Original Article

Knowledge, attitudes and utilization of food labels among undergraduate medical students in a medical college in Chennai – A cross sectional survey

Sinthiya Annamalai[1], Vijayaprasad Gopichandran[2]

[1]Department of Community Medicine, ESIC Medical College and PGIMSR, Chennai, Tamil Nadu, India, [2]Department of Community Medicine, ESIC Medical College and PGIMSR, Chennai, Tamil Nadu, India

Abstract

Introduction: Food labeling is an important method of providing food-related information on the package of food products, to facilitate people's choice of safe and appropriate foods. Medical students are potential agents of change in food label utilization behavior in the community. The objectives of this study were to evaluate the knowledge, attitudes, and utilization of food labels among undergraduate medical students in a medical college in Chennai.

Material & Methods: We conducted a cross-sectional survey of 200 students studying in the 1st to 3rd year in a medical college through an online Google Forms survey, self-administered by the students after online informed consent was obtained. We gathered information on their knowledge, attitudes, and utilization of food labels.

Results: Of 400 students approached, 200 responded to the online survey. They had good knowledge about food labels. Female students had 3.4 (1.59 to 7.25) times better knowledge compared to men. The students had a positive attitude toward food labels, and a majority thought that the food labels are useful. Utilization of food labels to understand the nutritive content (55%), additives (57%), and manufacturer details (47%) was poor. Utilization of food labels was 2.7 times more (1.142–6.587) among those who did regular exercise, and it was 0.2 (0.09 to 0.9) times less among those who were on a strict diet.

Conclusion: Medical students had a sound knowledge and good attitude toward food labels, but their food label utilization patterns were still poor. There is a need to incorporate food labeling in the undergraduate medical curriculum and inculcate better food label utilization behavior.

Keywords: Attitudes, awareness, food labeling, medical students, utilization

Address for correspondence: Dr. Vijayaprasad Gopichandran, Department of Community Medicine, ESIC Medical College and PGIMSR, KK Nagar, Chennai - 600 078, Tamil Nadu, India.
E-mail: vijay.gopichandran@gmail.com

Submitted: 23-Jun-2021 **Accepted in Revised Form:** 05-Oct-2021 **Published:** 30-Jun-2022

INTRODUCTION

With the vast expansion of urbanization, long work hours, and adaptation to a sedentary lifestyle, there is a surge in the production and consumption of prepackaged foods.[1] Most of these food items contain food labels, comprising trademarks, brand names, nutritive information, pictorial matter, or symbols relating to the foodstuff that are placed on any packaging, document, notice, ring, or

Access this article online	
Quick Response Code:	Website: www.ijcfm.org
	DOI: 10.4103/ijcfm.ijcfm_50_21

How to cite this article: Annamalai S, Gopichandran V. Knowledge, attitudes and utilization of food labels among undergraduate medical students in a medical college in Chennai – A cross sectional survey. Indian J Community Fam Med 2022;8:33-8.

collar accompanying or referring to such foodstuff.[2] Food labeling is a community-based approach providing information about the nutrient content of a food allowing consumers to make better and healthy food choices. Food labeling is important as it contains all the details about the food item, including the nutritive values, the manufacturing/expiry date, ingredients, vegetarian/nonvegetarian, and the price which guides consumers in choosing the right foods.[3] In India, the Food Safety and Standards Authority of India (FSSAI) is the authority which is responsible for regulating and supervising food safety.[4] There is a global increase in prevalence of noncommunicable diseases such as diabetes, hypertension, and heart diseases.[5] Unhealthy food choices, including increased consumptions of prepackaged and refined foods, are important risk factors for noncommunicable diseases.[6] Food labeling can help consumers keep track of what they eat and hence prevent and control noncommunicable diseases.[2] A few studies have shown that although most consumers have a good knowledge and attitude toward food labels, they do not utilize food labels often.[7] Some consumers find it difficult and complicated to understand food labels.[8] This problem arises due to the lack of nutrition knowledge among the people and failure to use simple words to describe the food product in the labels. Consumers also prefer buying food products based on the taste, quality, convenience of use, and the price rather than on the nutritive value. A few consumers do not practice reading the food labels due to time constraint and desire for certain foods.[9] There are also consumers who believe that food labels do not make truthful claims about the nutritional value of the food products.[10] Studies also show that women utilize food labels more frequently than men.[11]

As future doctors, undergraduate medical students must have a sound knowledge and understanding about healthy eating, food labels, and appropriate utilization of food labels. This sound knowledge will help them advise appropriate utilization of food labels to their future patients and hence act as agents of change in the community. Appropriate utilization of food labels will also help them lead a healthy life. This study was designed to assess the awareness of medical students, their attitudes, and their utilization of food labels in a medical college in Chennai.

MATERIAL & METHODS

We conducted the study among undergraduate students studying in a medical college in Chennai, which is established as a part of an autonomous corporation under the Ministry of Labour and Employment, Government of India. The institution provides undergraduate courses, postgraduate courses, and research facilities. The participants involved in the study were undergraduate medical students in the 1st, 2nd, and 3rd years of M. B. B. S course. Food safety, food hygiene, and food regulation are taught as a part of Community Medicine curriculum across the 1st to 3rd year of MBBS. Therefore, these 3-year students were sampled.

Sample size was calculated as 280 participants, using the formula N = (4 × p × q)/d^2, where $P = 40$ (assuming that 40% of the students have a good awareness about food labeling in India[12]) and d = 15% of P for a 95% confidence level. We got a sample size of 266.6 which we rounded off to 280. We sampled the required students by convenient sampling method. We approached the students during their lecture with permission from the teaching faculty. We shared the link to the Google Form questionnaire with the class representatives of each class, after explaining the details of the study. The class representative then shared the link in the social media group of the class. Students were encouraged to respond to the questionnaire. We sent a reminder to the class representative after 1 week. We gave one more weeks' time for the students to fill out the questionnaire and then closed the data collection.

The questionnaire contained five sections:

1. Student information, including name, age, height, weight, year of study, any food allergies, and questions pertaining to lifestyle, i.e., whether they are trying to lose weight, doing regular exercising, and following a strict diet
2. Content and format of food label: There were questions formed based on the FSSAI packaging and labeling regulation (2011) to assess the general knowledge about food labeling and the FSSAI
3. Utilization of food label: A table was formed with details present in the label of the food product, and the student had to tick which of the details he/she practiced looking into and how often, for example, the expiry date, FSSAI logo, ingredient list, and nutritional information. Ticking was done under the headings "always," "often," "sometimes," "rarely," and "never"
4. Attitude: The questions framed evaluated the attitude of the student toward food labels. The Likert scale used allowed the student to choose the level of agreement he/she had with each statement, for example, whether one believes that food labels can help people with health conditions (i.e., hypertension and allergies) to look out for ingredients to avoid, regulate calorie intake, etc.

The questionnaire was reviewed by experts in community medicine and public health and content validation was done.

We analyzed the data using the Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 21, Armonk, New York; IBM Corp) software.[13] We described the characteristics of the study population using frequencies and percentages. We computed scores of knowledge, attitude, and practices related to food labels by adding the individual responses to the questions under each domain. Based on the mean score, we categorized people as having good and poor knowledge, attitude, and practices related to food labels. We then used multiple logistic regression analysis to study the factors influencing good knowledge, attitude, and practices. We entered age, sex, body mass index (BMI), year of study, whether they were on a diet, whether they were exercising, whether they were trying to get into shape, and whether they suffered from any specific food allergies in the model to identify the factors influencing the knowledge, attitude, and practices. We used $P < 0.05$ to indicate statistical significance.

The study was approved by the Institutional Ethics Committee of the ESIC Medical College and PGIMSR, KK Nagar, Chennai, with the IEC No. IEC/2019/2/23 on October 30, 2019. Informed consent was obtained from all the students through the online Google Forms by clicking an icon to indicate consent to participate in the study. All personal identifying information related to the students were kept confidential. The digital data were saved in password-protected files, and only the researchers had access to the data.

RESULTS

We approached a total of 400 students through the class representatives. Out of this, 200 responded to the questionnaires with a response rate of 50%. The characteristics of the study participants are shown in Table 1. About 25% were below 19 years of age, and more than 60% were girls. There were more respondents from the 1st & 3rd year than the 2nd year. Only 21% were doing regular exercises and 9% were following a strict diet. About 17.5% were overweight and 3% were obese.

The participants had good knowledge regarding food labeling and the rules for appropriate food labeling followed by the FSSAI. Hundred twenty eight (64%) participants knew that health claims or risk reduction claims should not be present on the label of food packaging. A majority i.e. 171 (85.5%) participants have correctly picked out the color of the symbol on the food label which is green for vegetarian and brown for nonvegetarian. The knowledge on exact objectives of the FSSAI and the details of size of display of the food label details was poor, but all other aspects of knowledge regarding food labeling were good [Table 2]. Very few had negative attitude toward food labeling. Majority felt that food labeling is useful in choosing the right healthy foods and in regulating the diet. Majority of the participants felt that it is a good practice to regularly review food labels [Table 3]. The most frequently examined item in the food label was the expiry date, with more than 75% viewing it always. About 46% of the participants look for the veg/nonveg symbol in the food label. Nutrition information and information about food additives were viewed less frequently [Table 4]. It is seen that knowledge scores are normally distributed, whereas attitudes and practices scores were skewed, with more students having higher scores [Figure 1]. Female students had a 3.4 times greater odds of good knowledge (1.59 to 7.25) compared to the men, and students aged 21 years had 0.2 times lesser odds of good knowledge compared to students aged 17 years (0.054–0.832). Other risk factors such as BMI, year of study, and lifestyle factors did not influence knowledge on food labels. None of the above factors influenced the attitudes of the students toward food labels. While those who exercised regularly had a 2.7 times greater odds of utilizing food labels (1.142–6.587) well, those who followed a strict diet had a 0.297 times lesser odds of utilizing food labels (0.089–0.994) compared to those who did not [Table 5].

DISCUSSION

This study aimed at understanding the awareness, attitude, and utilization of food labels by undergraduate medical students in a college in Chennai. We found that students had good knowledge about the Food Safety and Standards Authority of India and their functions. They were familiar with most aspects of food labeling and the rules governing it. They had positive attitudes toward food

Table 1: Characteristics of the study sample

Characteristics	Categories	*n* (%)
Age (years)	17-18	51 (25.5)
	19-21	131 (65.5)
	≥22	18 (9)
Sex	Male	75 (37.5)
	Female	125 (62.5)
Year of study	First year	69 (34.5)
	Second year	54 (27)
	Third year	77 (38.5)
Are you trying to get in shape/lose weight?	Yes	92 (46)
Do you do regular exercise/gym visits?	Yes	42 (21)
Do you follow a strict diet?	Yes	18 (9)
BMI	<18 (undernourished)	22 (11)
	18.01-24.99 (normal)	137 (68.5)
	25-29.99 (overweight)	35 (17.5)
	≥30 (obese)	6 (3)

BMI: Body mass index

Table 2: Responses to questions on knowledge regarding food safety and food labeling

Question	Correct answer	Number of participants who got it correct, *n* (%)
The _____ is the supreme authority which is responsible for regulating and supervising food safety in India	c. Food Safety and Standards Association of India	189 (94.5)
The main objective of this supreme authority is_____	b. To maintain food quality levels in order to ensure safety and providing satisfaction to every customer	75 (37.5)
The material/container of the packaging_____	b. Must be aseptic, clean, and sealed properly	151 (75.5)
The label on the food packaging should not contain the following	b. Health claims or risk reduction	128 (64)
The color of the symbol ⊡ is	d. Green – vegetarian; blue – nonvegetarian	171 (85.5)
If the food product is imported, the importer's address must be mentioned	a. True	175 (87.5)
The particulars/declarations of labeling on a food product in Tamil Nadu should only use the following language	e. Both a and c	152 (76)
The size of the symbol should vary according to the size of the food package	True	56 (28)
If the food product contains food additives, the statement should be mentioned in	c. Capital letters only	112 (56)
The size of the Principal Display Panel (where all the information is grouped together) must vary according to the size of the package	True	132 (66)

Table 3: Attitude toward food labeling

Statement	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
I believe that food labeling can help people with health conditions (i.e., hypertension and allergies) to look out for ingredients to avoid	106 (53)	71 (35.5)	21 (10.5)	1 (0.5)	1 (0.5)
I believe that food labeling can help people regulate their calorie intake	69 (34.5)	91 (45.5)	34 (17)	6 (3)	0
People should take the time from their busy schedule to read the food label carefully before buying foods	69 (34.5)	83 (41.5)	43 (21.5)	5 (2.5)	0
People should not come to a conclusion that all FSSAI licensed products are "healthy"	69 (34.5)	73 (36.5)	48 (24)	7 (3.5)	3 (1.5)
Food labeling is easy to use as it provides all information of what the food product beholds within the package	58 (29)	102 (51)	26 (13)	13 (6.5)	1 (0.5)

FSSAI: Food Safety and Standards Authority of India

Table 4: Practices with respect to using the food labels

Food label use practices	Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Checking "best before" date	152 (76)	37 (18.5)	5 (2.5)	1 (0.5)	5 (2.5)
Viewing the ingredients	68 (34)	66 (33)	50 (25)	11 (5.5)	5 (2.5)
Viewing the nutritional information	55 (27.5)	80 (40)	51 (25.5)	12 (6)	2 (1)
Viewing the name and address of manufacturer	47 (23.5)	45 (22.5)	61 (30.5)	35 (17.5)	12 (6)
Reading directions for use	76 (38)	62 (31)	48 (24)	10 (5)	4 (2)
Checking veg/nonveg symbol	92 (46)	47 (23.5)	26 (13)	17 (8.5)	18 (9)
Checking food additives	51 (25.5)	60 (30)	47 (23.5)	27 (13.5)	15 (7.5)
Checking country of origin	47 (23.5)	55 (27.5)	52 (26)	32 (16)	14 (7)
Checking the net weight of the food	92 (46)	44 (22)	35 (17.5)	17 (8.5)	12 (6)

labels and felt that they are helpful and useful. However, despite the good knowledge and positive attitudes, they did not utilize the food labels adequately to know about the nutritive contents of the foods, the additives, and the details of the manufacturer, with most of them only going through the expiry date of the product. Women had better knowledge about food labeling, and students who were regularly exercising utilized food labels appropriately. Those who were on diet regulation utilized food labels poorly.

We found that the medical students in this study had a sound knowledge about food labels and the functions of the regulatory authority in India. Previous studies among college-going students, both medical and nonmedical, have observed that both knowledge and utilization of food labels are high, with medical students having higher levels of knowledge than nonmedical.[14-17] A sound knowledge about food labels and the regulation of food and nutrition labeling is important for a medical student as it prepares the student to create awareness among the patients. It also is important for the medical students to practice appropriate use of food labels themselves in order to stay healthy. The current undergraduate medical curriculum does not include sections on food labels and counseling people on the appropriate use of food labels.[18] It may be useful to incorporate it in the curriculum under food

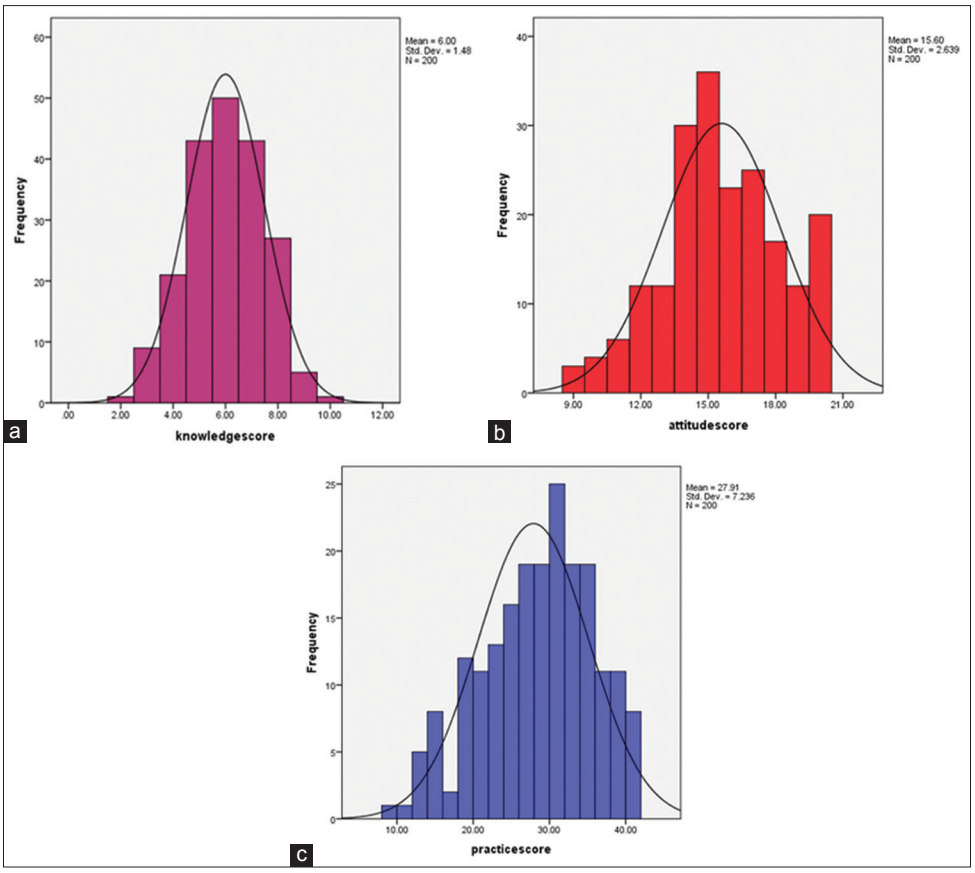

Figure 1: The distribution of the scores of knowledge (a), attitudes (b), and practices (c) regarding food labels among the surveyed medical college students

Table 5: Factors influencing knowledge about food labels

Characteristics	Knowledge about food labels			Practices related to food labels		
	OR	95% CI	*P*	OR	95% CI	*P*
BMI normal (reference underweight)	0.214	0.014-3.356	0.272	1.645	0.181-14.939	0.658
BMI overweight (reference underweight)	0.240	0.018-3.120	0.275	2.466	0.338-17.991	0.373
BMI obese (reference underweight)	0.440	0.029-6.641	0.553	1.628	0.198-13.406	0.650
Sex (reference men)	3.400	1.595-7.250	0.027*	1.292	0.663-2.519	0.451
Second year (reference 1st year)	0.396	0121-1.299	0.127	2.287	0.749-6.985	0.146
Third year (reference 1st year)	1.253	0.467-3.363	0.655	1.297	0.505-3.331	0.589
Age – 18 years old (reference 17 years old)	0.143	0.16-1.239	0.77	0.911	0.123-6.775	0.928
Age – 19 years old (reference 17 years old)	0.897	0.174-4.632	0.897	0.369	0.085-1.599	0.182
Age – 20 years old (reference 17 years old)	0.420	0.081-2.164	0.299	0.618	0.139-2.741	0.526
Age – 21 years old (reference 17 years old)	0.211	0.054-0.832	0.026*	0.545	0.160-1.858	0.332
Age – over 22 years old (reference 17 years old)	0.670	0.670-2.600	0.563	0.976	0.309-3.081	0.967
Are you trying to get in shape/lose weight	0.985	0.478-2.031	0.967	0.758	0.385-1.490	0.421
Are you doing regular exercise/gym?	0.826	0.344-1.987	0.670	2.742	1.142-6.587	0.024*
Are you following a strict diet?	0.821	0.206-3.273	0.779	0.297	0.089-0.994	0.049*
Are you allergic to any particular food item ingredient?	1.167	0.387-3.516	0.784	0.722	0.255-2.049	0.541

*$P<0.05$ statistically significant. OR: Odds ratio, CI: Confidence interval, BMI: Body mass index

safety and food hygiene. We found that students have a positive attitude toward food labels. They felt that food labels help patients choose their foods appropriately to prevent diseases and stay healthy. However, despite this good knowledge and attitude, their food label utilization was poor. While a majority of the students used the food label to check for "best before" date of expiry, they did not appropriately utilize the nutritive information, information about additives, and details of the manufacturer. This finding is similar to previous studies among medical as well as nonmedical students. Only 45%–50% of the medical as well as nonmedical students used food labels appropriately.[17] Previous studies have also shown that only about 30%–35% of the students use the information obtained from food labels to appropriately adjust their dietary intake.[14] We found that women had greater

awareness about food labels compared to men. Those who were 21 years old had lesser knowledge compared to those who were 17 years (in the 1st year of their undergraduate course). One of the possible reasons is that at 21, the students are very busy with no room for checking the label in their food. Those students who exercised or visited a gym regularly were utilizing food labels better than those who did not. This is probably because of the heightened awareness about healthy eating among those who are making efforts to lose weight or stay fit. None of the studied risk factors including year of study, age, sex, BMI, or lifestyle changes seemed to influence attitude toward food labeling, indicating that all the students had highly positive attitude. However, when it came to utilization of food labels, only the ones who were attempting to lose weight used it appropriately. It was also found that those who were on a strict diet had a lesser chance of utilizing the food labels appropriately. This is probably because when there is a strict diet control, the use of prepackaged and labeled foods in itself reduces.

This study has several limitations. The study was conducted in one medical college in Chennai, and therefore, the findings are not representative of all medical students of Chennai. The sample size is relatively small, and therefore, it is likely that the estimates are underpowered. There is a possibility of a socially desirable response in answering practice and attitude questions related to food labeling. However, despite these limitations, the study provides valuable information on levels of utilization of food labels among medical students.

CONCLUSION

Medical students had a sound knowledge and good attitude toward food labels, but their food label utilization patterns were poor. There is a need to incorporate "food labelling" as a topic in the undergraduate medical curriculum and inculcate better food label utilization behaviour.

Acknowledgments

The authors would like to acknowledge the support of Dr. Praveena P, Assistant Professor, Department of Community Medicine, SRM Medical College, Tiruchirappalli.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Law C, Green R, Kadiyala S, Shankar B, Knai C, Brown KA, *et al.* Purchase trends of processed foods and beveragees in urban India. Glob Food Sec 2019;23:191-204.
2. Temple NJ. Front-of-package food labels: A narrative review. Appetite 2020;144:104485.
3. Cowburn G, Stockley L. Consumer understanding and use of nutrition labelling: A systematic review. Public Health Nutr 2005;8:21-8.
4. Jindal AK. Food safety and quality control: Best practices in the Indian Armed Forces. Med J Armed Forces India 2020;76:142-6.
5. Benziger CP, Roth GA, Moran AE. The global burden of disease study and the preventable burden of NCD. Global Heart 2016;11:393-7.
6. Corvalán C, Reyes M, Garmendia ML, Uauy R. Structural responses to the obesity and non-communicable diseases epidemic: Update on the Chilean law of food labelling and advertising. Obes Rev 2019;20:367-74.
7. Cannoosamy K, Pugo-Gunsam P, Jeewon R. Consumer knowledge and attitudes toward nutritional labels. J Nutr Educ Behav 2014;46:334-40.
8. Deakin TA. Consumers find food labels confusing and too small to read. Practical Diabetes 2011;28:261-4c.
9. van Herpen E, van Trijp HC. Front-of-pack nutrition labels. Their effect on attention and choices when consumers have varying goals and time constraints. Appetite 2011;57:148-60.
10. Singer L, Williams P, Ridges L, Murray S, McMahon A. Consumer reactions to different health claim formats on food labels. Food Australia 2006;58:92-7.
11. Sharf M, Sela R, Zentner G, Shoob H, Shai I, Stein-Zamir C. Figuring out food labels. Young adults' understanding of nutritional information presented on food labels is inadequate. Appetite 2012;58:531-4.
12. Saha S, Vemula SR, Mendu VV, Gavaravarapu SM. Knowledge and practices of using food label information among adolescents attending schools in Kolkata, India. J Nutr Educ Behav 2013;45:773-9.
13. IBM. IBM SPSS Statistics for Windows, Version 21. Armonk, NY: IBM; 2012.
14. Marietta AB, Welshimer KJ, Anderson SL. Knowledge, attitudes, and behaviors of college students regarding the 1990 Nutrition Labeling Education Act food labels. J Am Diet Assoc 1999;99:445-9.
15. Smith SC, Taylor JG, Stephen AM. Use of food labels and beliefs about diet-disease relationships among university students. Public Health Nutr 2000;3:175-82.
16. Jasti S, Kovacs S. Use of trans fat information on food labels and its determinants in a multiethnic college student population. J Nutr Educ Behav 2010;42:307-14.
17. Malek Mahdavi A, Abdolahi P, Mahdavi R. Knowledge, attitude and practice between medical and non-medical sciences students about food labeling. Health Promot Perspect 2012;2:173-9.
18. National Medical Commission. Competency based undergraduate curriculum. In: Competency Based Undergraduate Medical Curriculum. National Medical Commission, New Delhi, 2019.