Awareness, Knowledge, and Practices towards Reading Snack Food Labels among Malaysian Adolescents

Norazmir Md Nor[1,2,3*], Siti Farhanah Mohd Rusli[1], Ummi Mohlisi Mohd Asmawi[4]

[1]Centre for Dietetics Studies, Faculty of Health Sciences, Universiti Teknologi MARA,
42300 Puncak Alam, Selangor, Malaysia
[2]Maternal, Infant & Young Child Nutrition (Mi-Child) Research Group, Faculty of Health Sciences,
Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia
[3]Integrative Pharmacogenomics Institute (iPROMISE), Universiti Teknologi MARA,
42300 Puncak Alam, Selangor, Malaysia
[4]Department of Pathology, Faculty of Medicine, Universiti Teknologi MARA,
47000 Sg Buloh, Selangor, Malaysia

ABSTRACT

This study aimed to determine the awareness, knowledge, and practices regarding food labels and factors that influence their use; a cross-sectional study was conducted among 200 Malaysian adolescents aged 10 to 19. Participants completed an online Food Label Use Questionnaire (FLUQ) that included demographic, nutrition knowledge, label use, and factors affecting label use. SPSS version 28.0 was used for data analysis. The results showed that 93% of adolescents correctly identified the consequences of over-consuming calories. Still, only 84.5% performed well on the nutrition use task, struggling to interpret calorie and carbohydrate amounts in certain foods. The main reasons for not using food labels were time constraints (45.5%), unattractive or confusing labels (36%), absence of labels on certain foods (33%), lack of health concerns (32%), and insufficient knowledge (27%). However, 90.5% of adolescents were concerned about product expiration dates and often read this information. Taste and price were the main reasons for referring to food labels, while time constraints were the main barrier to their use. In conclusion, practicing reading food labels can guide adolescents in making informed decisions about their food choices and portion intake. Awareness campaigns can aid in promoting healthy habits and empowering adolescents to make the right choices for their health.

Keywords: adolescents, food labels, nutrition facts, nutrition information panel

INTRODUCTION

The label means any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to a container of food (Codex 1985). Food labelling aims to promote healthier food choices by informing customers about nutrient content and making the food selection environment more favorable (Kattelmann *et al.* 2014). Food merchants and policymakers have worked to improve food labelling through design changes and food label laws to assist consumers in making easier and better decisions about various food products (Shen *et al.* 2018). In Malaysia, the mandatory Nutrition Information Panel (NIP) on packaged foods and beverages displays information on energy, protein, carbohydrate, and fat content to ensure consumers are well-informed and more health-conscious (Jefrydin *et al.* 2019).

Urbanisation, tobacco use, harmful alcohol consumption, unhealthy diet and physical inactivity are significant contributors to Non-Communicable Disease (NCD) risk due to the increased availability of unhealthy foods (Talagala & Arambepola 2016; Uwimana-Nicol *et al.* 2021). According to Jefrydin *et al.* (2019), adolescents are at a high risk of obesity due to their frequent consumption of processed foods like bread, biscuits, soft drinks, ice cream, canned sausage, and cheese. The energy intake of adolescents has increased in recent years due to increased consumption of animal products,

soft drinks, fast foods, and salty snacks (Rezali *et al.* 2012). Kansal *et al.* (2023) found that Indian adolescents face difficulties in comprehending information on food labels, including nutrition information, and are unaware of the adverse effects of consuming unhealthy packaged foods. Most respondents expressed the need for food labels to be available in their local language for better understanding.

The study's objective was to investigate the awareness, understanding, and utilisation of food labels among adolescents and the factors that affect their usage when making food purchases. The study hypothesised that adolescents possess knowledge, understanding, and practice of reading food labels. The factors that impact adolescents' use of food labels during food purchases are linked to their understanding of the information presented on the food label.

The present study focuses on Malaysian adolescents, a group that has received limited attention in previous research on food labels' knowledge, attitude, and practices, which primarily focused on university students and educated young adults (Norazmir *et al.* 2012). Adolescence, defined by the World Health Organization (WHO) as the period between childhood and adulthood (ages 10 to 19), is a crucial stage in life that requires attention to health as young people are particularly susceptible to long-term impacts (Tan *et al.* 2019). Given the critical role of consumers' awareness, knowledge, and practices about food labels in making healthy food choices, and the limited research in this area among Malaysian adolescents, The main objective of this research is to examine the awareness, knowledge, and practices of food label reading among adolescents, and to identify the factors that affect the utilisation of food labels during food purchasing among this demographic.

METHODS

Design, location, and time

A cross-sectional study was conducted among 10 to 19-year-old adolescents in all states of Malaysia to avoid bias in socio-demographic representation. Approval was obtained from UiTM Research Ethics Committee [REC/06/2021 (MR/396)], and online consent was obtained from adolescents who agreed to complete the online questionnaire.

Sampling

Convenience sampling was used in the study. Inclusion criteria: citizen aged 10 to 19 years old and; able to read in Malay or English. Exclusion criteria: non-citizen, permanent residents, can't read in Malay or English. A sample size calculation using Krejcie and Morgan (1970) formula. A precision of 0.05 at a 95% confidence interval. A total of 200 subjects participated in this study.

Data collection

The study took place from February to April 2022, and adolescents took an online survey (Google Forms) promoted on social networks (Facebook, Instagram, WhatsApp). Before analyzing the data, cleaning was done to remove duplicate submissions.

Instrumentation. A self-administered Food Label Use Questionnaire (FLUQ) (Nurliyana *et al.* 2011) was distributed to adolescents. FLUQ are well-established questionnaires; related to the scope of the study. The questionnaire consists of 26 questions and includes 4 main sections to measure the following aspects: (a) socio-demographic; (b) nutrition knowledge; (c) the use of food and nutrition labels; (d) factors affecting the use of food labelling.

Demographic data. In this section, there were questions about adolescents' demographic data, such as age (10–19 years), race (Malay, Chinese, Indian, or other), level of study (primary, secondary, or pre-university), height, and weight. Adolescents only fill up the body weight & height. Body Mass Index (BMI) was categorised as underweight (<18.5); normal (18.5–24.9); overweight (25–29.0); obese (>30), family income per month (≤RM 1,500 (USD330), RM 1,500–RM 2,500 (USD330–USD550), RM 2,500–RM 4,000 (USD550–USD880), or ≥RM 4,000 (USD880), and marital status (single, married, divorced, or widowed).

Nutrition knowledge. Consists of eight questions of nutrition label knowledge. The adolescents had to choose one answer only for the multiple-choice questions.

The use of food and nutrition labels. In this section, respondents were asked how to read the total calories of the whole packaging of bread and a packet of biscuits. They were also assessed to read the carbohydrate amount in one serving of bread and dietary fiber in one serving

of biscuit. Consists of a 4-part Likert-type answer set ranging from 'often' to 'never' to determine the frequency of using food labels among adolescents. Subsequently, several inquiries were made regarding the usefulness of the food label or nutrition label in making decisions about food purchases, with response options including "yes," "sometimes," and "no." Then, a 4-part Likert-type answer for the question of attitude regarding the most important aspects ranging from 'most important to 'not important in using food labels during food purchasing. (i.e., price, taste, nutrient content, ingredient, packaging materials, and expiry date). Finally, a 4-point Likert-type scale was used to assess the frequency of reading and reviewing specific food label items, including the list of ingredients, serving size, calories, total fat, trans fat, cholesterol, sodium, carbohydrates, protein, dietary fiber, sugars, vitamins, and minerals. Response options ranged from "often" to "sometimes," "rarely," and "never."

Factors affecting the use of food labelling. The adolescents can choose more than one answer on the factors they refer to, not the food label.

Data analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 17.0. (SPSS Inc, USA).

RESULTS AND DISCUSSION

Demographic data

A total of 200 adolescents were included in the cross-sectional study. Demographic data are presented in Table 1. The majority of adolescents were from secondary school (57.0%), followed by primary school (15.0%) and pre-university/ university (14.0%). A normal BMI was observed in 44.0% of the adolescents. Of the adolescents surveyed, 36.5% had a household income lower than the minimum wage in Malaysia, which is Ringgit Malaysia (RM) 1,500.

Level of awareness

The score for each question in nutrition knowledge and understanding. From the analysis, most adolescents could answer correctly except for Question 5, which asked about knowledge regarding the nutrient that provides the most energy. More than half (77%) answered wrongly, with (21%) correct and (2%) not sure. On

Table 1. Demographic of the study population (n=200)

Characteristic	Male (n)	Female (n)	%
Ethnicity			
Malay	70	183	91.5
Chinese	0	2	1
Indian	4	12	6
Others	1	3	1.5
Level of study			
Primary	12	30	15
Secondary	41	114	57
Pre-university	11	28	14
University	11	20	14
BMI (kg/m^2)			
Underweight (<18.5)	22	57	28.5
Normal (18.5–24.9)	33	88	44
Overweight (25–29.9)	15	30	15
Obese (>30)	5	25	12.5
Family income/month			
≤RM 1,500	24	73	36.5
RM 1,500–RM 2,500	16	41	20.5
RM 2,500–RM 4,000	9	36	18
≥RM 4,000	26	50	25
Marital status			
Single	74	197	98.5
Married	1	3	1.5

BMI: Body Mass Index
RM: Ringgit Malaysia

the other hand, 93% of adolescents correctly answered the question about the consequence of the over-consumption of calories.

Level of knowledge

Based on the responses to the questions above, the level of nutrition knowledge among adolescents was categorized into high, medium, and low. The scoring range for each level was determined as follows: High (6–8), Medium (4–5), and Low (0–3). The finding that the majority of adolescents had only medium knowledge about nutrition suggests that there is a need for increased nutrition education for this age group. Adolescents are at a stage in their lives where they are more likely to make independent

food choices, and therefore, they need to have a good understanding of nutrition to make healthy choices. Nutrition education programs can help adolescents learn about the nutrients required for their growth and development, the importance of a balanced diet, and how to make healthy food choices.

Table 2 shows the percentage of the nutrition label task score. Surprisingly, this study reported that the majority of the respondents were performing poorly (84.5%) in the nutrition use task as they were unable to interpret the total calories in the whole packaging of bread (98%) and biscuits (78%). Moreover, most of them misinterpret carbohydrates amount in one serving of bread (84%) and the gram of dietary fibre in one biscuit (71%).

According to a study by Jung *et al.* (2019), food label education is essential to promote healthy eating habits and prevent chronic diseases. The study found that consumers knowledgeable about food labels were more likely to make healthier food choices. However, many people find food

labels confusing and difficult to understand. To address this issue, a systematic review by Jovicic *et al.* (2021) suggests that simplifying food labels or developing apps to help interpret the information could be effective solutions. The review found that simplified food labels, such as the traffic light system, were easier for consumers to understand and make informed choices. Additionally, apps that use technology, such as augmented reality, can help consumers easily access and interpret the information on food labels.

Level of practices

The study showed that 35% of adolescents "sometimes" use food labels when purchasing food, followed by 31% who "rarely" use them, 19.5% who "often" use them, and 14.5% who "never" use them.

The fact that only 19.5% of adolescents reported often using food labels when purchasing food is concerning, as it suggests that many adolescents may need to be made aware of the importance of using food labels. Evidence suggests that the use of food labels is associated with healthier food choices and better dietary quality, particularly among adolescents. Therefore, promoting food labels among adolescents could be an effective strategy to improve their dietary quality and promote healthier eating habits.

Several strategies can be implemented to promote food labels among adolescents. For example, nutrition education programs can include information on reading and interpreting food labels and the importance of using food labels when making food choices. Schools can also provide opportunities for students to practice using food labels, for example, by including activities that involve analysing food labels as part of the curriculum.

Table 2. Nutrition label task score

Question number	Context of question	Answer			
		Correct		Wrong	
		n	%	n	%
1a	Total calories in the whole packaging of bread (kcal)	4	2	196	98
1b	Carbohydrate amount in 1 serving of bread (g)	32	16	168	84
2a	Total calories in a packet of biscuits	44	22	156	78
2b	Dietary fibre in 1 serving of biscuit (g)	58	29	142	71
2c	Classification of ability to interpret the label	31	15.5	169	84.5

Reasons for purchasing snacks

Table 3 showed that 90.5% of adolescents consider the expired date to be the "most important" aspect when purchasing food, but only 19.9% "often" use it during food purchases. As 50.5% and 51.5% of adolescents consider taste and ingredients as the "most important" aspects in making decisions, respectively. Less than half of the adolescents listed price (48%), nutrient content (40%), and packaging (35.5%) as the "most important" factors when buying food.

Table 3. Influence factors on the food label use

Influence	Use of food labels			
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Price				
Most important	17 (17.7)	31 (32.3)	28 (29.2)	20 (20.8)
Important	17 (20.5)	32 (38.6)	25 (30.1)	9 (10.8)
Least important	5 (26.3)	6 (31.6)	8 (42.1)	0 (0)
Not Important	0 (0)	1 (50)	1 (50)	0 (0)
Taste				
Most important	25 (24.8)	30 (29.7)	33 (32.7)	13 (12.9)
Important	11 (13.1)	35 (41.7)	25 (29.8)	13 (15.5)
Least important	3 (21.4)	4 (28.6)	4 (28.6)	3 (21.4)
Not Important	0 (0)	1 (100)	0 (0)	0 (0)
Nutrient content				
Most important	23 (28.7)	31 (38.8)	17 (21.3)	9 (11.3)
Important	10 (11.5)	30 (34.5)	34 (39.1)	13 (14.9)
Least important	5 (17.2)	9 (31)	10 (34.5)	5 (17.2)
Not Important	1 (25)	0 (0)	1 (25)	2 (50)
Ingredients				
Most important	26 (25.2)	42 (40.8)	22 (21.4)	13 (12.6)
Important	10 (13.5)	24 (32.4)	31 (41.9)	9 (12.2)
Least important	3 (13.6)	4 (18.2)	9 (40.9)	6 (27.3)
Not Important	0 (0)	0 (0)	0 (0)	1 (100)
Packaging				
Most important	24 (33.8)	19 (26.8)	17 (23.9)	11 (15.5)
Important	9 (11.7)	32 (41.6)	25 (32.5)	11 (14.3)
Least important	6 (12.5)	19 (39.6)	17 (12.5)	6 (12.5)
Not Important	0 (0)	0 (0)	3 (25)	1 (25)
Expiry date				
Most important	36 (19.9)	66 (36.5)	55 (30.4)	24(13.3)
Important	1 (6.7)	4 (26.7)	6 (40)	4 (26.7)
Least important	2 (66.7)	0 (0)	1 (33.3)	0 (0)
Not Important	0 (0)	0 (0)	0 (0)	1 (100)

Table 4 shows the reasons why adolescents read the food label. More than half (51%) of adolescents read food labels due to considerations of taste and cost. Followed by being to be able to comprehend the information presented on food labels (49.5%), to control energy intake (38%), for health and beauty concerns (31%), and due to food allergy (20.5%). Nearly half of the adolescents understood each food label informations, yet only 18.2% "often" use the food labels.

Meanwhile, Table 5 depicts attitudes towards not using or consulting food labels. The results indicate that 45.5% of adolescents cited

Table 4. Frequency and factors referring to the food label

Refer to the food label	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Understand each info on the food label				
Yes	18 (18.2)	41 (41.4)	31 (31.3)	9 (9.1)
No	21 (20.8)	29 (28.7)	31 (31.3)	20 (19.8)
Experience food allergy				
Yes	10 (24.4)	16 (39)	12 (29.3)	3 (7.3)
No	29 (18.2)	54 (34)	50 (31.4)	26 (16.4)
To control energy intake				
Yes	17 (22.4)	27 (35.5)	25 (32.9)	7 (9.2)
No	22 (17.7)	43 (34.7)	37 (29.8)	22 (17.7)
For health or beauty				
Yes	14 (22.6)	32 (51.6)	9 (14.5)	7 (11.3)
No	25 (18.1)	38 (27.5)	53 (38.4)	22 (15.9)
Concern about taste and price				
Yes	15 (14.7)	33(32.4)	35 (34.3)	19 (18.6)
No	24 (24.5)	37 (37.8)	27 (27.6)	10 (10.2)

Table 5. Frequency and factors of not referring to the food label

Do not refer to food label	Use of food label			
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Do not know how to use food label				
Yes	10 (18.5)	13 (24.1)	20 (37)	11 (20.4)
No	29 (19.9)	57 (39)	42 (28.8)	18 (12.3)
Time constrain/limited time				
Yes	19 (20.9)	39 (42.9)	22 (24.2)	22 (24.2)
No	20 (18.3)	31 (28.4)	40 (36.7)	18 (16.5)
Label was not attractive/confusing				
Yes	10 (13.9)	31 (43.1)	19 (26.4)	12 (16.7)
No	29 (22.7)	39 (30.5)	43 (33.6)	17 (13.3)
There is no label on certain food				
Yes	14 (21.2)	26 (39.4)	20 (30.3)	6 (9.1)
No	25 (18.7)	44 (32.8)	42 (31.3)	23 (17.2)
No health problem				
Yes	9 (14.1)	26 (40.6)	21 (32.8)	8 (12.5)
No	30 (22.1)	44 (32.4)	41 (30.1)	21 (15.4)

time constraints as the main reason for not using food labels, followed by unattractive/confusing labels (36%), absence of labels on certain foods (33%), no health concerns (32%), and lack of knowledge on how to use food labels (27%).

Other practices regarding food label use

According to the data presented in Table 6, more than half of the adolescents (51%) reported that they sometimes read the list of ingredients on food labels. Among the items listed, sugars were the most frequently referred to by adolescents,

Table 6. Association between practices and food label use

Practices items	Use of food label			
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Read: List of ingredients				
Often	19 (35.8)	19 (35.8)	13 (24.5)	2 (3.8)
Sometimes	12 (11.8)	40 (39.2)	38 (37.3)	12 (11.8)
Rarely	7 (20.6)	8 (23.5)	11 (32.4)	8 (23.5)
Never	1 (9.1)	3 (27.3)	0 (0)	7 (63.6)
Read: Serving size				
Often	14 (34.1)	19 (46.3)	5 (12.2)	3 (7.3)
Sometimes	13 (17.8)	29 (39.7)	26 (35.6)	5 (6.8)
Rarely	9 (13.6)	21 (31.8)	25 (37.9)	11 (16.7)
Never	3 (15)	1 (5)	6 (30)	10 (50)
Read: Health claim				
Often	18 (32.1)	24 (42.9)	9 (16.1)	5 (8.9)
Sometimes	14 (16.1)	29 (33.3)	33 (37.9)	11 (12.6)
Rarely	5 (13.2)	15 (39.5)	15 (39.5)	3 (7.9)
Never	2 (10.5)	2 (10.5)	5 (26.3)	10 (52.6)
Read: Calories/energy				
Often	16 (34)	21 (44.7)	8 (17)	2 (4.3)
Sometimes	17 (18.9)	31 (34.4)	34 (37.8)	8 (8.9)
Rarely	4 (8.5)	16 (34)	17 (36.2)	10 (21.3)
Never	2 (12.5)	2 (12.5)	3 (18.8)	9 (56.3)
Read: Calories from fat				
Often	18 (35.3)	22 (43.1)	8 (15.7)	3 (5.9)
Sometimes	15 (17.4)	32 (37.2)	32 (37.2)	7 (8.1)
Rarely	4 (9.1)	14 (31.8)	17 (38.6)	9 (20.5)
Never	2 (10.5)	2 (10.5)	5 (26.3)	10 (52.6)
Read: Total fat				
Often	19 (38.8)	20 (40.8)	7 (14.3)	3 (6.1)
Sometimes	12 (14.6)	29 (35.4)	34 (41.5)	7 (8.5)
Rarely	6 (12.2)	19 (38.8)	15 (30.6)	9 (18.4)
Never	2 (10)	2 (10)	6 (30)	10 (50)
Read: Trans fat				
Often	18 (39.1)	17 (37)	8 (17.4)	3 (6.5)
Sometimes	14 (16.9)	31 (37.3)	31 (37.3)	7 (8.4)
Rarely	5 (10.4)	19 (39.6)	15 (31.3)	9 (18.8)
Never	2 (8.7)	3 (13)	8 (34.8)	10 (43.5)
Read: Saturated fat				
Often	17 (41.5)	17 (41.5)	6 (14.6)	1 (2.4)
Sometimes	15 (17.6)	31 (36.5)	32 (37.6)	7 (8.2)
Rarely	5 (9.6)	20 (38.5)	16 (30.8)	11 (21.2)
Never	2 (9.1)	2 (9.1)	8 (36.4)	10 (45.5)

Continue from Table 6

Table 6. Association between practices and food label use

Practices items	Use of food label			
	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Read: Cholesterol				
Often	21 (42)	19 (38)	7 (14)	3 (6)
Sometimes	11 (13.6)	32 (39.5)	32 (39.5)	6 (7.4)
Rarely	5 (10.4)	17 (35.4)	17 (35.4)	10 (20.8)
Never	2 (9.5)	6 (28.6)	6 (28.6)	10 (47.6)
Read: Sodium				
Often	15 (33.33)	19 (42.2)	7 (15.6)	4 (8.9)
Sometimes	16 (20)	29 (36.3)	30 (37.5)	5 (6.3)
Rarely	4 (7.4)	19 (35.2)	21 (38.9)	10 (18.5)
Never	4 (19)	3 (14.3)	4 (19)	10 (47.6)
Read: Carbohydrate				
Often	19 (38.8)	20 (40.8)	7 (14.3)	3 (6.1)
Sometimes	12 (14.5)	31 (37.3)	33 (39.8)	7 (8.4)
Rarely	6 (11.8)	17 (33.3)	18 (35.3)	10 (19.6)
Never	2 (11.8)	2 (11.8)	4 (23.5)	9 (52.9)
Read: Protein				
Often	22 (36.7)	24 (40)	10 (16.7)	4 (6.7)
Sometimes	10 (12.7)	31 (39.2)	30 (38)	8 (10.1)
Rarely	5 (11.4)	13 (29.5)	19 (43.2)	7 (15.9)
Never	2 (11.8)	2 (11.8)	3 (17.6)	10 (58.8)
Read: Dietary Fibre				
Often	19 (40.4)	21 (44.7)	5 (10.6)	2 (4.3)
Sometimes	11 (12.9)	33 (38.8)	34 (40)	7 (8.2)
Rarely	6 (12.5)	14 (29.2)	19 (39.6)	9 (18.8)
Never	3 (15)	2 (10)	4 (20)	11 (55)
Read: Sugars				
Often	18 (27.7)	15 (19.2)	15 (23.1)	6 (9.2)
Sometimes	26 (40)	28 (35.9)	28 (35.9)	7 (9)
Rarely	15 (23.1)	28 (35.9)	18 (39.1)	9 (19.6)
Never	6 (9.2)	7 (9)	1 (9.1)	7 (63.6)
Read: Vitamin and mineral				
Often	20 (37)	22 (40.7)	7 (13)	5 (9.3)
Sometimes	10 (12.5)	29 (36.3)	33 (41.3)	8 (10)
Rarely	6 (12.2)	17 (34.7)	19 (38.8)	7 (14.3)
Never	3 (17.6)	2 (11.8)	3 (17.6)	9 (52.9)

with 32.5% reporting that they often refer to this information. Protein (30%) and health claims (28%) were the next most commonly referred to items that adolescents reported referring to often. In this study, practices of reading all labels were significantly associated with using food

labels when making decisions when buying food products.

Nutrition knowledge is understanding the concepts and processes regarding nutrition and health, such as the relationship between diet and health, diseases, food nutrients, dietary guidelines, and recommendations (Miller & Cassady 2015). Studies have shown that nutrition knowledge significantly impacts a person's understanding and use of information on food labels (Shireen *et al.* 2022). The utilisation of food labels among adolescents in this study was not significantly associated with their level of nutrition knowledge. This is consistent with Evelyn *et al.* (2020), which suggests that even if a person is aware of health, it may not be enough to encourage them to read food labels during purchasing. Adolescents in this study had moderate knowledge of general nutrition information, but only 84.5% could explain or interpret information on the Nutrition Information Panel (NIP). This may be due to a need for more knowledge of serving size (Shah *et al.* 2010) or need for clarity between calories per serving and calories per packaging. Adolescents reported needing help to answer questions about which nutrient provides the most calories, with most thinking carbohydrates provide more calories than fat. This may be due to poor knowledge of energy intake and expenditure. Additionally, low nutrition knowledge among young adults in Malaysia may be due to a lack of interest in healthcare issues (Jefrydin *et al.* 2019).

This study found that 90.5% of adolescents were concerned about the product's expiration date and often read the information. This is similar to previous research by Saha *et al.* (2013) that reported adolescents prioritising product safety and shelf life over other information. Despite their concern for expiry dates, only 19.9% often used food labels during purchasing, indicating no significant relationship between concern for expiration dates and use of food labels (Shireen *et al.* 2022). Adolescents reported that taste (51%) and price (51%) were the main reasons for referring to food labels, while time constraints (45.5%) were the reason for not referring to them. The semi-structured focus group discussion in Jerfydin *et al.* (2019) found that some adolescents had limited time to read all the information while grocery shopping and only bought desired foods. However, the relationship between attitudes and use of food labels varied in different studies.

Adolescents view the importance of various nutritional components listed on food labels, with some believing that information like fat content will help them lose weight (Jefrydin *et al.* 2019). Among the components, sugar content is the most frequently referred to (32.5%). Health education, awareness, and trust in low-fat/calorie diets significantly influence label use behaviour. About 51% of adolescents reported "sometimes" reading ingredient lists on food labels as they prefer products with better quality ingredients (Miller & Cassady 2015). The ingredients list can provide information on a food's healthfulness as the ingredients are listed in descending order of proportion by weight (Miller & Cassady 2015).

CONCLUSION

Adolescents have inconsistent attitudes towards food labeling, as they understand the significance of the expiration date but only sometimes check it during food purchases. This is due to time constraints, cost, and taste preferences. However, consistently reading food labels can help individuals make informed choices about their portion intake. Awareness campaigns including topic on food label use can aid adolescents in making healthier choices in their daily lives.

DECLARATION OF INTERESTS

The authors have no conflict of interest.

REFERENCES

Codex Alimentarius. 1985. General standard for labelling of prepackaged foods (CXS 1-1985). https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B1-

1985%252FCXS_001e.pdf [Accessed 8th October 2022].

Evelyn H, Aziz AF, Sariman S. 2020. Associations of knowledge, attitude and practices of food label on cardiovascular diseases (CVD) risk amongst university students in Selangor, Malaysia. J Nutr Sci Vitaminol 66(Supplement):S275–S282. https://doi.org/10.3177/jnsv.66.S275

Jefrydin N, Nor NM, Talib RA. 2019. Nutrition labelling: An exploratory study on personal factors that influence the practice of reading nutrition labels among adolescents. Malays J Nutr 25(1):143–153. https://doi.org/10.31246/mjn-2018-0123

Jovicic N, Smith K, Guo X, Wang Y. 2021. The effectiveness of nutrition label interventions on improving dietary intake and nutrition-related health outcomes: A systematic review. Appetite 167:105615.

Jung T, Huang J, Eagan L, Oldenburg D. 2019. Influence of school-based nutrition education program on healthy eating literacy and healthy food choice among primary school children. Int J Health Promot Educ 57(2):67–81. https://doi.org/10.1080/14635240.2018.1552177

Kansal S, Raj A, Pedapanga N, Worsley A, Rathi N. 2023. Indian adolescents' perceptions of packaged food and food labels-A qualitative inquiry. Appetite 180:106342. https://doi.org/10.1016/j.appet.2022.106342

Kattelmann KK, White AA, Greene GW, Byrd-Bredbenner C, Hoerr SL, Horacek TM, Kidd T, Colby S, Phillips BW, Koenings MM, Brown ON. 2014. Development of young adults eating and active for health (YEAH) internet-based intervention via a community-based participatory research model. J Nutr Educ Behav 46(2):S10–S25. https://doi.org/10.1016/j.jneb.2013.11.006

Krejcie RV, Morgan DW. 1970. Determining sample size for research activities. Educ Psychol Meas 30(3):607–610. https://doi.org/10.1177/001316447003000308

Miller LMS, Cassady DL. 2015. The effects of nutrition knowledge on food label use. A review of the literature. Appetite 92:207–216. https://doi.org/10.1016/j.appet.2015.05.029

Norazmir MN, Norazlanshah H, Naqieyah N, Anuar MK. 2012. Understanding and use of food package nutrition label among educated young adults. Pak J Nutr 11(10):836–842. https://doi.org/10.3923/pjn.2012.934.940

Nurliyana G, Norazmir MN, Anuar MK. 2011. Knowledge, attitude and practices of university students regarding the use of nutritional information and food labels. Asian J Clin Nutr 3(3): 79–91. https://doi.org/10.3923/ajcn.2011.79.91

Rezali FW, Chin YS, Yusof BNM. 2012. Obesity-related behaviors of Malaysian adolescents: A sample from Kajang district of Selangor state. Nutr Res Pract 6(5):458–465. https://doi.org/10.4162/nrp.2012.6.5.458

Saha S, Vemula SR, Mendu VVR, Gavaravarapu SM. 2013. Knowledge and practices of using food label information among adolescents attending schools in Kolkata, India. J Nutr Educ Behav 45(6):773–779. https://doi.org/10.1016/j.jneb.2013.07.011

Shah M, Adams-Huet B, Elston E, Hubbard S, Carson K. 2010. Food serving size knowledge in African American women and the relationship with body mass index. J Nutr Educ Behav 42(2):99–105.https://doi.org/10.1016/j.jneb.2009.02.001

Shen M, Shi L, Gao Z. 2018. Beyond the food label itself: How does color affect attention to information on food labels and preference for food attributes? Food Qual Prefer 64:47–55. https://doi.org/10.1016/j.foodqual.2017.10.004

Shireen S, Muthumareeswari S, Sumaya BK, Lakshmi Shree R. 2022. Food label and its influence among Indian consumers-a review. Journal of Food Science and Nutrition Research 5(2):543–551.

Talagala IA, Arambepola C. 2016. Use of food labels by adolescents to make healthier choices on snacks: A cross-sectional study from Sri Lanka. BMC Public Health 16(1):1–11. https://doi.org/10.1186/s12889-016-3422-1

Tan AK, Yen ST, Fang X, Chiang FS. 2019. Body weight and physical activity of adolescents in Malaysia. International Health 11(2):150–158.https://doi.org/10.1093/inthealth/ihy072

Uwimana-Nicol J, Hendricks L, Young T. 2021. Population-level interventions targeting risk factors of diabetes and hypertension in South Africa: A document review. BMC Public Health 21:1–14. https://doi.org/10.1186/s12889-021-11910-6