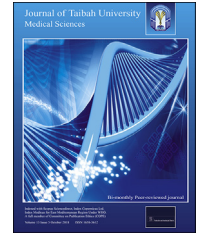




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Original Article

Cardiovascular risk and fruit and vegetable consumption among women in KSA; A cross-sectional study

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المخلص

أهداف البحث: تهدف هذه الدراسة إلى استكشاف مدى استهلاك الفاكهة والخضروات بين النساء السعوديات لتحديد الفوائد والعقبات المرجوة المرتبطة بالنظام الغذائي الصحي في الوقاية من مخاطر أمراض القلب والأوعية الدموية، ولربط نتائج مقياس فرامنغهام بالعقبات المتصورة.

طرق البحث: تم تطبيق استبيان مستوحى من المعتقدات الصحية المتعلقة بمعايير الأمراض القلبية الوعائية، وتم تطبيقه على النساء اللواتي يراجعن مراكز الرعاية الأولية في المملكة العربية السعودية. بالإضافة إلى الإحصاءات الوصفية، تم استخدام اختبار مربع كاي والانحدار الخطي المتعدد لتحديد الارتباط بين تصورات الاستفادة والعقبات باستخدام فئات نتائج فرامنغهام، وبين متوسط نتائج مقياس فرامنغهام والعقبات المتصورة.

النتائج: تم استقطاب ما مجموعه 503 امرأة في هذه الدراسة، في حين كان 75% منهن أكبر من 45 سنة. كان أكثر من 60% من النساء بدينات و97% يستهلكن حصة إلى 3 حصص يوميا من الفواكه والخضراوات، و فقط 4.1% يستهلكن خمس حصص أو أكثر في اليوم. كانت غالبية النساء على دراية بفوائد اتباع نظام غذائي صحي للوقاية من الأمراض القلبية الوعائية. ولم يتم تحديد أي اختلاف كبير بين نتائج مقياس فرامنغهام والمنفعة الملموسة أو العقبات. وقد شملت العقبات عبر المجموعات المنخفضة المخاطر إلى العالية المخاطر، نقص المعرفة بال "النظام الغذائي الصحي"، وعدم توفر الوقت الكافي للطهي، وتحمل التكاليف، ووجود مشاكل أكثر أهمية. وكان لدى النساء اللاتي اختلفن في العقبات، معاملات بيتا سلبية على متوسط نتائج مقياس فرامنغهام.

الاستنتاجات: كان تناول الفواكه والخضروات في هذه المجموعة الدراسية أقل مما هو موصى به في القواعد الإرشادية. وعلى الرغم من الوعي بفائدة اتباع نظام غذائي صحي في الوقاية من الأمراض القلبية الوعائية، فإن عددا قليلا من النساء كان يعرف ما هو "النظام الغذائي الصحي". لذا لا يمكن التحقق من وجود ارتباط مباشر بين نتائج مقياس فرامنغهام والتصورات/ والعقبات. ولكن يمكن التعامل مع العقبات المتصورة من خلال دمج الحملات التعليمية المستحدثة مع النماذج الموجودة للخطة الغذائية الصحية.

الكلمات المفتاحية: أمراض القلب والأوعية الدموية؛ النظام الغذائي؛ نمط الحياة؛ النساء؛ المملكة العربية السعودية.

Abstract

Objectives: This study aims to assess fruit and vegetable consumption among Saudi women to identify perceived benefits and barriers associated with a healthy diet in cardiovascular disease (CVD) risk prevention and to correlate Framingham risk scores (FRSs) with the perceived barriers.

Methods: A questionnaire adapted from the Health Beliefs Related to Cardiovascular Disease Scale was administered to women attending a primary care centre in KSA. In addition to descriptive statistics, a chi-square test and multiple linear regression analysis were used to determine the association between perceptions of benefit and barriers with FRS categories and between mean FRS and perceived barriers.

Results: A total of 503 women were included in this study, and 75% of the women were older than 45 years. More than 60% of women were obese, and 97% consumed 1–3 fruit and vegetable servings per day, whereas only 1.4% consumed fruits and vegetables 5 or

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more times per day. The majority of women were aware of the benefits of a healthy diet in CVD prevention. No significant difference between FRS and perceived benefits or barriers was observed. Barriers across the low- to high-risk groups included a lack of knowledge about a 'healthy diet', insufficient time to cook, food affordability, and having more important problems. Women who disagreed on barriers had negative beta coefficients for the mean FRS ($p < 0.03$).

Conclusions: In this study cohort, fruit and vegetable intake was lower than the recommended guidelines. Despite awareness of the benefits of a healthy diet in CVD prevention, very few women understood the true meaning of 'healthy diet'. A direct association between FRS and perceptions/barriers could not be validated. Perceived barriers could be addressed by integrating innovative educational campaigns to existing models of the Healthy Food Plan.

Keywords: Cardiovascular disease; Diet; Lifestyle; Women; KSA

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Introduction

High consumption of fruit and vegetable (FV) is a vital element of a healthy diet that is recommended for preventing diseases, including cardiovascular disease (CVD).^{1–3} A minimum of 5 portions (400 g) of FV per day has been shown to reduce the risk of serious health problems.⁴ FVs are a source of vitamins, minerals, fibres, and antioxidants, which protect against CVD and its risk factors.⁵ According to the World Health Organization (WHO) (2003), low FV intake is associated with more than 2.7 million deaths per year globally.⁴ Thus, increasing FV consumption is crucial not only to save lives but also to improve the well-being of society. Despite the general knowledge and perceived health benefits attributed to FV consumption, FV intake is far below the minimum daily recommendation in many countries.⁴ Barriers to consumption seem to play an important role in affecting dietary choices, regardless of perceived benefits.⁶

According to the WHO, the lack of compliance to FV intake recommendations is particularly evident in Middle Eastern countries and the North Africa region, with the proportion being up to 96.7% in Egypt⁷ and 91.1% in Qatar.⁸ Furthermore, in KSA, where this study will be focused, data from the last national health survey show that 97.4% of adults consumed fewer than 5 FV servings, and only 2.6% of adults complied with the consumption guidelines.⁹ Moreover, two studies reported a significant statistical difference in FV consumption between sexes; women were found to consume less FV than men ($p = 0.001$).^{10,11} Additionally, as reported in a recent

systematic review (2016), CVD affected women in KSA due to lifestyle-related factors such as obesity and physical inactivity.¹²

Consequently, to increase FV consumption, factors affecting behaviours associated with FV consumption need to be studied, i.e. perceived benefits and barriers to a healthy diet. Addressing low FV consumption among women can contribute to reducing not only their own CVD risk but also that of men. Furthermore, women can be key to a healthier diet as traditionally they are responsible for the household diet (ref). This study employed the Framingham risk score (FRS), which is commonly used in KSA, together with a modified version of the Health Beliefs Related to Cardiovascular Disease Scale (HBRCDs).¹³ These tools were used to understand health-related behaviours and assess behavioural associations with perceived benefits and barriers related to a healthy diet and CVD prevention. Perceived benefits and barriers to a healthy diet can influence food choices.¹⁴ Therefore, this study aimed to contribute towards increasing FV consumption among women in KSA by exploring FV consumption, identifying perceived benefits and barriers associated with a healthy diet for CVD risk prevention, and correlating probability FRSs with these perceived barriers.

Materials and Methods

Study design and sample recruitment

This cross-sectional descriptive and analytical study targeted women attending the Primary Care Centre (PCC) at King Saud University Medical City from December 2015 to June 2016.

The sample size calculation was based on an expected CVD frequency of 18% amongst women in KSA.¹⁵ Among these women, we aimed to determine if there was a correlation between their FV consumption and their CVD status. The required sample size was at least 389 women using the FluidSurveys© (2014) software,¹⁶ with 95% CI and an error margin of 0.05. In order to account for any missing data, the sample size was increased by 30%, and thus, the total number of required participants was 503. Using a non-random convenience sampling method, 503 women who visited the PCC for a regular appointment were recruited. All candidates answered an individual questionnaire, which was filled in by a research assistant. Inclusion criteria required that all participants be females with an age above 15 years. All the participants signed a consent form to be participate in this study. Patients with known CVD, i.e. ischaemic heart disease, stroke history, and other serious diseases, were excluded.

Questionnaire

The final questionnaire was divided into three sections. The first section queried about demographic data (e.g. age, marital status, educational level, employment, monthly family income, height, weight, and family history of CVD). The second section enquired about personal lifestyle. For an accurate report of FV intake, visual aids were used. The

images included serving dishes, cups, bowls, spoons, vegetables, and fruits to help participants estimate their daily servings. The last section included a validated tool adopted from the HBRCDs.¹⁷ Four statements were posed with respect to perceived benefits (i.e. Eating a healthy diet will decrease my chances of having heart attack or stroke; Eating a healthy diet most days of the week is one of the best ways for me to prevent a heart attack or stroke; When I eat healthy I am doing something good for myself; and Eating a healthy diet will decrease my chances of dying from cardiovascular disease), in addition to 4 statements regarding perceived barriers (I do not know what is considered a healthy diet that would prevent me from developing CVD; I do not have time to cook meals for myself; I can't afford to buy healthy foods; I have other problems more important than worrying about diet).

Ethical aspects

Ethical approval was obtained from King Saud University Medical City. Written informed consent was also obtained from each participant before data collection (reference # 15/0438/IRB).

Translation and data collection

The questionnaire was translated into Arabic and subjected to a process of forward and backward translation.¹⁸ A cross-cultural translation and adaptation process¹⁹ was used to adapt the HBRCDs questionnaire, and recommended amendments were discussed before the questionnaire was finalized. It was pre-tested for content, design, readability, and comprehension among 23 women (not included in the final analysis), and modifications were made to ensure that the questionnaire was simple to understand and answer.

The data were collected by a team of in-house trained research assistants who conducted face-to-face interviews with the patients. Each interview lasted for approximately 20–25 min.

Anthropometric measurements and laboratory measurements

Data for anthropometric and laboratory measurements were obtained from the most recent registries of patients' medical records. Height and weight were used to calculate the body mass index. Blood pressure included both systolic blood pressure and diastolic blood pressure. For the lipid profile, we used the most recent cholesterol level, i.e. within the last 4–6 years.²⁰ FRS was calculated considering the following factors: age; presence or absence of diabetes; smoking; lipid profile; and blood pressure values.²¹ The participants were then classified according to the FRS for CVD: low risk (10% or less) at 10 years; intermediate risk (10–20%); and high risk (20% or more).

Statistical analysis

Each survey item was coded and entered into the Statistical Package for the Social Sciences (SPSS) version 24.0

software. Descriptive statistics, such as frequencies, was performed for all demographic and personal variables. The chi-square test was used to determine the association between perceived benefits and barriers to a healthy diet with the FRS categories (low, moderate, and high). Moreover, multiple linear regression analysis was performed between mean FRS (as the dependent variable) and perceived barriers to a healthy diet. Variables with *p* values of <0.05 were considered statistically significant.

Results

A total of 503 women were included in this study. Of 503 women, FRS could be calculated for only 480 women because of the availability of a recent lipid profile (within the last 5 years). [Table 1](#) summarizes the demographic characteristics of the participants. Among the participants, 75% were older than 45 years, and more than 60% were obese, with waist-to-hip ratios exceeding 0.8.

Our first objective was to estimate the prevalence of FV consumption. Regarding this, the majority (97%) of participants consumed 1–3 servings per day, and only 1.4% of them consumed the recommend 5 or more servings per day. Half of the participants had a low educational level, mostly below high school, and more than 68% were housewives. Overall, the mean FRS among all the participants was 12.55 (± 8.9).

The second objective was to address the perceived benefits and barriers to a healthy diet. Most of the women were aware of the benefit of a healthy diet in CVD prevention ([Table 2](#)). No significant difference between FRS classification and perceived benefits and barriers was identified (See [Figures 1 and 2](#)). Nevertheless, it appeared that despite knowing the benefits of a healthy diet, the participants did not clearly understand the meaning 'healthy diet'. The other barriers across the low- to high-risk groups were not having time to cook, affordability, and having more important problems to take care of. The difference in agreement with these statements was 64–65% in the low-risk group, 71% in the moderate-risk group, and 73–74% in the high-risk group.

[Table 3](#) shows the relationship between perceived barrier items and FRSs of the perceived barrier items using multiple linear regression analysis. Women who disagreed regarding the barrier (all 4 statements in regard to the barrier) had negative (–2.12) beta coefficients on the mean FRS, and this relationship was significantly different ($p < 0.03$). This indicates a higher mean FRS among women who agree regarding these barriers.

Discussion

The current study found that low consumption of FV was dominant among all the participants. A number of researchers have also reported low consumption among the Saudi population. In Alzeidan et al, they measured the CVD risk among the university employees and their families, and FV consumption was documented. They reported that more than 87% consumed less than 5 servings per day.¹¹ Likewise, two national household surveys reported low-level consumption. The first one was conducted between August 2004 and 2005, and showed that only 5% consume 5

Table 1: Demographic characteristics of the participants (n = 503).

| | Frequency | Percent (%) |
|---|-----------|-------------|
| Age | | |
| 15–24 | 21 | 4.2 |
| 25–34 | 33 | 6.5 |
| 35–44 | 69 | 13.7 |
| 45–54 | 145 | 28.8 |
| 55–+64 | 167 | 33.1 |
| +65 | 68 | 13.5 |
| Marital status | | |
| Currently married | 371 | 73.6 |
| Never married | 32 | 6.3 |
| Separated/divorced/widowed | 100 | 19.9 |
| Education level | | |
| Elementary or less | 251 | 49.8 |
| Intermediate/high school | 129 | 25.6 |
| Diploma/college degree or postgraduate | 123 | 24.4 |
| Employment condition | | |
| Government/semi-government/private sector | 88 | 17.5 |
| Student/not working | 31 | 6.2 |
| Housewife | 356 | 70.6 |
| Retired | 28 | 5.6 |
| Monthly Income | | |
| less than 2000 SR | 124 | 24.6 |
| 3000–6999 SR | 107 | 21.2 |
| 7000–14999 SR | 182 | 36.1 |
| 15000 or above | 90 | 17.8 |
| Reported chronic disease status | | |
| Hypertension | 191 | 37.9 |
| Diabetes | 275 | 54.6 |
| 150 min/week of moderate PA or at least 75 min/week | | |
| YES | 185 | 36.7 |
| NO | 318 | 63.1 |
| Smoking status | | |
| Never smoked | 497 | 98.6 |
| Ex-smoker | 1 | 0.2 |
| Current smoker | 2 | 0.4 |
| Daily servings of fruits and vegetables | | |
| None | 5 | 1 |
| 1–3 servings | 489 | 97 |
| +3–5 servings | 5 | 1 |
| More than 5 servings | 2 | 0.4 |
| Daily hours spent in watching TV | | |
| 1 h or less | 246 | 48.8 |
| 1–3 h | 145 | 28.8 |
| >3–5 h | 35 | 6.9 |
| more than 5 h | 74 | 14.7 |
| BMI | | |
| Underweight/normal | 38 | 7.5 |
| Overweight | 138 | 27.4 |
| Obese | 308 | 61.1 |
| Waist-to-hip ratio (WHR) | | |
| <0.8 | 7 | 1.4 |
| >0.8 | 497 | 98.6 |
| Family history of DM | | |
| Yes | 170 | 33.7 |
| Family history of HTN | | |
| Yes | 269 | 58.8 |
| No | 206 | 40.9 |

Table 1 (continued)

| | Frequency | Percent (%) |
|-----------------------------------|-----------|-------------|
| Family history of hyperlipidaemia | | |
| Yes | 127 | 25.1 |
| No | 376 | 74.5 |
| Framingham risk classification | | |
| Low | 217 | 43.0 |
| Intermediate | 153 | 30.3 |
| High | 113 | 22.4 |

DM: Diabetes mellitus, HTN: Hypertension, BMI: Body mass index.

servings daily.²² The second one was in 2013 with only 8 % consuming 5 servings daily (8%).⁹ In addition, university studies, like Alsunni and Badar's (2015), report that despite more than 78 % of the university students being aware of WHO FV recommendation, 83% consumed less than one serving per day.²³ Also, in Al-Otaibi 2013, 78% of university students were consuming less than 5 servings daily; only 22% consumed 5 or more servings. In this case, the higher consumption group was more knowledgeable about the daily recommendations on FV.²⁴ While, in Epuru, Eideh et al. (2014), nearly half the study population did not know the potential health benefits of consuming FV on a daily basis, and about one fourth did not believe that it is important to consume fresh FV.²⁵ In our study, despite, most of the study participants agreeing in perceiving the benefit of a healthy diet in CVD prevention, only 0.4% consume more than 5 servings per day. However, the majority of them did not know what to consider a healthy diet for CVD prevention. This suggests that addressing the knowledge gap in FV daily consumption will contribute positively to an adequate intake of FV for the prevention of CVD. The more knowledge an individual gains the more likely that individual is to act upon that knowledge.²⁶ An example can be seen in Al-Bannay et al (2015). In the intervention group of this study, the participants showed that they had benefited from the intensive education program with improvements in blood sugar, physical activity, nutritional behaviours and choices.²⁷

Overall, a high score for perceived barriers to engaging in a healthy consumption of food was reported in this study. Most of the women were among intermediate and high FRS categories. As mentioned in the results section, the barriers were lack of time, financial courses, or other priorities. Some other studies have addressed the barriers for FV consumption among women in Saudi Arabia.^{24,25,28,29} The most mentioned barrier reported in them was the lack of time to prepare food or eat healthily. Two studies reported that healthier food is more expensive. In Epuru et al. (2014), around 40% of the subjects had the feeling that eating fresh FV was costly.²⁵ In Al-Otaibi's (2013) study, in which the students consumed less than 5 servings a day, they believed that FV were expensive, in addition to the unavailability of FV in university restaurants.²⁴ In Farrukh M (2015) study, 17% reported lack of access to healthy food, and 25% reported lack of time.²⁸ Most of the reported barriers in primary care settings, were lack of

Table 2: Relationship between perceived benefit/barrier to a healthy diet and Framingham risk scores in different categories.

| | | Framingham risk scores in different categories | | | | | | <i>P</i> value |
|--|----------|--|----------|-----------------------|----------|------------------|----------|----------------|
| | | Low (FRS < 10%) | | Moderate (FRS 10–19%) | | High (FRS > 20%) | | |
| | | N | Column % | N | Column % | N | Column % | |
| Perceived benefit to healthy diet | | | | | | | | |
| Eating a healthy diet will decrease my chances of having heart attack or stroke | Disagree | 11 | 5% | 8 | 5% | 6 | 5% | 0.158 |
| | Neutral | 4 | 2% | 11 | 7% | 6 | 5% | |
| | Agree | 196 | 93% | 129 | 87% | 98 | 89% | |
| Eating a healthy diet most days of the week is one of the best ways for me to prevent a heart attack or stroke | Disagree | 11 | 5% | 8 | 5% | 6 | 5% | 0.155 |
| | Neutral | 4 | 2% | 11 | 7% | 6 | 5% | |
| | Agree | 200 | 93% | 131 | 87% | 100 | 89% | |
| When I eat healthy I am doing something good for myself | Disagree | 11 | 5% | 8 | 5% | 6 | 5% | 0.256 |
| | Neutral | 4 | 2% | 11 | 7% | 6 | 5% | |
| | Agree | 200 | 93% | 131 | 87% | 100 | 89% | |
| Eating a healthy diet will decrease my chances of dying from cardiovascular disease | Disagree | 11 | 5% | 8 | 5% | 6 | 5% | 0.167 |
| | Neutral | 5 | 2% | 11 | 7% | 6 | 5% | |
| | Agree | 197 | 92% | 129 | 87% | 99 | 89% | |
| Perceived barrier to healthy diet | | | | | | | | |
| I do not know what is considered a healthy diet that would prevent me from developing cardiovascular disease | Disagree | 57 | 27% | 33 | 22% | 19 | 17% | 0.353 |
| | Neutral | 17 | 8% | 10 | 7% | 10 | 9% | |
| | Agree | 137 | 65% | 105 | 71% | 81 | 74% | |
| I do not have time to cook meals for myself | Disagree | 57 | 27% | 33 | 22% | 19 | 17% | 0.353 |
| | Neutral | 17 | 8% | 10 | 7% | 10 | 9% | |
| | Agree | 137 | 65% | 105 | 71% | 81 | 74% | |
| I cannot afford to buy healthy foods | Disagree | 58 | 27% | 33 | 22% | 19 | 17% | 0.284 |
| | Neutral | 18 | 9% | 10 | 7% | 10 | 9% | |
| | Agree | 135 | 64% | 105 | 71% | 81 | 74% | |
| I have other problems more important than worrying about diet | Disagree | 59 | 27% | 34 | 22% | 19 | 17% | 0.255 |
| | Neutral | 18 | 8% | 11 | 7% | 12 | 11% | |
| | Agree | 140 | 65% | 108 | 71% | 82 | 73% | |

Framingham risk score (FRS) categories: low risk (10% or less) at 10 years, intermediate risk (10–19%), and high risk (20% or more).

knowledge, lack of self-motivation, lack of social support, and lack of encouragement, corresponding to 43.7%, 82.4%, and 73.9%, respectively.²⁹

Strengths and limitations

One of the strengths of this study was the use of visual aids to describe the FV portion, to overcome misunderstandings in defining the serving size.

The main limitation of the study is the recall bias that could have occurred mainly in measuring behaviours like FV consumption. Another limitation is that the study was implemented in only one primary care setting, and most of the participants were older than 45 years of age, which can limit the generalizability of the findings. Also, in this study, we were not able to test the association between the FRS and FV consumption, because most of the participants (98%) were in one category (1–3 serving per day).

Conclusion

The findings of this study indicated that FV intake was lower than the recommended minimum daily requirement among women in KSA. Despite being aware of the benefit of a healthy diet in the prevention of CVD, the exact meaning of a healthy diet remained unclear and thus

represented a barrier for achieving the target FV consumption according to the KSA guidelines and the WHO serving recommendation; other barriers include a lack of prioritization and affordability. The perceived barriers could be addressed by integrating innovative educational campaigns to existing models, such as the Healthy Food Palm. Understanding FV consumption and addressing barriers to healthy eating are beneficial in CVD prevention and could also have an impact on other non-communicable diseases such as cancer. Further studies should be conducted using samples with an age distribution closer to the general population to accurately measure the association between FRS and FV consumption.

Abbreviations: FV, Fruit and vegetable; PCCs, Primary Care Centres; HBRCDs, Health Beliefs Related to Cardiovascular Disease Scale; CVD, Cardiovascular disease; WHO, World Health Organization.

Recommendations

Update guidelines and promote a simple message

In 2012, the Ministry of Health published dietary guidelines called the 'Healthy Food Palm'.³⁰ Although the consumption of grains has been found to be at an adequate

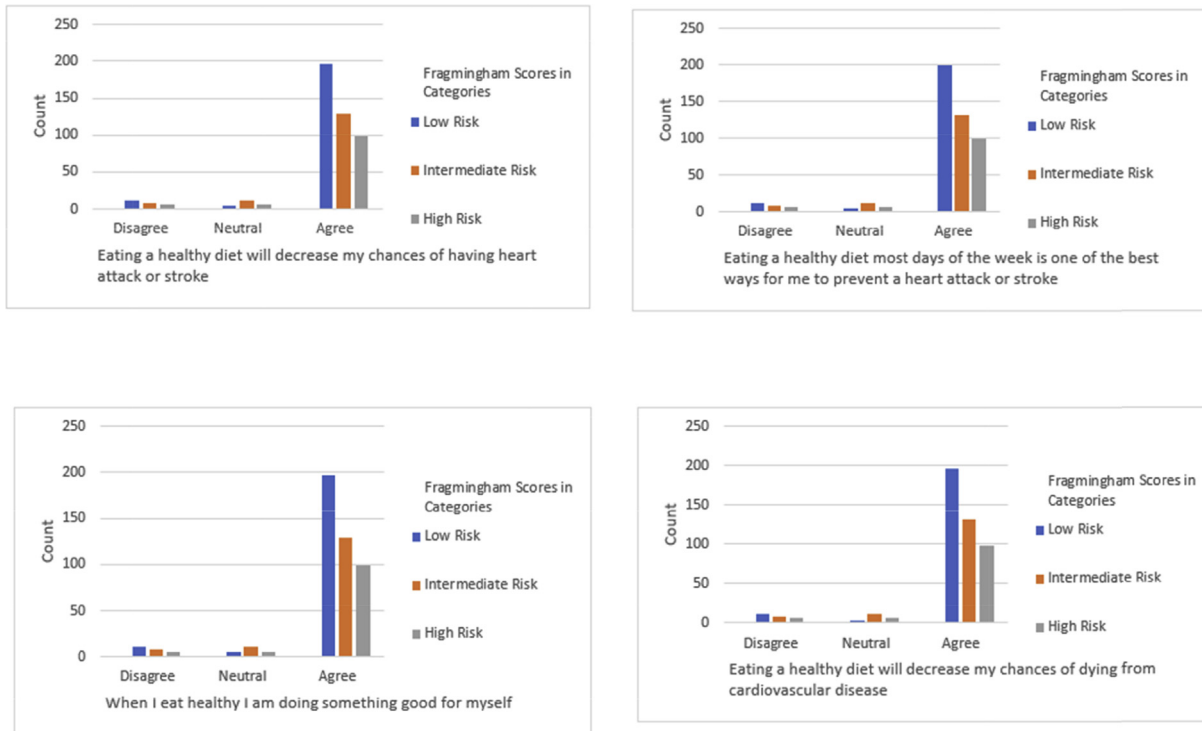


Figure 1: Bar chart of the perceived benefit to a healthy diet in CVD prevention and Framingham risk scores in different categories.

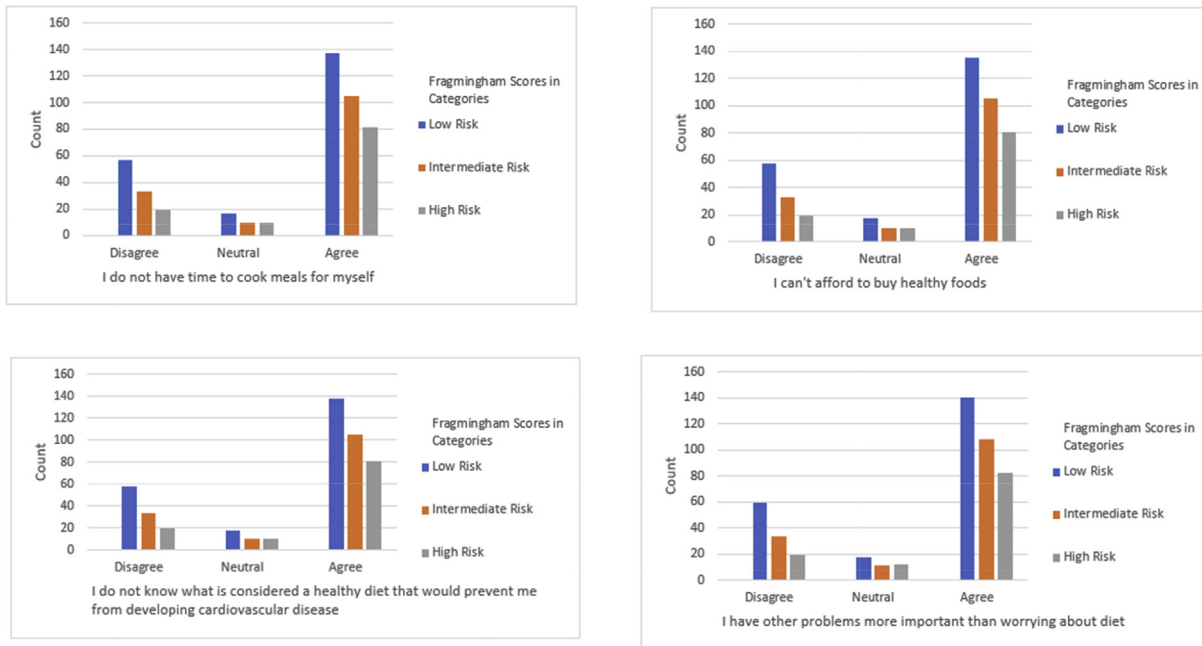


Figure 2: Bar chart of the perceived barriers to a healthy diet in CVD prevention and Framingham risk scores in different categories.

level,⁹ women have an elevated prevalence of diabetes (9.6%), hypertension (21.85%), and obesity (40.23%).¹² We recommend updating the dietary guidelines to prioritise and focus on FV intake with a simple, clear campaign about the serving amounts. The "5 a day" campaign of the UK's Department of health is a good example.³¹

Empower women, and use the Nudge theory to encourage healthy choices

Making the right food choices can be complex, and therefore empowering women in making the right decisions is highly recommended and will be reflected in society. One

Table 3: Relationship between perceived barrier items and Framingham risk scores.

| Perceived barrier items | N | Unstandardized coefficients | | Sign. |
|--|-------------|-----------------------------|------------|-------|
| | | B | Std. Error | |
| I do not know what is considered a healthy diet that would prevent me from developing cardiovascular disease | Agree (ref) | 339 | — | |
| | Disagree | 112 | -2.12 | 0.98 |
| | Neutral | 38 | 0.14 | 1.55 |
| I do not have time to cook meals for myself | Agree (ref) | 339 | — | |
| | Disagree | 112 | -2.12 | 0.988 |
| | Neutral | 38 | 0.144 | 1.55 |
| I can't afford to buy healthy foods | Agree (ref) | 339 | — | |
| | Disagree | 112 | -2.20 | 0.99 |
| | Neutral | 38 | -0.17 | 1.53 |
| I have other problems more important than worrying about diet | Agree (ref) | 339 | — | |
| | Disagree | 112 | -2.13 | 0.98 |
| | Neutral | 38 | 0.68 | 1.48 |

* Significant with P value < 0.05.

Mean Framingham risk scores: 12.55. Std. deviation 8.9, constant 13.018.

Dependent variable: Framingham risk scores.

Linear regression analysis shows the relationship between.

of the promising approaches for encouraging healthier choices in adults is the use of the Nudge Theory, proposed by Thaler and Sunstein in 2008.³² A systematic review in 2016 found that the application of the theory resulted in an average 15.3% increase in healthier dietary or nutritional choices.³³

Availability of data and materials

Anonymised patient data are in the possession of author Mashaal Alshaikh and may be shared upon request.

Source of funding

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Conflict of interest

The author declares that they have no competing interests.

Ethical approval

Ethical approval was obtained from King Saud University Medical City. In addition, written informed consent was obtained from each participant before data collection. (reference # 15/0438/IRB).

Authors' contributions

MKA constructed and designed the study, wrote the initial and final manuscript, led the research, provided

research materials, and analysed and organised data. SR revised the process and development of the manuscript by acting as a supervisor. HQY proofread and edited the final manuscript, as well as revised the data analysis. All authors reviewed and approved the manuscript for submission. All authors checked the manuscript for plagiarism and are satisfied that this manuscript complies with academic standards. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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