for-age is categorized according to the Asia-Pacific Body Mass Index Classification, which

classifies Underweight ( $<18.5 \text{ kg/m}^2$ ), Normal ( $18.5\text{--}22.9 \text{ kg/m}^2$ ), Overweight ( $23.0\text{--}27.4 \text{ kg/m}^2$ ), and Obese ( $\geq 27.5 \text{ kg/m}^2$ ).

Other than anthropometric and sociodemographic information, respondents answered a validated and modified self-administered questionnaire adapted from Nurliyana *et al.* (2011). The study used the Food Label Use Questionnaire (FLUQ) to determine the relationship between socio-demographic factors, nutrition knowledge, and the use of nutrition information labels during food purchases among undergraduate students in UiTM Puncak Alam, which comprises five primary parts. Section A compiles demographic data related to the students, including age, gender, year of study, faculty, and year of study. Section B comprises a set of eight concerns relating to the participant's knowledge in the field of nutrition. Five distinct answer choices accompany each question. The scores used to define each level were as follows: Low (0.0–2.0), Medium (3.0–5.0), and High (6.0–8.0).

Section C of the study evaluates the utilization of food and nutrition labels by students at UiTM. A 4-part Likert-type response set has been used to assess the frequency of label usage, with options including "often," "sometimes," "rarely," and "never." Furthermore, this component has an inquiry regarding the primary factor considered while making a food purchase, employing a Likert-type response scale consisting of four parts (most important, important, least important, and not important).

Section D of the survey has two inquiries that investigate the various determinants that impact the use of food labels during food purchases. Section E of the study examines the comprehension and preferences of students about multiple formats of nutrition information, specifically focusing on their preferred format for the nutrition information panel. However, it is essential to note that the questionnaire does not include specific inquiries concerning the frequency at which individuals read and analyze nutritional information on labels such as total fat content, the caloric contribution from fat, trans fat, saturated fat, cholesterol, carbohydrates, protein, dietary fiber, sugar, vitamins, and minerals.

#### Data analysis

The collected data was analyzed using Statistical Package for Social Sciences (SPSS),

version 27.0. Descriptive analysis was used to calculate and categorize the subject's sociodemographic characteristics. Fisher's Exact test was utilized to determine whether there is a significant association between socio-demographic factors, nutrition knowledge, and the use of nutrition information labels during food purchases among undergraduate students in UiTM Puncak Alam. The statistical significance level was set at  $p < 0.05$ . Categorical data are presented as frequency and percentage, while numerical data is shown as mean $\pm$ SD.

## RESULTS AND DISCUSSION

Table 1 shows the socio-demographic characteristics of the participants that are presented in frequency and percentage for the categorical variable and mean $\pm$ SD for the numerical variable. The study included 156 participants aged 18–25 years, with a mean age of  $21.97 \pm 1.13$ .

Based on Table 2, the participants' general nutrition knowledge levels were mainly categorized as high (56.4%), followed by medium (41.0%), and only a small proportion had a low level (2.6%) based on their scores. This finding aligns with previous research conducted in Malaysia targeting university students, which also supports the notion that most young adults have high nutrition knowledge (Norazlan Shah *et al.* 2013). Interestingly, no female students in this study had a low level of nutrition knowledge. This observation aligns with previous research, as Yahia *et al.* (2016) reported, which also found that female students have more excellent nutrition knowledge than male students. Fisher's Exact test (with  $\alpha < 0.05$ ) was used to evaluate whether gender is related to or not with nutrition knowledge and the result was statistically significant ( $p < 0.001$ ). Therefore, it is concluded that there is an association between gender and nutrition knowledge level (Table 3).

Various factors might contribute to this gender-based difference in nutrition knowledge. Women are often more involved in food preparation and family health, leading to increased exposure to nutrition-related information and discussions (Spronk *et al.* 2014). Additionally, a study found that young adult women display a keen interest in calorie and fat information on nutrition labels. This can be attributed to their strong desire for

Table 1. Socio-demographic characteristics of participants (n=156)

	Total (n=156)	
	n (%)	Mean±SD
Age group		
18–25		21.97±1.13
Gender		
Male	41 (26.3)	
Female	115 (73.7)	
Faculty		
Accountancy	10 (6.4)	
Art & design	13 (8.3)	
Build environment	4 (2.6)	
Business	23 (14.7)	
Education	9 (5.8)	
Health science	69 (44.2)	
Hotel & tourism management	8 (5.1)	
Pharmacy	20 (12.8)	

SD: Standard Deviation

weight control, leading them to make informed food choices to regulate their energy and fat intake (Lim *et al.* 2015). This might support a study by AlHazmi & Aziz (2020) that reported the awareness of young females regarding their body weight, physical appearance, and the aspiration to be socially accepted within the context of beauty standards emerged as noteworthy aspects.

A study reported that students with higher nutritional knowledge tended to consume less unhealthy fats and cholesterol, implying the potential benefits of improved nutrition knowledge (Yahia *et al.* 2016). Individuals with limited nutrition knowledge may encounter challenges in making informed dietary choices, potentially leading to weight gain and a higher BMI. Remarkably, no students with low nutrition knowledge were observed among the underweight and obese BMI categories, indicating that higher awareness and nutrition knowledge may contribute to better nutrition-related decisions

and more consistent body weight and BMI levels (Staškiewicz *et al.* 2023).

From Table 4, majority of the students use nutrition information labels during food purchases which are about 89.7% (n=140). Gender was not statistically different among the categorized nutrition information label usage ( $p>0.05$ ).

This observation is consistent with a previous study that found females more likely to practice using food labels than males. A local study emphasized the high awareness level of food labels among urban shoppers, and this awareness was associated with respondents' gender and income level. Notably, healthy males were less inclined to read food labels than healthy women, considering it time-consuming (Norazmir *et al.* 2012). Males are less attentive to food labels and less interested in their food decisions than their female counterparts, as females view food choices as a constant thought process.

Several theories link males' disinterest in food decisions to ideologies of masculinity, as dieting has often been associated with femininity (Nani 2016). Moreover, traditional gender roles may encourage women to be more meticulous about food selection. The study highlights that women are often responsible for grocery shopping, which may explain their heightened awareness and use of nutrition labels when buying groceries for the family (Ponnudurai *et al.* 2019). Additionally, females were more likely to be concerned about their body weight and motivated to change it through dietary adjustments, potentially contributing to their greater use of nutrition information labels during food purchases (Heiman & Olenik-Shemesh 2019).

Table 2. The frequency of nutrition knowledge according to gender (n=156)

Nutrition knowledge	Gender		Total n (%)
	Male (n=41) n (%)	Female (n=115) n (%)	
Low	4 (9.8)	0 (0.0)	4 (2.6)
Medium	24 (58.5)	40 (34.8)	64 (41.0)
High	13 (31.7)	75 (65.2)	88 (56.4)

Table 3. The association of gender and BMI with nutrition knowledge (n=156)

	Nutrition knowledge				p
	Low (%)	Medium (%)	High (%)	Total (%)	
Gender					
Male	4 (100.0)	24 (37.5)	13 (14.8)	41 (26.3)	<0.001 <sup>a*</sup>
Female	0 (0.0)	40 (62.5)	75 (82.5)	115 (73.7)	
BMI					
Underweight	0 (0.0)	10 (15.6)	21 (23.9)	31 (19.9)	0.730 <sup>a</sup>
Normal	3 (75.0)	28 (43.8)	33 (37.5)	64 (41.0)	
Overweight	1 (25.0)	18 (28.1)	26 (29.5)	45 (28.8)	
Obese	0 (0.0)	8 (12.5)	8 (9.1)	16 (10.3)	

<sup>a</sup>Fisher's Exact test; \*Significant at p<0.05; BMI: Body Mass Index

Moreover, the data shows that among students who use the nutrition information label, 40.7% have a normal BMI. Similarly, among students who do not use the nutrition information label during food purchase, 43.8% belong to the normal BMI classification. This suggests that nutrition information label usage is prevalent among students with a normal BMI, regardless of whether they utilize the labels or not. However, a previous study found that young adults who regularly use the nutrition facts label have higher diet quality (Buyuktuncer *et al.* 2018). Based on BMI, more overweight students use nutrition information labels (29.3%) compared to underweight students (18.6%). This indicates that students who are overweight are more likely to utilize nutrition information labels during food purchases than underweight students. This is supported by a study that found many students read food labels to control energy intake (Norazmir *et al.* 2012).

Meanwhile, participants not using nutrition information labels are higher among underweight than overweight students, who are 31.1% and 25.0%, respectively. This might be due to a lack of awareness of basic dietary guidelines, as supported by a study in China reporting low overall dietary guideline awareness in both urban and rural areas (Jiang *et al.* 2023). Moreover, all students who are obese use nutrition information labels during food purchases (14.4%). However, a considerable proportion of consumers, especially those belonging to specific demographics like

children, adolescents, and older adults who are obese, exhibit a notable lack of reliance on nutrition labels during their food purchasing decisions, raising concerns about their potential limited awareness of nutritional content and its implications (Jefrydin *et al.* 2019). Nevertheless, there was no significant association between BMI and nutrition information label usage among UiTM Puncak Alam students (p>0.05). This result suggests that body weight status may not be the primary factor driving students' engagement with nutrition information labels. Several factors could contribute to the absence of a significant association, such as diverse reasons for label usage. Students may use nutrition information labels for various purposes, including weight management, health consciousness, dietary preferences, and nutritional awareness. These motivations may vary widely among students, irrespective of their BMI.

As for nutrition knowledge, it is shown that students who use nutrition information labels during food purchases range from high (58.6%), medium (38.6%), and low (2.9%) levels of nutrition knowledge. This suggests that students with higher nutrition knowledge are more likely to utilize nutrition labels when making food choices. Previous studies have also found that knowledgeable consumers comprehend nutrition labels better than those with lower knowledge levels (Miller & Cassady 2015). In the study of Al-Barqi *et al.* (2020), 40.9% of the students stated lack of time as the primary reason for not



Table 4. The association between gender, BMI, and knowledge with nutrition information label usage (n=156)

	Nutrition information label usage			<i>p</i>
	Use (%)	Not use (%)	Total (n=151) (%)	
<b>Gender</b>				
Male	36 (25.7)	5 (31.3)	41 (26.3)	0.765 <sup>a</sup>
Female	104 (74.3)	11 (68.8)	115 (73.7)	
<b>BMI</b>				
Underweight	26 (18.6)	5 (31.1)	31 (19.9)	0.425 <sup>a</sup>
Normal	57 (40.7)	7 (43.8)	64 (41.0)	
Overweight	41 (29.3)	4 (25.0)	45 (28.8)	
Obese	16 (11.4)	0 (0.0)	16 (10.3)	
<b>Nutrition knowledge</b>				
Low	4 (2.9)	0 (0.0)	4 (2.6)	0.205 <sup>a</sup>
Medium	54 (38.6)	10 (62.5)	64 (41.0)	
High	82 (58.6)	6 (37.5)	88 (56.4)	

<sup>a</sup>Fisher's Exact Test; \*Significant at  $p < 0.05$ ; BMI: Body Mass Index

using food labels, with other reasons including no interest, no need, and difficulty in usage. This suggests that most students refrain from using food labels during purchases due to time constraints and a perception that they already know what to buy, making label usage seem unnecessary.

Additionally, attitudes significantly and positively influence consumers' food purchase intentions. The utilization of nutrition information labels during food purchases among students appears to be shaped by many factors encompassing psychological, economic, and social dimensions, all of which influence their behaviour (Jefrydin *et al.* 2019). Delving into the significance of using nutrition labels, it is evident that employing these informative labels in the process of food selection empowers consumers to make well-informed and sensible choices, thereby aligning their dietary practices with desirable nutritional behaviours, such as maintaining appropriate calorie or fat intake levels (Lim *et al.* 2015). Further research may be needed to understand better the complexities of these relationships and their impact on promoting healthier food habits among students.

## CONCLUSION

In conclusion, the study highlights that nutrition awareness among university students can influence their dietary choices as well as overall health. Most students had high general nutrition knowledge levels followed by medium and only a small proportion had a low level based on their scores. Notably, between BMI and nutrition knowledge or nutrition label usage, there was no association found whereas gender showed a statistically significant association with nutrition knowledge level. This study contributes valuable insight into the relationship between nutrition knowledge level, nutrition label usage and BMI among students. It lays the groundwork for further research and intervention strategies to promote healthier eating habits and nutrition awareness among young adults.

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## DECLARATION OF CONFLICT OF INTERESTS

The authors declared that they have no conflict of interest.

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