Article

Appraisal survey of the knowledge, attitudes, and behaviors of Jordanian society toward diet and nutrition during COVID-19 era

Omar A. Alhaj,[1]* Hiba F. Al-Sayyed,[1]* Maha M. AlRasheed,[2] Haitham Jahrami[3,4]

[1]Department of Nutrition, Faculty of Pharmacy and Medical Sciences, University of Petra, Amman, Jordan; [2]College of Pharmacy, King Saud University, Riyadh, Saudi Arabia; [3]Ministry of Health, Manama, Bahrain; [4]College of Medicine and Medical Sciences, Arabian Gulf University, Manama, Bahrain

**Shared first author*

Abstract

Background: This study aimed to evaluate the knowledge, attitudes, and behavior (KAB) of the Jordanian society toward nutrition and diet during the COVID-19 era.

Design and methods: This study is an observational, cross-sectional study using a structured, validated, reproducible, self-administered online Arabic questionnaire. KAB of the study participants was assessed *via* a web-based, structured, validated, reproducible Arabic questionnaire. The tool for the assessment of the KAB was composed of 33-closed-ended multi-answer questions.

Results: A total of 672 people were surveyed, 70.2% were between 18 and 34, and 69.5% were females. Participants have paid little attention to the healthfulness of their diet in the last year. The majority of participant's attitudes towards using different approaches to manage weight in the next year were: eating smaller portions for weight management, tracking to maximize the amount of time of physical activity, and substituting lower-calorie foods for full-calorie alternatives. Only tenth of participants utilize the time to perform physical activity. The majority made changes to their diet and exercise, and strictly follow commitment in connection with planning for the following year.

Conclusions: Educators, legislatives, food manufacturers, household heads, and policymakers are called upon to improve Jordanians' KAB on nutrition and diet. Furthermore, Jordanian nutrition and diet behavior can be invested to improve the dietary interventions designed by nutrition and dietetics professionals.

Introduction

The pandemic of COVID-19 has changed dietary behavior and lifestyle of people around the globe. Nutrition and dietetics knowledge is an integral part of health knowledge; whereby poor health outcomes are related to low health literacy. The science of nutrition and dietetics is an important and exciting field due to its impact on the population's health, well-being, and environment. Nowadays, internet websites are filled with information on health, nutrition, and diet. The news of food and nutrition were among the hot topics on TV channels and takes the lead headlines of newspaper columns.[1] A number of research has focused on food and nutrition related topics during COVID-19 pandemic.[2] The nutrition transition is the change in a population's dietary pattern from undernutrition to overnutrition with a diet high in refined carbohydrates, sugars, fat, and animal protein. Jordan has passed in urbanization and nutrition transition;[3] this is coupled with a shift in the disease pattern. The most common nutrient deficiency diseases in Jordan are iron, vitamin A, and iodine deficiencies.[4] On the other hand, the most common causes of mortality are nutrition-related such as cardiovascular diseases, cancers, diabetes, as well as chronic respiratory diseases.[4] Concomitant with this, the obesity rate is increasing worldwide and in Jordan.

The novel coronavirus disease of the year 2019 (COVID-19) caused the first mortality in December 2019.[5] Since then, the World Health Organization (WHO) has recommended the restriction of human outside movement.[6] Jordan was one of the first countries which tried to control the spread of COVID-19 *via* mandating 14-day lockdown in which most services switched into the electronic versions. The lockdown was renewed several times.[7] The era of COVID-19 has changed the dietary behavior of people.[8-10] Dietary behavior is a result of interaction between human knowledge and attitudes. Knowledge is the awareness of things and processes which distinguishes specialists from non-specialists.[11] Attitudes are opinions of humans that are affected by knowledge[12] leading to certain practices (behaviors).[13] Thus, behaviors vary from simple manners such as food chewing to complexes such as food preparation, etiquette, and policy-making.[11] Nutrition and dietetics knowledge is an integral part of health knowledge. Reduced health literacy is associated with poor health outcomes.[14]

Knowledge, attitudes, and behavior (KAB) surveys are valuable tools to assess the opinion of people regarding certain topics *via* structured questionnaires. The collected data could be qualitative or quantitative.[15]. Besides, assessing knowledge, attitudes, and behaviors of a community or population is an integral part of assessing community needs and resources to initiate community

Significance for public health

This study is an observational, cross-sectional study using a structured, validated, reproducible, self-administered online Arabic questionnaire. No previous study evaluated KAB nutrition and diet among Jordanian society adults during the SARS-CoV-2 pandemic. This is the first valid survey to be used for Arabic-language speakers as a tool to initiate an assessment of community resources and needs at different periods of time and, most likely, after certain interventions. Jordanian nutrition and diet behavior can be invested to improve the dietary interventions designed by nutrition and dietetics professionals.

nutrition.[16] To the best of our knowledge, no previous study has evaluated the nutrition and diet KAB in Jordan during the COVID-19 era. This study, thus, aimed to evaluate the KAB of the Jordanian society toward these aspects during the COVID-19 lockdown period.

Study designing and setting

The data of this observational, cross-sectional study were collected consecutively during the COVID-19 lockdown period in July 2020 in the Hashemite Kingdom of Jordan. At the time of the study, COVID-19 situation in Jordan included 1110 confirmed cases and 10 deaths. Detailed presentation of COVID-19 in Hashemite Kingdom of Jordan during the study period is presented in Supplemental Table 1. Using a validated, reproducible, self-administered online Arabic questionnaire with a reliability test (Cronbach alpha) of 0.9 for all questions. The questionnaire was adapted from a US version developed and used by the United States Department of Agriculture to assess food and health National Data.[17] The study design, structure, and quality were enhanced using the straightening of the reporting of observational studies in epidemiology- nutrition extension (STROBE -nut).[18]

Study participants

Using a cross-sectional design, we estimated the sample needed for our survey to be approximately 400 participants using the package 'samplesize'.[19] These 400 or more surveys are needed to have a confidence level of 95% (95%CI) that the real value is within 5.0% (alpha level) and type II error about (20%) of the surveyed values assuming the total eligible Jordanian adult population is about 6.2 million according to the Department of Statistics, Jordan.[20] To increase the statistical power to 90% we aimed to include about 650 participants in the final analyses, thus we surveyed 1500 people assuming 40% non-response. The inclusion criteria for this study were as follows: Jordanian or non-Jordanian citizens living in Jordan, Arabic language speaker, aged above 18 years for both genders. Exclusion criteria were participants not meeting the inclusion criteria. The authors discussed all possible methods and sources for reaching the intended participants from the population before beginning the recruitment process.

Instruments

A structured, validated, reliable, translated questionnaire was used to collect the data. This questionnaire consisted of two main parts. The first part contained general questions, including sociodemographic characteristics such as gender, career, marital status, number of children, pregnancy, income, smoking, education level, nationality, health, and anthropometric data. The second part of the questionnaire contained knowledge, attitudes, and behavior of the study participants towards health and nutrition being assessed using question items number 4, 13, and 15, respectively. The survey tool was distributed and conveniently answered voluntarily by sophomores, juniors, and seniors studying at the Department of Nutrition/Faculty of Pharmacy and Medical Sciences, University of Petra in Amman, Jordan. After completing the questionnaire, the students were instructed to share the link with other adults (whether or not they lived in Jordan) and non-Jordanians living in Jordan through social media platforms including WhatsApp, Facebook, Instagram, and Twitter during the COVID-19 lockdown period. Compared to face-to-face methods, this type of recruitment has the advantages of covering a wider and more diverse demographic/geographic region as well as saving time, money, and effort. All data were saved in a protected Google Drive, accessible only to the principal investigators, and coded for the research team.

Ethical approval

This study was revised and approved by the Research Ethics Committee of the Faculty of Pharmacy and Medical Sciences, University of Petra, Amman, Jordan (REC: 7Q/1/2020). In this study, all ethical principles adopted in Helsinki, Finland in the 1964 declaration and its amendments were applied.

Statistical analysis

All missing and repeated data (217 responses) were excluded before starting the statistical analysis. Pearson product-moment correlation coefficient was used as a bivariate correlation to quantify the linear correlation between the question answers. A statistically significant correlation between the two questions indicates that the two questions correspond to the same concept. Correlation coefficients were visualized using the correlogram techniques. The correlation value is shown by a color mapping of two hues at varying degrees of brightness, where blue represents the positive values and red represents the negative values. Significant (*) and highly significant (**) correlations signified p-value <0.05 and <0.01, respectively. All data analyses were performed using R for statistical computing version 4.0.3.

Results

Table 1 shows the demographic characteristics of the participants, of which 83.3% had Jordanian nationality, 69.5% were females, 60.1% singles, and 60.2% had no career. Furthermore, 70.2% were between 18 and 34 years, and 21.3% between 35-39 years. Non-smokers constituted 60%, high school graduates 13.1%, and Bachelor's degree holders 69%. Most of the female participants (94%) were not pregnant during the foregoing 12 months, whereby 25.3% did not have children under 18 years of age within their households. The average body weight and height of the study participants were 70 kg and 165 cm respectively. The average body mass index was 25.3 indicating the overweight category. Besides, 61.6 % of participants were not currently being treated for any illness with 25% describing their health status as excellent and 41.7% as very good.

Knowledge, attitude, and behavior of the study participants towards health and nutrition

Knowledge

Table 2 summarizes the responses to the questions evaluating knowledge. Most of the individuals in the current study either saw or knew a lot about the MyPlate graphic. On the other hand, about 90% of them either had not heard about the local community nutrition programs or declined to answer this question. Besides, Tables 5 and 6 points to a highly significant positive correlation of familiarity with MyPlate graphic and a reliable source of food knowledge pointing to trusted personal health care professionals in Jordan as having accurate and informative data on the food choices for the general public.

Table 3 lists the 13 questions and responses to assess participant attitudes toward diet healthfulness (4 questions), physical activity (2 questions), weight change (6 questions), and personality self-description (1 question).

Jordanians paid little attention to the healthfulness of their diet in the last year. In addition, the majority of our study participants

Table 1. Sociodemographic and health characteristics of the study participants

Characteristic	Average (range)	Frequency (%)
Gender	NA	
Females		469 (69.5)
Males		203 (30.2)
Age (years)	NA	
18-34		472 (70.2)
35-39		143 (21.3)
50-64		44 (6.5)
65-80		13 (1.9)
Marital status	NA	
Married		244 (36.3)
Single		404 (60.1)
Divorced		7 (1)
Widowed		7 (1)
Prefer not to declare		10 (1.5)
Nationality	NA	
Jordanian		560 (83.3)
Palestinian		30 (4.5)
Iraqi		20 (3)
Syrian		42 (6.3)
Other		20 (2.9)
Place of residence		
Jordan		611 (90.9)
Kingdom of Saudi Arabia		34 (5.1)
Other		27 (4.0)
Pregnancy during the past 12 months	NA	
No		441 (94)*
Yes		25 (5.3)
Prefer not to answer		3 (0.6)
Smoking	NA	
No		464 (69)
Yes		198 (29.5)
Prefer not to declare		10 (1.5)
Education	NA	
Less than high school		20 (3)
Graduated high school		88 (13.1)
Some college (no degree)		44 (6.5)
Associates degree or technical or vocational school		17 (2.5)
Bachelor's degree		464 (69)
Postgraduate		39 (5.8)
Specialty	NA	
Business administration		105 (15.6)
Engineering		59 (8.8)
Medical science		210 (31.3)
Information technology		30 (4.5)
Languages		38 (5.7)
Science		31 (4.6)
Arts		50 (7.4)
Law		13 (1.9)
Media		8 (1.2)
Tourism		10 (1.5)
Agriculture		9 (1.3)
Other		17 (2.5)
None		92 (13.7)
Career	NA	
Business administration		48 (7.1)
Engineering		21 (3.1)
Medical science		31 (4.6)
Information technology		7 (1)
Languages \ Translation		1 (0.1)
Education/ Research		77 (11.5)
Social worker		9 (1.3)
Other		67 (10)
None		411 (61.2)
Number of children within the household	NA	
None		219 (25.3)
Prefer not to say		29 (3.4)
0 to 2 years old		96 (11.1)
3 to 6 years old		135 (15.6)
7 to 12 years old		194 (22.5)
13 to 17 years old		191 (22.1)
Household income (JOD)	NA	
<220		17 (2.5)
220- <500		114 (17)
500- <800		92 (13.7)
800-<1200		110 (16.4)
1200-<1800		46 (6.8)
≥1800		54 (8)
Do not know		122 (18.2)
Prefer not to declare		117 (17.4)
Body weight (kg)	70 (89-185)	NA
Height (cm)	165 (146-198)	NA
BMI (kg/m^2)	25.30 (13.84-72.10)	NA
Self-description of health status	NA	
Excellent		168 (25)
Very good		280 (41.7)
Good		184 (27.4)
Fair		36 (5.4)
Poor		4 (0.6)
Current treatment of	NA	
Elevated cholesterol		22 (2.9)
Elevated blood pressure		47 (6.1)
Overweight/obesity		75 (9.8)
Stress/anxiety/depression		47 (6.1)
Diabetes		19 (2.5)
Attention deficit hyperactivity disorder		11 (1.4)
Heart disease		12 (1.6)
Osteoporosis		7 (0.9)
Cancer		3 (0.4)
Stroke		5 (0.7)
None		474 (61.6)
Other		47 (6.1)

NA, not applicable; *frequencies and percentages calculated for female participants.

were neutral about the level of physical activity they had performed over the previous year. Furthermore, only about a tenth of them would utilize the time to perform physical activity

A third of the participants described themselves as agreeable, trustworthy, generous, sympathetic, and cooperative; 6.2% of the study participants would spend more on dining out, 3.3% on groceries, while the majority of the participants would save, invest or pay off their debts. Furthermore, nearly more than a quarter strongly disagreed with the statement "I would rather lose 1,000 JOD than gain 10 kg". Furthermore, the majority believed that having enough physical exercise would contribute the most to their success in maintaining/losing weight.

The attitudes of the majority of the participant towards using different approaches to manage weight in the next year were: eating smaller portions of what currently consumption for weight management in the coming year, eating snacks less often, tracking to maximize the amount of time of physical activity, eating smaller, more regular meals or snacks, eating meals less regularly, substituting lower-calorie foods for full-calorie alternatives, monitoring to limit the amount of calories in foods.

The significant correlations between participant knowledge, attitudes, and behaviors are shown in Figure 1. Details of positive correlations are shown in Supplemental Tables 2a and 2b require educators, legislatives, food manufacturers, household heads, and policymakers to pay attention to improving Jordanians' knowledge in order to improve their attitudes and behaviors in nutrition and diet.

The behavior of participants toward diet and nutrition was evaluated using 15 questions to assess the types of foods (4 questions), time (2 questions) and money spent (1 question), new year resolution (2 questions), food and beverage purchasing (2 questions), and body weight (4 questions) (Table 4).

Almost a third of the respondents mainly drank water, while another third reported drinking dairy products and soft drinks. On the other hand, nectars or natural juices (fresh or packed), energy drinks, nonalcoholic malt, hot drinks, and other beverages were consumed by the last third of the study participants.

The respondents in our study reported that they had not noticed or seen any nutrition facts or information (such as caloric counting) when dining out in restaurants. As revealed by this study, participants spend more than 60 min for cooking on weekdays. Furthermore, the majority of the participants spent no time watching their favorite sport or sports team or keeping track of their diet's healthiness.

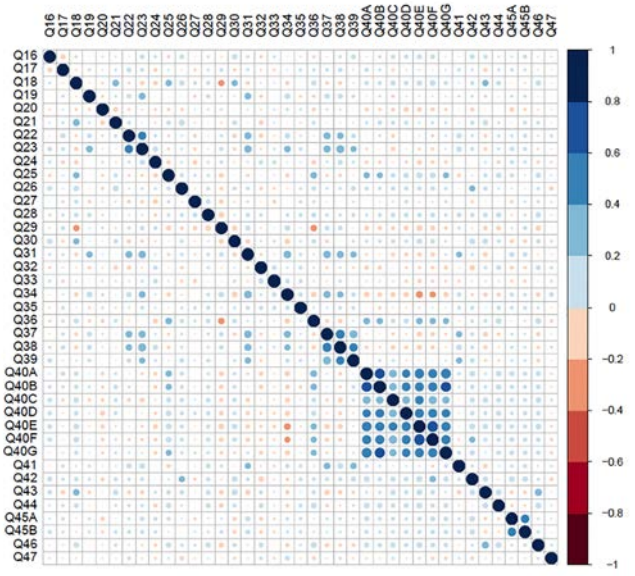

Figure 1. Correlogram display showing significant (*) and highly significant (**) correlations with p<0.05 and p<0.01. respectively.

Table 2. Questions examining participants' knowledge in diet and nutrition during the SARS-CoV-2 pandemic.

Question number	Question	Answer	Frequency (%)
30.	How familiar are you, if at all, with the following graphic (Display of MyPlate)?	I have seen it and know a lot about it	151 (22.5)
		I have seen it and know a fair amount about it	167 (24.9)
		I have seen it, but know very little about it	153 (22.8)
		I have never seen it before	175 (26)
		Not sure	26 (3.9)
43.	What source of calories are the most likely to cause weight gain?	Sugars	232 (34.5)
		Carbohydrates	122 (18.2)
		Fats	143 (21.3)
		Protein	22 (3.3)
		All sources are equal	92 (13.7)
		Not sure	61 (9.1)
45.	Which one of these sources do you think you can trust the most to offer reliable facts about the types of foods you should be eating?	Your own healthcare expert	263 (39.1)
		A colleague or family member	142 (21.1)
		Governmental agencies	32 (4.8)
		A food professional on TV	184 (27.4)
		Health, food and nutrition bloggers	39 (5.8)
		Farmer	1 (0.1)
		Food producer or business	11 (1.6)
47.	Have you ever heard of any of the following programs?	Missing	289 (43.0)
	Bread fortified with vitamins and minerals	No	305 (45.4)
	Salt iodization program	Yes	78 (11.6)
	School children feeding program		
	Salt iodization program		
	School children feeding program		

Table 3. Questions examining participants' attitudes toward diet and nutrition during the SARS-CoV-2 pandemic.

Question number	Question (%)	Answer	Frequency
18.	How much consideration have you given to the healthfulness of the foods and drinks you drink in the last year?	A lot	223 (33.2)
		A little	284 (42.3)
		None	132 (19.6)
		Not Sure	33 (4.9)
21.	How much time have you spent worrying about how much physical exercise you get in the last year?	A lot	153 (22.8)
		A little	203 (30.2)
		Neutral	303 (45.1)
		None	13 (1.9)
22.	What would you do with an extra 100 JOD a month if you had it?	Save, invest, pay off debt	356 (22.4)
		Pay for household expenses or home repairs	217 (13.7)
		Spend more on travel	98 (6.2)
		Shop (for anything other than groceries)	257 (16.2)
		Spend more on entertainment	145 (9.1)
		Spend more on dining out	99 (6.2)
		Donate money to a charity or church	153 (9.6)
		Put towards a gym membership or athletic activities	205 (12.9)
		Spend more money on groceries	53 (3.3)
		Other	6 (0.4)
23.	What would you do with an additional 4 hours a week if you unexpectedly had them?	Doing exercises	224 (11.9)
		Spend time/socialize with friends and family	304 (16.1)
		Relaxing/Sleeping	332 (17.6)
		Other household chores/tasks	96 (5.1)
		Reading	114 (6)
		Performing a hobby	133 (7)
		Using electronic devices	72 (3.8)
		Watching TV	73 (3.9)
		Keeping better track of my exercise/health/diet	62 (3.3)
		Get involved in cooking or baking	87 (4.6)
		Shopping (for anything besides groceries)	96 (5.1)
		Volunteering for a charity/religious activity	54 (2.9)
		Working	58 (3.1)
		Grocery shopping	13 (0.7)
		Worshiping	165 (8.7)
		Other	5 (0.3)
25.	Which of the following statement do you agree with or disagree with the most? "I would rather lose 1,000 JOD than gain 10 kg."	Strongly agree	150 (22.3)
		Somewhat agree	146 (21.7)
		Somewhat disagree	147 (21.9)
		Strongly disagree	184 (27.4)
		Not sure	45 (6.7)
27.	How happy would you be to try the following if you time-traveled 30 years into the future and discovered it had been invented?	An appliance that can turn raw ingredients into any meal	225 (33.5)
		Food that has customizable nutritional value/calories	294 (43.8)
		A 3D printer that can make any food you want from scratch	153 (22.8)
35.	Which of the following characteristics applies the most to your personality?	Extroverted: general descriptors: sociable, assertive, talkative active.	127 (18.9)
		Agreeable: general descriptors: trusting, generous sympathetic, cooperative.	230 (34.2)
		Conscientious: general descriptors: organized self-disciplined hard working not impulsive.	176 (26.2)
		High emotional stability: general descriptors: relaxed self-confident not easily upset or stressed.	73 (10.9)
		Open to experiences: general descriptors: open-minded, curious reflective, creative	66 (9.8)
37.	Which of the following would contribute/has contributed the most to your success in maintaining/losing weight? (four maximum options were allowed)	Changing the types of food eaten	296 (15.0)
		Making sure I get enough physical activity	311 (15.8)
		Eating smaller meals or snacks	249 (12.6)
		Controlling higher calorie food and beverages	216 (11.0)
		Changing how often I eat throughout the day	158 (8.0)
		Weighing myself on a regular basis	176 (8.9)
		Keeping track of calories	106 (5.4)
		Support of family/friends	114 (5.8)
		Having a workout buddy	82 (4.2)
		Using a digital tracker	36 (1.8)
		Participating in a weight loss program	17 (0.9)
		Working with a personal trainer	58 (2.9)
		Working with a health professional	68 (3.5)
		Workplace wellness programs/incentives	16 (0.8)
		None of the above	66 (3.4)

Table 3. Questions examining participants' attitudes toward diet and nutrition during the SARS-CoV-2 pandemic.

Question number	Question (%)	Answer	Frequency
38.	Which of the following motivates keep you remain on track with your weight loss/maintenance efforts? (four maximum options were allowed)	Improvement in physical appearance	489 (24.6)
		Increased energy, physical mobility, less tired	303 (15.2)
		Improvement in health/overall well-being	420 (21.1)
		Increased self-esteem	197 (9.9)
		Compliments from friends/family	124 (6.2)
		Stress relief	178 (8.9)
		Tracking/recording progress	69 (3.5)
		Being a good role model	104 (5.2)
		More attention from others	37 (1.9)
		Workplace wellness programs/incentives	28 (1.4)
		None of the above	34 (1.7)
		Other	6 (0.3)
39.	Which of the following prevents you from keeping on track while trying to lose or maintain weight? (four maximum options were allowed)	Absence of willpower	291 (15.3)
		Absence of time	292 (15.3)
		Not getting immediate results	215 (11.3)
		Stress, demanding work or travel schedule	98 (5.1)
		Energy deficiency	182 (9.6)
		Cost of food, weight loss programs, or gym memberships	119 (6.2)
		Feeling hungry all the time	129 (6.8)
		Get bored	230 (12.1)
		Limited options of foods and beverages that taste good	85 (4.5)
		Don't like the taste of foods/beverages I have to eat/drink	54 (2.8)
		Dislike of physical activity	69 (3.6)
		Lack of support from friends/family	41 (2.2)
		Lack of knowledge	50 (2.6)
		None of the above	44 (2.3)
		Other	6 (0.3)
40. a	How likely do you believe you like to use or continue eating smaller portions of what you now eat for weight control in the next year?	Very likely	261 (38.8)
		Somewhat likely	264 (39.3)
		Not too likely	73 (10.9)
		Not at all likely	45 (6.7)
		Not sure	29 (4.3)
40. b.	How likely do you believe you like to use or continue eating snacks less frequently for weight control in the next year?	Very likely	164 (24.4)
		Somewhat likely	286 (42.6)
		Not too likely	139 (20.7)
		Not at all likely	57 (8.5)
		Not sure	26 (3.9)
40. c.	How likely do you believe you like to use or continue tracking to increase the amount of time you are physically active for weight control in the next year?	Very likely	189 (28.1)
		Somewhat likely	282 (42.0)
		Not too likely	109 (16.2)
		Not at all likely	51 (7.6)
		Not sure	41 (6.1)
40. d.	How likely do you believe you like to use or continue eating smaller, more frequent meals or snacks for weight control in the next year?	Very likely	167 (24.9)
		Somewhat likely	277 (41.2)
		Not too likely	143 (21.3)
		Not at all likely	59 (8.8)
		Not sure	26 (3.9)
40. e.	How likely do you believe you like to use or continue using substituting lower calorie foods for full calorie alternatives for weight control in the next year?	Very likely	210 (31.3)
		Somewhat likely	262 (39.0)
		Not too likely	102 (15.2)
		Not at all likely	64 (9.5)
		Not sure	34 (5.1)
40. f.	How likely do you believe you like to use or continue tracking to limit the number of calories in the foods you eat for weight control in the next year?	Very likely	178 (26.5)
		Somewhat likely	264 (39.3)
		Not too likely	127 (18.9)
		Not at all likely	67 (10.0)
		Not sure	36 (5.4)
40. g.	How likely do you believe you like to use or continue eating meals less frequently for weight control in the next year?	Very likely	164 (24.4)
		Somewhat likely	268 (39.9)
		Not too likely	126 (18.8)
		Not at all likely	83 (12.4)
		Not sure	31 (4.6)
42.	How critical is it for you to be able to customize (or personalize) your dining experience?	Very important	247 (36.8)
		Somewhat important	216 (32.1)
		Neither important nor Unimportant	90 (13.4)
		Somewhat unimportant	59 (8.8)
		Very unimportant	35 (5.2)
		Don't know	25 (3.7)
46.	Which of the following statements do you agree with or disagree with the most? "I would rather hear what I should eat than what I should not eat."	Strongly agree	246 (36.6)
		Somewhat agree	230 (34.2)
		Somewhat disagree	104 (15.5)
		Strongly disagree	47 (7.0)
		Not sure	45 (6.7)

Table 4. Questions examining participants' behaviors toward diet and nutrition during the SARS-CoV-2 pandemic.

Question	Question number	Answer	Frequency (%)
19.	What types of drinks do you generally drink?	Water	540 (31)
		Carbonated water (soda)	66 (3.8)
		Soft drinks	202 (11.6)
		Diet soft drinks	65 (3.7)
		Nectars or natural juices (fresh or packed)	245 (14.1)
		Juices	118 (6.8)
		Dairy products	277 (15.9)
		Energy drinks	94 (5.9)
		Nonalcoholic malt	99 (5.7)
		Hot drinks	29 (1.7)
		Other	5 (0.3)
20.	Do you eat organic foods (foods free of hormones, chemical fertilizers, pesticides and non-GMO)?	No	417 (62.1)
		Yes	255 (37.9)
22.	What would you do with an extra 100 JOD a month if you had it?	Save, invest, pay off debt	356 (22.4)
		Pay for household expenses or home repairs	217 (13.7)
		Spend more on travel	98 (6.2)
		Shop (for anything other than groceries)	257 (16.2)
		Spend more on entertainment	145 (9.1)
		Spend more on dining out	99 (6.2)
		Donate money to a charity	153 (9.6)
		Put towards a gym membership or athletic activities	205 (12.9)
		Spend more money on groceries	53 (3.3)
		Other	6 (0.4)
24.	On an average weekday, how much time (in minutes) do you spend cooking or preparing dinner?	I do not cook	247 (36.8)
		Some, but < 15	41 (6.1)
		15 - < 30	78 (11.6)
		30 - < 45	109 (16.2)
		45 - < 60	80 (11.9)
		≥ 60	117 (17.4)
26.	What do you like to do more with your time?	Following your favorite sport or sports team	118 (17.6)
		Tracking the healthfulness of your diet	169 (25.1)
		None	385 (57.3)
28.	Did your New Year's Resolution include	Change to both diet and exercise	272 (33.6)
		A new exercise routine or exercise goals	193 (23.9)
		Changes to your diet or the food you eat	213 (26.3)
		None of the above	13 (16.2)
29.	Are you still following your New Year's Resolution?	Blank	148 (22)
		No	135 (20.1)
		Yes, strictly following	389 (57.9)
31.	What information do you look at on the food or beverage package when deciding to purchase or eat a food or beverage?	Expiration date	516 (21.3)
		Nutrition Facts panel	236 (9.7)
		Ingredients' list	260 (10.7)
		Servings' size and amount per container	141 (5.8)
		Calorie and other nutrition information	255 (10.5)
		Brand name	193 (8)
		Cooking instructions/preparation time	217 (9)
		Statements about nutrition benefits	104 (4.3)
		Country of origin labeling	244 (10.1)
		Statements about health benefits	121 (5)
		Statements about absence of certain food ingredients	136 (5.6)
32.	Choose the factor that influences your decision when buying food and drinks?	Taste	299 (44.5)
		Price	111 (16.5)
		Healthfulness	153 (22.8)
		Convenience	59 (8.8)
		Sustainability	50 (7.4)
33.	Choose the things that you try to control the most in your life?	Happiness	252 (37.5)
		Weight	141 (21)
		Healthfulness of your diet	31 (4.6)
		Amount of money you make	100 (14.9)
		Level of physical activity	37 (5.5)
		Physical attractiveness	45 (6.7)
		Safety of the foods and beverages you consume	66 (9.8)

Table 4. Questions examining participants' behaviors toward diet and nutrition during the SARS-CoV-2 pandemic.

Question	Question number	Answer	Frequency (%)
34.	Which of the following, if any, have you made an effort to do in the last year?	Eat more fruits and vegetables	291 (19)
		Cut calories by drinking water, low and no calorie beverages	234 (15.3)
		Eat more foods with whole grains	98 (6.4)
		Cut back on foods higher in added sugars	217 (14.2)
		Consume smaller portions	217 (14.2)
		Cut back on foods higher in salt	115 (7.5)
		Cut back on foods higher in solid fats	131 (8.6)
		Compare sodium in foods like soup, bread, and frozen meals, and choose the foods with lower numbers	20 (1.3)
		Cut back on full fat dairy and replace with a low-or no-fat alternative	49 (3.2)
		Balance calories to manage my weight	159 (10.4)
36.	Which of the following statements better describes your current weight-loss strategy?	I am trying to lose weight	293 (43.6)
		I am trying to maintain my weight	170 (25.3)
		I am trying to gain weight	98 (14.6)
		I am currently not doing anything regarding my weight	111 (16.5)
41.	Which, if any, of the following have you tried to increase the healthfulness of your diet?	Family/friends support	220 (20.5)
		Weight loss plan	203 (18.9)
		An app or other means to track daily food/beverage intake	138 (12.9)
		Medical professional	51 (4.8)
		Registered Dietitian	128 (11.9)
		Online support group, blog, or other online community	93 (8.7)
		I have not used any resources to help improve the healthfulness of my diet	222 (20.7)
		Other	17 (1.6)
42.	How, if at all, have you used nutrition information (like calorie counts) when eating out at restaurants?	I will not eat something when eating out without first checking the nutritional information	118 (17.6)
		I will regularly use nutrition information to decide what to have when eating out	101 (15.0)
		I will sometimes use nutrition information to decide what to have when eating out	126 (18.8)
		I have noticed nutrition information before, but haven't paid any attention to it	90 (13.4)
		I have not noticed or seen any nutrition information when eating out at restaurants	237 (35.3)
45.	Which of these sources do you think you should rely on for reliable food safety information?	Your own healthcare expert	185 (27.5)
		A friend or family member	139 (20.7)
		Governmental agencies	108 (16.1)
		A food expert on TV	182 (27.1)
		Health, food and nutrition bloggers	23 (3.4)
		Farmer	4 (0.6)
		Food company or manufacturer	31 (4.6)

The finding of the current study shows that the new years' resolution behaviors are linked to the study participant's attitudes (Tables 5 and 6). Furthermore, Jordanians are most concerned with the expiration date, which is the most important factor in deciding whether or not to purchase anything. On the other hand, the taste has the greatest impact on Jordanian food purchases. Nutritionists and food producers are required to produce healthy food products without affecting food taste in order to enhance nutrition and diet behavior.

Approximately one-fifth of the participants did not use any resources to help them improve their diet healthiness. Furthermore, the participants attempted to control body weight, physical attractiveness, food safety, and level of physical activity. Furthermore, Jordanians attempt to lose or manage their weight. With the above-mentioned strategies, nutrition and dietetics professionals should question their clients about the most effective strategies for motivating nutrition and diet adjustments that suit their personalities.

Discussion

The responders in this study are comparable to those of the US Food and Health research survey[17] in terms of gender, adult age, and age of children within the household. It appears that females usually respond more to diet and health surveys,[21,22] probably because they typically lead the household[23] being responsible for the diet and nutrition accordingly.[24,25]

In 2017, more than one-third of Jordanians had a BMI value >27 kg/m^2,[26] which represents the Jordanian society despite ours being a convenient sample. Our results on self-description of the health status (Table 1) are similar to those reported by the International Food Council,[8] possibly because most of the respondents are aged 18-34 years. They are in agreement with those published by the High Health Council,[26]which rated the current health situation in Jordan as one of the best among the Middle Eastern countries.

Knowledge results are in agreement with those of the NDL-USA[17] in terms of the source of accurate nutrition information and the value of energy-yielding nutrients. Thus, compared to the NDL-USDA observation, most of the individuals in the current study either saw or knew a lot about the MyPlate graphic. On the other hand, about 90% of our study participants either had not heard about the local community nutrition programs or declined to answer this question. Thus, in terms of the local community nutrition programs and the value of energy-yielding nutrients, the knowledge of the sample in this study requires improvement. Besides, since there is a highly significant positive correlation of familiarity with MyPlate graphic and a reliable source of food knowledge pointing to trusted personal health care professionals in Jordan as having accurate and informative data on the food choices for the general public, it is recommended that diet and nutrition knowledge be enriched and communicated through the best-trusted sources, such as healthcare professionals and TV-food experts. However, food healthfulness can be described in many ways, whereby a healthy diet is defined by its ability to reduce the risk of potential chronic diseases[27,28] and promote well-being.[2] Our respondent attitudes on diet healthfulness are similar to those of the Americans[17] in terms of trying food with customizable nutritional value/calories, given the chance to time-travel 30 years into the future and currently at restaurants, and hearing what they should eat over what they should not eat. However, in contrast to Americans,[8,1] Jordanians paid little attention to the healthfulness of their diet in the last year, as indicated by the majority of adolescents displaying a negative attitude towards a healthy diet.[23] Based on The Dietary Guidelines for Americans[29] used by the US Department of Agriculture to describe a healthy diet, many factors influence a consumer's understanding of a food product's healthfulness, including the details provided to them, the color and shape of the packaging, the ingredient and category, sensory characteristics, and the organic origin.[30] Al-sheyab found that availability, perceived benefits, cost, and sensory appeal all influenced healthy food purchases by Jordanian adolescents.[31] Therefore, general population education initiatives on the healthfulness of foods in terms of benefits are needed. Besides, the cost of healthy foods must be lowered to make them affordable to the majority of the population.In contrast to Americans who gave a lot of thought to their physical activity,[17] the majority of our study participants were neutral about the level of physical activity they had performed over the previous year. Furthermore, only about a tenth of them would utilize the time to perform physical activity in comparison to more than a third of Americans, if given an extra four hours a week, for example.[17] Consistent with these results, in 2012, the majority of Jordanian adolescents did not engage in any physical activity.[32] Thereby, among schoolchildren, physical activity was determined by age, gender, academic achievement, maternal education, and family income.[23] Moreover, self-esteem and perceived benefits constituted barriers to physical activity among Jordanian university students in 2019.[33] In adults, self-esteem, barriers to change, perception of benefits, and sedentary activities appeared to be determinants of physical activity.[21] Thus, Jordanians are motivated to increase their physical activity in consideration of its cultural determinants. To implement its strategy to tackle obesity and other chronic diseases, the Jordanian Ministry of Health encouraged roadside walking, increased football play areas within local parks, and partnered with the Ministry of Education to establish free play areas and swimming pools within schoolyards for use in the summer vacations by the public.[34]

With regard to Jordanians' self-description, 61% of Americans describing themselves as conscientious.[17] On the question of weight change, our findings concurred with those reported among Americans towards gaining extra money.[17] Thereby, 6.2% would spend more on dining out, 3.3% on groceries, while the majority of the participants would save, invest or pay off their debts. Furthermore, nearly more than a quarter strongly disagreed with the statement "I would rather lose 1,000 JOD than gain 10 kg", compared to about a third of Americans who strongly agreed.[17] Furthermore, the majority believed that having enough physical exercise would contribute the most to their success in maintaining/losing weight, while Americans believed that changing the type of foods they consumed had the greatest impact in maintaining/losing weight.[17] Indeed, managing energy intake is the essential way of changing body composition. Exercising, on the other hand, is critical for improving biomarkers of chronic diseases that are linked to obesity.[35] Therefore, Jordanians must change their attitudes toward balancing the importance of adequate consumption of energy and physical activity. Similarly, the study participants believed that improvement in health/overall well-being would be the most motivating factor in their effort to lose/maintain weight. According to the NDL-USDA in 2015, Americans believed that an increase in physical appearance has contributed to keeping them on track to lose or maintain weight.[8,17] The respondents believed that lack of willpower would contribute/has prevented them from remaining on track in their effort to lose/maintain weight. Healthcare professionals and educators are required to encourage the public toward weight maintenance by emphasizing the importance of incentives such as improved health and overall well-being.[1] In comparison to Jordanians' attitudes towards using different approaches to manage weight in the next year, Americans intended to use the following approaches to manage their body weight: changing the types of food eaten, making sure of getting enough physical activity, eating smaller meals or snacks, controlling higher calorie foods and beverages, changing the frequency of eating during the day, self-weighing regularly, tracking of energy intake, support of family/friends, participating in workout buddy, use of a digital tracker, engaging in a weight loss program, exercising with a personal trainer, working with a health professional, workplace wellness programs/incentives.[17] The responses of this study can provide some guidelines for healthcare professionals, educators, retailers, and policymakers to motivating weight loss, such as enhancing snack options, reducing purchased/sold serving sizes, implementing physical activity strategies, and producing healthier versions of local foods.

On the other hand, in terms of beverage consumption by Jordanians and according to the Americans dietary guidelines, adults should drink 1ml/kcal/day and limit the consumption of beverages with added sugars.[36,37] In line with this, the Jordanian Mistry of Health[38] advised adults to drink 9-13 cups of water daily. In Jordan, drinking sugary drinks is one of the features of the western dietary trend linked to the incidence of cardiovascular disease risk.[39] Despite the report of 69% awareness of organic foods in Jordan by Altarawneh,[40] the majority of the respondents did not consume them. This is in contrast to the higher percentage of Americans eating organic foods.[17] This discrepancy might be due to the food prices.[41] In 2015, the majority of Americans chose to use nutrition facts to help them select what to consume when going out to eat.[17] The respondents in our study reported that they had not noticed or seen any nutrition facts or information (such as caloric counting) when dining out in restaurants. Accordingly, Jordanian policymakers and legislators are urged to enact laws and regulations related to nutritional facts on restaurant food packages/labels and to learn from the experiences of other countries such as Saudi Arabia. In fact, menu labeling has been shown to minimize food energy consumption,[43] which is an effective strategy for managing body weight and obesity-related chronic diseases.

Most of the study participants cook food at home. Indeed, cooking at home is a good habit to improve eating efficiency and avoid gaining weight.[44] Because of Jordan's high restaurant cost, the majority of the participants cook at home.[45] As revealed by this study, participants spend more than 60 min for cooking while on weekdays, Americans spend more than 15 min cooking dinner.[17] Furthermore, the majority of the participants spent no time watching their favorite sport or sports team or keeping track of their diet's healthiness, while Americans spent their time in both activities.[17] In agreement with the results of the NDL-USDA, the majority of respondents made changes to their diet and exercise, and strictly follow such a commitment in connection with planning for the following year' resolution.[17] However, surprisingly the intended new years' resolution diminishes by 77% after the first month, with just 19% remaining by the end of the year.[46] As suggested by Oscarsson *et al*. Sticking to the new year's resolution is usually linked to the knowledge, environmental support, goals, and the perceived measures of success rate.[46] Consistent with this, the finding of the current study shows that the new years' resolution behaviors are linked to the study participant's attitudes (Tables 5 and 6). Furthermore, in line with Americans, Jordanians are most concerned with the expiration date, which is the most important factor in deciding whether or not to purchase anything. Concordant with this behavior, Jordanian food law requires the inclusion of production and expiration dates in packaged food.[47] On the other hand, the taste has the greatest impact on Jordanian food purchases. Nutritionists and food producers are required to produce healthy food products without affecting food taste in order to enhance nutrition and diet behavior. Like the Americans in 2015,[8,17] participants in this study made numerous attempts to eat healthy over the previous year. The support from family and friends, plan to lose weight, an application or other forms to monitor everyday food and beverage consumption, registered dietitian, online support group, blog, or some other form of an online network, and medical professional were among the participant habits to enhance the healthfulness of the diet (in descending order of the participants' answers). Approximately one-fifth of the participants did not use any resources to help them improve their diet healthiness. To achieve this diet in 2020, Americans modified the types of foods and/or food ingredients they ate, the quantity of consumed foods, the frequency of eating, counting energy, and changing the use of dietary supplements.[8] Furthermore, the participants attempted to control body weight, physical attractiveness, food safety, and level of physical activity, which is similar to Americans.[17] Furthermore, Americans[17] and Jordanians attempt to lose or manage their weight. With the above-mentioned strategies, nutrition and dietetics professionals should question their clients about the most effective strategies for motivating nutrition and diet adjustments that suit their personalities. In terms of the types of drinks consumed, Jordanian eating and behavior are likely to require improvement. Furthermore, Jordanian behavior can be used to enhance nutrition and dietetics professional's dietary interventions.

Study strengths and limitations

No previous study evaluated KAB nutrition and diet among Jordanian society adults during the SARS-CoV-2 pandemic. This is the first valid survey to be used for Arabic-language speakers as a tool to initiate an assessment of community resources and needs at different periods of time and, most likely, after certain interventions. The analysis is restricted by a convenient sampling technique and the absence of a scoring system to provide a more reliable evaluation. Future research is needed for preexisting KAB nutrition and diet among Jordanian society before SARS-CoV-2 pandemic.

Conclusion

Knowledge of our sample requires improvement in terms of the local community nutrition programs and energy value of energy-yielding nutrients. Attitudes of the study participants may provide some hints for healthcare professionals, educators, manufacturers, and policymakers to be adopted to motivate weight change such as improving the types of snacks, reducing purchased/sold serving size, adopting strategies to increase physical activity, and manufacturing healthier versions of local foods. The assessed Jordanian population's nutrition and diet behaviors probably need improvement in terms of the types of beverages consumed.

Correspondence: Omar Alhaj, Department of Nutrition, Faculty of Pharmacy and Medical Sciences, University of Petra/Amman/Jordan, 11196 Amman, Jordan. Tel. +96.2797050741.
E-mail: omar.alhaj@uop.edu.jo

Key words: Knowledge; attitudes; behaviors; nutrition; diet.

Acknowledgement: The authors would like to express their gratitude to the participants and students who distributed the survey, as well as Miss Nour Hamed for her data acquiring and technical assistance.

Funding: This research was funded by the Dean of Scientific Research and Graduate Studies at the University of Petra/Amman/Jordan, grant number 18/4/2020.

Contributions: OAA, HFAS, conception and design of the study, acquisition of data, methodology, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content, final approval of the version to be submitted, supervision and research administration; MMA, revising it critically for important intellectual content, final approval of the version to be submitted; HJ, formal analysis, methodology, analysis and interpretation of data, revising it critically for important intellectual content, final approval of the version to be submitted.

Conflict of interest: The authors declare no conflict of interest.

Availability of data and materials: The data are available from the authors upon reasonable request.

Ethical approval: This study was revised and approved by the Research Ethics Committee of the Faculty of Pharmacy and Medical Sciences, University of Petra, Amman, Jordan (REC: 7Q/1/2020).

Informed consent: Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

Received for publication: 5 May 2021.
Accepted for publication: 22 May 2021.

Journal of Public Health Research 2021;10:2381
doi:10.4081/jphr.2021.2381

References

1. Contento IR. Foundation in theory and research: Increasing awareness and enhancing motivation. In: IR Contento, MS Rose, editors. Nutrition Education: Linking Research, Theory, and Practice. Jones & Bartlett Learning; 2016. p. 96–134.
2. Medical Research Council, National Institute of Health Research. Review of Nutrition and Human Health Research. 2017. Available from: https://mrc.ukri.org/documents/pdf/review-of-nutrition-and-human-health/
3. Al Hourani H. Food and Nutrition Profile: the Hashemite Kingdom of Jordan. 2011. Available from: http://www.fao.org/3/aq039e/aq039e.pdf
4. World Health Organization. NLiS Country Profile: Jordan. Nutrition Landscape Information System (NLiS). 2020. Accessed: 2020 Aug 5. Available from: https://apps.who.int/nutrition/landscape/report.aspx?iso=jor
5. World Health Organization. Wuhan 2019 Novel Coronavirus - 2019-nCoV. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4
6. World Health Organization. Considerations for quarantine of contacts of COVID-19 cases. 2020. Available from: https://www.who.int/publications/i/item/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-(covid-19)
7. Al-Tammemi AB. The battle against COVID-19 in Jordan: An early overview of the Jordanian experience. Front Public Health 2020;8:1-6.
8. International Food Information Council. Food & Health Survey 2020. Available from: https://foodinsight.org/wp-content/uploads/2020/06/IFIC-Food-and-Health-Survey-2020.pdf
9. Elsahoryi N, Al-Sayyed H, Odeh M, et al. Effect of Covid-19 on food security: A cross-sectional survey. Clin Nutr ESPEN 2020;40:171–8.
10. Ismail LC, Osaili TM, Mohamad MN, et al. Eating habits and lifestyle during covid-19 lockdown in the united arab emirates: A cross-sectional study. Nutrients 2020;12:1–20.
11. Worsly T. Nutrition knowledge and food consumption: can nutrition knowledge change food behaviour? Asia Pac J Clin Nutr 2002;11:S579–85.
12. Weerasekara PC, Withanachchi CR, Ginigaddara GAS, Ploeger A. Food and nutrition-related knowledge, attitudes, and practices among reproductive-age women in marginalized areas in Sri Lanka. Int J Environ Res Public Health 2020;17:1–24.
13. Aikman SN, Min KE, Graham D. Food attitudes, eating behavior, and the information underlying food attitudes. Appetite 2006;47:111–4.
14. Spronk I, Kullen C, Burdon C, O'Connor H. Relationship between nutrition knowledge and dietary intake. Br J Nutr 2014;111:1713–26.
15. SPRING, USAID [Internet]. The KAP Survey Model (Knowledge, Attitudes, and Practices) 2011. Accessed: 2020 Nov 20. Available from: https://www.spring-nutrition.org/publications/tool-summaries/kap-survey-model-knowledge-attitudes-and-practices
16. Houpis G, Rodríguez JM, Strobel C. Guideline for Conducting a Knowledge, Attitude and Practice (KAP) Study. Post Deliv Innov Digit Econ 2015;131–42.
17. National Data Laborator United States Department of Agriculture (NDL-USDA). The 2015 food & health survey: Consumer attitudes toward food safety, nutrition & health. 2015. Accessed: 2020 Nov 20. Available from: https://foodinsight.org/wp-content/uploads/2015/05/2015-Food-and-Health-Survey-FINAL.pdf
18. Hörnell A, Berg C, Forsum E, et al. Perspective: An extension of the STROBE statement for observational studies in nutritional epidemiology (STROBE-nut): Explanation and elaboration. Adv Nutr 2017;8:652–78.
19. R-project. Package 'samplesize'. 2016. Availabel from: https://CRAN.R-project.org/package=samplesize
20. Department of Statistics Jordan [Internet]. Home page. 2020. Accessed: 2020 Jul 20. Available from: http://dosweb.dos.gov.jo/20
21. United Nations. Women and nutrition − Nutrition policy discussion paper No. 6. Available from: https://www.unscn.org/layout/modules/resources/files/Policy_paper_No_6.pdf
22. Ammouri AA, Neuberger G, Nashwan AJ, Al-Haj AM. Determinants of self-reported physical activity among Jordanian adults: Clinical scholarship. J Nurs Scholarsh 2007;39:342–8.
23. Al-sheyab N, Alomari M, Hayajneh A, Shah S. Attitudes and perceived barriers toward healthy lifestyle behaviors in Jordanian adolescents: a developing country perspective. Adolesc Health Med Ther 2019;10:39–47.
24. World Bank. Hashemite Kingdom of Jordan – Understanding how gender norms in MNA impact female employment outcomes. 2018;1–18. Available from: http://documents.worldbank.org/curated/en/859411541448063088/Hashemite-Kingdom-of-Jordan-Understanding-How-Gender-Norms-in-MNA-Impact-Female-Employment-Outcomes
25. World Health Organization. Eastern Mediterranean Health Observatory. Regional Office for the Eastern Mediterranean. 2021. Available from: https://rho.emro.who.int/ThemeViz/TermID/146
26. High Health Council. The National Strategy for Health Sector in Jordan 2015- 2019. Hashemite Kingdom Jordan. 2015. Available from: https://jordankmportal.com/system/resources/attachments/000/000/311/original/Jordan_National_Health_Sector_Strategy_2015-2019_.pdf?1455799625
27. Margetts BM, Martinez JA, Saba A, et al. Definitions of "healthy" eating: A pan-EU survey of consumer attitudes to food, nutrition and health. Eur J Clin Nutr 1997;51:S23-9.
28. Hamelin AM, Lamontagne C, Ouellet D, et al. Healthful eating: Beyond food, a global concept. Can J Diet Pract Res 2010;71:e21-7.
29. United States Department of Agriculture (USDA). Healthy Eating Index (HEI). 2020 [cited 2020 Nov 22]. Available from: https://www.fns.usda.gov/resource/healthy-eating-index-hei
30. Plasek B, Lakner Z, Temesi Á. Factors that influence the perceived healthiness of food - Review. Nutrients 2020;12:1–20.
31. Alshurideh MT. Do we care about what we buy or eat? A Practical study of the healthy foods eaten by Jordanian youth. Int J Bus Manag 2014;9:65–75.
32. Obeisat S, Gharaibeh H. Physical activity behaviour of Jordanian adolescents and its associated factors. Eur J Sci Res 2012;67:433–43.
33. Hamdan KM, Shaheen AM. Determinants of physical activity among Jordanian University Students. Res Heal Sci 2019;4:191.
34. World Health Organization. The National Strategy and Plan of Action against Diabetes, Hypertension, Dyslipidemia, and Obesity in Jordan. 2015.
35. Clark JE. Diet, exercise or diet with exercise: Comparing the effectiveness of treatment options for weight-loss and changes in fitness for adults (18-65 years old) who are overfat, or

obese; systematic review and meta-analysis. J Diabetes Metab Disord 2015;14:31.
36. Ellie Whitney, Rolfes SR. Understanding Nutrition 12th ed. Williams P, Rose N, Feldman E, et al., editors. Vol. 47. Woods Worth, Cengage learning; 2015.
37. Slavin J. Dietary guidelines: Are we on the right path? Nutr Today 2012;47:245-51.
38. Ministry of Health. Jordanian Dietary Guidelines. Amman; 2021.
39. Tayyem RF, Al-Shudifat AE, Johannessen A, et al. Dietary patterns and the risk of coronary heart disease among Jordanians: A case–control study. Nutr Metab Cardiovasc Dis 2018;28:262–9.
40. Altarawneh M. Consumer awareness towards organic food: A pilot study in Jordan. J Agric Food Technol 2013;3:14–8.
41. Eneizan BM. Critical obstacles to adopt the organic farming in Jordan: From marketing perspective. Eur J Bus Manag 2017;3:38-43.
43. Zhou M, Lemaire R, Hedrick V, et al. Nutrients effects of menu labeling policies on transnational restaurant chains to promote a healthy diet : A scoping review to inform policy and research. Nutrients 2020;12:1544.
44. Mills S, Brown H, Wrieden W, et al. Frequency of eating home cooked meals and potential benefits for diet and health: Cross-sectional analysis of a population-based cohort study. Int J Behav Nutr Phys Act 2017;14:1–12.
45. Government of Jordan. Jordan Economic Growth Plan 2018-2022. Executive Summary 2018; Available from: http://egp.jo/ar
46. Oscarsson M, Carlbring P, Andersson G, Rozental A. A large-scale experiment on New Year's resolutions: Approach-oriented goals are more successful than avoidance-oriented goals. PLoS One 2020;15:1–13.
47. Jordan Food and Drug Administration. Jordanian Food Law. Jordan Food and Drug Administration; 2015.