



Original Article

Risk Factors for Obesity and Sedentary Lifestyle in Adults in Tripoli, Libya: A Cross-Sectional Study

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Abstract:

Background: Obesity emerged as a global public health crisis, with the Middle East and North Africa region experiencing particularly rapid increases in prevalence driven by urbanization and the nutrition transition. Libya, especially its capital Tripoli, faced escalating rates of overweight and obesity; however, contemporary local data on specific risk factors remained limited. This cross-sectional study aimed to assess the prevalence of overweight and obesity among adults in Tripoli and to identify associated risk factors, including dietary habits, physical inactivity, and sedentary behavior. **Methods** The study included 200 adult residents (aged ≥ 18 years) recruited during February 2026. Data were collected using a structured questionnaire covering demographic characteristics, anthropometric measurements, physical activity levels, dietary habits, and lifestyle factors. BMI was classified according to WHO standards, and statistical analysis was performed using SPSS version 26. The mean BMI was 27.9 ± 5.2 kg/m². **Results:** The combined prevalence of overweight (38.0%) and obesity (34.0%) reached 72%, with only 26% having normal weight. Males showed higher obesity rates (41.7%) than females (29.7%). Notably, 60.5% did not engage in regular exercise, 27% sat for more than 9 hours daily, and 78% did not walk for 30 minutes daily. Regarding dietary habits, 43.5% consumed fast food 3–4 times per week, 72.5% drank sugary beverages daily, and 52.5% consumed only 1–2 servings of fruits and vegetables daily. **Conclusion:** This confirmed a critical public health crisis in Tripoli, with nearly three-quarters of adults being overweight or obese. High fast food consumption, daily sugary drink intake, and pervasive physical inactivity were identified as the primary drivers, necessitating urgent policy measures, urban infrastructure improvements, and community-based programs to mitigate this escalating epidemic.

Keywords: Obesity, overweight, sedentary lifestyle, physical inactivity, dietary habits, Tripoli, Libya, cross-sectional study.

Introduction:

Obesity constitutes a global public health crisis, affecting over 1.9 billion adults worldwide and serving as a primary risk factor for non-communicable diseases (NCDs), including type 2 diabetes, cardiovascular disease, and various malignancies [1]. The Middle East and North Africa (MENA) region has witnessed particularly alarming trajectories, driven by rapid urbanization and a pronounced "nutrition transition," wherein traditional high-fiber diets have been progressively supplanted by energy-dense, ultra-processed foods and sugar-sweetened beverages [2, 3]. Libya, and specifically its capital Tripoli, exemplifies this critical trend, with current estimates indicating that over 70% of the adult population is classified as overweight or obese [4]. This escalating burden is intrinsically linked to the pervasive adoption of sedentary lifestyles, marked by high daily sitting times, insufficient physical activity, frequent fast-food consumption, and a lack of pedestrian-friendly urban infrastructure—

collectively fostering an obesogenic environment [5, 6]. Despite the evident severity of this public health issue, contemporary and localized evidence delineating the specific behavioral, dietary, and lifestyle determinants within the Tripolitan context remains remarkably scarce. This knowledge gap significantly impedes the formulation of evidence-based, targeted public health policies and interventions necessary to mitigate this epidemic [7]. This cross-sectional study aimed to assess the prevalence of obesity and identify the associated risk factors and sedentary lifestyle patterns among adults in Tripoli, Libya

Materials and Methods:

This cross-sectional study was conducted to assess the risk factors associated with obesity and sedentary lifestyle among adults in Tripoli, Libya. Data collection took place during February 2026. A convenience sampling strategy was used to recruit 200 adults in Tripoli through: (1) face-to-face invitations at public



venues, and (2) digital dissemination via social media combined with snowballing. Soft quota controls for age and gender were applied to mitigate selection bias and enhance representativeness, based on recent demographic estimates.

Inclusion Criteria: Adults residing in Tripoli, Libya, aged 18 years and above, and Voluntarily provided informed consent.

Exclusion Criteria: Individuals unwilling or unable to provide informed consent, Individuals under 18 years of age, and Individuals not residing in Tripoli, Libya. Participants' ages ranged from 18 to over 50 years, with age categories being (18-29 years: 52%, 30-39 years: 28%, 40-49 years: 11%, ≥ 50 years: 9%). Females constituted 64% (n=128) and males 36% (n=72) of the total sample. The questionnaire was adopted from previously validated instruments used in similar regional studies, ensuring content validity and reliability.

Data Collection:

Data were collected using a structured questionnaire covering demographic aspects, anthropometric measurements, physical activity levels, dietary habits, and lifestyle factors. Informed consent was obtained from all participants prior to data collection.

Measurements:

The measurements collected included:

- **Demographic Data:** Age, gender, marital status (single, married, divorced/widowed), and occupation (employed, unemployed, student, retired).
- **Anthropometric Measurements:** Height (in centimeters) and weight (in kilograms) were measured for each participant. Body Mass Index (BMI) was calculated using the formula: $\text{weight (kg)} / [\text{height (m)}]^2$. BMI was categorized as: underweight ($<18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}24.9 \text{ kg/m}^2$), overweight ($25.0\text{--}29.9 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$).
- **Physical Activity:** Physical activity was assessed through questions regarding regular exercise (at least 30 minutes, 3 times/week), daily sitting hours (work, TV, phone), daily walking for at least 30 minutes, and types of exercise typically engaged in by participants.
- **Dietary Habits:** Dietary habits were investigated through questions about the frequency of fast-food consumption,

the number of fruit and vegetable servings consumed daily, and daily sugary beverage (soft drinks/juice) consumption.

- **Lifestyle Factors:** Other lifestyle factors included smoking status, daily sleep hours, and whether a doctor had previously informed the participant that they were overweight or obese.

Ethical Approval:

Ethical approval for this study was obtained from the Research Ethics Committee of Tripoli Al-AHLIA University. All participants provided informed consent prior to their involvement in the study, and their anonymity and confidentiality were maintained throughout the research process.

Statistical Analysis:

All collected data were entered into and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 26. Descriptive statistics were employed to summarize the demographic, anthropometric, physical activity, and dietary habit data. Continuous variables, specifically anthropometric measurements (height, weight, and BMI) as presented in Table 2, were summarized using means $\pm$ standard deviations (Mean $\pm$ SD) and medians with ranges (Min–Max), disaggregated by gender. Categorical variables, including demographic data (Table 1), BMI categories (Table 3), physical activity (Table 4), dietary habits (Table 5), and lifestyle factors (Table 6), were presented as frequencies and percentages (N (%)). For BMI categories in Table 3, the distribution was also analyzed by gender. Associations between categorical variables were analyzed using Chi-square tests. A p-value of <0.05 was considered statistically significant.

Results:

The results of this cross-sectional study on risk factors for obesity and sedentary lifestyles among adults in Tripoli, Libya, are presented below. A total of 200 participants were included in the study.

Demographic Characteristics:

Table 1: Demographic Characteristics of Study Participants. The majority of participants were aged 18-29 years (52%), female (64%), single (51%), and students (43%).

Table 1: Demographic Characteristics:

Variable	Category	N (%)
Age (years)	18 – 29	104 (52)
	30 – 39	56 (28)
	40 – 49	22 (11)
	≥ 50	18 (9)
Gender	Male	72 (36)
	Female	128 (64)



Marital Status	Single	102 (51)
	Married	74 (37)
	Divorced / Widowed	24 (12)
Occupation	Employed	84 (42)
	Unemployed	26 (13)
	Student	86 (43)
	Retired	4 (2)

Anthropometric Characteristics:

Table 2 presented the anthropometric characteristics of the participants, disaggregated by gender. The mean

height for all participants was 166.2 ± 7.4 cm, and the mean weight was 77.5 ± 14.3 kg. The overall mean BMI was 27.9 ± 5.2 kg/m².

Table 2: Anthropometric Characteristics of Participants by Gender (N=200)

Variable	Gender	N	Mean $\pm$ SD	Median	Range (Min–Max)
Height (cm)	All	200	166.2 ± 7.4	165	147 – 189
	Male	72	171.5 ± 6.2	171	155 – 188
	Female	128	163.2 ± 5.8	163	147 – 189
Weight (kg)	All	200	77.5 ± 14.3	75	53 – 120
	Male	72	82.3 ± 15.1	82	54 – 120
	Female	128	74.8 ± 13.2	73	53 – 112
BMI (kg/m²)	All	200	27.9 ± 5.2	27.2	17.8 – 43.2
	Male	72	28.6 ± 5.8	28.1	18.2 – 42.1
	Female	128	27.5 ± 4.9	26.9	17.8 – 41.5

BMI Categories:

For BMI categories in Table 3, the distribution was also analysed by gender. A significant proportion of the

participants were classified as overweight (38.0%) or obese (34.0%).

Table 3: Distribution of BMI Categories by Gender (N=200)

BMI Category	Total (N=200)	Male (N=72)	Female (N=128)
Underweight (<18.5)	4 (2.0%)	1 (1.4%)	3 (2.3%)
Normal weight (18.5–24.9)	52 (26.0%)	15 (20.8%)	37 (28.9%)
Overweight (25.0–29.9)	76 (38.0%)	26 (36.1%)	50 (39.1%)
Obese (≥ 30)	68 (34.0%)	30 (41.7%)	38 (29.7%)

Although males demonstrated a higher obesity prevalence than females (41.7% vs. 29.7%), the Chi-square test revealed that this difference was not statistically significant ($\chi^2 = 2.945$, $df = 1$, $p = 0.086$). This finding indicates that the observed gender disparity may be attributed to random variation rather than a true population-level difference, potentially influenced by the

relatively small sample size in the male subgroup ($n=72$), which limits statistical power.

Physical Activity:

Table 4 details the physical activity levels among participants. The majority (60.5%) reported not exercising regularly. A considerable portion (27%) spent more than 9 hours per day sitting.

**Table 4:** Physical Activity Levels Among Participants

Variable	N (%)
Do you exercise regularly (at least 30 minutes, 3 times/week)?	
Yes	79 (39.5)
No	121 (60.5)
How many hours per day do you spend sitting (work, TV, phone)?	
Less than 4 hours	56 (28)
4–6 hours	56 (28)
7–9 hours	34 (17)
More than 9 hours	54 (27)
Do you walk for at least 30 minutes daily?	
Yes	44 (22)
No	156 (78)
What types of exercise do you typically engage in? (Select all that apply)	
Walking	113 (56.5)
Running/Jogging	3 (1.5)
Weightlifting/Strength Training	14 (7)
Others	70 (35)

Dietary Habits:

Table 5 summarized the dietary habits of the participants.

A high percentage (43.5%) consumed fast food 3–4 times

per week, and 72.5% reported drinking sugary beverages daily.

Table 5: Dietary Habits of Participants

Variable	N (%)
How often do you eat fast food?	
1–2 times/week	57 (28.5)
3–4 times/week	87 (43.5)
≥5 times/week	56 (28)
How many servings of fruits and vegetables do you eat daily?	
None	60 (30)
1–2 servings	105 (52.5)
3–4 servings	35 (17.5)
≥5 servings	0 (0)
Do you drink sugary beverages (soft drinks/juice) daily?	
Yes	145 (72.5)
No	55 (27.5)

Lifestyle Factors:

Table 6 presents other lifestyle factors. A quarter of the participants (26.5%) were smokers, and 31%

slept less than 6 hours per night. 72% of participants had been informed by a doctor that they were overweight or obese.

Table 6: Lifestyle Factors Among Participants

Variable	N (%)
Do you smoke?	
Yes	53 (26.5)
No	147 (73.5)



How many hours do you sleep per night?	
Less than 6 hours	62 (31)
6–8 hours	82 (41)
More than 8 hours	56 (28)
Has a doctor ever told you that you are overweight or obese?	
Yes	144 (72)
No	56 (28)

Discussion:

The study provided a critical and contemporary snapshot of the escalating obesity crisis among adults in Tripoli, Libya. The results indicated a combined prevalence of overweight (38.0%) and obesity (34.0%), meaning that a staggering 72% of the participants were above the healthy weight range. This high prevalence was particularly alarming given the relatively young demographic of the sample, where 52% of the participants were aged 18-29 years. Such a high burden of excess weight in young adulthood suggested a looming public health crisis, as these individuals were considered to be at increased risk for early-onset non-communicable diseases (NCDs).

When compared to historical data from Libya, our results indicated a continuing and rapid upward trend in obesity rates. A comprehensive review conducted in the early 2010s reported obesity rates in Libya at approximately 30% [8]. Our current results of 34% obesity suggested that the situation had worsened over the last decade despite increased global awareness. Interestingly, our result of higher obesity rates in males (41.7%) contrasted with broader national surveys from previous years that historically showed higher rates among Libyan women [9]. This discrepancy was attributed to the specific urban and student-heavy nature of our sample, where young men may have had higher access to fast food and more sedentary leisure habits.

In a regional context, the results aligned with trends observed in other North African and Middle Eastern urban centres. Similar global trend analyses reported that overweight and obesity rates in Egypt and Tunisia frequently exceeded 60%, driven by identical shifts toward Westernized diets and physical inactivity [10]. Our results also mirrored those from the oil-producing countries of the Arabian Peninsula, where rapid urbanization led to a dramatic decrease in non-exercise physical activity, such as walking for transportation. This was reflected in our study, where 78% of the participants reported not walking for at least 30 minutes daily [11]. Several factors explained the high prevalence of obesity and sedentary behavior identified in this study. Firstly, the "food environment" in Tripoli had shifted dramatically. The proliferation of fast-food outlets offering energy-dense, low-cost meals made unhealthy eating the most accessible option for many, especially for the student population (43% of our sample) [12]. This

was supported by our data, which showed that 71.5% of the participants consumed fast food three or more times per week. Furthermore, the high consumption of sugary beverages (72.5% daily) was a reflection of cultural norms where soft drinks and juices were standard accompaniments to social gatherings.

Secondly, the high level of sedentary behavior was driven by both occupational and environmental factors. With 42% of the participants employed in likely office-based roles and 43% being students, a significant portion of the day was spent sitting. Our results showed that 27% of the participants spent more than 9 hours per day sitting. The urban infrastructure in Tripoli further exacerbated this; the city was primarily designed for car transport, with limited safe pedestrian pathways, which discouraged walking as a form of transportation [13]. Additionally, the clustering of unhealthy lifestyle behaviors, such as smoking (26.5%) and poor sleep patterns (31% sleeping <6 hours), likely contributed to metabolic dysfunction, a phenomenon often described as a syndemic of lifestyle risk factors [14].

Study Limitations:

Despite the valuable insights provided, this study had several limitations. Firstly, while the sample size of 200 participants was useful for a local snapshot, it may not have been fully representative of the entire Libyan population, limiting the generalizability of the results. Secondly, data regarding physical activity and dietary habits were collected via self-reported questionnaires, which introduced the possibility of recall bias, where participants may have overestimated healthy behaviors or underestimated unhealthy ones. Thirdly, the cross-sectional design identified associations but could not establish definitive causal relationships between risk factors and obesity. Finally, while BMI was a standard and practical measure for population studies, it did not distinguish between muscle mass and fat mass, which could have provided a more nuanced view of metabolic health [15].

Conclusion:

This study confirmed a critical public health crisis in Tripoli, where 72% of the surveyed adults were classified as overweight or obese. These high rates, particularly among young adults, were driven by pervasive physical inactivity and poor dietary habits, including frequent fast-food consumption and daily sugary beverage intake.



The findings indicated a worsening trend compared to historical data and underscored the urgent need for multi-faceted interventions. Effective mitigation required a combination of policy regulations on unhealthy foods, improvements in pedestrian-friendly urban infrastructure, and the implementation of community-based health promotion programs. Addressing these behavioral and environmental determinants was essential to curb the escalating obesity epidemic and reduce the future burden of non-communicable diseases in Libya. Furthermore, the study recommended that future research focus on longitudinal assessments

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