Original Article

Challenges to lifestyle modification of chronic disease patients attending primary health care centers in Riyadh

Sulaiman A. Alshammari[1], Abdullah Z. AlDhayan[2], Omar M. Saad Al-essa[2], Majed M. Alosaimi[2], Badr M. Al-badr[2], Anas B. Ali[2], Qusay A. Ajlan[2]

[1]The Health Promotion and Health Education Research Chair, Department of Family and Community Medicine, College of Medicine, King Saud University Medical City, Riyadh, Saudi Arabia, [2]Department of Family and Community Medicine, Student, College of Medicine, King Saud University, Riyadh, Saudi Arabia

Abstract

Background: The rate of chronic diseases is increasing due to the global pandemic of inactivity and an unhealthy diet. **Objective:** We aimed to determine the dietary habits, physical activities of the participants, and challenges facing them to adapt to a healthy lifestyle. **Methodology:** The researchers conducted a cross-sectional study on chronic disease patients attending primary health care centers in Riyadh from January to March 2018. The estimated sample size was 250 patients. The participants completed a self-administered questionnaire. **Result:** The mean age of the 250 participants was 35.3 years old. The Overweight and obese participants accounted for 67.2% of the sample (mean BMI = 28.0). Two-thirds of the participants depend mainly on rice or pasta for their diet, and 48.4-52.0% eat fruits and vegetables less than three times a week. About 50% of the participants perceived a lack of information, skills, motivation, and family or friends support as a barrier to a healthy diet. Also, (56.4%) of males and (67.8%) of females are physically inactive. Accessibility, cost, and the hot climate were physical activity obstacles in more than 60% of the respondents. Optimal BMI showed a significant association with increased physical activity $P = 0.04$. **Conclusion:** Physical inactivity and consuming a non-balanced diet are common. So awareness campaigns of the benefit of a healthy lifestyle besides increasing physical exercise facilities, installing environmental changes, and subsidizing sports gyms would encourage people to be more physically active.

Keywords: Diet, lifestyle modification, physical exercise

Introduction

Lifestyle modification is the act of changing someone's habit for an extended time to maintain good health. People can obtain a healthy life through regular exercise to healthy eating. Furthermore, they should consume beneficial types of food in the right quantities. However, they may go on a diet with a plan to consume a specific type of food for a period to lose weight.[1] a study shows that a low-carbohydrate diet leads to a 7.27–10.20 kg weight loss in 6 months, while a low-fat diet had a 6.01–9.92 kg also in 6 months.[2] another study stated that pre-meal water consumption led to a reduction in food intake, which controls weight.[3] As for the benefits of weight loss, a study showed significant associations between losing at least 5% of weight and improvement in blood glucose, blood pressure, and lipids.[4] Adherence to a plant-based diet limiting red meat intake with alcohol cessation was associated with reduced breast cancer risk, particularly in postmenopausal women.[5] However, research on young adults has shown that if the people around a person (i.e., friends and family) had unhealthy dietary habits,

Address for correspondence: Prof. Sulaiman A. Alshammari, Department of Family and Community Medicine, College of Medicine, King Saud University Medical City, P.O. Box 2925, Riyadh - 11461, Riyadh Saudi Arabia.
E-mail: amsahsa@gmail.com

Received: 31-05-2020 **Revised:** 05-09-2020
Accepted: 06-10-2020 **Published:** 31-12-2020

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_1037_20

How to cite this article: Alshammari SA, AlDhayan AZ, Saad Al-essa OM, Alosaimi MM, Al-badr BM, Ali AB, *et al*. Challenges to lifestyle modification of chronic disease patients attending primary health care centers in Riyadh. J Family Med Prim Care 2020;9:6186-93.

it would affect him. Besides, a cheaper meal as it is in fast-food restaurants is preferable to expensive nutritional meals. Also, in the young-aged population, thinking that time is too short to planning, shopping, and cooking for a healthy diet is not worth it. Investigators considered all of these as barriers to *achieve* a healthy dietary lifestyle.[6] the lack of healthy options at some universities' canteens is the main barrier to bad diet among college students.[7]

There is high morbidity of noncommunicable diseases globally. WHO estimated that NCDs kill 40 million people each year. In Saudi Arabia, [a national study Of the 10,735 participants found, 28.7% were obese (body mass index ≥30 kg/m^2). obesity prevalence was higher among women. It was associated with marital status, diet, physical activity, diagnoses of DM and hypercholesterolemia, and hypertension. Amongst Saudi's, 15.2% and 40.6%were hypertensive or borderline hypertensive, respectively. The overall prevalence of current smoking was 12.2%, and males were more likely to smoke than females (21.5% vs. 1.1%). Diabetes Mellitus type 2 prevalence was 23.1%, obesity 31.1%, and Hypertension and Coronary artery disease 32.6%.[8-11]

A Swedish study has proved that lifestyle-changing intervention programs were remarkably cost-effective for preventing Type 2 DM.[12] Another study showed that interventions at day camp weight loss for children have favorable effects after one year of the program compared to a standard group. However, it was more costly than the standard one, and so more studies are needed to achieve significant implications with fewer costs.[13]

Despite the improvement in medical technologies, cardiovascular diseases are still a leading cause of death in the US. However, it is quite possible to reduce cardiovascular events' recurrence in those who have had one before sticking to the prescribed medications and lifestyle modification. It lowers the mortality and morbidity rates in cardiovascular disease patients.[14] also, psychological distress can affect lifestyle modification attempts as many participants suffer from falling into old habits, and this raises questions about whether sports centers can help with their lifestyles.

So, it may need other approaches such as social or psychological intervention.[15]

Regarding healthy eating, a study showed that 10% of women lacked cooking skills, where others didn't not liking the taste, preparation time, and lack of willpower were also significant. the only considerable result (for men) was not enjoying healthy food.[16] Cultural beliefs can comprise some barriers to a healthy lifestyle. It was noticed in South Asians who were advised to adopt a cardiac rehabilitation program after suffering a myocardial infarction as many of them had their decision influenced by a social context, giving priority to family beliefs and cultural norms over the medical advice.[17] a study in Saudi Arabia showed an increased percentage of physically inactive adolescents, 84% for males, and 91.2% for females. while only (12.9%) met the recommended levels of physical activity.[18] According to a study done in Saudi Arabia, there was no significant difference in physical activity frequency between males and females. However, only (33.5%) of the overall population (study sample) met the recommended moderate physical activity levels.[19] *it is proven that implementing* a healthy diet and physical activities were highly cost-effective in managing Diabetes.[20] Moreover, the implementation of the hypertension guidelines, with adherence to a healthy lifestyle, leads to control hypertension and could be effective and cost-saving and prevent cardiovascular events annually.[21]

lifestyle modifications are an excellent method to overcome noncommunicable diseases' epidemic. It can reduce reduces health care budget by promoting physical activity in the community as primary prevention.[22,23] The high prevalence of physical inactivity is a global problem that contributes *to increased* morbidity and increased economic costs.[24-27] There was a need to investigate the cost-effectiveness, psychosocial aspect, and barriers to lifestyle modification. These studies should target common diseases in our population, most importantly, diabetes mellitus and obesity. Barriers to a healthy lifestyle differ from one community to another, which *could be due to* lack of knowledge, recourses, availability of a healthy diet, and lack of willpower. There is a lack of literature investigating the barriers to a healthy lifestyle by patients in the Saudi community. The present study aimed to determine dietary habits, physical activities, and challenges facing chronic disease patients to adapt to a healthy lifestyle in Riyadh.

Method

The authors conducted a cross-sectional study in primary healthcare centers in Riyadh from January to March 2018. The directorate of health care centers divided Riyadh into five areas north, south, east, west, and middle. The survey sampling frame was the number of health care centers in Riyadh. Three centers were selected randomly from each area, and patients would participate by systematic random selection. We included chronic disease patients, 18 years old and above of both genders. The study excluded patients with communication problems. Furthermore, the investigators interviewed those who could not read or write. The authors used a predesigned self-administered questionnaire. Study variables were demographic characteristics such as age, sex, nationality, marital status, monthly income, education level. The questionnaire also investigated physical activity, a healthy diet, and the challenges facing chronic disease patients when adapting to a healthy lifestyle. The outcome variables were knowledge about physical activity status and diet status and barriers to lifestyle modification. The ethics committee approved the study as Research project no. CMED 305-MB8-2017-18 on 11 December 2018.

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires.

The IPAQ has acceptable measurement properties for use in many settings and languages. The IPAQ is a 27-item self-reported

measure of physical activity for individual adult patients aged 15 to 69. Health professionals can use the IPAQ clinically and population research to compare physical activity levels between populations internationally.

Scoring a HIGH level of physical activity on the IPAQ means the participant's physical activity levels equate to approximately one hour of exercise per day or at least a moderate-intensity activity level.[28]

The dietary instrument for nutrition education (DINE) is a semi-quantitative food frequency questionnaire that uses 19 food groups to assess dietary intake. The tool classifies fat and fiber intakes as 'low,' 'medium,' or 'high.'

The DINE method is a valid, brief, and inexpensive tool for diet assessment by primary care staff without specialized nutritional knowledge and includes a dietary counseling component.[29]

Also, the questionnaire consists of questions about barriers to a healthy diet and physical exercise.

The investigators estimated sample size according to the formula: N = Z2 P (1-P)/d2. N = sample size, Z = the Z statistic for a 95% level of confidence; therefore, and the Z value was 1.96. Moreover, *P* = we took the percentage of Diabetes mellitus in Saudi Arabia 19.2% (average from two national studies),[11,30,31] d = the degree of precision (0.05). So the estimated sample size was 238. However, we increased the sample to 250 to account for non-respondents.

Five academic experts (three family physicians, two preventive medicine professors) reviewed the questionnaire. We piloted the self-administrated questionnaire on 20 chronic disease patients in 5 primary health care centers in Riyadh to ascertain that the questions were understood, to estimate the required time to fill in the questionnaire, and to explore the obstacles and constraints. At the same time, the investigators revised the questionnaire and tested its clarity and feasibility. People who participated in the pilot study spent 10 and 15 minutes to complete it. We excluded them from the main study.

The Institutional Review Board, department of family and community medicine college of medicine, King Saud University approved this research project (Project No: CMED 305-F12-2017-2018). Participants signed a written consent form after the investigators informed them about the study's purpose, why they were chosen, and their right to withdraw. There were no incentives or rewards will be given to participants.

We analyzed the data using the Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). The investigators expressed categorical variables as percentages and using Chi-square. A *P* value <0.05 was considered statistically significant.

Results: Two hundred fifty patients (65.2% males) participated in this study. Their mean age was 35.3 years old (the age range 18.0 to 93.0). The other participants' characteristics are: 60.4% married, 89.6% high school and above, and 56.4% currently working. The Overweight and obese participants represented 67.2% of the sample with a mean BMI of 28.0 Table 1. Table 2 illustrated the personal and environmental barriers to healthy eating. The barriers were not having enough information or the motivation about healthy diet," not enjoying eating healthy food, "and "Not having skills to plan and shop for preparing or cooking healthy foods," as reported by about 50.0%. On Social barriers side, about half of the participants stated that "No family or friends support to eat a healthy diet" and "No work environment to eat a healthy diet" as obstacles to healthy eating. With regards to personal barriers to physical activity, statements

Table 1: Socio demographic characteristics of chronic disease patients (*n*=250)

Variable	Frequency (%)
Age (years)	
<25	60 (24.0)
25-34	68 (27.2)
35-44	64 (25.6)
45-59	46 (18.4)
60+	12 (4.8)
Mean (SD)	35.3 (13.4)
Gender	
Male	163 (65.2)
Female	87 (34.8)
Marital Status:	
Single	93 (37.2)
Married	151 (60.4)
Divorced or Separated	6 (2.4)
Educational Level:	
Illiterate	5 (2.0)
Less than high school	21 (8.4)
High School	92 (36.8)
Postgraduate	132 (52.8)
Occupation	
Unemployed	34 (13.6)
Student	60 (24.0)
An employee	141 (56.4)
Retired	15 (6.0)
Monthly Income	
<5000 Riyal	34 (13.4)
5000-10000 Riyal	51 (20.4)
10000-20000 Riyal	69 (27.6)
20000-50000 Riyal	24 (9.6)
More than 50000	7 (2.8)
Not Constant	12 (4,8)
I prefer not to answer	53 (21.2)
BMI Classification	
Underweight	8 (3.2)
Normal	74 (29.6)
Overweight	103 (41.2)
Obese	65 (26.0)
Mean (SD)	28.0 (8.0)

Table 2: Significant differences and frequencies in chronic disease patients for perceived barriers to physical activity and healthy diet

Challenges	1	2	3
	Obstacles *n* (%)	Somewhat obstacles *n* (%)	Non-obstacles *n* (%)
Personal and environmental barriers to healthy eating.			
Do not have enough information about health diet?	51 (20.4)	74 (29.6)	125 (50.0)
Do not have motivation to eat a healthy diet?	40 (16.0)	82 (32.8)	128 (51.2)
Do not enjoy eating healthy food?	40 (16.0)	85 (34.0)	125 (50.0)
Do not have skills to plan and shop for preparing or cooking healthy foods?	69 (27.6)	68 (27.2)	113 (45.2)
Do not have access to healthy foods?	64 (25.6)	63 (25.2)	123 (49.2)
Not able to buy healthy foods that are inexpensive?	49 (19.6)	75 (30.0)	126 (50.4)
Social barriers to healthy eating			
No family support to eat a healthy diet?	46 (18.4)	74 (29.6)	130 (52.0)
No friends' support to eat a healthy diet?	64 (25.6)	81 (32.4)	105 (42.0)
No work environment to eat a healthy diet?	72 (28.8)	83 (33.2)	95 (38.0)
Not having time to prepare or eat healthy foods?	64 (25.6)	73 (29.2)	113 (45.2)
Personal barriers to physical activity			
Do not have motivation to do physical activity, exercise, or sport?	40 (16.0)	88 (35.2)	122 (48.8)
Not enjoying physical activity, exercise, or sport?	39 (15.6)	75 (30.0)	136 (54.4)
Do not have the skills to do physical activity, exercise, or sport?	54 (21.6)	75 (30.0)	121 (48.4)
Social support barriers to physical activity			
No family support to be physically active	44 (17.6)	75 (30.0)	131 (52.4)
No friends' support to be physically active	40 (16.0)	87 (34.8)	123 (49.2)
No work environment to be physically active?	51 (20.4)	86 (34.4)	113 (45.2)
Environmental barriers to physical activity			
Do not have enough information about how to increase physical activity?	52 (20.8)	81 (32.4)	117 (46.8)
Not having access to places to do physical activity, exercise, and sport?	67 (26.8)	75 (30.0)	108 (43.2)
Not being able to Find physical activity facilities that are inexpensive?	86 (34.4)	67 (26.8)	97 (38.8)
Not having the time to be physically active?	54 (21.6)	60 (24.0)	136 (54.4)
Feeling shy when practicing exercise outdoors?	37 (14.8)	47 (18.8)	166 (66.4)
The climate is not suitable for practicing exercise?	92 (36.8)	76 (30.4)	82 (32.8)
Not being able to practice physical activity due to cultural factors?	41 (16.4)	43 (17.2)	166 (66.4)
Do not have enough money to enroll on physical activity club?	59 (23.6)	63 (25.2)	128 (51.2)

of "Not enjoying physical activity, exercise, or sport," "Do not have the motivation to do physical activity, exercise, or sport" and "Do not have the skills to do physical activity, exercise, or sport" was reported as the highest obstacle among about 50.0% of the subjects.

Concerning social support barriers to physical activity, about half of the participants reported the following obstacles "No family support to be physically active," "No friends' support to be physically active," and "No work environment to be physically active."

Lastly, in environmental barriers to physical activity, more than 60% of the participants did not perceive "Not being able to practice physical activity due to cultural factors"" Feeling shy when practicing exercise outdoors" as barriers physical exercise. But access to places to do physical activity, cost and the hot climate were an obstacle to more than 60% of the respondents. Furthermore, about 50% of the participants attributed barriers to lack of information about increasing physical activity and time.

Table 3 showed no significant association between increased physical exercise and demographic variables such as participant's age, sex, marital status, and employment status. But, optimal BMI showed a significant association with increased physical activity $P = 0.04$.

Table 4 showed that 44.0% of participants reported eating one or two white bread pieces daily, 64.8% eat less than one piece of brown bread daily, and 50.0% eat less than one piece of toasted bread daily.

For breakfast, participants reported eating less than once a week cereals 58.0%, Porridge 71.2%, bran type 77.2%.

The participants reported eating 3-5 times per week pasta and rice 44.4%, while 53.6% eat potatoes1-2 times a week. Out of all participants, 71.6% eat peas, and 66.0% eat beans less than once a week. A third of the subject reported eating fruits and vegetables 1-2 times per week, and a further third consume vegetables 3-5 times per week.

Discussion

Overweight and obesity affected more than half of the participants, 56%. Our study's risk factor is less than the United States, which estimated 71.6% of the US adults had obesity and Overweight.,[32]

Table 3: Association of study variables with the status of physical activity and healthy diet of chronic disease patients (*n*=250)

Variables	Exercise *n* (%)		*P*
	Yes 99 (39.6)	No 151 (60.4)	
Age			
<25[60]	22 (36.7)	38 (63.3)	0.8
25-34[68]	30 (44.1)	38 (55.9)	
35-44[64]	24 (37.5)	40 (62.5)	
45-59[46]	17 (37.0)	29 (63.0)	
>60[12]	6 (50.0)	6 (50.0)	
Gender:			
Male[163]	71 (43.6)	92 (56.4)	0.80
Female[87]	28 (32.2)	59 (67.8)	
Marital status:			
-single[93]	41 (44.1)	52 (55.9)	0.52
-married[151]	56 (37.1)	95 (62.9)	
-divorced[6]	2 (33.3)	4 (66.7)	
Educational level:			
-illustrate[5]	2 (40.0)	3 (60.0)	0.15
-less than high school[21]	7 (33.3)	14 (66.7)	
high school	29 (31.5)	63 (68.5)	
postgraduate	61 (46.2)	71 (53.8)	
Occupation:			
-unemployed[34]	9 (26.5)	25 (73.5)	0.40
-student[60]	26 (43.3)	34 (56.7)	
-an employee[141]	58 (41.1)	83 (58.9)	
-retired[15]	6 (40.0)	9 (60.0)	
Monthly income (riyals):			
<5000[34]	13 (38.2)	21 (61.8)	0.13
5000-10000[51]	18 (35.3)	33 (64.7)	
10000-20000[69]	33 (47.8)	36 (52.2)	
20000-50000[24]	14 (58.3)	10 (41.7)	
more than 50000[7]	3 (42.9)	4 (57.1)	
non-constant[12]	3 (25.0)	9 (75.0)	
I prefer not to answer[53]	15 (28.3)	38 (71.7)	
BMI			
<18[8]	1 (12.5)	7 (87.5)	
18-24.9[74]	38 (51.4)	36 (48.6)	
25-30[103]	35 (34.0)	68 (66.0)	0.04
31+[65]	25 (38.5)	40 (61.5)	

the UAE 67.6% of the study population.[33] while the findings of Overweight and obesity among Indian adults' were (45.6%).[34] However, our results are comparable to adults in Germany where overweight and obese accounted for (54.0%) of study subjects.[35] The current study showed that 50% of participants did not adhere to the recommended diet or exercise programs. Regarding eating habits, 65% of the participants depend mainly on rice or pasta for their diet, and 45-49% of them eat fruits and vegetables less than three times a week. It is similar to another study from Oman. The caloric intake (bread, rice, and pasta) was over 70% had six or more servings per day while over 50% had less than three servings per day vegetables and the fat intake was double for both genders.[36] and close to that of the United States and other Arab Gulf countries like Kuwait. In India, students aged 14-16 years reported inadequate dietary intakes; (30%) of participants reported no consumption of vegetables, and (45%) did not consume any fruits. However, 70% reported eating three or more servings of energy-dense snacks on the previous day.[37] A Swedish population study showed a recent change in dietary habits towards a low carbohydrate 41.4% and an increasing high fat diet 37.5%.[38] In Latin America, a study showed that energy, fat, and protein intake had increased substantially. it resulted in a diet high in fat and sugar but low in micronutrients and vegetables.[39]

Our findings were consistent with other Saudi research, which showed high intake of carbs and low vegetable intake. It showed that less than 45% consume fish as recommended, and 80% use white bread.

We found that (56.4%) of males and (67.8%) females are physically inactive. A National study showed that 66.6% of participants were inactive. Amongst females, 73% were inactive.[40] In Kuwait, they found that (75.2%) of men and (67.2%) of women are physically active.[41] We conclude that physical activity in women compare to men is low in most of the gulf countries. another research done by Kenya found that only 8% of males and 7.5% of female participants are not physically active.[42] In South Africa, women who lived in rural regions are more active (1260 min/week) because of their daily work. Compared to urban women, rural women were less overweight and obese. Furthermore, low income contributes to more physical activity.[43] More than 60% of the participants in our study perceived practicing outdoors as acceptable. Our study found that 55% of participants perceived a lack of information as a barrier to a healthy diet. A previous study reported similar results a lack of knowledge and personal taste among barriers to healthy eating.[44] In contrast, a nationwide study in Switzerland reported price as the most prevalent barrier to a healthy diet among 43.2% and 35.8% women and men.[45] Another study in Europe showed a lack of willpower, time constraints, and taste preferences as the three main barriers.[46] the evidence suggests that exercise is just as effective as medical treatment in special situations.[47] We found that 44% of our participants have reported a lack of motivation and family support as barriers to physical activity. Also, about one-third of them said that they did not have access to physical activity facilities. This finding is consistent with a high school student study in Riyadh. As the main barriers toward physical activity were lack of sports facilities (74%) followed by lack of friends and peer support (59.4%), and finally, lack of suitable public sports club in the community. (54.6%).[48] the same was reported for Saudi female university students.[49] Furthermore, in Saudi Arabia, it was reported that lack of time was perceived as a primary barrier for females. In contrast to males who perceived lack of motivation as the main barrier.[50] In another study on type 2 DM patients attending PHC in Saudi Arabia, the participants have reported a lack of social support, lack of energy, fear of injury, and Lack of skills as essential barriers to physical activity.[51] Finally, concerning environmental factors, 25% of our study population attributed to the hot climate barrier. The pandemic of COVID-19 has raised many questions on how we can boost immunity by increasing through promoting a healthy lifestyle of diet and physical activities. Having a healthy lifestyle and exercising at moderate to vigorous intensity can improve immune responses to vaccination, reduce chronic low-grade inflammation, and improve various immune markers in several

Table 4: Different food types and their dietary intake in chronic disease patients

Food type	*n*(%)
White bread:	
Less than one piece daily	76 (30.4)
One piece or two pieces daily	111 (44.4
3-4 pieces daily	55 (20.0)
5 pieces or morel	8 (3.2)
Brown bread:	
Less than one piece daily	162 (64,8)
One piece or two pieces daily	61 (24.4)
3-4 pieces daily	25 (10.0)
5 pieces or more	2 (0.8%)
Toasted bread:	
Less than one piece daily	145 (50.0)
One piece or two pieces daily	21 (8.4)
3-4 pieces daily	10 (4.0)
5 pieces or more	1 (0.4)
Breakfast cereal	
Sugar type:	
Less than once a week	145 (58.0)
1-2 times a week	53 (21.2)
3-5 times a week	30 (12.0)
6 or more times a week	22 (8.8)
Porridge or Ready Break:	
Less than once a week	178 (71.2)
1-2 times a week	53 (21.2)
3-5 times a week	17 (6.8)
6 or more times a week	2 (0.8)
Bran type:	
Less than once a week	193 (77.2)
1-2 times a week	34 (13.6)
3-5 times a week	18 (7.2)
6 or more times a week	5 (2.0)
Vegetables	
Pasta or rice:	
Less than once a week	25 (10.0)
1-2 times a week	61 (24.4)
3-5 times a week	111 (44.4)
6 or more times a week	53 (21.2)
Potatoes:	
Less than once a week	55 (22.0)
1-2 times a week	134 (53.6)
3-5 times a week	54 (21.6)
6 or more times a week	7 (2.8)
Peas:	
Less than once a week	179 (71.6)
1-2 times a week	46 (18.4)
3-5 times a week	21 (8.4)
6 or more times a week	4 (1.6)
Beans:	
Less than once a week	165 (66.0)
1-2 times a week	58 (23.2)
3-5 times a week	22 (8.8)
6 or more times a week	5 (2)
Vegetables:	
Less than once a week	38 (15.2)
1-2 times a week	83 (33.2)
3-5 times a week	82 (32.8)
6 or more times a week	47 (18.8)
Fruit:	
Less than once a week	48 (19.2)
1-2 times a week	82 (32.8)
3-5 times a week	74 (29.6)
6 or more times a week	46 (18.4)

disease states, including cancer, HIV, and cognitive impairment. It can also protect the host from many types of viral infections, including influenza.[52]

A family physician and his team, supported by health decision-makers, are the optimal health promotion and disease prevention. Hence, the primary care team shouldn't miss modifying the public risk factors following the Saudi national vision. They can utilize all available media to motivate their patient to participate in healthy lifestyle activities.

Limitations of the study

We conducted this study in Riyadh, which may limit its representativeness to other areas. Recall bias may be involved.

Conclusion

We have concluded that most of our participants live a sedentary lifestyle with low physical activity, more carbohydrates, and fewer fruits and vegetables. Such a lifestyle, in the end, may increase the prevalence of chronic diseases. So many claimed barriers could be overcome individually or institutionally.

To summarize our study's key points:

- majority of the population lead a sedentary lifestyle
- majority of the people depend on rice pasta for their diet
- majority of the people eat few fruits and vegetables
- most participants perceived a lack of information as a barrier to a healthy diet
- most participants reported a lack of motivation and family support.

Recommendation

We highly recommend conducting a periodic national study, including rural and urban areas. All age groups and disease-free individuals. Besides, awareness campaigns utilizing appropriate audiovisual media would benefit people's perception of lifestyle modification in reducing the risk of noncommunicable diseases and overall health. Furthermore, finally, we recommend focusing on changing and reducing the negative social effect on those trying to start a healthy lifestyle. We suggest increasing the facilities of sport and walking areas in every neighborhood. Subsiding the gyms fees and providing water sprinkles and big fans in walking places to overcome hot climates may encourage more people to modify their lifestyle.

Acknowledgment

The authors would like to acknowledge the Co-operation of the Participants who took part in the study. The researchers are thankful to the Deanship of Scientific Research, King Saud University, for supporting through Vice Deanship of Scientific Research Chairs.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest

References

1. Khodaee GH, Emami Moghadam Z, Khademi G, Saeidi M. Healthy diet in children: Facts and keys. Int J Pediatr 2015;3:1183-94.
2. Johnston BC, Kanters S, Bandayrel K, Wu P, Naji F, Siemieniuk RA, *et al.* Comparison of weight loss among named diet programs in overweight and obese adults: A meta-analysis. JAMA 2014;312:923-33.
3. Jeong JN. Effect of pre-meal water consumption on energy intake and satiety in non-obese young adults. Clin Nutr Res 2018;7:291-6.
4. Franz MJ, Boucher JL, Rutten-Ramos S, VanWormer JJ. Lifestyle weight-loss intervention outcomes in overweight and obese adults with type 2 diabetes: A systematic review and meta-analysis of randomized clinical trials. J Acad Nutr Diet 2015;115:1447-63.
5. Catsburg C, Kim RS, Kirsh VA, Soskolne CL, Kreiger N, Rohan TE. Dietary patterns and breast cancer risk: A study in 2 cohorts. Am J Clin Nutr 2015;101:817-23.
6. Munt A, Partridge S, Allman-Farinelli M. The barriers and enablers of healthy eating among young adults: A missing piece of the obesity puzzle: A scoping review. Obesity Rev 2017;18:1-17.
7. Hilger J, Loerbroks A, Diehl K. Eating behaviour of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. Appetite 2017;109:100-7.
8. Memish ZA, El Bcheraoui C, Tuffaha M, Robinson M, Daoud F, Jaber S, *et al.* Peer reviewed: Obesity and associated factors—Kingdom of Saudi Arabia, 2013. Prev Chronic Dis 2014;11:E174.
9. Al Dawish MA, Robert AA, Braham R, Al Hayek AA, Al Saeed A, Ahmed RA, *et al.* Diabetes mellitus in Saudi Arabia: A review of the recent literature. Curr Diabetes Rev 2016;12:359-68.
10. Moradi-Lakeh M, El Bcheraoui C, Tuffaha M, Daoud F, Al Saeedi M, Basulaiman M, *et al.* Tobacco consumption in the Kingdom of Saudi Arabia, 2013: Findings from a national survey. BMC Public Health 2015;15:611.
11. El Bcheraoui C, Memish ZA, Tuffaha M, Daoud F, Robinson M, Jaber S, *et al.* Hypertension and its associated risk factors in the Kingdom of Saudi Arabia, 2013: A national survey. Int J Hypertens 2014;2014:564679.
12. Neumann A, Lindholm L, Norberg M, Schoffer O, Klug SJ, Norstrom F. The cost-effectiveness of interventions targeting lifestyle change for the prevention of Diabetes in a Swedish primary care and community based prevention program. Eur J Health Econ 2017;18:905-19.
13. Larsen KT, Huang T, Moller NC, Andersen LB, Sorensen J. Cost-effectiveness of a day-camp weight-loss intervention programme for children: Results based on a randomised controlled trial with one-year follow-up. Scand J Public Health 2017;45:666-74.
14. Piepoli MF, Villani GQ. Lifestyle modification in secondary prevention. Eur J Prev Cardiol 2017;24 (3_suppl):101-7.
15. Folling IS, Solbjor M, Helvik AS. Previous experiences and emotional baggage as barriers to lifestyle change-a qualitative study of Norwegian Healthy Life Centre participants. BMC Fam Pract 2015;16:73.
16. Mc Morrow L, Ludbrook A, Macdiarmid JI, Olajide D. Perceived barriers towards healthy eating and their association with fruit and vegetable consumption. J Public Health (Oxf) 2017;39:330-8.
17. Dilla D, Ian J, Martin J, Michelle H, Felicity A. "I don't do it for myself, I do it for them": A grounded theory study of South Asians' experiences of making lifestyle change after myocardial infarction. J of Clin Nurs 2020. doi: 10.1111/jocn. 15395.
18. Althumiri NA, BinDhim NF, Alqahtani SA. Prevalence of physical inactivity and sedentary behaviors and associations with obesity among SaudiAdults. J Health Econ Outcomes Res 2020. doi: 10.21203/rs. 3.rs-40306/v1.
19. AlQuaiz AM, Tayel SA. Barriers to a healthy lifestyle among patients attending primary care clinics at a university hospital in Riyadh. Ann Saudi Med 2009;29:30-5.
20. Alouki K, Delisle H, Bermúdez-Tamayo C, Johri M. Lifestyle interventions to prevent type 2 diabetes: A systematic review of economic evaluation studies. J Diabetes Res 2016;2016:2159890.
21. Moran AE, Odden MC, Thanataveerat A, Tzong KY, Rasmussen PW, Guzman D, *et al.* Cost-effectiveness of hypertension therapy according to 2014 guidelines. N Engl J Med 2015;372:447-55.
22. Vijay G, Wilson EC, Suhrcke M, Hardeman W, Sutton S. Are brief interventions to increase physical activity cost-effective? A systematic review. Br J Sports Med 2016;50:408-17.
23. Mattli R, Farcher R, Syleouni M-E, Wieser S, Probst-Hensch N, Schmidt-Trucksäss A, *et al.* Physical activity interventions for primary prevention in adults: A systematic review of randomized controlled trial-based economic evaluations. Sports Med2020;50:731-50.
24. Mehdad S, Benaich S, Bouhaddou N. Magnitude of overweight, obesity and physical inactivity as risk factors of major noncommunicable diseases in North African Countries. In: Disease Prevention and Health Promotion in Developing Countries 2020. Cham: Springer. p. 73-84.
25. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: A pooled analysis of 358 population-based surveys with 1.9 million participants. Lancet Global Health 2018;6:e1077-e86.
26. Raj JP, Norris JJ, Ploriya S. Prevalence of low physical activity, its predictors and knowledge regarding being overweight/obesity: A community-based study from urban South India. J Family Med Prim Care 2020;9:82.
27. Ács P, Kovács A, Paár D, Hoffbauer M, Szabó P, Szabó T, *et al.*

Comparative analysis of the economic burdens of physical inactivity in Hungary between 2005 and 2017. BMC Public Health 2020;20:1-9.

28. group TI. International Physical Activity Questionnaire. 2016. www.ipaq.ki.se.
29. ROE L, Strong C, Whiteside C, Neil A, Mant D. Dietary intervention in primary care: Validity of the DINE method for diet assessment. Fam Pract1994;11:375-81.
30. Al-Daghri NM, Al-Attas OS, Alokail MS, Alkharfy KM, Yousef M, Sabico SL, *et al*. Diabetes mellitus type 2 and other chronic noncommunicable diseases in the central region, Saudi Arabia (Riyadh cohort 2): A decade of an epidemic. BMC Med 2011;9:76.
31. El Bcheraoui C, Basulaiman M, Tuffaha M, Daoud F, Robinson M, Jaber S, *et al*. Status of the diabetes epidemic in the Kingdom of Saudi Arabia, 2013. Int J Public Health 2014;59:1011-21.
32. Fryar CD, Carroll MD, Ogden CL. Prevalence of overweight, obesity, and severe obesity among adults aged 20 and over: United States, 1960-1962 through 2015–2016. NCHS Health E-Stats 2018. Available fro m: https://stacks.cdc.gov/view/cdc/58670.
33. Kalavathy R, Al Araj SA, Rabbani SA. Prevalence of obesity among adults in Ras Al Khaimah, United Arab Emirates. Int J Res Med Sci 2019;7:555.
34. Nagendra K, Nandini C, Belur M. A community based study on prevalence of obesity among urban population of Shivamogga, Karnataka, India. Int J Community Med Public Health 2017;4:96-9.
35. Schienkiewitz A, Mensink G, Kuhnert R, Lange C. Overweight and obesity among adults in Germany. 2017. doi: 10.17886/RKI-GBE-2017-038.
36. Waly MI, Zayed K, Al Haddabi B. Obesity, eating habits and sedentary behaviour of Omani young adolescents: A cross-sectional study. EC Nutr 2017;7:3-10.
37. Rathi N, Riddell L, Worsley A. Food consumption patterns of adolescents aged 14–16 years in Kolkata, India. Nutr J 2017;16:50.
38. Bergström M, Håkansson A, Blücher A, Andersson HS. From carbohydrates to fat: Trends in food intake among Swedish nutrition students from 2002 to 2017. Plos One 2020;15:e0228200.
39. Corvalán C, Garmendia M, Jones-Smith J, Lutter C, Miranda J, Pedraza L, *et al*. Nutrition status of children in Latin America. Obes Rev 2017;18:7-18.
40. Al-Zalabani AH, Al-Hamdan NA, Saeed AA. The prevalence of physical activity and its socioeconomic correlates in Kingdom of Saudi Arabia: A cross-sectional population-based national survey. J Taibah Univ Med Sci 2015;10:208-15.
41. Badr HE, Lakha SF, Pennefather P. Differences in physical activity, eating habits and risk of obesity among Kuwaiti adolescent boys and girls: A population-based study. Int J Adolesc Med Health 2017;31. doi: 10.1515/ijamh-2016-0138.
42. Gichu M, Asiki G, Juma P, Kibachio J, Kyobutungi C, Ogola E. Prevalence and predictors of physical inactivity levels among Kenyan adults (18–69 years): An analysis of STEPS survey 2015. BMC Public Health 2018;18:1217.
43. Micklesfield LK, Munthali RJ, Prioreschi A, Said-Mohamed R, Van Heerden A, Tollman S, *et al*. Understanding the relationship between socio-economic status, physical activity and sedentary behaviour, and adiposity in young adult South African women using structural equation modelling. Int J Environ Res Public Health 2017;14:1271.
44. Farahmand M, Amiri P, Tehrani FR, Momenan AA, Mirmiran P, Azizi F. What are the main barriers to healthy eating among families? A qualitative exploration of perceptions and experiences of Tehranian men. Appetite 2015;89:291-7.
45. de Mestral C, Stringhini S, Marques-Vidal P. Barriers to healthy eating in Switzerland: A nationwide study. Clin Nutr 2016;35:1490-8.
46. Pinho M, Mackenbach J, Charreire H, Oppert J-M, Bárdos H, Glonti K, *et al*. Exploring the relationship between perceived barriers to healthy eating and dietary behaviours in European adults. Eur J Nutr 2018;57:1761-70.
47. Pedersen BK, Saltin B. Exercise as medicine–evidence for prescribing exercise as therapy in 26 different chronic diseases. Scand J Med Sci Sports 2015;25:1-72.
48. Alsubaie AS, Omer EO. Physical activity behavior predictors, reasons and barriers among male adolescents in Riyadh, Saudi Arabia: Evidence for obesogenic environment. Int J Health Sci 2015;9:400.
49. Samara A, Nistrup A, Al-Rammah TY, Aro AR. Lack of facilities rather than sociocultural factors as the primary barrier to physical activity among female Saudi university students. Int J Women's Health 2015;7:279.
50. Al-Otaibi HH. Measuring stages of change, perceived barriers and self efficacy for physical activity in Saudi Arabia. Asian Pac J Cancer Prev 2013;14:1009-16.
51. Alzahrani AM, Albakri SBB, Alqutub TT, Alghamdi AA, Rio AA. Physical activity level and its barriers among patients with type 2 diabetes mellitus attending primary healthcare centers in Saudi Arabia. J Fam Med Prim Care 2019;8:2671.
52. Simpson RJ, Katsanis E. The immunological case for staying active during the COVID-19 pandemic. Brain Behavior Immun 2020;87:6-7.