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# ASSOCIATION OF FAST FOOD FREQUENCY WITH OBESITY, DIABETES, HTN AND CVD AMONG SAUDI ADULTS IN AL-AHSA

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**ABSTRACT** **Introduction:** Unhealthy dietary habits, particularly high-fat, high-sugar (HFHS) foods, increase the risk of obesity and related non-communicable diseases such as diabetes, hypertension, and cardiovascular disorders. The Western-style HFHS diet has become increasingly common in Saudi Arabia, making excessive consumption a significant public health concern. **Aim:** To investigate the association between the frequency of high-fat, high-sugar fast food consumption and the prevalence of obesity, diabetes, hypertension, and cardiovascular diseases among Saudi adults in Al-Ahsa city. **Method:** The design was a descriptive, cross-sectional survey with a prestructured validated questionnaire to obtain quantitative data as a result. Data was collected among the adults (18-65 yrs), in Al-Ahsa region from September 2021 to November 2021. The questionnaire consisted of three sections, which are demographic variable, Questions about HSHF containing fast foods, frequency of consumption, and quantity of consumption. Questions about the prevalence of obesity, diabetes, hypertension, cardiovascular diseases. People who are responded to the survey are 710 persons. The responses who did not meet the inclusion criteria were excluded and the total of responses became 625. **Results:** Frequent consumption of high-fat, high-sugar foods (e.g., burgers 25.4%, French fries 39.7%, ice cream 31.5%) and sweetened or caffeinated beverages (soft drinks 34.9%, other sweetened beverages 20.3%), as well as larger portion sizes of pastries (29.8%), cakes/cookies (41.1%), and French fries (39.7%), was significantly associated with increased risk of diabetes, hypertension, and obesity. **Conclusion:** Frequent intake and larger portions of high-fat, high-sugar foods and sweetened beverages are associated with a higher risk of obesity, diabetes, and hypertension.

**KEYWORDS :** HFHS, Fast food consumption, DM, Obesity, Hypertension, CVD

## INTRODUCTION / BACKGROUND:

Unhealthy dietary habits are strongly associated with the increasing prevalence of non-communicable diseases (NCDs) and metabolic disturbances worldwide (World Health Organization [WHO], 2024). Diets high in fat and sugar, particularly through fast food and ultra-processed food (UPF) consumption, are major contributors to obesity, which in turn elevates the risk of diabetes, hypertension, and cardiovascular diseases (Alhusseini, Al-Jawaldeh, & Al-Mazrouei, 2024; Agjei, Owusu, & Yeboah, 2025). Globally, the consumption of HFHS and UPFs has risen dramatically due to urbanization, globalization, and the increased availability of convenience foods (Elizabeth et al., 2020). In Saudi Arabia, the adoption of a Western-style diet rich in HFHS and UPFs has become increasingly prevalent, replacing traditional prudent dietary patterns (Alsulami, Al-Mazrouei, & Alhusseini, 2023). Excessive consumption of these foods and sugar-sweetened beverages has been linked to higher body mass index,

obesity, and metabolic complications among Saudi adults (Al-Hanawi, Ahmed, Alshareef, Qattan, & Pulok, 2022; Hassanein et al., 2022). Evidence suggests that higher frequency of fast food intake and UPF consumption is associated with increased risk of obesity, type 2 diabetes, cardiovascular diseases, and other metabolic disorders (Malik & Hu, 2022; Agjei et al., 2025). While moderation in fat and sugar intake is recommended, current dietary trends in the Eastern Region of Saudi Arabia pose a significant public health concern (Alhusseini et al., 2024). Understanding the frequency of HFHS fast food consumption and its association with obesity, diabetes, hypertension, and cardiovascular diseases is essential to inform interventions and promote healthier dietary behaviors among Saudi adults.

## MATERIALS AND METHODS:-

A cross-sectional survey was conducted using a pre-structured questionnaire to collect quantitative data among adults in the Al-Ahsa region from September to November 2021. Ethical approval was obtained from KAIMRC and the IRB prior to data collection. The questionnaire covered demographic variables, awareness of high-sugar and high-fat (HSHF) fast foods, frequency and quantity of consumption, physical activity, anthropometric measurements, Its validity and reliability were confirmed through a pilot study on 10% of the sample.

Out of 710 respondents, 625 met the inclusion criteria and were included in the analysis. Participants, from cities including Al-Hofuf, Al-Mubarraz, Al-Oyoon, and Al-Omran, completed the self-administered questionnaire via social media or in-person interviews. Inclusion criteria were adult Saudis aged 18–65 years residing in Al-Ahsa, while those not meeting these criteria or unwilling to participate were excluded.

Data were checked for completeness and analyzed using SPSS software. Descriptive statistics (mean, median, percentages) summarized the data, and inferential statistics, including Chi-square tests, were used to assess associations between categorical variables.

## RESULTS AND DISCUSSIONS:

***Table 1: Demographic Characteristics Of Respondents.***

| Demographic characters | | N(%) |
|---|---|---|
| **Age** | 18-30 | 426 (68.2) |
| | 30-40 | 113 (18.1) |
| | 40-50 | 61 (9.8) |
| | 50 -65 | 25 (4.0) |
| **Gender** | Female | 513 (82.1) |
| | Male | 112(19.9) |
| **Education level** | Primary level | 6 (1.0) |
| | Intermediate level | 12 (1.9) |
| | Secondary level | 125 (20.0) |
| | University | 471 (75.4) |
| | High education | 11 (1.8) |
| **Residence** | Eastern region | 127 (20.3) |
| | Northern region | 253 (40.5) |
| | Central region | 245 (39.2) |
| **Employment** | Student | 335(53.6) |
| | Employed | 124(19.8) |
| | Unemployed | 147(23.5) |
| | Retired | 19(3.0) |

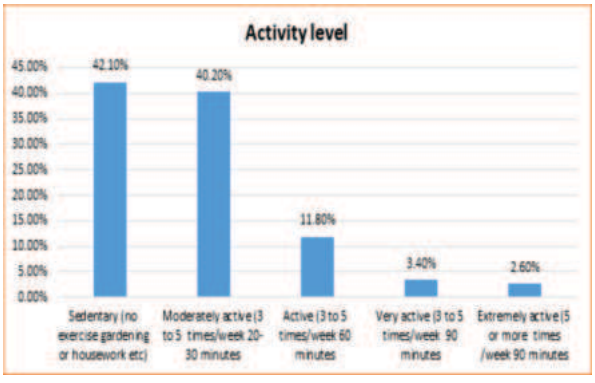
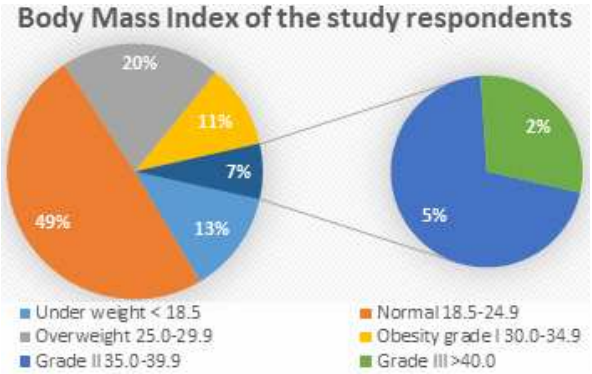



***Figure #1*** *Activity Level Of Respondents*

**Table 2 : Anthropometric Measurements Of Study Respondents (n= 625)**

| Variable | | Mean | SD |
|---|---|---|---|
| **Anthropometric measurements** | Height in cms | 160.96cm | ±8.57cm |
| | Weight in kgs | 64.19 kgs | ±18.23 kgs |

Majority of the participants were in the age group of 18 to 30 years (68.2%) depicted in table 1. The gender distribution revealed that 513 respondents (82.1%) were female, while 112 (19.9%) were male. Higher number of respondents were undergraduates (75.4%). The majority of the attendees were students (53.6%), with most of them coming from the northern region (40.5%). The analysis of physical activity levels depicted in figure #1 indicated that a majority of participants were sedentary (42.1%), followed by those who were moderately active (40.2%), with only a small fraction being extremely active (2.6%). The detailed information about the demographic characteristics among the study subjects is presented in ***Table 1***.The mean height of study participants was 160.96 cm (±8.57cm) while their mean weight was found to be 64.19 kg, (±18.23kg) is presented in ***Table 2***




***Figure# 2:-*** *Body Mass Index Of The Study Respondents*

The body mass index (BMI) distribution of Saudi adults residing in Al Ahsa, as presented in figure #2, reflects a significant public health concern. The data reveals that nearly half of the respondents (49.3%) fall within the "normal" BMI range (18.5-24.9), which is a positive indicator of overall health. However, a large proportion of the population shows signs of weight-related issues, with 20.2% classified as overweight (BMI 25.0-29.9), and an alarming 17.7% of respondents falling into the obesity categories (BMI ≥ 30.0).

The data reveals a concerning trend toward overweight and obesity among Saudi adults in Al Ahsa. A combined 37.9% of respondents are either overweight or obese (BMI ≥ 25.0), which is consistent with national trends in Saudi Arabia. The Saudi Health Information Survey (2013) indicated that 28.7% of the adult population is overweight, and 33.5% are classified as obese. The prevalence of overweight and obesity has been linked to an increased risk of non-communicable diseases (NCDs), including cardiovascular diseases, type 2 diabetes, and certain types of cancer (Alqarni, 2016)(3).

**Table 3: Frequency Of Consumption Of Fast Foods *(1-2 Times Per Week) (n= 625)***

| Variable | Not eaten | 2-3/ month | 1-2 / week# |
|---|---|---|---|
| a) Mince, beef, or lamb, such as burgers. | 186(29.9%) | 280(44.8%) | 159(25.4%) |
| b) Beef such as steaks, ribs, roasts. | 361(57.8%) | 201(32.2%) | 63(10.1%) |
| c) Fried chicken or chicken burgers | 151(24.2%) | 253(40.5%) | 221(35.4%) |
| d) Sausages or hot dogs. | 586(93.8%) | 32(5.1%) | 7(1.1%) |
| e) Pizza. | 253(40.5%) | 320(51.2%) | 52(8.3%) |
| f) French fries. | 121(19.4%) | 256(41%) | 248(39.7%)# |
| g) Corn chips, potato chips, or popcorn with Butter. | 187(29.9%) | 232(7.1%) | 206(33%) |
| h) Doughnuts, pastries, or croissants. | 163(26.1%) | 276(44.2%) | 186(29.8%) |

| | | | |
|---|---|---|---|
| i) Cakes or cookies. | 99(15.8 %) | 269(43 %) | 257(41.1 %)# |
| j) Ice cream. | 166(26. 6%) | 262(41. 9%) | 197(31.5 %)# |
| k) Chocolate. | 89(14.2 %) | 201(32. 2%) | 335(53.6 %)# |
| l) Lollipops. | 503(80. 5%) | 80(12.8 %) | 42(6.7%) |
| m) Spreads incl. peanut butter, jam, or Honey. | 241(38. 6%) | 184(29. 4%) | 200(32% )# |
| n) Soft drink. | 221(35. 4%) | 186(29. 8%) | 218(34.9 %) |
| o) Other sweetened beverages | 309(49. 4%) | 189(30. 2%) | 127(20.3 %) |
| p) In the past month, how many times have you eaten food from a takeaway or fast-food restaurant for example McDonalds, KFC, Mexican? Chinese, Thai, or Italian? | 192(30. 7%) | 292(46. 7%) | 141(22.6 %) |

The table shows that many HFHS items are consumed at least occasionally by a large share of participants in Al-Ahsa. Processed meats such as sausages and hot dogs were rarely eaten, with 93.8% of respondents reporting "not eaten." In contrast, sweets and confectionery items were frequently consumed: chocolate (53.6%) and cakes/cookies (41.1%) were most often reported as eaten 1–2 times per week, while ice cream (31.5%) and doughnuts/pastries (29.8%) also showed notable weekly consumption.

Fast-food items such as French fries (39.7%), fried chicken (35.4%), and pizza (8.3%) were consumed weekly by a significant proportion, while the majority reported 2–3 times per month for these items. Sugar-sweetened beverages (SSBs) were also prevalent, with 34.9% consuming soft drinks weekly and 20.3% consuming other sweetened beverages weekly.

Takeaway/fast-food meals (e.g., McDonald's, KFC, Italian, or Chinese cuisine) were consumed 1–2 times per week by 22.6% of participants, while almost half (46.7%) reported consumption 2–3 times per month. Overall, the data highlight a pattern of frequent intake of energy-dense, nutrient-poor foods, particularly sweets, fried items, and Sugar-sweetened beverages (SSBs).

***Table 4:- Prevalence of Non- Communicable Diseases among study participants***

| Diseases | | Number | Frequency (%) |
|---|---|---|---|
| Hypertension | Yes | 25 | 4% |
| Diabetes | Yes | 28 | 4.5% |
| Cardiovascular diseases | Yes | 3 | 0.5% |
| Obesity | Yes | 80 | 12.8% |
| None of the above | Yes | 485 | 77.6% |
| Other | Yes | 30 | 4.8% |

Non-Communicable Diseases for participants were self- reported. The prevalence of NCDs include Hypertension (4%), Diabetes (4.5%), cardiovascular diseases (0.5%), and Obesity (13%). Most of the participants do not suffer from any of these diseases (77.8%) as showed in **Table 4**

**Table 5: Association Between Non- Communicable Diseases And Frequency Of Consumption (1-2 Times per week) *(n= 625)***

| Variable | DM | HTN | CVD | OBESITY |
|---|---|---|---|---|
| a) Mince, beef, or lamb, such as burgers. | 9 (0.554) | 8 (0.7) | 1 (0.2) | 30(0.007) * |
| b) Beef such as steaks, ribs, roasts. | 2 (0.863) | 2 (0.155) | 1 (0.269) | 6 (0.381) |
| c) Fried chicken or chicken burgers | 5 (0.137) | 6 (0.292) | 1 (0.176) | 33 (0.177) |
| d) Sausages or hot dogs. | 1 (0.393) | - | - | - |
| e) Pizza. | 1 (0.648) | 3 (0.490) | 1 (0.288) | 7 (0.246) |
| f) French fries. | 9 (0.629) | 9 (0.253) | 3 (0.101) | 42 (0.055) * |
| g) Corn chips, potato chips, or popcorn with butter. | 7 (0.301) | 4 (0.012) * | 2 (0.377) | 30 (0.687) |
| h) Doughnuts, pastries, or croissants. | 8 (0.970) | 6 (0.503) | 2 (0.250) | 27 (0.718) |
| i) Cakes or cookies. | 8 (0.377) | 9 (0.518) | 2 (0.308) | 38 (0.514) |
| j) Ice cream. | 9 (0.026) * | 5 (0.045) * | 1 (0.947) | 26 (0.612) |
| k) Chocolate. | 14 (0.262) | 9 (0.028) * | - | 53 (0.317) |
| l) Lollipops. | 3 (0.487) | 2 (0.148) | 1 (0.082) | 7 (0.611) |
| m) Spreads incl. peanut butter, jam, or honey. | 9 (0.574) | 4 (0.125) | 1 (0.471) | 23 (0.719) |
| n) soft drink | 10 (0.011)* | 6 (0.088) | 1 (0.420) | 35 (0.121) |
| o)Other sweetened beverages | 8 (0.024) * | 3 (0.165) | 1 (0.511) | 23 (0.060) |
| p) In the past month, how many times have you eaten food from a takeaway or fast-food restaurant for example McDonalds, KFC, Mexican?Chinese, Thai, or Italian? | 6 (0.019) * | 4 (0.005) * | 1 (0.243) | 24 (0.239) |

**(P< .05 * Significant at 5% Level)**

Table 5 presents the association between the frequency of consumption of high-fat, high-sugar (HFHS) foods (1–2 times per week) and the prevalence of non-communicable diseases (NCDs) including diabetes mellitus (DM), hypertension (HTN), cardiovascular disease (CVD), and obesity among 625 Saudi adults in Al-Ahsa.

The results show several significant associations. Consumption of ice cream was significantly associated with both DM ($p = 0.026$) and HTN ($p = 0.045$). Soft drink intake was significantly linked to DM ($p = 0.011$), while consumption of other sweetened beverages also showed a significant association with DM ($p = 0.024$). Eating food from takeaways or fast-food restaurants was significantly associated with both DM ($p = 0.019$) and HTN ($p = 0.005$).

Obesity was significantly associated with consumption of mince, beef, or lamb (burgers) ($p = 0.007$) and French fries ($p = 0.055$), indicating that frequent intake of specific HFHS foods may contribute to overweight and obesity. Additionally, consumption of corn chips, chocolate, and other HFHS items showed varying non-significant trends with NCDs.

**Table 6: Association Of NCD And The Frequency Of Portion Consumption (1-2 Times per week)**

| Variable | DM | HTN | CVD | OBESITY |
|---|---|---|---|---|
| How many carbonated beverages do you drink per day? | 2 (0.242) | - | - | 2 (0.430) |
| How many caffeinated beverages do you drink per day? | 6 (0.001) * | 1 (0.666) | - | 11 (0.047) * |
| How many sweetened beverages do you drink per day? | 4 (0.001) * | - | - | 1 (0.874) |
| How many teaspoons of sugar have you added to your beverages, cereal, or food? | 2 (0.32) | 2 (0.053) | 2 (0.911) | 2 (0.280) |
| How many slices of pizza you eat at a time? | 2 (0.157) | 2 (0.142) | 2 (0.154) | 2 (0.411) |
| How many portions of French fries (30 gm portion) you eat at a time? | 2 (0.536) | 2 (0.479) | 2 (0.493) | 2 (0.50) |

| | | | | |
|---|---|---|---|---|
| How many portions of corn chips, potato chips, or popcorn with butter (30 gm portion) you eat at a time? | 4 (0.523) | - | - | 15 (0.425) |
| How many portion of doughnuts, pastries, croissants (30 gm portion) you eat at a time? | 3 (0.211) | 2 (0.112) | - | 13 (0.016) * |
| How many portion of cakes, cookies (30 gm portion) you eat at a time? | 3 (0.624) | 1 (0.631) | - | 11 (0.042) * |
| How many portions of ice cream (15 gm portion) you eat at a time? | - | 1 (0.148) | - | 5 (0.689) |
| How many shawarmas do you eat at a time? | 1 (0.878) | 1 (0.814) | - | 4 (0.345) |

**(P < .05 * Significant at 5% Level)**

Table 6 presents the association between the portion size of various high-fat, high-sugar (HFHS) foods and beverages consumed 1–2 times per week and the prevalence of non-communicable diseases (NCDs) among 625 Saudi adults in Al-Ahsa.

Significant associations were observed between the consumption of caffeinated beverages and both diabetes mellitus (DM, $p = 0.001$) and obesity ($p = 0.047$). Similarly, daily intake of sweetened beverages was significantly associated with DM ($p = 0.001$). Portion size of doughnuts, pastries, and croissants was significantly associated with obesity ($p = 0.016$), as was the portion size of cakes and cookies ($p = 0.042$).

Other HFHS items such as carbonated beverages, pizza, French fries, corn chips, ice cream, and shawarma showed no significant associations with DM, HTN, CVD, or obesity at the portion sizes consumed.

## DISCUSSION

The findings from study highlight significant associations between the frequency and portion size of high-fat, high-sugar (HFHS) food consumption and the prevalence of non-communicable diseases (NCDs) among Saudi adults in Al-Ahsa. In particular, frequent intake of items such as **ice cream, chocolate, soft drinks, and fast foods (e.g., McDonald's, KFC)** showed significant correlations with diabetes mellitus (DM) and hypertension (HTN), while obesity was significantly associated with frequent consumption of **burgers, French fries, and doughnuts/pastries.** These results reinforce the well-established role of unhealthy dietary behaviors in the development of metabolic disturbances and NCDs.

The significant link between soft drinks and sweetened beverages with diabetes and hypertension is consistent with earlier studies showing that sugar-sweetened beverages increase the risk of insulin resistance, obesity, and metabolic syndrome (Malik & Hu, 2022). High intake of sugary drinks has been identified as a major contributor to the rising burden of type 2 diabetes globally (Imamura et al., 2015). Similarly, frequent fast-food consumption, as seen in the current study, has been associated with higher odds of obesity, hypertension, and dyslipidemia, especially in populations transitioning to Western-style diets (Bahammam et al., 2020; Odegaard et al., 2012).

Moreover, portion size analysis (Table 6) further demonstrated that larger consumption of doughnuts, pastries, and cakes/cookies was significantly associated with obesity, while increased portions of **caffeinated and sweetened beverages** were linked to diabetes and hypertension. This aligns with prior evidence that caloric excess from both solid and liquid HFHS sources contributes to weight gain and obesity-related comorbidities (Mozaffarian, 2016). The role of portion size in promoting excess energy intake has been documented across several populations, with larger portions increasing both total calorie intake and obesity prevalence (Rolls, 2014).

Interestingly, while cardiovascular disease (CVD) showed weaker associations in this dataset, the patterns suggest that chronic HFHS dietary behaviors may act more strongly on intermediate risk factors such as obesity, hypertension, and diabetes, which are well-known precursors to CVD (World Health Organization [WHO], 2020). These results suggest that preventive strategies in Al-Ahsa should focus not only on limiting the frequency of HFHS food consumption but also on addressing portion sizes, particularly of energy-dense snacks and sugary beverages.

Overall, the present findings confirm that unhealthy dietary behaviors are strongly associated with major NCDs in Saudi adults. Public health interventions should therefore prioritize reducing sugar-sweetened beverage consumption, discouraging fast food reliance, and raising awareness of portion control. These strategies are essential for mitigating the growing NCD burden in Saudi Arabia, where modernization and lifestyle shifts have contributed to increasing obesity and metabolic diseases (Alqarni, 2016).

## CONCLUSION

The study demonstrated that frequent and high-portion consumption of high-fat, high-sugar (HFHS) foods—particularly soft drinks, sweetened beverages, ice cream, chocolate, fast foods, pastries, and French fries—was significantly associated with increased prevalence of diabetes, hypertension, and obesity among Saudi adults in Al-Ahsa. While cardiovascular disease showed weaker associations, the findings confirm that unhealthy dietary habits and large portion sizes are major contributors to metabolic risks and NCD development. These results highlight the urgent need for public health strategies focused on reducing HFHS food intake, promoting portion control, and encouraging healthier dietary behaviors to mitigate the growing burden of NCDs in Saudi Arabia.

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