

## What are the perceptions of healthy food choices? A cross-sectional study from Saudi Arabia

Nawal A. Alissa\*

Community Health Sciences Department, College of Applied Medical Sciences, King Saud University, Riyadh 11433, Saudi Arabia

\*Corresponding Author: Nawal A. Alissa, PhD, HSAD, Community Health Sciences Department, College of Applied Medical Sciences, King Saud University, P.O. Box 10219, Riyadh 11433, Saudi Arabia. Email: [nalissa@ksu.edu.sa](mailto:nalissa@ksu.edu.sa)

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### Abstract

Previous studies conducted in Saudi Arabia demonstrated dietary patterns or energy/nutrient intakes with limited information about Saudi's perception about healthy food choices. Insights in the perceptions of healthy food choices are critical for developing targeted interventions to support Saudi population with the goal of improving healthy eating behaviors and, as a result, lowering the risk of diet-related diseases. Therefore, this study aimed to assess knowledge, attitude as well as the practice of people about healthy food choices in Saudi Arabia. The study employed a descriptive cross-sectional design with 303 participants included in the analysis. The population settings were at three primary healthcare centers in Tabuk city of Saudi Arabia. Data were collected through self-administered paper–pencil surveys to assess the knowledge, attitude, and practices of healthy food choices. Data were analyzed using the SPSS statistical software version 26. The results revealed that participants in this study performed above average in terms of their perceptions (knowledge, attitude, and practice) of healthy food choices. The major findings of this study showed that statistically significance difference was found between the place of residence in relation to the practices of healthy food choices ( $F 7,238$  and  $p < 0.05$ ). A significant association was observed between knowledge of healthy food choices and marital status. Multiple comparisons post hoc tests indicated that the married group was a significantly different group at  $\alpha = 0.044$ . Additionally, the relationship between monthly income groups and attitudes was statistically significant, with  $p < 0.05$ . Findings of this study could assist health educators in developing appropriate programs, awareness messages, and community campaigns to improve perceptions about healthy food choices. The findings observed that considering why practicing healthy food choices that could lower the risk of diseases and promote optimal health could be a challenge.

*Keywords:* attitudes; healthy food choices; knowledge; perceptions; Saudi Arabia

### Introduction

Globally, 20% of women and 14% of men, or over 1.9 billion people, will be obese by 2030 (World Health Organization [WHO], 2021). Saudi Arabia has been noted as a country with notably high rate of obesity. Recently, the prevalence of obesity in Saudi Arabia has been reported as high as 36% (Salem *et al.*, 2022). A recent data from all regions of the Kingdom of Saudi Arabia have revealed the prevalence of obesity as 24.7%

(Althumiri *et al.*, 2021). According to Alhyas *et al.* (2011), the increased prevalence is due to socioeconomic and lifestyle changes. The move from traditional fiber-rich diets to sugar-rich and high-fat foods has resulted in major changes in dietary behaviors (Musaiger *et al.*, 2010).

Globalization has resulted in a global culture characterized by the consumption of fast foods by various age groups (Mahfouz *et al.*, 2011). Fast food outlets in

Saudi Arabia serve foods that are culturally acceptable and relevant to the Saudi people's tastes (Ibahrine, 2015). The menus created specifically for Saudis comprise food choices tailored to their tastes and preferences. The menu adaptations of fast-food chains to local/Saudi plates shape food choices in the country and the manner people eat. Furthermore, Saudis discovered easily prepared food in the market that met their expectations and culture.

To address obesity and unhealthy eating issues, the primary focus must be on promoting healthy food choices by reducing intake of calories, salt, sugar, and saturated fat. Moreover, to ensure healthy development, control over body weight, maintenance of body functions as well as nourishment, and lower onset of noncommunicable diseases (NCDs), life-long healthy food choices must be developed (Wahl *et al.* 2017).

Food groups are currently on the rise regarding what constitutes a "healthy" food, which has traditionally fluctuated between nutrients and food groups (Drewnowski and Fulgoni, 2020). The Food and Drug Administration (FDA) proposed a new definition of food to incorporate the most recent results of food research as well as government dietary guidelines (Siu and Drewnowski, 2023). Diet would be considered healthy if it had rigorous restrictions on added sugar, sodium, and saturated fats as well as minimal levels of fruits, vegetables, grains, and dairy. Eating a variety of foods that provide the nutrients required to maintain health, feel good, and have energy is defined as healthy food. Proteins, fats, carbohydrates, water, vitamins as well as minerals comprise a good diet (Boddy *et al.*, 2019). All people need proper nourishment. Good eating is a great strategy to assist the body to remain strong and healthy when integrated with physical activity as along with keeping a good weight (Mete *et al.*, 2019). A healthy food should involve seven different food elements: carbohydrates, proteins, vitamins, fats, fiber, minerals, and water (Kolte *et al.*, 2022). Eating a healthy food is vital, so is eating the right portions as well as amounts of food. In addition, balanced nutrition assist in weight loss as well as maintaining it in addition to boosting the immune system and general well-being.

A study conducted by Al-Jaroudi *et al.* (2016) in Saudi Arabia found that 98% of participants were interested in learning more about healthy food choices and lifestyle habits. The study also discovered that a significant proportion of women would make unhealthy food choices and had misconceptions about what constitutes a healthy food choice. A recent study conducted to describe dietary patterns in a nationally representative sample of adults in Saudi Arabia revealed that only a small proportion of Saudis followed dietary recommendations, particularly for fruit and vegetable consumption, dairy

products, nuts, and fish intake (Sabur *et al.* 2022). Studies and health education initiatives are required to make and improve healthy food choices in Saudi Arabia.

A wealth of literature has looked at the link between nutrition knowledge and people's dietary behavior, as it is one of the variables determining a healthy diet. The results indicate that individuals who possess a greater understanding of nutrition tend to exhibit higher propensity for consuming nutritious food choices (Ferrão *et al.*, 2018; Moradi-Lakeh *et al.* 2017). According to the American Heart Association, economic and social considerations and knowledge of health risks as well as advantages of making healthy food choices, personal enjoyment, and freedom to be spontaneous with food decisions, could influence an individual's habits acquired and evolved through everyday life experiences (Pilgrim-Hector, 2016).

Previous studies done in Saudi Arabia demonstrated dietary patterns or energy/nutrient intakes with limited information about Saudi's perception about making healthy food choices. More research is needed to understand the perception of making healthy food choices in the urban context of Tabuk, which is considered a key agricultural region of Saudi Arabia. It has been transformed into a model for sustainable agriculture through collaboration between the Ministry of Environment, Water, and Agriculture and local farmers (Bin Sunaid *et al.*, 2021). No research is conducted to assess the perceptions of healthy food choices in Tabuk, aligning with the growing shift to organic crop production for safe and healthy food choices. Understanding Tabuk residents' perceptions of healthy food choices is important because it provides insights that could be used to shape and refine agriculture and food production strategies as well as meet the growing demand for high-value health food products. The study could provide informed insights into the determinants of healthy food choices, assisting authorities in making commendable changes in agriculture to improve health and well-being.

The complexity of problem and historical disregard for various interpretations of "healthy food" could be responsible for the scarcity of information. Few studies are conducted in Arab nations on how adults perceived eating well. Data from Saudi Arabia are limited to food availability, consumption of food, eating behavior, and the factors that contributed to making food choices. More research is needed to assess Saudi adults' perceptions of making healthy food choices. Insights in perceptions of healthy food choices are critical for developing targeted interventions to support Saudi population, with the goal of improving healthy eating behavior and, as a result, lowering the risk of diet-related diseases. Therefore, this study aimed to assess knowledge, attitude as well as

practices of people about making healthy food choices in Saudi Arabia.

### Study objectives

- To assess knowledge regarding healthy food choices.
- To identify main factors that influence attitudes about healthy food choices.
- To explore practices of motivation toward healthy food choices.

### Research questions

What are the perceptions of making healthy food choices in Saudi Arabia? This question was divided into the following three minor specific questions:

- What is the knowledge about healthy food choices?
- What are the attitudes toward healthy food choices?
- What are the actual practices of making healthy food choices?

## Method

### Study design

A cross-sectional descriptive study was used to assess the knowledge, attitude, and practices of people about healthy food choices in Saudi Arabia.

### Settings

The population settings comprised three primary health-care centers in Tabuk city of Saudi Arabia. The primary healthcare centers included Almahran healthcare center, Sulaymaniyah healthcare center, and Alsaada healthcare center.

### Inclusion criteria

Patients who attended the primary healthcare centers, irrespective of gender, aged  $\geq 18$  years, and able to read Arabic were included in the study.

### Sampling

A random sampling technique was used. The sample size was determined using the Richard Geiger equation, considering the total number of populations with a 5% margin of error and 95% confidence interval. As a result, we had set our sample estimate to 290 participants.

### Study instrument

A structured and self-administered survey was used to conduct the research. Three constructs were suggested by the study's purpose as its primary study target factors. The first construct was knowledge about healthy food choices; the second construct was attitudes about healthy food choices; and the third construct was practices of healthy food choices. This study's instrument was previously pilot-tested to assess the reliability of construct scales. This study's survey included 39 items. These items were divided into four study groups, and each group was validated through a pilot study. The first study group involved demographic questions, which included age, gender, marital status, educational level, weight, height, income, residence, and employment status.

The second study group of the survey was about "the knowledge of food" to measure the first construct (knowledge about healthy food choices). The scale was adapted from Aranceta and Serra Majem (2011) and included nine items to measure perceptions about healthy food choices. The item-response options included the following: "Yes," "I don't know," and "No." Participants received 3 points if they selected correct answers, 2 points if they selected "I don't know," and 1 point if they selected incorrect answers, with 1.5 as an average score.

For example, item #6 "Foods I eat daily are good for my health." asked the participants to report "yes," "I don't know," or "no" to the statement.

The third study group of the survey was "attitudes about foods" to measure the second construct (attitudes about healthy food choices). The scale was adapted from Sharma *et al.* (2013), and included 11 statements. The item-response options included the 3-point Likert scale, ranging from 1 = I disagree, 2 = I don't know, and 3 = I agree, with 1.5 as an average score. For example, item #5, "I support setting up systems that reduce the amount of sugar and salt in food," asked the participants to report how much they agreed or disagreed with the above statement applied to them.

The fourth study group of the survey was "food behavioral practices" to assess the third construct (practices about healthy food choices). The scale that was adapted (Lynch, 2015) included 10 items. The item-response options included the 3-point Likert scale, ranging from 1 = I disagree, 2 = I don't know, and 3 = I agree, with 1.5 as an average score. For example, item #1 "I seriously think about choosing healthy foods" asked the participants to report how much they agreed or disagreed with the above statement applied to them. The final score of  $< 1.5$  indicated low perception about healthy food choices;

the score of 1.5–2 indicated moderate, and the score of >2 was considered high perception about healthy food choices. Higher composite scores indicated participants' higher levels of healthy food choices.

### Pilot study

The pilot study provided useful data and evidence for the study's validity and reliability. It included 14 patients from the primary health centers in Tabuk city of Saudi Arabia. The primary goal of the pilot study was to collect additional feedback on the amount of time it took to complete the survey, clarity of the questions asked, and logical arrangement. It used the equation of internal consistency with Cronbach's  $\alpha$  to determine an instrument's stability. The test results showed that Cronbach's  $\alpha$  was >0.60 for all study variables, which was considered acceptable for research (Paquette, 2005).

### Data collection

The data were collected after the study was approved by the Institutional Review Board (IRB) of King Saud University (approval No. KSU-HF-23-525). The questionnaires were distributed to participants (face-to-face), during August–November 2023, at the primary health-care centers of Tabuk city of Saudi Arabia. The participants were asked to complete a 15-min paper survey to measure their perceptions of healthy food choices. They were contacted in person by the researcher and had the opportunity to clarify any question or concern to complete the survey. During the study, 387 questionnaires were distributed; 323 were returned, of which 303 were satisfactorily completed (response rate 83.4%).

### Ethical consideration

Participants who met the inclusion criteria were asked to read or the researcher read the informed consent to them for clarification about any information. Participants were informed that their participation in this study was voluntary and that they could refuse to answer questions or withdraw from the study at any time. Anonymity was maintained throughout the study with a data collection ID (specified by the researcher for data collection). Participants were asked to avoid writing any form of ID (such as Identity documents, phone numbers, and file numbers). The participants were informed about the study's purpose, expectations, and significance. All the data were treated, analyzed, and presented as a group data. For security purposes, the data were retained in a locked cabinet. Only the investigator had access to this cabinet.

### Data analysis

Data were analyzed using a Statistical Package for Social Sciences (SPSS), version 26. The following statistical techniques and tests were used for data analysis:

- Frequencies and proportions to describe demographic variables.
- Cronbach's  $\alpha$  reliability (a) measures the strength of correlation and coherence between items of questionnaires, (b) highlights the stability of consistency with which the instrument is measuring the concept, and (c) helps to assess the "goodness" of measure.
- Descriptive statistical techniques: these included mean values and standard deviations. These techniques were used to illustrate respondents' study fields.
- Independent sample t-test.
- One-way analysis of variance (ANOVA) test, which is a post hoc statistical analysis, was used to make unplanned comparisons.

## Results

### Demographic data

A total of 303 patients who met the study criteria and agreed to participate in the study completed the survey. As shown in Table 1, the majority 291 (96.0%) of the participants were from urban areas, and 205 (67.7%) of them were males. In addition, the majority (213; 70.3%) of them were married and 123 (40.6%) were aged 31–40 years. Regarding the level of education, the data showed that the majority (162; 53.5%) of them had a bachelor's degree. The majority (96; 31.7%) of the participants weighed 61–70 kg; 119 participants (39.3%) had a height of 150–160 cm; 102 (33.7%) had a monthly income of 8,000–12,000 Saudi Riyal (SR), and 153 (50.5%) worked in government sectors.

### Knowledge about healthy food choices

The first research question assessed the participants' knowledge of healthy food choices. Their level of knowledge of healthy food choices was measured using the knowledge of food scale. The total mean score of 10 items was 2.52 (SD = 0.76). The knowledge level of the participants about healthy food choices was above average (i.e., 1.5). A one-sample *t*-test obtained the mean of 2.52, which was significantly higher than the average of 1.5 ( $p < 0.001$ ). In measuring the knowledge of healthy food choices, 90.4% of the participants knew that eating fruits and vegetables was good for health with a mean score of 2.84 out of 3 (Table 2), while the lowest proportion of knowledge was 50.2% (2.16 out of 3.00) for the item "the foods I eat daily are good for my health."

**Table 1. Distribution of study groups according to demographic characteristics.**

Variables	Total Number = 303	Percentage
Residence		
Urban	291	96.0
Rural	12	4.0
Gender		
Male	98	32.3
Female	205	67.7
Marital status		
Single	72	23.8
Married	213	70.3
Divorced	13	4.3
Widower	5	1.7
Age group		
20–30 years old	83	27.4
31–40 years old	123	40.6
41–50 years old	79	26.1
51–60 years old	10	3.3
>60 years old	8	2.6
Educational status		
No education	6	2.0
Primary certificate	8	2.6
Intermediate certificate	13	4.3
Secondary certificate	44	14.5
Undergraduate diploma	49	16.2
Graduate	162	53.5
Postgraduate	21	6.9
Weight		
<50 kg	29	
51–60 kg	64	
61–70 kg	96	
71–80 kg	83	
81–90 kg	23	
>90 kg	8	2.6
Height		
<150 cm	25	
150–160 cm	119	
161–170 cm	117	
171–180 cm	39	
>180 cm	3	1.0
Monthly income		
<4,000 Saudi Riyal (SR)	71	
4,000–8,000 SR	90	
8,001–12,000 SR	102	
12,001–16,000 SR	28	
>16,000 SR	12	4.0

(continues)

**Table 1. Continued.**

Variables	Total Number = 303	Percentage
Working condition		
Student	36	
Government employed	153	
Private sector	25	
Businessman	11	
Retired	24	
Not working	54	17.8

### Attitudes about healthy food choices

The second research question assessed the attitudes toward healthy food choices among the participants. Their attitudes were measured using the attitudes about healthy food choices scale. The total mean score of 11 items was 2.63 (SD = 0.56) (Table 3). The participants' attitudes toward healthy food choices were above average (1.5). A one-sample *t*-test demonstrated that the obtained mean of 2.63 was significantly higher than the average mean of 1.5 ( $p < 0.001$ ). Most item that Item 11, that is, "Adding too much sugar to juices and drinks is harmful to health," with a mean score of 2.76 out of 3 showed a high proportion (79.5%) among the participants, while the lowest proportion of attitudes was 40.9% (2.35 out of 3.00) to the item 2, that is, "I believe that eating too many calories is harmful to my health."

### Practice of healthy food choices

The last research question assessed the practice of healthy food choices among the participants. Their practice of healthy food choices was measured using the practices about healthy food choices scale. The total mean score of 10 items was 2.07 (SD = 0.62). The participants' practice of healthy food choices was slightly above the average (i.e., 1.5). Item 2 "I consult specialists about my eating habits" showed high proportion (88%) among the participants with a mean score of 2.27 out of 3, while the lowest proportion of attitudes was 36% (1.98 out of 3.00) for the item "I Take care to eat low-calorie foods."

### Perceptions (knowledge, attitudes, and practices) of healthy food choices

A composite variable was created by calculating the mean of three scales (2.40 out of 3). Higher composite scores indicated increased perceptions of healthy food choices. In this sample, the perceptions of healthy food choices were above the average score of 1.5. A one-sample *t*-test demonstrated the obtained mean score of

**Table 2. Knowledge and perceptions about healthy food choices (N = 303).**

Item	Correct	Do not know	Incorrect	Mean	SD
1. Cholesterol is only found in animal foods	190 (62.7)	37 (12.2)	76 (25.1)	2.38	0.860
2. White bread contains a source of fiber	152 (50.2)	48 (15.8)	103 (34.0)	2.16	0.905
3. Fruits are a rich source of protein than meat	172 (56.8)	38 (12.5)	93 (30.7)	2.26	0.900
4. If a person has high cholesterol, he/she should reduce fatty foods	243 (80.2)	18 (5.9)	42 (13.9)	2.66	0.709
5. Eating fruits and vegetables is good for health	274 (90.4)	9 (3.0)	20 (6.6)	2.84	0.518
6. The foods I eat daily are good for my health	229 (75.6)	23 (7.6)	51 (16.8)	2.59	0.762
7. The drinks I drink daily are good for my health	206 (68.0)	26 (8.6)	71 (23.4)	2.45	0.847
8. Foods and drinks that contain high calories are harmful to health	233 (76.9)	28 (9.2)	42 (13.9)	2.63	0.715
9. Foods and drinks that contain high calories increase weight	249 (82.2)	24 (7.9)	30 (9.9)	2.72	0.632
General mean and standard deviation				2.52	0.76

**Table 3. Attitudes and perceptions about healthy food choices (N = 303).**

Item	Agree	Do not know	Disagree	Mean	SD
1. Foods and drinks that contain high calories increase weight	176 (58.1)	93 (30.7)	34 (11.2)	2.47	0.689
2. I believe that eating too many calories is harmful to my health	124 (40.9)	161 (53.1)	18 (5.9)	2.35	0.589
3. Reducing salt and sugar in my food will improve my health	228 (75.2)	57 (18.8)	18 (5.9)	2.69	0.577
4. Eating fruits and vegetables regularly is an important health-promoting behavior	232 (76.6)	67 (22.1)	4 (1.3)	2.75	0.462
5. I support setting up systems that reduce the amount of sugar and salt in foods	222 (73.3)	70 (23.1)	11 (3.6)	2.70	0.534
6. Excessive consumption of foods rich in fat is harmful to health	206 (68.0)	85 (28.1)	12 (4.0)	2.64	0.557
7. There is a connection between what we eat and the diseases that afflict us	217 (71.6)	75 (24.8)	11 (3.6)	2.68	0.540
8. I know how to choose foods that are good for my health	209 (69.0)	86 (28.4)	8 (2.6)	2.66	0.526
9. Eating foods that contain trans fats is harmful to health	222 (73.3)	76 (25.1)	5 (1.7)	2.72	0.487
10. I think it is difficult to know what healthy foods are	184 (60.7)	86 (28.4)	33 (10.9)	2.50	0.685
11. Adding too much sugar to juices and drinks is harmful to health	241 (79.5)	50 (16.5)	12 (4.0)	2.76	0.514
General mean and standard deviation				2.63	0.56

2.40, which was significantly higher than the average of 1.5 ( $p < 0.001$ ).

### Relationship between key variables

Table 4 shows statistically significant differences in perceptions (knowledge, attitudes, and practices) about healthy food choices according to their demographic characteristics. The results indicated that there was no significant difference at  $p < 0.05$  between the area of residence and the knowledge and attitudes about making healthy food choices. However, the area of residence in relation to the practices of healthy food choices was

statistically significant, with  $F(7,238)$  and  $p < 0.05$ . This indicated that the practices of healthy food choices among urban citizens were different from that of rural dwellers.

The relationship between perceptions about healthy food choices and gender of the participants was examined by  $t$ -test. No statistically significant difference based on gender of the participants was observed ( $p < 0.05$ ). This indicated that male and female participants did not differ in perceptions about healthy food choices.

One-way ANOVA statistical test was used to investigate the relationship between perceptions of healthy

**Table 4.** T-test to measure perceptions about healthy food choices according to their residential areas.

Items	Test	N	Mean	Std. deviation	F	t	Significance (2-tailed)
Knowledge	Urban	291	2.517	0.36	3.832	0.805	0.421
	Rural	12	2.602	0.23			
Attitudes	Urban	291	2.632	0.29	1.289	1.012	0.312
	Rural	12	2.546	0.23			
Practices	Urban	291	2.778	0.55	7.238	2.221	0.027*
	Rural	12	2.425	0.25			

\*p value is significant at 0.05.

**Table 5.** Post hoc tests to specify the significance of knowledge and marital status.

Dependent variable	Marital status (I)	Marital status (J)	Mean difference (I – J)	Std. error	Significance
Knowledge		Single	0.05639	0.10576	0.594
		Married	0.19373*	0.10026	<b>0.044</b>
		Widowed	0.29744	0.18469	0.108

food choices and marital status. No significant difference was observed in attitudes and practices of healthy food choices with respect to marital status. However, a significant association was observed between knowledge of healthy food choices and marital status at  $p < 0.05$ . To determine the marital status that caused these differences, a *post hoc* test was performed to identify exact marital status that caused these statistical differences (Table 5). Multiple comparison post hoc tests indicated through assumed equal variances that the married group was a significantly different group, with  $\alpha = 0.044$ . Married participants were significantly more likely than other participants to report a satisfactory level of knowledge about healthy food choices.

Based on the one-way ANOVA test, no statistically significant difference was observed in perceptions about healthy food choices in terms of age, education level, and employment status.

The knowledge and practices of healthy food choices regarding monthly income groups was also not statistically significant, while it was statistically significant in the attitudes toward healthy food choices, with  $p < 0.05$ . Multiple comparison post hoc tests revealed that the monthly income of more than 16,000 SR was significantly different at  $\alpha = 0.002$ . Participants with higher incomes significantly more likely reported a positive attitude toward healthy food choices.

## Discussion

The potential for eating habits to be detrimental to one's health highlights the necessity to comprehend

the underlying mechanics of these choices. It is crucial to comprehend how people generally think of "healthy" foods and what criteria are utilized to assess the nutritional value of food products (Machin *et al.*, 2020; Plasek *et al.*, 2020). Additionally, given the difficulty in making dietary decisions based on perceived healthfulness and a variety of factors in determining food choices, this study examined the perceptions (knowledge, attitudes, and practices) of healthy food choices in Tabuk city of Saudi Arabia.

The findings of the study indicated that most of the participants (96.0%) lived in urban areas, and about two-thirds of them (67.7%) were males and married (70.3%). Additionally, 40.6% of the participants were in the age group of 31–40 years. Concerning the level of education, 53.5% of the participants had a bachelor's degree, and about 31.7% of them had a body weight of 61–70 kg. In addition, 39.3% of the participants had a height of 150–160 cm. Regarding monthly income, about 33.7% of the participants had an income of SR 8,001–12,000. Finally, about 50.5% of the participants were government employees. This result was consistent with the results of the cross-sectional study conducted by Sabur *et al.* (2022). The study revealed that most participants lived in urban areas and more than 50% of them had a mean age of  $35.6 \pm 10.52$  years; also, more than 50% of them were government employees.

Based on the study's findings, the current level of knowledge of healthy food choices was satisfactory, specifically in relation to eating fruits and vegetables. A similar finding was observed in a Saudi Arabia study, where most participants showed a good knowledge of food (Mailinda and Lestari, 2019). However, this result

did not concur with the previous research that showed low level of knowledge in relation to choosing healthy foods (Rawas *et al.*, 2012; Sabur *et al.*, 2022).

Results of the current study indicated that the participants had a positive attitude toward healthy choices, especially in relation to health risks associated with excessive sugar consumption. Contradictorily, the previous research indicated that Saudis had unfavorable attitudes toward the health consequences of excessive added sugar intakes (Walaa *et al.*, 2020).

Results of the current study demonstrated that the practice of healthy food choices was acceptable among participants, especially regarding consulting specialists about their eating habits. This finding was attributed to participants' knowledge of positive attitudes to choose healthy foods.

Participants in this sample performed above average in terms of their perceptions (knowledge, attitude, and practice) of healthy food choices. These results were similar to the findings reported by Kana'An *et al.* (2022) and Mailinda and Lestari, (2019) in Indonesia; the authors found that participants reported positive knowledge, attitude, and practice about healthy food choices. A study was conducted by Farivar *et al.* (2009) to assess Iranian urban household food knowledge, attitude, and practice about healthy food choices. The results of the cited study showed that the knowledge level and attitudes of participants about food choices were similar to that of our study, but their practice level about healthy food choices was higher from the current study.

Regarding the statistical significance of demographic variables (age, gender, income, education, residency, employment, and marital status) in terms of knowledge, attitudes, and practices of healthy food choices, the place of residence in relation to the practices of healthy food choices was statistically significant. This suggested that urbanites' practices regarding healthy food choices differ from that of rural dwellers. This could be related to the fact that urban areas could provide greater access to a diverse array of educational opportunities.

The study found that married participants were significantly more likely than other participants to report a good level of knowledge about healthy food choices; this result was consistent with a study conducted in Oman (Amanat *et al.*, 2020). According to the cited Omani study, high percentage of married participants had good knowledge of healthy foods.

Moreover, our study reported that participants with higher incomes were more likely than others to report a positive attitude toward healthy food choices. This

result concurred with the study conducted by Sabur *et al.* (2022), who stated that with a decrease in household income, the spending pattern was more likely toward unhealthy foods. Cheaper unhealthy food could be a factor as 24.2% of participants stated that they preferred it because of its affordability.

The present study provided new insights that could be applied to health institutions and health practice. The findings could help health educators and dieticians to understand Saudi Arabian perceptions of healthy food choices. Findings of this study could assist health educators in developing appropriate programs, awareness messages, and community campaigns to improve perceptions about healthy food choices. Future research could determine barriers in following the healthy food choices. This information could support the development of effective nutrition education programs to overcome challenges to make healthier food choices. Researching how Saudi Arabians form their perceptions and the reasons behind their non-practice of behaviors that could lower their risk of diseases and promote overall wellness and optimal health is crucial.

### Study limitations

The current study was a cross-sectional analysis; therefore, no conclusions about cause and effect could be drawn. The participants were recruited from primary health centers, one of the best places to promote good health through preventative medicine and health screening and education. The locations of recruitment may explain their above-average perceptions about healthy food choices.

### Conclusion

Most participants in this study were overweight and obese, with biomass index ranging from 27.11–31.11. In this sample, the prevalence of overweight and obesity was high irrespective of gender and in the urban residents. Results of this study confirmed that the participants had adequate knowledge and positive attitudes about healthy food choices. However, satisfaction level of practices of healthy food choices was lowest in comparison to the knowledge and attitudes. In the future, nutritional intervention, such as nutrition education programs, could be necessary for promoting health and healthy dietary practices. A statistically significant difference was discovered in the knowledge of healthy food choices based on marital status and place of residence. A statistically significant difference was also determined in attitudes toward healthy food choices with respect to monthly incomes.

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## Declaration of Interests

There was no conflict of interest to declare.

## References

- Alhyas L., McKay A., Balasanthiran A. and Majeed A. 2011. Prevalence of overweight, obesity, hyperglycemia, hypertension and dyslipidaemia in the Gulf: systematic review. *J Royal Soc Med.* 2(55): 2–23.
- Al-Jaroudi D., Ghaith R., Al-Usaimi K. and Al-Badr A. 2016. Beliefs of nutrition and healthy lifestyle among women in a hospital setting. *Prensa Med Argent.* 102(2): 1–7. <https://doi.org/10.4172/lpma.1000202>
- Althumiri N.A., Basyouni M.H., AlMousa N., Al Juwaysim M.F., Almobark R.A., Bin Dhim N.F., *et al.* 2021. Obesity in Saudi Arabia in 2020: prevalence, distribution, and its current association with various health conditions. *Healthcare.* 9: 311. <https://doi.org/10.3390/healthcare9030311>
- Amanat A., Al Naabi A. *et al.* 2020. Assessment of nutritional knowledge, dietary habits, nutrient intake and nutritional status of Omani University students. *Can J Clin Nutr.* 8(2): 35–52. <https://doi.org/10.14206/canad.j.clin.nutr.2020.02.04>
- Aranceta J. and Serra Majem L. 2011. Objetivos nutricionales para la población española. Consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Comunitaria.* 17(4): 178–199.
- Bin Sunaid F.F., Al-Jawaldeh A., Almutairi M.W., Alobaid R.A., Alfuraih T.M., Bensaidan F.N., Alragea A.S., Almutairi L.A., Duhaim A.F., Alsaloomey T.A., *et al.* 2021. Saudi Arabia's healthy food strategy: progress & hurdles in the 2030 road. *Nutrients.* 13: 2130. <https://doi.org/10.3390/nu13072130>
- Boddy G., Booth A. and Worsley A. 2019. What does healthy eating mean? Australian teachers' perceptions of healthy eating in secondary school curricula. *Health Educ.* 119(4): 277–290. <https://doi.org/10.1108/HE-04-2019-0018>
- Drewnowski A. and Fulgoni V.L. 2020. New nutrient rich food nutrient density models that include nutrients and MyPlate food groups. *Front Nutr.* 7: 107. <https://doi.org/10.3389/fnut.2020.00107>
- Farivar E., Heshmat R., Aemati B., Abbaszadeh Ahranjani S., Keshtkar A., Sheykh-ol-Eslam R. and Nadim A.H. 2009. Knowledge, attitude and practice of urban households toward principles of nutrition. *Iran J Epidemiol.* 5(2): 11–18.
- Ferrão A.C., Guiné R.P., Correia P., Ferreira M., Cardoso A.P., Duarte J., *et al.* 2018. Perceptions towards a healthy diet among a sample of university people in Portugal. *Nutr Food Sci.* 48(4): 669–688. <https://doi.org/10.1108/NFS-10-2017-0205>
- Ibahrine M. 2015. Pitfalls of glocalisation and promises of Islamic branding. The case of IKEA in Saudi Arabia. Available at: [http://www.academia.edu/9842440/Pitfalls\\_of\\_Glocalisation\\_and\\_Promises\\_of\\_Isamic\\_Branding\\_The\\_Case\\_of\\_IKEA\\_in\\_Saudi\\_Arabia](http://www.academia.edu/9842440/Pitfalls_of_Glocalisation_and_Promises_of_Isamic_Branding_The_Case_of_IKEA_in_Saudi_Arabia)
- Kana'An, H., Saadeh R., Zruqait A. and Alenezi M. 2022. Knowledge, attitude, and practice of healthy eating among public school teachers in Kuwait. *J Public Health Res.* 11(2): 1–6. <https://doi.org/10.4081/jphr.2021.2223>
- Kolte A., Mahajan Y. and Vasa L. 2022. Balanced diet and daily calorie consumption: consumer attitude during the COVID-19 pandemic from an emerging economy. *Plos One,* 17(8): e0270843. <https://doi.org/10.1371/journal.pone.0270843>
- Lynch M. 2015. Kindergarten food familiarization. An exploratory study of teachers' perspectives on food and nutrition in kindergartens. *Appetite.* 87: 46–55. <https://doi.org/10.1016/j.appet.2014.12.200>
- Machin L., Antunez L., Curutchet M.R. and Ares G. 2020. The heuristics that guide healthiness perception of ultra-processed foods: a qualitative exploration. *Public Health Nutr.* 4: 1–9. <https://doi.org/10.1017/S1368980020003158>
- Mahfouz A., Khan M., Mostafa O., Shatoor A., Daffalla A. and Hassanein M. 2011. Nutrition, physical activity, and gender risks for adolescent obesity in southwestern Saudi Arabia. *Saudi J Gastroenterol.* 17(5): 318–321.
- Mailinda E. and Lestari R.F. 2019. The relationship between level of knowledge and attitude towards behavior in choosing healthy snacks of 4th and 5th grade students. *Enfermeria Clin.* 29: 81–84. <https://doi.org/10.1016/j.enfcli.2018.11.026>
- Mete R., Shield A., Murray K., Bacon R. and Kellett J. 2019. What is healthy eating? A qualitative exploration. *Public Health Nutr.* 22(13): 2408–2418. <https://doi.org/10.1017/S1368980019001046>
- Moradi-Lakeh M., El Bcheraoui C., Afshin A., Daoud F., AlMazroa MA, Al Saeedi M, *et al.* 2017. Diet in Saudi Arabia: findings from a nationally representative survey. *Public Health Nutr.* 20(6): 1075–1081. <https://doi.org/10.1017/S1368980016003141>.
- Musaiger A., Takruri H., Hassan A. and Tarboush H. 2010. Food-based dietary guidelines for the Arab Gulf countries. *J Nutr Metab.* 1(1): 2–15.
- Paquette M. C. 2005. Perceptions of healthy eating: state of knowledge and research gaps. *Canadian J Public Health.* 96(Suppl 3): S16. <https://doi.org/10.1007/BF03405196>
- Pilgrim-Hector J. 2016. Perception of nutrition and utilization of healthy food ideas when making food choices. Walden Dissertations and Doctoral Studies, No. 2575. Walden University Scholar Works. [ScholarWorks@waldenu.edu](https://scholarworks@waldenu.edu).
- Plasek B., Lakner Z. and Temesi A. 2020. Factors that influence the perceived healthiness of food review. *Nutrients.* 12: 1881. <https://doi.org/10.3390/nu12061881>
- Rawas H.O., Yates P., Windsor C. and Clark R.A. 2012. Cultural challenges to secondary prevention: implications for Saudi women. *Collegian.* 19(1): 51–57. <https://doi.org/10.1016/j.colegn.2011.12.00>.
- Sabur A.M., Alsharief L.A. and Amer S.A. 2022. Determinants of healthy food consumption and the effect of Saudi food related policies on the adult Saudi population, a national descriptive assessment 2019. *Curr Res Nutr Food Sci J.* 10(3): 1058–1076. <https://doi.org/10.12944/CRNFSJ.10.3.21>

- Salem V., Al Hussein N., Abdul Razack H.I., Naoum A., Sims O.T., Alqahtani S.A. 2022. Prevalence, risk factors, and interventions for obesity in Saudi Arabia: a systematic review. *Obes Rev.* 23(7): e13448. <https://doi.org/10.1111/obr.13448>
- Sharma S, Dortch KS, Byrd-Williams C, *et al.* 2013. Nutrition-related knowledge, attitudes, and dietary behaviors among head start teachers in Texas: a cross-sectional study. *J Acad Nutr Diet.* 113: 558–562. <https://doi.org/10.1016/j.jand.2013.01.003>
- Siu K. and Drewnowski A. 2023. Toward a new definition of “healthy” foods – issues and challenges. *Curr Develop Nutr.* 100080. <https://doi.org/10.1016/j.cdnut.2023.100080>
- Wahl D.R., Villinger K., König L.M., Ziesemer K., Schupp H.T. and Renner B. 2017. Healthy food choices are happy food choices: evidence from a real life sample using smartphone-based assessments. *Sci Rep.* 7(1): 17069. <https://doi.org/10.1038/s41598-017-17262-9>
- Walaa M.A., Alamri A.A, Mahrous A.A., Alharbi B.M, Almohaimeed J.S., Hakeem M.I., *et al.* 2020. Knowledge, attitudes, and practices toward added sugar consumption among female undergraduate students in Madinah, Saudi Arabia: a cross-sectional study. *Nutrition.* 79–80: 110936. <https://doi.org/10.1016/j.nut.2020.110936>
- World Health Organization (WHO). 2021. Obesity and overweight key facts. Available online at: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.