Medical Science

Authors' Affiliation:
[1] Dammam Medical Complex, Dammam, Saudi Arabia
[2] King Faisal University, Hofuf, Saudi Arabia
[3] Bisha University, Bisha, Saudi Arabia
[4] Shaqra University, Shaqra, Saudi Arabia
[5] King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia
[6] Near East University, Nicosia, Cyprus

[*] Corresponding Author
King Fahd Armed Forces Hospital,
Jeddah, Saudi Arabia.
Email:
drfarasani@gmail.com

Awareness of morbid obesity as a risk factor for obesity-related cancers among Saudi morbid obese patients: A cross-sectional study

Enas M Al Qahtani[1], Aziz Jarman M Alsubaie[2], Rajeh Omar Rajeh Alaklabi[3], Sultan Hammad Mohammed Alosaimi[4], Mashael Muhammad Alfarasani[5*], Tahani Alshandari[6], Malik Al Mutairi[1]

ABSTRACT

Background and Aims: Obesity has become one of the most prevalent epidemic disorders worldwide. This study aimed to evaluate society's perception of the relationship between obesity and cancer. *Settings and Design:* A descriptive cross-sectional study was conducted targeting obese patients in Saudi Arabia, Targeting Saudi participants aged 18 years and older from August to October 2022. *Methods:* After having ethical approval, an online questionnaire was used for data collection. *Statistical Analysis:* Data was revised, coded and input to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL) after being extracted. *Results:* The study questionnaire was completed by 512 individuals in total. Almost 70% of the obese participants are not recognized themselves as obese. In contrast, only 20.5% of them believe that they are obese. Most participants are ready to treat obesity and 47.1% consider surgery to treat obesity. The most noted reasons for treating obesity among participants were to have a better lifestyle and diet. Only 11% of them considered cancer as a threat resulting from obesity. *Conclusion:* The study revealed that the vast majority of the obese participants knew that obesity is a health threat due to associated complications, including metabolic diseases. However, in our society, obesity is not often recognized as a risk. The factor for cancers. Thus, it's recommended that there is a need to increase the awareness and implantation of obesity prevention programs for patients prepared by healthcare providers.

Keywords: Obesity, Bariatric surgery, Awareness, Cancers.

1. INTRODUCTION

Nowadays, Obesity has become one of the most common epidemic diseases

worldwide. Health organizations and facilities have drawn attention to tackling this epidemic. The World Health Organization defined obesity as a body mass index (BMI) greater than 30 kg/m2 (James et al., 2001). While in Saudi Arabia was reported to have a rapid increase in the prevalence of obesity compared to global obesity (35 % vs. 13%) and 70% are overweight (Althumiri et al., 2021; Salem et al., 2022). Obesity is attributed to many metabolic and cardiovascular diseases and poses a risk factor for ovarian, uterine, breast, prostate and colon cancers (Alorwan et al., 2022). A study was done in Manchester Academic Health Sciences Centre-affiliated hospitals among morbid obese female patients and concluded that two-thirds (65.6%) of participants knew that obesity was a risk factor for endometrial cancer (Derbyshire et al., 2022) in comparison to (52.1%) did not correlate obesity with an increased risk of endometrial cancer (Washington et al., 2015). With this rapid increase in Obesity worldwide, it is not surprising to consider it the first risk factor for cancer rather than smoking in the coming few years. As obesity is also linked to metabolic reprogramming in cancer cells, making them more likely to metastasize. Also, inducing angiogenesis as the adipose stromal cell will activate neovascularization. Obesity is now recognized as a chronic inflammatory state that predisposes to cancer, in addition to genomic instability in colorectal and endometrial cancer in women. In oesophageal adenocarcinoma, visceral obesity is also associated with genomic instability events, both in vitro and in vivo.

Moreover, it was found that obesity has an adverse effect on patients who develop 'obesity-related' cancers. For example, patients with colorectal cancer and excess body weight are reported to have a 22% higher colorectal cancer-specific and 25% higher all cause mortality relative to patients with average weight (Petrelli et al., 2021). Similar hazards are observed for breast cancer in obese patients before diagnosis (40% decreased survival). Cancer associations advise staying active and avoiding obesity in patients diagnosed with cancer as it will improve long-term patient survival and prevent metastasis (Rock et al., 2022). Hence, obesity is a preventable disease that can be managed by modifying lifestyle, exercise, good eating habits, pharmacological therapy and bariatric surgeries. Providing these reviews raises the responsibility of healthcare providers and cancer associations to increase society's awareness and education (Arnold et al., 2016). This study aimed to assess the knowledge and perception of the relationship between obesity and cancer.

2. METHODOLOGY

A descriptive cross-sectional study targeted obese persons aged 18 years or older in Saudi Arabia during the study period from August 2022 to October 2022. Participants under 18 years and those who refused to complete the questionnaire were excluded. While obese persons older than 18 years and a BMI of more than 30% were included. A cross-sectional design with a stratified multistage cluster sample technique was used. Stratification will be according to the educational level (Below secondary school vs. Secondary school vs. University). In the first stage, two districts within each region were randomly selected. In the second stage, three below secondary school and two secondary school and two universities within each district were randomly selected from each region. In the third stage, all eligible obese patients available within the selected educational level were invited to participate in the study. Study participants are expected to fill out the survey and return it in a sealed envelope with no identifiers. The cover letter served as the front page that explained the purpose of the study and invited the teachers to participate voluntarily and at his/her own leisure. The questionnaire was developed by researchers after intensive literature reviews and expert consultation. The study was conducted by interviewing patients in hospitals in Saudi Arabia. After obtaining ethical approval, an online questionnaire was used for data collection. The questionnaire included participants' personal data, medical and training data, awareness regarding obesity-related hazards and their perception regarding their weight, obesity and its treatment.

Data analysis

After data were extracted, it was revised, coded and fed to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two-tailed tests. P value less than 0.05 was statistically significant. Descriptive analysis based on frequency and percent distribution was done for all variables, including participants' personal data, attending health education campaigns for obesity and perception regarding their weight, obesity and obesity management. Also, participants' awareness regarding obesity-related complications was graphed. Cross tabulation was used to assess the association between participants' awareness of obesity hazards by their personal data and participants' perception of their weight and obesity treatment by their awareness of obesity hazards. Relations were tested using the persons' chi-square and exact probability tests for small frequency distributions.

3. RESULTS

A total of 512 participants completed the study questionnaire. A total of 171 (33.4%) were from the central region, 151 (29.5%) from the western region, 102 (19.9%) from the Eastern region, 82 (16%) from the southern region and only 6 participants were from the Northern region. Participants' ages ranged from 18 to 85 years, with a mean age of 43.4 ± 13.9. Exact 297 (58%) were females and 199 (38.9%) reported monthly income exceeding 8000 SR, while 132 (25.8%) had monthly income less than 5000 SR. As for educational level, 316 (61.7%) were university graduates, while 62 (12.1%) were below the secondary school level. 102 (20.2%) participants previously attended an awareness campaign about obesity (Table 1).

Table 1 Personal data of study obese participants, Saudi Arabia

Personal data	no.	%
Region		
Central Region	171	33.4%
Northern Region	6	1.2%
Eastern Region	102	19.9%
Western Region	151	29.5%
Southern Region	82	16.0%
Age in years		
18-35	206	40.2%
36-50	210	41.0%
51-85	96	18.8%
Gender		
Male	215	42.0%
Female	297	58.0%
Monthly income		
< 5000 SR	132	25.8%
5000-8000 SR	181	35.4%
> 8000 SR	199	38.9%
Educational level		
Below secondary school	62	12.1%
Secondary school	134	26.2%
University	316	61.7%
Have you ever attended an awareness campaign about obesity?		
Yes	102	20.2%
No	403	79.8%

Table 2 Participants' perception regarding their weight, obesity and obesity management. Exact 308 (60.2%) of the obese participants think that they are overweight, while 105 (20.5%) think that they are obese / morbidly obese, but 99 (19.3%) believe they are within the average weight. As for obesity, 491 (93%) of the obese participants believe obesity is a health threat. Exact 476 (93%) participants are ready to treat obesity and 241 (47.1%) consider surgery to treat obesity. The most reported motives for treating obesity among participants were for having a better lifestyle and living (42.8%), having a better appearance (27.5%), managing co-morbidities (27%) and avoiding having cancer (2.7%).

Table 2 Participants' perceptions regarding their weight, obesity and obesity management

Perception	no.	%
Perceived body weight		
Within average	99	19.3%
Overweight	308	60.2%
Obese	11	2.1%

Morbid obesity	94	18.4%
Do you think obesity is a health threat?		
Yes	491	95.9%
No	21	4.1%
Are you ready to treat obesity?		
Yes	476	93.0%
No	36	7.0%
Are you considering surgery to treat obesity?		
Yes	241	47.1%
No	271	52.9%
What is your primary motivation for obesity treatment?		
For a better lifestyle and better living	219	42.8%
For better appearance	141	27.5%
To treat chronic co-morbidities	138	27.0%
To avoid having cancer	14	2.7%

Figure 1 Obese participants' awareness regarding obesity-related complications in Saudi Arabia. The most known complication was diabetes mellitus (79.5%), followed by hypercholesterolemia (67.6%), HTN (59.2%), Cardiac disease (57.2%) and cancer (11.1%).
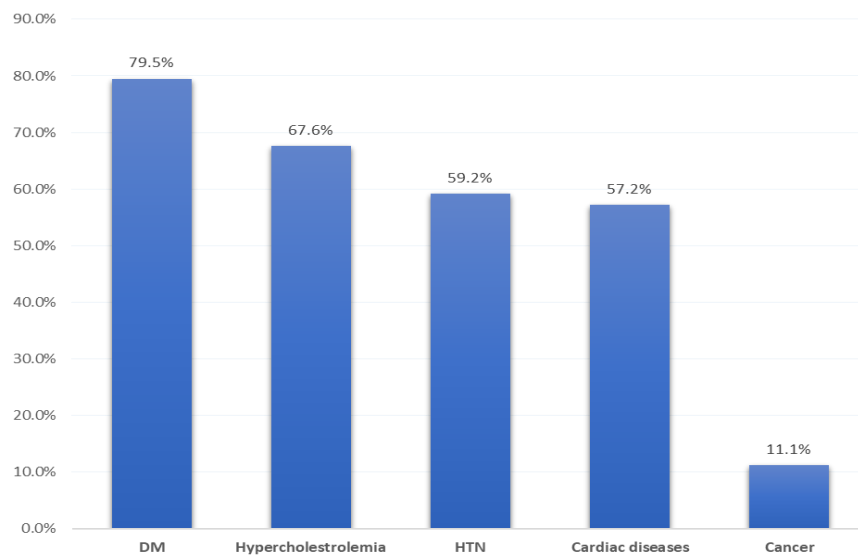

Figure 1 Obese participants' awareness regarding obesity-related complications, Saudi Arabia

Table 3 Participants' awareness regarding obesity hazards by their personal data. Only gender showed a significant association with obese participants' awareness, as 98% of the female participants know that obesity is a health threat compared to 93% of males with reported statistical significance (P=.005).

Table 3 Participants' awareness regarding obesity hazards through their personal data

Personal data	Do you think obesity is a health threat?				P value
	Yes		No.		
	No	%	No	%	
Region					
Central Region	161	94.2%	10	5.8%	.661$
Northern Region	6	100.0%	0	0.0%	
Eastern Region	98	96.1%	4	3.9%	

Western Region	146	96.7%	5	3.3%	
Southern Region	80	97.6%	2	2.4%	
Age in years					.239
18-35	194	94.2%	12	5.8%	
36-50	203	96.7%	7	3.3%	
51-85	94	97.9%	2	2.1%	
Gender					.005*
Male	200	93.0%	15	7.0%	
Female	291	98.0%	6	2.0%	
Monthly income					.337
< 5000 SR	129	97.7%	3	2.3%	
5000-8000 SR	174	96.1%	7	3.9%	
> 8000 SR	188	94.5%	11	5.5%	
Educational level					.445
Belo secondary	60	96.8%	2	3.2%	
Secondary	126	94.0%	8	6.0%	
University	305	96.5%	11	3.5%	
Have you ever attended an awareness campaign about obesity?					.555$
Yes	99	97.1%	3	2.9%	
No	386	95.8%	17	4.2%	

Table 4 Participants' perception regarding their weight and obesity treatment by their awareness regarding obesity hazards. The exact of 94.1% of participants who knew about obesity hazards were ready to treat obesity compared to 66.7% of others who were not (P=.001). Also, 47.7% of obese participants who know about obesity risk were considering surgery to treat obesity versus 33.3% of others (P=.049).

Table 4 Participants' perception regarding their weight and obesity treatment by their awareness of obesity hazards

Perception	Do you think obesity is a health threat?				p-value
	Yes		No		
	No	%	No	%	
Perceived body weight					.498$
Within average	93	18.9%	6	28.6%	
Overweight	295	60.1%	13	61.9%	
Obese	11	2.2%	0	0.0%	
Morbid obesity	92	18.7%	2	9.5%	
Are you ready to treat obesity?					.001*
Yes	462	94.1%	14	66.7%	
No	29	5.9%	7	33.3%	
Are you considering surgery to treat obesity?					.049*
Yes	234	47.7%	7	33.3%	
No	257	52.3%	14	66.7%	
What is your primary motivation for obesity treatment?					.416$
For better appearance	133	27.1%	8	38.1%	
To treat chronic co-morbidities	131	26.7%	7	33.3%	
To avoid having cancer	14	2.9%	0	0.0%	
For a better lifestyle and better living	213	43.4%	6	28.6%	

P: Pearson X² test $: Exact probability test* P < 0.05 (significant)

4. DISCUSSION

Obesity has become an impending global health issue with corresponding severe morbidity, including but not limited to metabolic syndrome and cancers. Many researchers have found a strong connection between obesity and the development of many types of cancers, including breast, pancreatic, kidney, endometrial and colorectal cancer (Booth et al., 2015) with evidence that obesity increases the occurrence and negatively affects the prognosis of post-menopausal breast cancer independently of menopausal status (Fallone et al., 2018) that's due to the association between hyperadiposity and altered adipose tissue function, adipocyte death and low-grade chronic inflammation. Most obese individuals harbor inflamed adipose tissue, which resembles chronic tissue injury, in addition to immune cell infiltration and remodeling. Several pathophysiologic changes are found within this altered environment that might lead to breast and other cancers (Iyengar et al., 2016). Similarly, in a study conducted in the UK to measure public awareness of the association between cancer and obesity, researchers demonstrated that only 25% of adults in the UK are aware of cancer as a complication caused by being obese (Hooper et al., 2018). Our study was conducted to assess the perception of obese patients about knowledge of obesity as a threat to many diseases and cancer on top of that.

It also revealed obese patients' self-recognition of their obesity, as more than 70% of participants have a false perception about their weight and aren't identified themselves as obese. This is considered a cornerstone of the problem, although 62% had higher education. On the other hand, 93% of participants considered obesity as a health threat and a risk factor, particularly for Metabolic diseases (Diabetes, Hypertension, Hypercholesterolemia) and are motivated to start treatment accordingly. Surprisingly, only 11% were motivated to start obesity treatment for cancer prevention which makes us realize that cancer is not at the forefront of obesity patients' minds.

The main motivation of obese patients for treatment was to improve their lifestyle and living. Our results indicate a poor level of knowledge regarding the impact of obesity and cancers in Saudi Arabia. As 27% of our participants aimed to manage co-morbidities, only 2.7% considered weight loss to avoid malignancies. In addition, the study also emphasizes on the lack of well-structured obesity prevention programs and awareness in Saudi Arabia, as only 2% of participants attended the obesity awareness events. It is highly recommended to establish obesity-related cancer prevention programs targeting obese patients and encourage health care providers to do so.

Limitation

The age group didn't include adolescents and children, with the increasing prevalence of obesity in this age group.

5. CONCLUSION AND RECOMMENDATION

The study revealed that the vast majority of the obese participants were aware that obesity is a health threat due to associated complications, including metabolic Diseases. Yet, obesity is not well acknowledged as a risk factor for cancers in our society. Females were more aware than male obese participants. Also, most participants were ready to treat obesity, but surgical management was less considered. Thus, there is a need to increase the awareness and implantation of obesity prevention programs for patients prepared by health care.

Author's Contributions

Enas Alqahtani, Aziz Alsubaie, Mashael Alfarasani and Malik Almutairi contributed to the design. Enas Alqahtani, Aziz Alsubaie, Rajeh Alaklabi and Sultan Alosaimi prepared the study protocol and questionnaire. Enas Alqahtani, Tahani Alshandari, Mashael Alfarasani and Malik Almutairi contributed to the data collection, analysis and interpretation of the result. Enas Alqahtani, Aziz Alsubaie, Rajeh Alaklabi, Sultan Alosaimi, and Mashael Alfarasani contributed to the drafting of the manuscript. Aziz Alsubaie, Sultan Alosaimi, Tahani Alshandari and Mashael Alfarasani contributed to reviewing and editing the manuscript. All authors approved the final version of the manuscript.

Ethical Approval

The ethical research committee of Dammam Medical Complex Institutional Review Board (MDC IRB), Dammam, Saudi Arabia, approved this study (H-05-D-107, Project No. SUR-01, IRB log no. 47). All participants in the research gave their verbal and written informed consent.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES AND NOTES

1. Alorwan A, Bukhari M, Quayidkhalanazi O. Obesity as a risk and predictive factor for ovarian cancer among Saudi women: Hypothetical cloned artistic projection. Medical Science 2022; 26: ms60e2016. doi: 10.54905/disssi/v26i120/ms60e2016

2. Althumiri NA, Basyouni MH, Al Mousa N, Al Juwaysim MF, Almubark RA, Dhim NFB, Alkhamaali Z, Alqahtani SA. Obesity in Saudi Arabia in 2020: Prevalence, distribution and its current association with various health conditions. Healthcare (Basel) 2021; 9(3):311. doi: 10.3390/healthcare9030311

3. Arnold M, Leitzmann M, Freisling H, Bray F, Romieu I, Renehan A, Soerjomataram I. Obesity and cancer: An update of the global impact. Cancer Epidemiol 2016; 41:8–15. doi: 10.1016/j.canep.2016.01.003

4. Booth A, Magnuson A, Fouts J, Foster M. Adipose tissue, obesity and adipokines: Role in cancer promotion. Horm Mol Biol Clin Investig 2015; 21(1). doi: 10.1515/hmbci-2014-0037

5. Derbyshire AE, Mac Kintosh ML, Pritchard CM, Pontula A, Ammori BJ, Syed AA, Beeken RJ, Crosbie EJ. Women's risk perceptions and willingness to engage in risk-reducing interventions for the prevention of obesity-related endometrial cancer. Int J Womens Health 2022; 14:57–66. doi: 10.2147/IJWH.S326417

6. Fallone F, Deudon R, Muller C, Vaysse C. Cancer du sein, obesite et tissu adipeux. Med Sci 2018; 34(12):1079–86. doi: 10.1051/medsci/2018298

7. Hooper L, Anderson AS, Birch J, Forster AS, Rosenberg G, Bauld L, Vohra J. Public awareness and healthcare professional advice for obesity as a risk factor for cancer in the UK: A Cross-sectional survey. J Public Health 2018; 40(4):797–805. doi: 10.1093/pubmed/fdx145

8. Iyengar NM, Gucalp A, Dannenberg AJ, Hudis CA. Obesity and cancer mechanisms: Tumor microenvironment and inflammation. J Clin Oncol 2016; 34(35):4270–6. doi: 10.1200/JCO.2016.67.4283

9. James PT, Leach R, Kalamara E, Shayeghi M. The worldwide obesity epidemic. Obes Res 2001; 9(S11). doi: 10.1038/oby.2001

10. Petrelli F, Cortellini A, Indini A, Tomasello G, Ghidini M, Nigro O, Salati M, Dottorini L, Iaculli A, Varricchio A, Rampulla V, Barni S, Cabiddu M, Bossi A, Ghidini A, Zaniboni A. Association of obesity with survival outcomes in patients with cancer. A Systematic Review and Meta-analysis. JAMA Netw Open 2021; 4(3). doi: 10.1001/jamanetworkopen.2021.3520

11. Rock CL, Thomson CA, Sullivan KR, Howe CL, Kushi LH, Caan BJ, Neuhouser ML, Bandera EV, Wang Y, Robien K, Basen-Engquist KM, Brown JC, Courneya KS, Crane TE, Garcia DO, Grant BL, Hamilton KK, Hartman SJ, Kenfield SA, Martinez ME, Meyerhardt JA, Nekhlyudov L, Overholser L, Patel AV, Pinto BM, Platek ME, Rees-Punia E, Spees CK, Gapstur SM, Mc Cullough ML. American Cancer Society Nutrition and physical activity guideline for cancer survivors. CA Cancer J Clin 2022; 72(3):230–62. doi: 10.3322/caac.21719

12. Salem V, Al Husseini N, Abdul HIR, Naoum A, Sims OT, Alqahtani SA. Prevalence, risk factors and interventions for obesity in Saudi Arabia: A systematic review. Obes Rev 2022; 23(7). doi: 10.1111/obr.13448

13. Washington CR, Haggerty A, Ronner W, Neff PM, Ko EM. Knowledge of endometrial cancer risk factors in a general gynecologic population. Gynecol Oncol 2020; 158(1):137–42. doi: 10.1016/j.ygyno.2020.03.03