

Research Article

Awareness of the general population towards obesity and bariatric surgery in the Western region of Saudi Arabia. A cross-sectional survey

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ABSTRACT

BACKGROUND: Obesity is considered a chronic condition caused by an abundance of body fat; it significantly rises morbidity and the risk of early death. Severe obesity is thought to be best treated with bariatric surgery hence the number of these procedures is increasing recently in Saudi Arabia thus our aim is to assess the general population's awareness regarding obesity and bariatric surgery complications in the Western region of Saudi Arabia.

METHODS: The design of this study is cross-sectional; it was carried in Umm Al-Qura University. Respondents were from Saudi Arabia's Western region and the sample was collected via an online questionnaire from October 2022 to December 2022.

RESULTS: 1122 respondents were collected in the study. 664 (59.2%) were females compared to 458(40.8%) males, Ages of participants ranged from 15 to 46 years with a mean age of 24.3 ± 13.9 years. The overall knowledge of participants was good accounting for 641(57.1%) compared to 481(42.9%) were having poor knowledge.

CONCLUSION: Overall knowledge among the general population regarding obesity and bariatric surgery complications in the Western region of Saudi Arabia was sufficient. Yet, more studies should be conducted all over Saudi Arabia to assess general population awareness and identify any factors influencing the level of knowledge to enhance them through medical education.

1. INTRODUCTION

Obesity is defined as a chronic condition due to an excess amount of body fat. Patients who have obesity carry a substantial risk of having many comorbid illnesses such as cardiovascular disease, gastrointestinal disorders, type 2 diabetes, muscular and joint disorders, respiratory issues, and psychiatric problems, therefore, these conditions may have a significant impact on patients' everyday lives and raise their mortality risks (Fruh, S. M. 2017).

One of the most widely used methods to determine obesity is the body mass index (BMI) (Obesity Expert Panel, 2013: doi.org/10.1002/oby.20821; WHO Discussion Paper: <https://www.who.int/publications>; Apovian C. M. 2016). The BMI is categorized into three classes according to the increased health risks associated with increasing BMI levels: class I (BMI 30–34.9), class II (BMI 35–39.9), and class III (BMI ≥ 40). Those classes help guide the treatment options (Katzmarzyk, P. T. 2006).

Globally, the prevalence of obesity is increasing sharply among both adults and children (Jebb, S. 2004). According to 2016 data from the World Health Organization, 13% of adults worldwide (men: 11%; women: 15%) are obese (Gadelkarim, et al. 2022). In 2016, 330 million children and adolescents between the ages of 5 and 19 and 40 million children under the age of 5 were estimated to be overweight or obese (Jebb, S. 2004). According to a study conducted in Saudi Arabia, obesity and overweight have become more common in recent years and the prevalence of obesity was 24.7%, especially women have twice the rate of obesity of men (Althumiri, et al. 2021).

Weight loss surgical treatment such as bariatric surgery is seen to be the most effective way to treat severe obesity (Kinlen, et al. 2017). Moreover, the number of bariatric surgery procedures performed has thus risen in Saudi Arabia in recent years (Salem, et al. 2022). Within the

first two years of follow-up after bariatric surgery, several small RCTs have demonstrated better weight loss and type 2 diabetes remission compared with non-surgical therapy. Large, long-term observational studies demonstrate improved lipids, diabetes, and weight loss with bariatric surgery that remain after five years (Courcoulas, et al. 2014).

Bariatric surgery is a component of the multimodal treatment of obesity, which includes diagnosis and multidisciplinary evaluation, conservative and surgical treatments, and lifelong follow-up care (Runkel, et al. 2011). However, many obese individuals in Saudi are still unaware of the various problems associated with this type of weight loss treatment (Alreshidi, et al. 2022). As no similar studies have been conducted in the western region of Saudi Arabia, we aimed to assess the awareness of the general population of obesity and bariatric surgery complications as well as explore the association between the level of awareness and sociodemographic characteristics.

2. MATERIALS AND METHODS

2.1 Study design and setting:

A cross-sectional study using an online questionnaire distributed via Google Forms was conducted among the general population of the western region of Saudi Arabia from October 2022 to December 2022.

2.2 Ethical consideration:

We distributed our survey after obtaining ethical approval on 11/11/2022 from the Biomedical Research Ethics Committee of Umm Al-Qura University, Makkah, KSA (Approval number APO-02-K-012-2022-11-1245). Moreover, the study was conducted according to the Declaration of Helsinki's principles. The subjects were informed of their rights to refuse to participate and end their involvement at any time. The study objectives, methods used to collect the data, and assurance of the safety of participants were all explained to the subjects.

In this study, confidentiality and anonymity were maintained by not disclosing the participant's name on the questionnaire and research reports and by keeping the collected data confidential, and not revealing subjects' identities.

2.3 Eligibility criteria:

We included in our sample men and women among the general population who live in the western region of Saudi Arabia. Individuals under the age of 15 years and those who refused to participate in the survey were excluded from the study.

2.4 Sample size:

After we determined our study population, we calculated the sample size using OpenEpi version 3.0 (Sullivan, et al. 2009). Accordingly, the sample size required for this study was 384. However, we recruited 1122 participants in this study.

2.5 Study tool:

This study used both English and Arabic versions of a previously published and validated questionnaire, which was modified to suit our target population (Alrashid, et al. 2021). The English version was used for the statistics and the Arabic version for data collection. The survey was split into five sections. The first section included demographic questions. The second section assessed the participants' attitudes toward obesity-associated factors. The third section consisted of questions on the respondents' knowledge of bariatric surgery. The fourth and fifth sections assessed the participants' perceptions of bariatric surgery and its complications, respectively. A consent form was obtained from the participants at the beginning of the questionnaire.

2.6 Statistical analysis:

The data were collected, reviewed, and then fed to Statistical Package for Social Sciences version 21 (SPSS: An IBM Company). All statistical methods used were two-tailed with an alpha level of 0.05 considering significance if the P value is less than or equal to 0.05. Regarding knowledge; any correct answer was given a 1-point score. Overall knowledge level regarding bariatric surgery was assessed by summing up discrete scores for different correct knowledge items. The overall knowledge score was categorized as a poor level if the participant's score was less than 60% of the overall score and a good level of knowledge was considered if the participant's score was 60% or more of the overall score. Descriptive analysis was done by prescribing frequency distribution and percentage for study variables including participants' data, and their BMI. Also, Participants' perceptions and attitudes towards some obesity-associated factors and knowledge items were tabulated while the overall knowledge level was graphed. Cross tabulation for showing the distribution of participants' overall knowledge level by their data and other factors with Pearson chi-square test for significance and exact probability test if there were small frequency distributions.

3. RESULTS

A total of 1122 participants completed the study questionnaire. Participants' ages ranged from 15 to more than 46 years with mean age of 24.3 ± 13.9 years old. Exact of 664 (59.2%) were females and 764 (68.1%) had bachelor's degree and 306 (27.3%) had Secondary educational level. As for job titles, 777 (69.3%) were not working, 244 (21.7%) were non-healthcare workers, and 101 (9%) were health care workers. Monthly income of less than 10000 SR was reported among 484 (43.1%) participants while 231 (20.6%) had monthly income exceeding 19000 SR. As for BMI, 179 (16%) had underweight, 522 (46.5%) had normal weight, and 37.5% were overweight or obese (Table 1).

Table 1. Demographic data of the general population in the Western region of Saudi Arabia

Demographic data	No	%
Age in years		
15-25	680	60.6%
26-35	197	17.6%
36-45	138	12.3%
46+	107	9.5%
Gender		
Male	458	40.8%
Female	664	59.2%
Education		
Secondary education	306	27.3%
Bachelor degree	764	68.1%
Post-graduate degree	52	4.6%
Job		
Not working	777	69.3%
Non-health care worker	244	21.7%
Health care worker	101	9.0%
Monthly income		
< 10000 SR	484	43.1%
10000-19000 SR	407	36.3%
> 19000 SR	231	20.6%
BMI		
Underweight	179	16.0%
Normal weight	522	46.5%
Overweight	257	22.9%
Obese	164	14.6%

In the Table 2. we have shown the perception and attitude towards some obesity-associated factors among the general population in the Western region of Saudi Arabia. Exact 241 (21.5%) participants think that they have obesity, 82 (7.3%) experienced bariatric surgery, and 318 (28.3%) had a family history of obesity. Also, 364 (32.4%) consider their current weight is harmful to their health and 899 (80.1%) confirmed that they care about their weight/physical appearance.

Table 2. Perception and attitude toward some obesity-associated factors among the general population in the Western region of Saudi Arabia

Perception & attitude	No	%
Had obesity?		
Yes	241	21.5%
No	828	73.8%
I don't know	53	4.7%
Did you experience bariatric surgery?		
Yes	82	7.3%
No	1025	91.4%
I don't know	15	1.3%
Family history of obesity		
Yes	318	28.3%
No	738	65.8%
I don't know	66	5.9%
Did you consider your current weight is harmful to your health?		
Yes	364	32.4%
No	641	57.1%
I don't know	117	10.4%
Are you caring about weight/physical appearance?		
Yes	899	80.1%
No	171	15.2%
I don't know	52	4.6%

In the Table 3. We have described the knowledge and awareness of the general population towards obesity and bariatric surgery in the Western region of Saudi Arabia. 7.7% agreed that surgery is the only way to get rid of obesity, and 85.5% of participants think that surgery contributes to the reduction of body weight, only 11.5% consider surgery as the first choice for reduction of body weight without diet or exercise, and 56.7% agreed that weight loss surgery decreases the mortality rate. Also, 74.2%

reported weight loss surgery results in death, 67.1% Believe that surgery will cause a drastic change in their lifestyle and 66.8% Believe that surgery will cause a drastic change in their eating habits. Regarding the perception of complications, the most reported were dumping and vomiting (86.9%), behavioral/psychosocial changes (83.4%), nutritional deficiencies (80.7%), GIT diseases (76.3%),

and the least reported complications were ulcers (62.8%), hemorrhage (60.4%), hernias (58.9%), and infection (54.4%). As for chronic complications, 26.3% reported DM and insulin resistance, 25.7% reported blood clotting, 21.3% reported disturbed liver functions, and 19.7% know about renal diseases.

Table 3. Knowledge and awareness of the general population towards obesity and bariatric surgery in the Western region of Saudi Arabia

Domains	Knowledge items	Yes		No		I don't know	
		No	%	No	%	No	%
General knowledge	Surgery is the only way to get rid of obesity	86	7.7%	1034	92.2%	2	.2%
	Surgery contributes to the reduction of body weight	959	85.5%	149	13.3%	14	1.2%
				89	7.9%	11	1.0%
	Consider surgery as the first choice for the reduction of body weight without diet or exercise	129	11.5%	987	88.0%	6	.5%
	Weight loss surgery decreases the mortality rates	636	56.7%	434	38.7%	52	4.6%
	Weight loss surgery results in death	832	74.2%	243	21.7%	47	4.2%
	Believe that surgery will cause a drastic change in your lifestyle	753	67.1%	348	31.0%	21	1.9%
	Believe that surgery will cause a drastic change in your eating habits	749	66.8%	354	31.6%	19	1.7%
Perception about complications	Nutritional Deficiencies	905	80.7%	203	18.1%	14	1.2%
	Dumping & Vomiting	975	86.9%	134	11.9%	13	1.2%
	Behavioral/Psychosocial Changes	936	83.4%	168	15.0%	18	1.6%
	Hemorrhage	678	60.4%	401	35.7%	43	3.8%
	GIT Diseases	856	76.3%	233	20.8%	33	2.9%
	Ulcers	705	62.8%	370	33.0%	47	4.2%
	Hernias	661	58.9%	414	36.9%	47	4.2%
	Infection	610	54.4%	473	42.2%	39	3.5%
Chronic complications	Disturbed Liver Functions	239	21.3%	196	17.5%	687	61.2%
	Renal Diseases	221	19.7%	250	22.3%	651	58.0%
	DM and Insulin Resistance	295	26.3%	329	29.3%	498	44.4%
	Blood Clotting	288	25.7%	201	17.9%	633	56.4%

Table 4. Factors associated with public awareness and knowledge regarding bariatric surgery

Factors		Overall knowledge level				p-value
		Poor		Good		
		No	%	No	%	
Age in years	15-25	253	37.2%	427	62.8%	0.001*
	26-35	104	52.8%	93	47.2%	
	36-45	70	50.7%	68	49.3%	
	46+	54	50.5%	53	49.5%	
Gender	Male	181	39.5%	277	60.5%	0.060
	Female	300	45.2%	364	54.8%	
Education	Secondary education	133	43.5%	173	56.5%	0.943
	Bachelor degree	325	42.5%	439	57.5%	
	Post-graduate degree	23	44.2%	29	55.8%	
Job	Not working	326	42.0%	451	58.0%	0.002*
	Non-health care worker	124	50.8%	120	49.2%	
	Health care worker	31	30.7%	70	69.3%	
Monthly income	< 10000 SR	233	48.1%	251	51.9%	0.004*
	10000-19000 SR	165	40.5%	242	59.5%	
	> 19000 SR	83	35.9%	148	64.1%	
BMI	Underweight	77	43.0%	102	57.0%	0.403
	Normal weight	236	45.2%	286	54.8%	
	Overweight	105	40.9%	152	59.1%	
	Obese	63	38.4%	101	61.6%	
Had obesity?	Yes	98	40.7%	143	59.3%	0.055 ^S
	No	352	42.5%	476	57.5%	
	I don't know	31	58.5%	22	41.5%	
Did you experience bariatric surgery?	Yes	40	48.8%	42	51.2%	0.007*
	No	429	41.9%	596	58.1%	
	I don't know	12	80.0%	3	20.0%	
Family history of obesity	Yes	125	39.3%	193	60.7%	0.006*
	No	316	42.8%	422	57.2%	
	I don't know	40	60.6%	26	39.4%	
Did you consider your current weight is harmful to your health?	Yes	134	36.8%	230	63.2%	0.006*
	No	286	44.6%	355	55.4%	
	I don't know	61	52.1%	56	47.9%	

Are you caring about weight/physical appearance?	Yes	377	41.9%	522	58.1%	0.141
	No	75	43.9%	96	56.1%	
	I don't know	29	55.8%	23	44.2%	

P: Pearson χ^2 test;

S: Exact probability test; * $P < 0.05$ (significant).

Overall knowledge level regarding obesity and bariatric surgery among the general population in the Western region of Saudi Arabia is presented in Figure 1. A total of 641 (57.1%) respondents had an overall good knowledge level for bariatric surgery while 481 (42.9%) had a poor knowledge level.

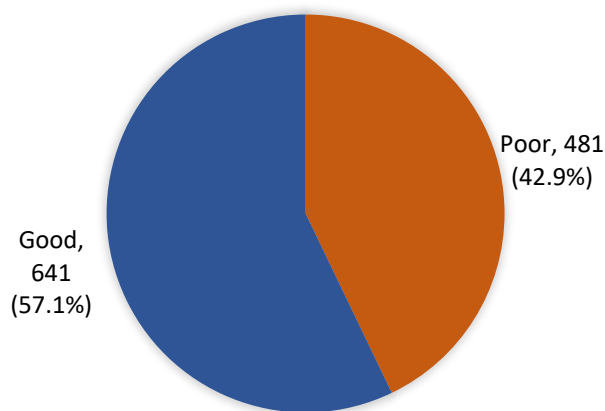


Figure 1. Overall knowledge level regarding obesity and bariatric surgery among the general population in the Western region of Saudi Arabia

Factors associated with public awareness and knowledge regarding bariatric surgery is shown in Table 4. Exact 62.8% of participants aged 15-25 years had an overall good knowledge level versus 49.5% of others aged 46 years or more with recorded statistical significance ($P=0.001$). Also, 60.5% of the male gender reported a good level of knowledge. 69.3% of Health care workers had an overall good knowledge level of bariatric surgery compared to 49.2% of non-healthcare workers ($P=0.002$). A good knowledge level was detected among obese participants 61.6%, whereas, 54.8% of participants with normal weight had a good level of knowledge. 51.2% of those who experienced bariatric surgery showed a good knowledge level versus 58.1% of those who didn't experience bariatric surgery ($P=0.007$). Additionally, 60.7% of participants with a family history of obesity had a good knowledge level in comparison to 57.2% of those who don't have a family history of obesity ($P=0.006$). Also, 63.2% of participants who consider their current weight harmful to their health had good knowledge about bariatric surgery versus 47.9% of those who don't know ($P=0.006$).

4. DISCUSSION

In this cross-sectional study, we aimed to assess the awareness of the general population of obesity and bariatric surgery in the western region of Saudi Arabia. According to our results, we found that 57.1% of the participants had adequate knowledge of obesity and bariatric surgery, which is consistent with a previously published study (Alfadhel, et al., 2019). Dissimilarly, another study conducted among women in the eastern province of Saudi Arabia showed that 73.1% had a low awareness of obesity (Almansour, et al. 2019). However, our study is consistent with another published article that assessed the awareness of obesity in the Tabuk region (Alrashid, et al. 2021).

A study of adults aged 18–45 years in Medina, Saudi Arabia found that the study population had sufficient knowledge of obesity, particularly those with higher educational levels (Alhawiti, R. 2021). In comparison with our study findings, the majority of the participants, who were aged 15–25 years, demonstrated a good knowledge level, as did those respondents with a bachelor's degree.

According to our results, a higher monthly income was positively associated with a better understanding and awareness of obesity. On the contrary, another Saudi study found a positive association between high income and obesity (Mosli, et a., 2020).

An assessment of the participant's BMI was included in our questionnaire. We identified that 37.5% of the respondents suffered from overweight and obesity. Nevertheless, a study conducted in Saudi Arabia showed that the awareness of obesity is poor among those respondents who are obese and had undergone bariatric surgery (Alrashid, et al. 2021). Accordingly, further studies should be conducted to estimate the understanding of obesity complications and morbidity among the general population, especially those who weigh more than the normal range.

Although we found a significant prevalence of obesity, only 21.5% of the study population thought that they were obese. Moreover, only 7.3% of them had undergone bariatric surgery. Altogether, 41.2% of the respondents in a study of Saudi adults reported their unwillingness to consider bariatric surgery (Alfadhel, et al. 2021); hence, we encourage further studies and programs assessing and

increasing awareness of the indicators and contraindications of bariatric surgery.

The low number of participants who considered bariatric surgery could be a result of their bad perception of it since 74.2% of the respondents thought that weight loss surgery could result in death. Hence, awareness programs on the benefits and complications of bariatric surgery are highly recommended.

4.1 Limitations of the Study:

Although we used a brief and easy-to-understand questionnaire, misunderstandings can result from self-reported, web-based cross-sectional studies, leading to a decrease in the quality of the study findings and the generalizability of the results. Additionally, recall bias is possible in this study's design.

5. CONCLUSION AND RECOMMENDATION

We aimed to evaluate the awareness of obesity and bariatric surgery of people who live in the western region of Saudi Arabia. According to the findings of our survey, we concluded that the knowledge of obesity and bariatric surgery and associated complications was generally good among our respondents. However, about 43% of the respondents had a poor level of knowledge. These findings support the need for more effort toward raising awareness. In addition, more studies are needed across Saudi Arabia to assess the population's awareness and determine the shortcomings of medical education.

AUTHOR CONTRIBUTION

The authors participated equally in each step of the research process.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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