

Awareness About the Role of Bariatric Surgery in Mortality and Morbidity among General Population of Albaha City

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ABSTRACT

Background: Obesity is an emerging health concern worldwide and in Saudi Arabia. Until now bariatric surgery is the most effective treatment for morbid obesity.

Objective: The aim of this study was to measure awareness about the role of bariatric surgery in mortality and morbidity among general population in Albaha city in Saudi Arabia.

Methods: A questionnaire was distributed among the general public in Albaha city, Saudi Arabia. The questionnaire consisted of two parts, the first one included personal data and the second one was concerned with awareness and knowledge of people regarding effectiveness and complications of bariatric surgery. Only completed questionnaires without missing data were subjected to statistical analysis.

Results: The majority of respondents opposed surgery and didn't believe in its effectiveness compared with other treatment lines. There were false beliefs about the regaining of weight after surgery and exaggeration of its complications. The most common causes for refusal of surgery were lack of need and fear of complications while the most common motives for acceptance were desire of more weight loss and health benefits.

Conclusion: Health education is necessary to increase patients' awareness and knowledge about bariatric surgery. The topics to be focused upon are the expected benefits after surgery, the maintenance of weight and the nature and incidence of surgical complications.

Keywords: bariatric surgery; obesity; body mass index.

INTRODUCTION

Obesity is a growing health problem worldwide. In Saudi Arabia one out of three adults suffers from obesity and at least one out of ten adults has morbid obesity ⁽¹⁾. In the United States approximately 30 percent of adults are obese, and the prevalence of obesity has increased rapidly in recent decades. Increasing numbers of children are overweight, which contributes to the high projections of obese adults in the future. Obesity leads to 30-50 % more chronic medical problems than heavy smoking or drinking ⁽²⁾. It contributes to coronary artery disease, cancer (breast, cervix, colon, esophagus, kidney, pancreas, prostate and uterus), diabetes, hypertension, pancreatitis, gall bladder problems, gout, infertility, liver problems and stroke. Obesity alone causes 100,000 cancers each year in the United States ⁽³⁾.

Demand for bariatric surgery has increased ⁽⁴⁾. It is estimated that 15,000 bariatric operations are performed annually in Saudi Arabia ⁽¹⁾. Between 2003 and 2011, 735 bariatric procedures were performed at Imam Abdulrahman Al-Faisal Hospital (IAFH) and 452 standard biliopancreatic diversion (BPD) ⁽⁵⁾. Typically patients lose between 20 and 50 kg within the first 1-2 postoperative years, and maintain the bulk of this weight loss for up to 10 years and longer. While, up to 25% of patients fail to achieve adequate weight loss, typically defined as > 50% excess weight lost and maintained for at least 5 years after

surgery. Other patients regain substantial amounts of weight, even within the first 1-2 years after surgery ⁽⁶⁾.

Studies have found bariatric surgery to have more positive health impacts on many obesity-related diseases than traditional weight-loss tactics. Obese individuals with diabetes, high blood pressure, high levels of uric acid and other obesity-related conditions who received bariatric surgery showed greater improvement in these comorbidities at two and 10 years than those who did not receive surgery. Despite clinical outcomes improvement, bariatric surgery is not without risk. Common risks include infection, ulcers, dumping (involuntary vomiting or defecation), hemorrhage, wound reopening, blood clots, heart attacks and hernias ⁽⁴⁾. On the other hand, **Elder and Wolfe** ⁽⁷⁾ assessed that nutrient deficiencies or GI pathology considered as a complications that may follow any of the bariatric surgical procedures.

Buckley and Marlowe ⁽⁴⁾ reported that experience and proven outcomes are essential components for a successful surgical program. While one of the most important determinants of high-quality bariatric surgery outcomes is experience, there exists a huge range of experience between hospitals and surgeons. On the other hand, **Al-Khalidi** ⁽¹⁾ reported that in many medical centers, operations have been done under questionable surgical circumstances and a lacking

of standards, in addition to shortage of surgeons with good experience in bariatric surgery which made patient at high risk of complications and sometime death of patients.

Since bariatric surgery was and still is the only available technique with established long-term effects on weight loss. The present investigation was carried out to examine the public awareness regarding side effects of bariatric surgery on the mortality and morbidity among general population in Albaha city in KSA.

METHODS

This study was conducted from 1/5/2017 to 1/8/2017. This study was approved by the institutional review board of the Faculty of Medicine, Albaha University. An informed consent was obtained from each participant.

This study had a random cross-sectional design that was used to assess awareness of the general population about the role of bariatric surgery in mortality and morbidity. This study was carried out among general population of Albaha city in Saudi Arabia.

People who approved to participate in the study were included, but those not achieving inclusion criteria and those with incomplete data were excluded from the study.

A sample size of 788 person, aged between 18 to 60 years both males and females were randomly selected in Albaha city (population size 80,000 person, and a confidence level of 95%, confidence interval of 4).

A self-administered questionnaire was used for data collection. The questionnaire had two parts. The first part was about personal information of the participants. The second part was about awareness and knowledge of people regarding side effects, morbidity and mortality of bariatric surgery. The questionnaire was distributed to the participants by direct contact with them. Data were confirmed then coded and entered to a personal computer. Thanks and appreciations were used to inspire the participants to be involved in the study.

Statistical design

The collected data were organized and statistically analyzed using SPSS software statistical computer package for windows version 22. Frequencies were expressed as number and percentage of the group. Chi square and Fisher's exact tests were used as indicated to test for association between categorical variables.

Significance was adopted at $p < 0.05$ for interpretation of results of tests ⁽⁸⁾.

RESULTS

The questionnaire forms were distributed then collected from 788 participants. After exclusion of incomplete questionnaires, 488 were submitted for statistical analysis. The questionnaires were assorted into three groups; group I (participants who did not agree to undergo bariatric surgery), group II (participants who agree) and group III (unsure participants who were unable to decide). The percentage of group I was much higher than those group II (70.7 and 21.3 respectively, while group III included 8.0% only (Figure 1).

Table 1 illustrates the socio-demographic data and body mass index in the participants. The highest frequency of participants was in age group ">21-30 years" and the least was in age group ">50-60" (44.5 % and 5.7%). More than half the participants were males (54.1%). Most participants were married (60.9%), while 38.7% were single and only 0.4% were divorced. The majority of participants had high education (73.2%), followed by secondary education (13.3%), post-graduate (9%) and the least percentage had only primary education (4.5%). There was no statistically significant association between the agreement to bariatric surgery and age ($p=0.275$), sex ($p=0.976$), marital status ($p=0.578$) or educational level ($p=0.782$). As regards the body mass index, most of the participants had BMI higher than normal (pre-obese: 26.6% and obese: 42.6%). There was a statistically significant association between the agreement to bariatric surgery and BMI as a higher frequency of group II were obese (67.3%) than the other groups and none of group II participants were underweight ($p<0.001$).

Table 2 demonstrates the health effects that are related to obesity in the studied participants. The most reported health complaints were knee and back pain (45.3%), followed by elevated cholesterol level (20.5%), hypertension (12.7%), and osteoporosis (10.7%). Group II subjects had a higher frequency of health complaints than the other groups except DM type 2. There was a significant association between the willingness to undergo surgery and knee and back pain ($p = 0.017$), hypertension ($p<0.001$) and gall stones ($p = 0.018$).

Figure 2 illustrates the interventions for weight loss thought by participants to be effective. Dieting was regarded by the participants generally as the most effective tool for weight loss (44.3%)

followed by exercise (43%), surgery (11.9%) and lastly weight losing drugs (0.8%). Table 3 shows the opinion of the participants considering the effectiveness of bariatric surgery as a treatment of obesity. Only 55.5% of all participants correctly affirmed that more weight loss can be achieved with bariatric surgery than with other methods of weight loss, with a significantly higher frequency in group II (73.1%; $p < 0.001$). Group II had a significantly higher frequency of believers in the effectiveness of surgery (75%; $p < 0.001$) and that it would result in more weight loss (73.1%; $p < 0.001$). A significantly higher percentage of group I thought that weight would be regained during the first 1-2 years post-surgery (46.1%; $p < 0.001$). Most participants believed that surgery can cause a drastic change in eating habits (69.9%) and lifestyle (64.1%), with a significantly higher percentage in group II (82.7%; $p < 0.001$ & 84.6%; $p < 0.001$ respectively).

Table 4 demonstrates the complications of bariatric surgery expected by the participants. The most common complications expected by participants included nutritional deficiencies (62.1%), dumping and vomiting (60%), behavioral/psychosocial changes (55.5%), hemorrhage (49.2%), and GIT disorders (47.7%).

A significantly higher percentage of group I subjects believed in the occurrence of complications that include nutritional deficiencies (65.2% of group I subjects), DM and insulin resistance (20.6%), renal diseases (21.2%), disturbed liver functions (24.1%), behavioral/psychosocial changes (58.3%), infection (32.5%), ulcers (37.4%), and GIT disorders (51.3%).

Table 5 shows the reasons expressed by participants for being interested or not interested in bariatric surgery. As regards the reasons for not being interested in the surgery, the most common was lack of need of surgery (60.6%), followed by fear of complications (16.8%) and disbelief in the effectiveness of surgery (10.4%). The least reasons given were cost and fear of pain (0.6% each). This difference was statistically significant ($p < 0.001$). As considers the reasons for being interested in surgery, the most common was the desire for greater weight loss (53.8%), anticipated health benefits (32.7%) and lastly for better management of DM and improved mobility (1.9% each). The improved aesthetic appearance as a motive for surgery was reported by 9.6% of those agreeing to surgery. A statistically significant difference was observed ($p < 0.001$).

Table (1): Socio-demographic data and body mass index of all participants and the studied groups.

		Groups								Fisher's exact test	
		All participants (N= 488)		Group I (N=345)		Group II (N=104)		Group III (N=39)			
		N	%	N	%	N	%	N	%	X ²	p
Age (years)	18-21	39	8	31	9	6	5.8	2	5.1	9.641	0.275
	>21-30	217	45	148	43	48	46	21	54		
	>30-40	104	21	76	22	24	23	4	10		
	>40-50	100	21	66	19	24	23	10	26		
	>50-60	28	5.7	24	7	2	1.9	2	5.1		
Sex	Female	224	46	159	46	48	46	17	44	0.102	0.976
	Male	264	54	186	54	56	54	22	56		
Marital status	Single	189	39	127	37	44	42	18	46	2.692	0.578
	Marries	297	61	216	63	60	58	21	54		
	Divorced	2	0.4	2	0.6	0	0	0	0		
Educational level	Primary	22	4.5	14	4.1	6	5.8	2	5.1	3.211	0.782
	secondary	65	13	42	12	18	17	5	13		
	High	357	73	257	75	72	69	28	72		
	Post-graduate	44	9	32	9.3	8	7.7	4	10		
Body mass index (kg/m ²)	Underweight	22	4.5	21	6.1	0	0	1	2.6	42.74	<0.001*
	Normal	128	26	106	31	12	12	10	26		
	Pre-obesity	130	27	100	29	22	21	8	21		
	Obese (Classes I, II or III)	208	43	118	34	70	67	20	51		

*significant at $p < 0.05$.

Table (2): Health effects of obesity in all participants and the studied groups.

	Groups								Fisher's exact test	
	All participants		Group I		Group II		Group III			
	(N= 488)		(N=345)		(N=104)		(N=39)		X ²	p
	N	%	N	%	N	%	N	%		
Knee and back pain	221	45.3	145	42	60	57.7	16	41	8.161	0.017*
Elevated cholesterol level	100	20.5	62	18	30	28.8	8	21	5.637	0.059
Hypertension	62	12.7	28	8	26	25	8	21	21.3	<0.001*
Osteoprosis	52	10.7	30	9	16	15.4	6	15	4.961	0.085
DM type 2	40	8.2	24	7	10	9.6	6	15	3.769	0.157
gallstones	28	5.7	14	4	12	11.5	2	5.1	7.406	0.018*
cardiac disease	6	1.2	4	1	2	1.9	0	0	0.719	0.774

DM: diabetes mellitus; *significant at p<0.05.

Table (3): Effectiveness of surgery as a treatment for obesity in all participants and the studied groups.

	Groups								Fisher's exact test		
	All participants		Group I		Group II		Group III				
	(N= 488)		(N=345)		(N=104)		(N=39)		X ²	p	
	N	%	N	%	N	%	N	%			
Do you consider bariatric surgery as an effective tool for weight loss?	No	140	29	124	36	10	9.6	6	15	45.66	<0.001*
	Don't know	105	22	76	22	16	15	13	33		
	Yes	243	50	145	42	78	75	20	51		
Do believed that you would lose more weight with bariatric surgery?	No	122	25	104	30	14	14	4	10	26.4	<0.001*
	Don't know	95	20	74	21	14	14	7	18		
	Yes	271	56	167	48	76	73	28	72		
Do you think that you could regain your weight within the first 1-2 years after surgery?	No	102	21	54	16	36	35	12	31	25.61	<0.001*
	Don't know	187	38	132	38	36	35	19	49		
	Yes	199	41	159	46	32	31	8	21		
Do you believe that surgery will cause a drastic change in your eating habits?	No	66	14	60	17	6	5.8	0	0	29.61	<0.001*
	Don't know	81	17	54	16	12	12	15	39		
	Yes	341	70	231	67	86	83	24	62		
Do you believe that surgery will cause a drastic change in your lifestyle?	No	78	16	70	20	6	5.8	2	5.1	35.29	<0.001*
	Don't know	97	20	72	21	10	9.6	15	39		
	Yes	313	64	203	59	88	85	22	56		

*significant at p<0.05.

Table (4): Complications of surgery expected by all participants and the studied groups.

Do you believe these are complications to bariatric surgery?	Groups								Fisher's exact test	
	All participants (N= 488)		Group I (N=345)		Group II (N=104)		Group III (N=39)			
	N	%	N	%	N	%	N	%	X ²	p
Nutritional Deficiencies	303	62	225	65	56	54	22	56	9.931	0.039*
Dumping & Vomiting	293	60	211	61	62	60	20	51	9.23	0.05
Behavioral/Psychosocial Changes	271	56	201	58	54	52	16	41	12.94	0.011*
Hemorrhage	240	49	180	52	42	40	18	46	7.009	0.132
GIT Diseases	233	48	177	51	44	42	12	31	15.08	0.004*
Wound Reopening	216	44	154	45	46	44	16	41	8.152	0.083
Ulcers	165	34	129	37	26	25	10	26	17.58	0.001*
Blood Clotting	154	32	118	34	26	25	10	26	6.66	0.152
Hernias	134	28	90	26	32	31	12	31	1.378	0.854
Infection	132	27	112	33	10	9.6	10	26	32.04	<0.001*
Disturbed Liver Functions	97	20	83	24	12	12	2	5.1	34.24	<0.001*
Renal Diseases	89	18	73	21	14	14	2	5.1	26.96	<0.001*
DM and Insulin Resistance	87	18	71	21	10	9.6	6	15	21.61	<0.001*

*significant at p<0.05.

Table (5): Reasons of being interested or not interested in bariatric surgery.

		N	%	Chi square goodness of fit test	
				X ²	p
Reasons for not being interested in bariatric surgery	Don't need surgery	209	60.6	791.812	<0.001*
	Fear of complications	58	16.8		
	Don't believe surgery is effective	36	10.4		
	Fear of surgeries in general	24	7		
	Religious & cultural reasons	8	2.3		
	Fear of death	6	1.7		
	Cost	2	0.6		
	Pain	2	0.6		
Reasons for being interested in bariatric surgery	Greater weight loss	56	53.8	107.538	<0.001*
	Health benefits	34	32.7		
	Aesthetic appearance	10	9.6		
	Diabetes management	2	1.9		
	Improved mobility	2	1.9		

*significant at p<0.05.

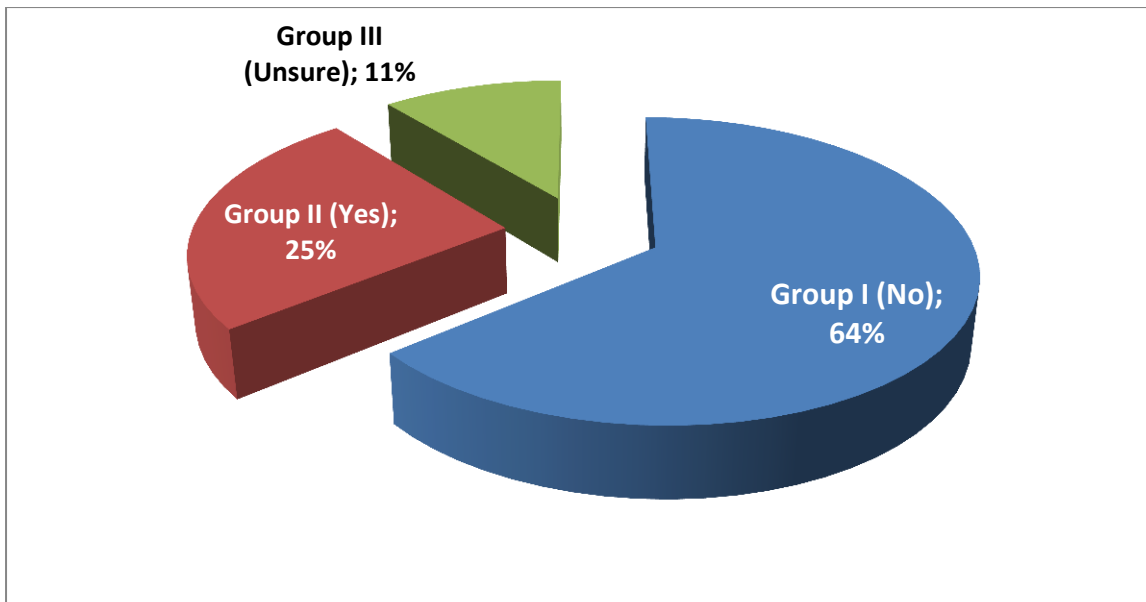


Figure (1): Distribution of the participants according to their agreement to do bariatric surgery.

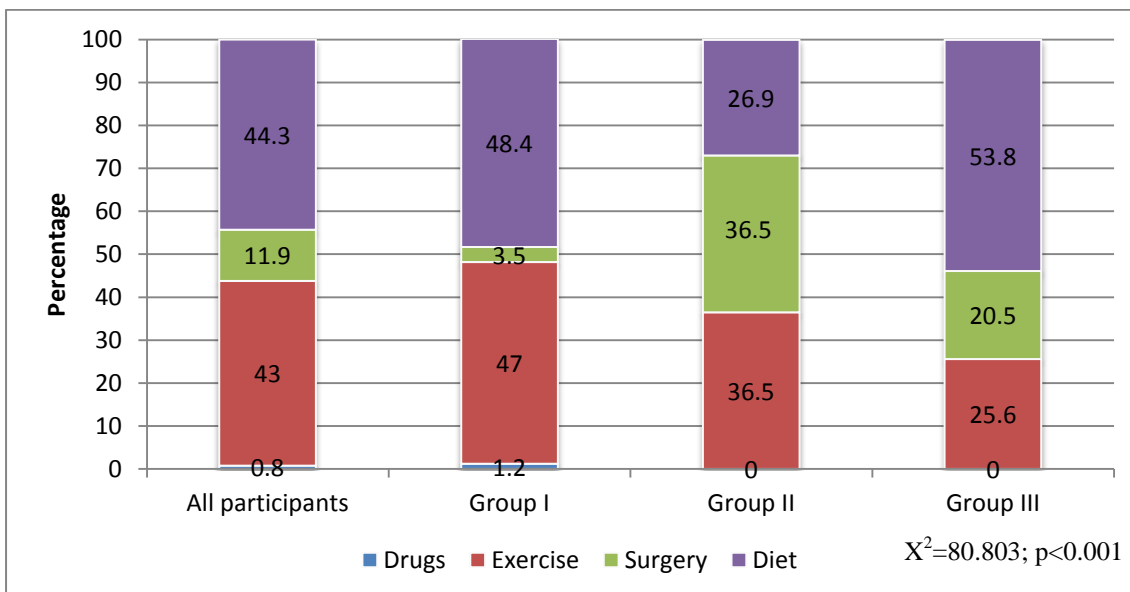


Figure (2): Intervention thought by participants as an effective tool for losing weight.

DISCUSSION

Obesity is a growing health problem worldwide and in Saudi Arabia. The only effective treatment for morbid obesity is bariatric surgery ⁽⁹⁾. The patients' expectations of weight loss and knowledge about surgery can affect the behaviour of patients after surgery ⁽¹⁰⁾.

In this study, the respondents who expressed willingness to undergo bariatric surgery represented 21.3% only of all participants while the majority (70.7%) expressed their refusal of the surgery. The highest frequency of participants was in age group ">21-30 years" and the least was in age group ">50-60" (44.5 % and 5.7%). More than half the participants were males (54.1%). The majority of

participants were well educated (73.2% university, 13.3% secondary education and 9% post-graduate). On the other hand, **Sikorski et al.** ⁽¹¹⁾ reported a higher incidence of female respondents in their study (55.5%). This discrepancy could be attributed to the difference in socio-cultural aspects between the Saudi population and western countries as lower number of Saudi women go to work and participate in outdoor activities so their share in the questionnaire is expected to be less than men.

In the current study, a high percentage of the respondents were pre-obese or obese (26.6% and 42.6% respectively), as judged by their BMI. This incidence reflect the magnitude of the problem of obesity in Albaha population or could be attributed

to the tendency of the subjects suffering from overweight or obesity to complete the questionnaire thoroughly and thus they had a larger share as participants in this study. A higher frequency of group II were obese (67.3%) than the other groups and none of group II participants were underweight.

In the present study, the most reported health complaints were knee and back pain, followed by elevated cholesterol level, hypertension, and osteoporosis. Group II subjects had a higher frequency of health complaints than the other groups except DM type 2. There was a significant association between the willingness to undergo surgery and the presence of knee and back pain, hypertension and gall stones. This could be explained by the high education of the participants, some of them were health care providers, and their knowledge of the effects of bariatric surgery on improving cholesterol levels and recovery from hypertension. It is well known that obesity is associated with increased incidence of various medical diseases including DM, gallbladder disease, cardiovascular disease, hypertension and dyslipidemia^(12,13).

In the present study, the interventions for weight loss that were viewed as mostly effective by the respondents were dieting (44.3%), exercise (43%), surgery (11.9%) and weight losing drugs (0.8%). In partial agreement to this result, **Teo *et al.***⁽¹⁴⁾ surveyed general population and reported that the respondent's preferred method of weight loss was exercise (58.4%), followed by diet (32.8%), while medications and surgery ranked the least favourable among participants (7.3% and 2.2% respectively). **Sarwer *et al.***⁽¹⁵⁾ found that patients with type 2 DM and BMI 30-40 kg/m² estimated diet and exercise (85.4%) to be the most effective for weight loss and management of DM, followed by medications (52.1%) and lastly surgeries (43.1%- 45.2%).

The current study revealed the presence of a misconception about the effectiveness of bariatric surgery as tool for weight loss as 55.5% only of all participants agreed to this, 25% disagreed while the remainders were unsure. Group II showed a significantly higher percentage of believers in bariatric surgery effectiveness. It was reported by other studies that the expected weight loss after bariatric surgery ranges between 50% to 75% of excess weight, which is higher than weight loss achieved by other treatment lines^(16,17). Moreover, **Sikorski *et al.***⁽¹¹⁾ found that nearly half of the participants considered bariatric surgery to be a "very effective" intervention. However, **Sarwer *et al.***⁽¹⁵⁾ reported a lower percentage of respondents

who had favorable belief in the effectiveness of bariatric surgery.

Another misconception elicited by the questionnaire analysis in the present study was that 40.8% of all participants and 46.1% of group I subjects believed weight regain to occur during the first 1-2 years after surgery. Studies showed that the body weight is maintained for a longer duration after bariatric surgeries, amounting to 16 years, while weight regain usually takes place 6 to 24 months in patients who have behavioural and psychopharmacologic treatments⁽¹⁸⁻²⁰⁾.

In the current study, most participants believed that surgery can cause a drastic change in eating habits (69.9%) and lifestyle (64.1%), with a significantly higher percentage in group II (82.7% & 84.6% respectively). Likewise, **Bauchowitz *et al.***⁽¹⁰⁾ found that 71.9% of the patients had correctly indicated that bariatric surgery would enable them to alter diet and exercise. It is necessary that patients form realistic and correct expectations about weight loss after bariatric surgery so that patients remain motivated, instead of being disappointed, and maintain the essential changes in life style required for achieving weight loss.

There appeared to be a gap between the acknowledged complications of bariatric surgery and those believed by the participants in the present study. The complications reported by studies comprised deficiencies of protein, vitamins and iron⁽⁷⁾ and GIT disorders in the form of hemorrhage in early postoperative period⁽²¹⁾, gall stones⁽²²⁾, marginal ulceration^(23,24) and vomiting⁽⁷⁾. The unrealistic complications expected by the participants in this study included behavioral/psychosocial changes (55.5%), disturbed liver functions (19.9%), renal diseases (18.2%), and DM and insulin resistance (17.8%). There is a paucity of research on the perception of risks and complications of bariatric surgery. **Perlman *et al.***⁽²⁵⁾ revealed an overestimation of surgery risks among health care professionals.

In this study, the motives beyond accepting or refusing bariatric surgery were investigated. The most common motive for refusal was lack of need of surgery (60.6%), followed by fear of complications (16.8%) and disbelief in the effectiveness of surgery (10.4%). The least reasons given were cost and fear of pain (0.6% each). These motives reflect false beliefs about the ideal BMI as a considerable percentage of those refusing surgery had BMI above the ideal. In addition, the fear of complications stems from unrealistic and exaggerated expectations of surgical complications.

The most common motives for accepting bariatric surgery was the desire for greater weight loss (53.8%), anticipated health benefits (32.7%), improved aesthetic appearance (9.6%) and better management of DM and improved mobility (1.9% each). In partial agreement to these results, **Munoz et al.** ⁽²⁶⁾ found that the motives for seeking bariatric surgery were health benefits (73%), preventing medical disorders (16%), and self-esteem (3%).

CONCLUSION

The results of this study can be helpful to improve patients' awareness, knowledge and expectations about bariatric surgery by health education and behavioural interventions. The results revealed a high prevalence of overweight and obesity in the studied population. Most respondents opposed bariatric surgery and the motives beyond this appeared to originate from misconceptions about the effectiveness of surgery and exaggeration of expected surgical complications. Future epidemiological studies are recommended to estimate correctly the prevalence of obesity in Saudi population.

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