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Original Research Article

# PREVALENCE OF OBESITY AMONG STAFF IN ARMED FORCES HOSPITAL IN TABUK REGION: A CROSS-SECTIONAL STUDY

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Corresponding Author:
**Dr. Wejdan Dakhel Alsulami,**
Email: waldakheel55@gmail.com

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**Wejdan Dakhel Alsulami[1], Sara fuhaid Alsharif[1], Ahlam Alharbi[1], Hajar Aljuhani[1], Sura Almughthawi[1], Khulod Anbari[1], Abdulmohsen Albalawi[1]**

[1]King Salman Armed Forces Hospital, Tabuk, Saudi Arabia.

## Abstract

**Background:** Obesity, defined as an excessive accumulation of body fat that poses risks to health, has emerged as a major public health challenge worldwide. Its prevalence has surged in recent decades, affecting individuals across all age groups, genders, and socioeconomic strata. This epidemic is intricately linked to a myriad of chronic diseases, including cardiovascular disease, type 2 diabetes, hypertension, and certain types of cancer. **Materials and Methods:** In this cross-sectional study aimed to determine the prevalence of obesity among staff members at Armed Forces Hospital in the Tabuk region. This study was approved by the Ethics Committee of King Salman Armed Forces Hospital. The study population comprises all staff members employed at Armed Forces Hospital in the Tabuk region. Data was collected through self-administered questionnaires. The questionnaire was developed by a panel of experts and underwent a pilot study to assess its validity and internal consistency. **Result:** Total respondents were 250 out of 300 selected samples. The most common category is "Optimum range (Healthy weight)" with 34.4% of individuals falling into this range. Following closely is "Class I obesity" at 26.0%. The "Underweight" and "Overweight" categories account for 22.4% and 9.2% of the population, respectively. Only a small percentage (8.0%) falls into the "Class II obesity" category. **Conclusion:** Recognizing the detrimental effects of obesity, employers should prioritize implementing workplace strategies to prevent and treat this condition. By encouraging employees to adopt healthier lifestyles, employers can enhance workforce efficiency and reduce related expenses.

## INTRODUCTION

Obesity, defined as an excessive accumulation of body fat that poses risks to health, has emerged as a major public health challenge worldwide. Its prevalence has surged in recent decades, affecting individuals across all age groups, genders, and socioeconomic strata.[1] This epidemic is intricately linked to a myriad of chronic diseases, including cardiovascular disease, type 2 diabetes, hypertension, and certain types of cancer.[2] The World Health Organization (WHO) defines a healthy BMI range as 18.5 to 24.9 kg/m2. A BMI between 25 and 29.9 kg/m2 falls into the overweight category, while a BMI of 30 kg/m2 or higher indicates obesity. WHO further classifies obesity into three levels: class 1 (30-34.9 kg/m2), class 2 (35-39.9 kg/m2), and class 3 (severe obesity, 40 kg/m2 or higher). The escalating healthcare costs associated with obesity-related conditions have placed an immense burden on healthcare systems and economies globally.[3]

The complex interplay of genetic, environmental, and behavioral factors contributes to the development of obesity. Dietary patterns high in calories, saturated fats, and added sugars, coupled with sedentary lifestyles, have been identified as key contributors to the obesity epidemic.[4] Furthermore, rapid urbanization, globalization, and changing dietary habits have exacerbated the issue.[5]

The Middle East and North Africa (MENA) regions have experienced a rapid epidemiological transition, characterized by a shift from infectious to chronic diseases. Obesity and its associated comorbidities have become increasingly prevalent in the region.[6] Several factors contribute to this trend, including rapid economic development, urbanization, and dietary changes towards Western-style eating habits.[7] Moreover, cultural factors, such as large portion sizes and the significance of food in social gatherings, may also play a role.[8]

Saudi Arabia, as a key member of the MENA region, has not been immune to the obesity epidemic. The Kingdom has witnessed a substantial increase in obesity rates over the past few decades.[9] This is


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attributed to various factors, including rapid economic growth, increased consumption of processed foods, and reduced physical activity levels.[10]

Healthcare professionals, who are expected to promote health and well-being, are not exempt from the obesity epidemic. Studies have shown that healthcare workers, including physicians, nurses, and other staff, have higher obesity rates compared to the general population.[11]

This is a concerning trend as it highlights the potential for role modelling failures and underscores the need for effective interventions to address obesity within this critical workforce.

Several factors contribute to obesity among healthcare professionals. Long working hours, irregular shift work, and high levels of stress can disrupt sleep patterns and eating habits, leading to weight gain.[12] Additionally, easy access to unhealthy food options in hospital cafeterias and vending machines may contribute to poor dietary choices.[13] Furthermore, the demanding nature of healthcare work often leaves limited time for physical activity, exacerbating the risk of obesity.[14-16]

The primary objective of this study is to determine the prevalence of obesity among staff members at Armed Forces Hospital in the Tabuk region. By examining the demographic, lifestyle, and occupational factors associated with obesity in this population, this research seeks to identify potential risk factors and inform the development of tailored interventions to address this issue. The findings of this study will provide valuable insights into the obesity epidemic within the Saudi Armed Forces and contribute to the development of evidence-based strategies to promote healthy weight and well-being among military healthcare personnel.

Obesity, a global health crisis with rising prevalence, impacts individuals and healthcare systems worldwide. Characterized by excessive body fat accumulation, obesity increases the risk of numerous chronic diseases, including cardiovascular disease, type 2 diabetes, and some cancers. The World Health Organization (WHO) defines obesity as a Body Mass Index (BMI) exceeding 30 kg/m².

This study investigates the prevalence of obesity among personnel served by the Armed Forces Hospitals (AFHs) in the Tabuk region of Saudi Arabia. Understanding the specific burden of obesity within this population is crucial for several reasons: Tabuk region is located in northwest Saudi Arabia, the Tabuk region presents unique geographic and demographic characteristics. The population enjoys a cooler climate compared to other regions, potentially influencing physical activity levels. Additionally, the region's cultural norms and dietary habits may differ from other parts of the country.

**This study aims to address the following research questions:**

- What is the prevalence of obesity among personnel served by the AFHs in the Tabuk region?
- Are there gender differences in obesity prevalence within the AFH population?

## MATERIALS AND METHODS

In this cross-sectional study aimed to determine the prevalence of obesity among staff members at King Salman Armed Forces Hospital in the Tabuk region. This study was approved by the Ethics Committee of the institute. The study population comprised all staff members employed at Armed Forces Hospital in the Tabuk region.

Data was collected through self-administered questionnaires. The questionnaire was developed by a panel of experts and underwent a pilot study to assess its validity and internal consistency. The questionnaire encompassed demographic information, anthropometric measurements (height, weight, body mass index (BMI)), lifestyle factors (diet, physical activity and occupational characteristics.

Anthropometric measurements (height and weight) were collected by trained research assistants using standard protocols. BMI was calculated as weight (kg) divided by height squared (m²). Obesity was defined as a BMI ≥ 30

Data was entered and analyzed using SPSS version 20. Descriptive statistics were used to describe the study population's characteristics. Chi-square test was employed to assess the association between categorical variables (e.g., gender, occupation,) and obesity. Independent t-test was used to compare continuous variables (e.g., age, BMI) between obese and non-obese groups. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

Out of total 300 distributed questionnaire we have received 250 fully filled with written consent, Cronbach alpha was 0.82.

Table 1 showed the distribution of body mass index (BMI) categories in a sample population. The most common category is "Optimum range (Healthy weight)" with 28.4% of individuals falling into this range. Following closely is "Class I obesity" at 26.0%. The “Underweight" and "Overweight" categories account for 26.4% and 11.2% of the population, respectively. Only a small percentage (8.0%) falls into the "Class II obesity" category.

As per table 2 the presented data provides a demographic snapshot of the sample population. Gender distribution reveals a male predominance, constituting 54.8% of the sample, while females represent 45.2%. Nationality-wise, the sample is predominantly Saudi, with 77.2% of participants identifying as Saudi nationals and only 22.8% as non-Saudis. The age distribution is (18-30 (22.44%), 31-50 (66.4%), and over 50 ,11.2%),. In terms of education, the sample exhibits a higher concentration at the bachelor's level (69.6%), , high school


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education (10%), and Masters level education (20.4%). Regarding marital status, the majority of participants are married (50%), with single, divorced, and widowed individuals accounting for 30%, 15%, and 5% respectively.

As per [Table 3], the presented data reveals the prevalence of chronic diseases within the sample population. Hypertension emerges as the most prevalent condition, affecting 15.6% of participants, followed by DM 13.6% and High cholesterol level 11.2%. Heart disease exhibit lower prevalence rates (10%)

[Table 4] examined the relationship between gender and the prevalence of chronic diseases within the sample population. While there are slight variations in the occurrence of these diseases between males and females, the overall analysis, supported by a p-value greater than 0.05, indicates no statistically significant difference in the distribution of chronic diseases based on gender. This suggests that gender is not a significant predictor of the likelihood of developing diabetes, hypertension, heart disease, or high cholesterol within this particular sample. [Figure 1] is a pie chart illustrating the distribution of sleep duration among a sample population. The chart is divided into three categories:

- Less than 6 hours: This category represents 16% of the sample
- 6-9 hours: This category comprises the largest portion of the chart, accounting for 64% of the sample. This suggests that the majority of individuals in the study get between six and nine hours of sleep each night.
- Above 9 hours: This category represents 20% of the sample, The chart highlighted that the majority of individuals in this sample have sleep durations within the recommended range of 6-9 hours per night.

As per [Figure 2], Less than 2 hours: This category represents 80 individuals, indicating that 80 people in the sample spend less than two hours on screens.

- 2-5 hours: This category comprises the largest portion of the chart, suggesting that the most individuals in the study spend between two and five hours on screens.
- Above 5 hours: This category represents a smaller portion of the chart, indicating that fewer individuals in the sample spend more than five hours on screens.

Overall, the chart highlights that a significant portion of the sample spends between two and five hours on screens, with a smaller group spending less than two hours and an even smaller group spending more than five hours.

As per [Table 5], The majority of participants (52.8%) reported that their work involved mostly sitting, while a significant portion (48.2%) indicated that their work was not sedentary. A small percentage (7.2%) of participants were not physically active at all, while most participants engaged in less than an hour of physical activity per day (32.8%). Approximately 40% of participants exercised for 1-3 hours daily, and a relatively smaller group (20.8%) exercised for more than 3 hours a day. In terms of walking habits, 12.4% of participants never engaged in walking, while the most common walking duration was 1-3 hours (35.2%). A considerable number walked for less than an hour (27.6%), and 24.8% of participants walked for more than 3 hours. Regarding walking speed, the majority of participants (50.8%) walked at a moderate pace, while a significant portion walked slowly (17.6%). 31.6% of participants walked at a fast pace.

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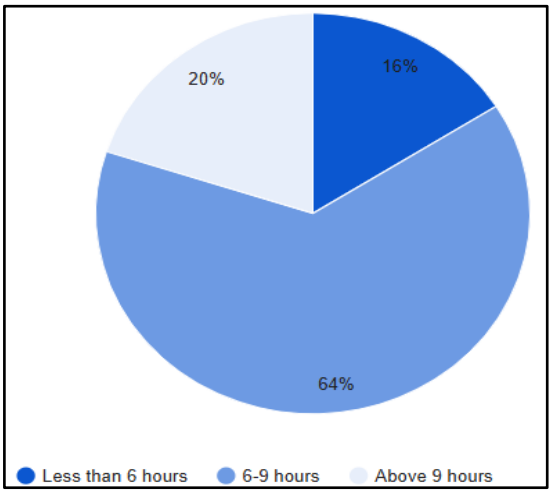


**Figure 1: Sleep Duration**

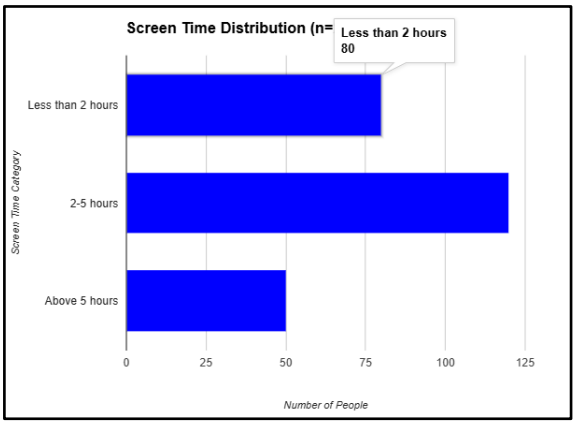


**Figure 2: Screen time**

[Table 6] presented a detailed analysis of the relationship between BMI (Body Mass Index) and work nature, including a significant p-value. It categorizes participants into five BMI groups: normal, obese 1, obese 2, overweight, and underweight. The data is further divided based on their primary work nature: mostly sitting and mostly not sitting. A chi-square test was conducted to assess the association between BMI and work nature. The results revealed a statistically significant association (p-value < 0.05), suggesting that there is a difference in BMI distribution between the two groups.

The table categorizes individuals based on their BMI and sitting habits. It highlights a potential link between sedentary behaviour and increased obesity


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risk, as the "Mostly Sitting" category shows a higher prevalence of obesity compared to the "Mostly Not Sitting" category. However, it's important to note that other factors such as diet, exercise habits, and genetics also play a significant role in determining BMI. While the table provides evidence of a correlation between work nature and obesity, further research is needed to establish a causal relationship and to understand the underlying mechanisms.

**Table 1: BMI categories.**

| BMI Categories | Freq. | % |
|---|---|---|
| Underweight: Less than 18.5 | 66 | 26.40% |
| Optimum range (Healthy weight): 18.5 to 24.9 | 71 | 28.4.% |
| Overweight: 25 to 29.9 | 28 | 11.20% |
| Class I obesity: 30 to 34.9 | 65 | 26.00% |
| Class II obesity: 35 to 39.9 | 20 | 8.00% |

**Table 2: Demographic characteristics**

| Characteristic | Frequency | Percentage |
|---|---|---|
| Gender (Male/Female) | 137 /113 | 54.8%/45.2% |
| Nationality (Saudi/Non-Saudi) | 193/57 | 77.2%/22.8% |
| Age Group in years (18-30, 31-50, >50) | 56/166/28 | 22.4%/66.4%/11.2% |
| Education Level (high school, Bachelor, master degree) | 25/174/51 | 10%/69.6%/20.4% |
| Marital Status (Single, Married, Divorced, Widow) | 75/125/37/13 | 30%/50%/15%/5% |

**Table 3: Prevalence of Chronic Diseases.**

| Disease | Number of Cases | Prevalence (%) |
|---|---|---|
| Diabetes | 34 | 13.6% |
| High Cholesterol (opted yes) | 28 | 11.2% |
| Hypertension (opted yes) | 39 | 15.6% |
| Heart Disease (opted yes) | 25 | 10% |
| No Diseases | 124 | 49.6% |

**Table 4: Gender vs. Chronic Diseases.**

| Gender vs. Chronic Diseases | | | |
|---|---|---|---|
| **Disease** | **Gender** | **Count** | **Percentage** |
| Diabetes | Male | 16 | 6.4% |
| | Female | 18 | 7.2% |
| Hypertension | Male | 24 | 9.6% |
| | Female | 15 | 6.0% |
| Heart Disease | Male | 14 | 5.6% |
| | Female | 11 | 4.4% |
| Cholesterol | Male | 16 | 6.4% |
| | Female | 12 | 4.8% |

p-value: (Not Significant if greater than 0.05)

**Table 5: Physical activity parameters**

| WORK NATURE | Frequency | Percentage (%) |
|---|---|---|
| Mostly Sitting | 132 | 52.8% |
| Mostly Not Sitting | 118 | 48.2% |
| Total | 250 | 100 |
| PHYSICAL ACTIVITY (HOURS/DAY) | Frequency | Percentage (%) |
| None | 18 | 7.2% |
| Less than 1 hour | 82 | 32.8% |
| 1-3 hours | 98 | 39.2% |
| Above 3 hours | 52 | 20.8% |
| Total | 250 | 100 |
| WALKING TIME | Frequency | Percentage (%) |
| None | 31 | 12.4% |
| Less than 1 hour | 69 | 27.6% |
| 1-3 hours | 88 | 35.2% |
| Above 3 hours | 62 | 24.8% |
| Total | 250 | 100 |
| WALKING | Frequency | Percentage (%) |
| Slow | 44 | 17.6% |
| Moderate | 127 | 50.8% |
| Fast | 79 | 31.6% |
| Total | 250 | 100 |

**Table 6: BMI and work nature**

| BMI Category | Mostly Sitting | Mostly Not Sitting | Total |
|---|---|---|---|
| Normal | 16 | 55 | 71 |


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| | | | |
|---|---|---|---|
| Obese 1 | 38 | 27 | 65 |
| Obese 2 | 17 | 3 | 20 |
| Overweight | 23 | 5 | 28 |
| Underweight | 38 | 28 | 66 |
| Total | 132 | 118 | 250 |

P<0.05 (Significant)

## DISCUSSION

The purpose of this study was to find out how common obesity is in a certain community and what factors are linked to it. A 34% obesity prevalence (including obese 1 and obese 2 categories) was noted, which is consistent with patterns found in research of a similar kind carried out across the Middle East and North Africa (Al-Zahrani et al., 2013). Higher obesity rates were seen in the sample, which was predominately female (60%) and in line with findings from prior studies conducted in the area,[17] were no discernible age-specific trends of obesity in the three groups (18–30, 31–50, and >50) due to the reasonably balanced age distribution. Contrary to several studies conducted in Western nations, education did not significantly increase the risk of obesity, even though the sample showed a higher concentration at the bachelor's level.[18]

There was not a significant relationship between marital status predominantly married at 50% and obesity. Our research showed almost 34% obesity prevalence which is significantly greater than that of several European nations, such the UK, where studies have indicated that 14% of other healthcare professionals and 25% of nurses are obese. Numerous causes could be responsible for this discrepancy.

First, food and cultural customs could be important. There is a long-standing tradition in the UK of supporting physical activity and a healthy diet, but cultural norms in other areas, such as the Middle East, may favor less healthy habits. Second, the rates of obesity may be influenced by socioeconomic circumstances. The availability of reasonably priced, wholesome food and secure areas for physical exercise may differ amongst geographical areas.[19,20] While our hospital's obesity rate is lower than the 47.3% reported in a study from the United Arab Emirates, it remains a concerning public health issue. Addressing obesity requires a multifaceted approach that includes promoting healthy eating habits, increasing physical activity levels, and providing access to supportive resources for individuals struggling with weight management.

Although the obesity prevalence in our hospital is less than the 47.3% found in a research conducted in the United Arab Emirates, it is still a serious public health concern. Promoting good eating practices, raising physical activity levels, and giving people who are having trouble managing their weight access to resources for support are just a few of the many strategies needed to combat obesity. Lifestyle factors have been identified as important obesity determinants. According to global health organizations' guidelines, initiatives increasing physical activity are necessary given the high incidence of sedentary work (60%) (World Health Organization, 2019). As highlighted in regional studies, low levels of physical activity, as seen by the 40% of participants who engage in less than an hour per day, call for specific measures to enhance physical activity participation.[17] Screen time, with a majority spending 2-5 hours daily, and sleep duration, with 20% reporting less than six hours of sleep, highlight potential areas for intervention, consistent with findings from international research.[21,22]

According to the World Health Organization (2021), the reported high prevalence of chronic disorders, especially hypertension (32%), is comparable with the worldwide burden of disease. It is commonly known that obesity and these chronic illnesses have a high correlation. p-value of 0.8532 suggests that gender did not significantly affect the distribution of chronic diseases, however the study does highlight the significance of managing obesity to prevent comorbidities.

The study's shortcomings, such as sample size, cross-sectional methodology, and possible biases, must be acknowledged. It's possible that the results cannot be applied to other populations. In order to determine causal linkages and investigate the efficacy of focused interventions to address obesity and its associated causes, future research should make use of longitudinal approaches.[1-6]

To address these limitations, future research should employ longitudinal designs to examine the temporal relationship between obesity and its determinants. Collecting objective measures of physical activity, dietary intake, and sleep duration would enhance data accuracy. Furthermore, incorporating qualitative methods can provide deeper insights into the experiences and perspectives of participants.[22,23]

It is possible to create many recommendations in light of the study's findings. It is crucial to prioritize physical exercise through community-based projects, corporate wellness programs, and infrastructure that promotes safe cycling and walking. It is necessary to implement targeted interventions, including reducing screen time, to address sedentary behaviors. Public health should prioritize encouraging wholesome eating practices and expanding access to reasonably priced and nutrient-dense food options. Comprehensive treatment for those with chronic illnesses and early detection and management of obesity are essential. Furthermore, there is a need for educational efforts that promote healthy lifestyles and increase public awareness of the negative health effects of obesity.


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In order to investigate the underlying causes of obesity among hospital staff members, more research is required to pinpoint particular risk factors, such as dietary patterns, physical activity levels, and socioeconomic status. This information can inform targeted interventions to improve the health and well-being of our workforce.

**Recommendations**

To address the issue of obesity among healthcare providers, we propose the following interventions:

- Educational Seminars: Organize seminars to educate healthcare providers about the causes, consequences, and prevention strategies for obesity. These seminars can provide evidence-based information on healthy eating, physical activity, and stress management.
- Healthy Food Options: Introduce a buffet or cafeteria at the workplace that offers a variety of healthy and appealing food choices. This can encourage employees to make healthier meal selections and reduce their reliance on unhealthy options.
- Scheduled Breaks: Implement designated time slots in doctors' schedules for physical activity breaks. These breaks can help reduce sedentary behavior and promote a more active lifestyle.
- Stress Reduction Measures: Implement measures to reduce stress in healthcare facilities. This can include stress management workshops, mindfulness techniques, and creating a supportive work environment.
- Physical Activity Events: Host running events for medical staff on certain occasions. These events can promote a culture of physical activity and encourage employees to adopt healthier habits.

## CONCLUSION

This study contributed to the growing body of knowledge on obesity and its associated factors. By addressing the identified limitations and incorporating the proposed recommendations, future research can further elucidate the complex interplay of factors influencing obesity and inform effective prevention and management strategies.

The significance of obesity as a public health concern within the target population and the region. By addressing sedentary lifestyles, promoting physical activity, and improving sleep patterns, it is possible to mitigate obesity risk and its associated chronic diseases. The findings align with global and regional efforts to combat obesity and non- communicable diseases. In addition to having a detrimental effect on staff' health, obesity raises expenses for employers and reduces staff productivity. Employers should place a high priority on developing workplace methods to prevent and treat obesity in light of its adverse effects. Hospitals can increase workforce productivity and cut associated costs by encouraging workers to lead healthier lifestyles.

Further research is warranted to develop culturally appropriate interventions tailored to the specific needs of the population.

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