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## Factors affecting the referral of primary health care doctors toward bariatric surgery in morbid obesity

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Bariatric surgery;  
Referral process;  
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**Abstract** *Background:* Few eligible candidates are referred from primary care for bariatric surgery in spite of improvement in its safety and efficacy.

*Objective:* The aim of this study was to identify factors affecting primary care physicians' (PCPs) referral to bariatric surgery in morbid obesity.

*Methods:* This study is a cross-sectional survey that was conducted at three randomly selected health regions in Kuwait. Primary care physicians were classified according to whether they refer patients to bariatric surgery or not into cases (non-referring) and controls (referring). The participating physicians were family practice physicians (FPs) or general practitioners (GPs). Self-administered questionnaires were distributed to all PCPs currently working in 50 centers in the selected regions. The questionnaire included data on their personal characteristics, their perception and knowledge about the use of bariatric surgery in morbid obesity. Univariate analyses were used followed by multiple logistic analysis to determine factors associated with non-referral to bariatric surgery.

*Results:* The results revealed that the referring physicians were more liable to be females and FPs (OR = 0.5, 95% CI: 0.3–0.9 and OR = 0.5, 95% CI: 0.3–0.8, respectively). Overweight and obese

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physicians were more liable to be non-referring than those with normal BMI (OR = 1.6, 95% CI: 1.2–3.3 and OR = 1.2, 95% CI: 1.1–2.8, respectively). Physicians who could not define correctly bariatric surgery for morbid obesity that requires surgery in a patient without or with co-morbidities were more liable to be non-referring (OR = 1.3, 95% CI: 1.2–2.4, OR = 1.4, 95% CI: 1.1–2.9 and OR = 1.8, 95% CI: 1.2–3.6, respectively). Also, non-referring physician didn't know the average percentage of the excess weight that is lost in 5 years after bariatric surgery (OR = 1.4, 95% CI: 1.2–2.4).

*Conclusion:* Training in the referral process should ensure that PCPs obtain the skills necessary to expand their scope of practice, when appropriate and determine when and why a patient should be referred.

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## 1. Introduction

There is a worldwide epidemic of overweight, obesity, and morbid obesity, encompassing 1.7 billion people. Obesity is not only a medical problem, but also a social, psychological, and economic problem.<sup>1</sup> At present, the morbidly obese are refractory to diet and drug therapy, but have a substantial, sustained weight loss after bariatric surgery.<sup>4</sup>

Bariatric surgery is expanding exponentially to meet the global epidemic of morbid obesity. Today, it is the only effective therapy for morbid obesity. Yet, of the patients qualifying for surgery, only about 1% is receiving this therapy. The number of patients undergoing surgery for the treatment of obesity, and the proportion of the health care budget dedicated to this health problem, are growing exponentially.<sup>2</sup> Commonly performed procedures include adjustable gastric banding (AGB) and vertical banded gastroplasty (VBG); variations of Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion or duodenal switch (BPD) and mixed procedures. All these procedures can be performed by open surgery and more recently by laparoscopy.<sup>3</sup>

Since bariatric surgery is the only broadly successful treatment for morbid obesity, it is incumbent on all physicians to be familiar with current bariatric operations, and to understand the evolution of bariatric surgery.<sup>4</sup> Controversy exists regarding the best surgical procedure.<sup>5</sup>

Although most primary care physicians (PCPs) have little training in this area, they must choose appropriate candidates for surgery, properly prepare them for success before the surgery, and care for their special needs after surgery.<sup>6</sup> Training in the referral process should ensure that PCPs obtain the skills necessary to expand their scope of practice, when appropriate; determine when and why a patient should be referred; and identify the type of practitioner to whom the patient should be sent.<sup>7</sup>

Referrals show a multi-directional pattern rather than a simple pattern of primary to specialty care, with referrals between PCPs, referrals between specialists, and referrals from specialty to primary care being not uncommon. Strong predictors of referral include patient health and patient insurance coverage and income.<sup>8</sup>

Primary care physicians are more likely than other medical specialists to be knowledgeable about, personally subscribe to, and refer patients for alternative therapies.<sup>9</sup>

Referrals of patients with morbid obesity from primary care to surgical specialist care are an important activity in any health care system.<sup>10</sup> Consultation and referral are essential components of the practice of primary care. Despite this, little is known about the factors that contribute to the success of a referral.<sup>11</sup>

The aim of this study was to identify PCPs' factors associated with non-referral of patients with morbid obesity to bariatric surgery as an effective management of obesity. The identification of such factors is an essential step in the development of more potent strategies for managing obesity and for decreasing the adverse effects of obesity in Kuwait.

## 2. Methods

### 2.1. Setting and study design

The health care system in Kuwait is divided into five regional health authorities. Primary health care is provided by 78 centers served by either family practice physicians (FPs) or general practitioners (GPs). The present study is part of a larger study that was conducted to explore the knowledge and perception of physicians working in primary health care (PHC) in Kuwait toward bariatric surgery in morbid obesity.<sup>12</sup>

This study is a cross-sectional survey that was conducted from October to December 2007 in three randomly selected health regions, namely Capital, Hawali and Farwanya. These regions serve 482,969, 750,221 and 3878 individuals by 119, 116 and 89 physicians through 20, 13, 17 health centers, respectively. All PCPs who were currently working as FPs or GPs in the selected health centers were asked to participate in the study.

Self-administered questionnaires were distributed to all PCPs after obtaining their verbal consent to participate. In order to maintain confidentiality, questionnaires were made anonymous.

The questionnaire was derived from other published studies dealing with the same topic as well as from our own experience. The questionnaire consisted of two sections. The first section includes personal characteristics (age, gender, height, weight, marital state, duration of work in PHC, and specialty). The second section describes the perception of physicians about method for long term control of morbid obesity, their opinion about successful bariatric surgery, and their knowledge about common complication and side effects of the surgery. Also, in this part, degree of physician's knowledge includes 10 questions related to different statements about bariatric surgery. Statements are related to definition of morbid obesity with and without co-morbidity, extreme obesity and definition of bariatric surgery. Also, knowledge on the procedures of vertical bandage gastroplasty, recommendation of liposuction, safety of the surgery in adolescents, wound complications, results of the surgery, dumping syndrome and risk of early death after the surgery were assessed. Physicians

were asked to pick only one answer for each question within 5 min without guessing or discussing the answer with other colleagues.

Physicians were classified according to their referral attitude into two groups. The first group included those who did not refer obese patients for bariatric surgery (cases) and the other group included those who practice referral (control group).

## 2.2. Statistical analysis

The Statistical Package for Social Sciences (SPSS-9) was used for data processing. Simple descriptive statistics were used (mean  $\pm$  standard deviation for quantitative variables, and frequency with percentage distribution for categorized variables).

Analysis was initially carried out based on a series of univariate comparisons. In order to control simultaneously for possible confounding effect of the variables, multiple logistic regression was used for the final analysis. In the univariate analysis  $\chi^2$ -square test was used to detect the association between non-referral and explanatory variables. Fisher's exact test was used whenever the  $\chi^2$ -test was not appropriate. In multiple logistic regression analysis, the association between exposure and outcome was expressed in terms of odds ratio (OR) together with their 95% confidence intervals (95% CI). All the explanatory variables included in the logistic model were categorized into two or more levels.

## 3. Results

General characteristics of the participating physicians are summarized in Table 1. Approximately more than half of both referring (52.2%) and all non-referring (58.7%) groups were

40 years and above. The mean age was insignificantly younger in referring group ( $40.5 \pm 8.2$  years) as compared with non-referring one ( $42.2 \pm 9.6$  years). Female physicians were more likely to practice referral of obese patients than males, where 60.9% of the referring group were females compared to only 45.5% among the non-referring one ( $P = 0.02$ ). General practitioners were less encountered among the referring than in the non-referring group (56.5% versus 76.0%,  $P = 0.001$ ). The years of experience among referring group was insignificantly lower than in the non-referring one ( $14.3 \pm 7.7$  versus  $16.1 \pm 9.1$  years,  $P = 0.76$ ). The study reveals that the mean body mass index (BMI) among the referring group was slightly higher than the non-referring group ( $28.8 \pm 15.8$  versus  $28.3 \pm 9.8$ ).

Table 2 illustrates association between physicians' knowledge regarding bariatric surgery and their referring pattern. Overall, correct answers were more encountered in the referring than in the non-referring groups of physicians. Significant higher proportions of physicians in the referring group could correctly define morbid obesity that requires surgery in a patient with or without co-morbid conditions and dumping syndrome than in the non-referring group (81.5% versus 69.5%,  $P = 0.04$ ; 66.3% versus 51.5%,  $P = 0.02$ ; and 47.8% versus 34.7%,  $P = 0.04$ , respectively). No significant differences could be detected, regarding other knowledge, between both groups. The majority of physicians could define bariatric surgery correctly with higher proportion in the referring than in the non-referring groups (92.4% versus 86.8%). On the other hand, physicians' knowledge about types of bariatric surgery was limited, whereas 27.8% could describe vertical bandage gastroscopy (28.3% versus 26.9%) and 46.8% had correct knowledge about liposuction operation (47.8% versus 46.7%). A surprising result was that 95.7% of the referring and 96.4% of the non-referring group had wrong knowledge regarding safety of bariatric surgery in adolescents. About two-third of physicians had correct knowledge about postoperative wound complication associated with increasing BMI (66.3% as compared with 56.9% in both groups).

When they were asked about the average percentage of excess weight lost in the 5 years after bariatric surgery, about three quarters in both groups gave wrong answers (73.9% versus 79.6%, respectively). Nearly both groups did not know the risk of early death after bariatric surgery, this was encountered among 96.7% of the referring and 97.6% of the non-referring groups. Overall, physicians with low knowledge score about bariatric surgery were more liable for non referral.

The results of multiple logistic regression analysis are presented in Table 3. Among physicians' characteristics, only gender, specialty and BMI had significant effect on referral pattern process. Females as compared to males and FPs as compared to GPs were less liable to be non-referring to bariatric surgery (OR = 0.5, 95% CI: 0.3–0.9 and OR = 0.5, 95% CI: 0.3–0.8, respectively). Also, overweight and obese physicians were more liable to be non-referring than the normal weight ones (OR = 1.6, 95% CI: 1.2–3.3 and OR = 1.2, 95% CI: 1.1–2.8, respectively).

Certain physicians' knowledge was associated with non-referral of obese patients to bariatric surgery. More proportion of physicians who wrongly define bariatric surgery was encountered in non-referring group (OR = 1.3, 95% CI: 1.2–3.5). Physicians who could not define correctly morbid obesity that requires surgery in a patient without or with co-morbidities

**Table 1** Characters of participating doctors and their work features.

Characteristics	Referral status				Significance
	Yes ( $n = 92$ )		No ( $n = 167$ )		
	No.	%	No.	%	
<i>Age (year)</i>					
<40	44	47.8	69	41.3	$\chi^2 = 1.02$
$\geq 40$	48	52.2	98	58.7	$P = 0.31$
<i>Gender</i>					
Males	36	39.1	91	54.5	$\chi^2 = 5.60$
Females	56	60.9	76	45.5	$P = 0.02$
<i>Marital status</i>					
Married	84	91.3	151	90.4	$\chi^2 = 0.06$
Unmarried	8	8.7	16	9.6	$P = 0.81$
<i>Experience (year)</i>					
<5	9	9.8	17	10.2	$\chi^2 = 0.54$
5–10	17	18.5	25	15.0	$P = 0.76$
>10	66	71.7	125	74.9	
<i>Specialty</i>					
GP	52	56.5	127	76.0	$\chi^2 = 10.60$
FP	40	43.5	40	24.0	$P = 0.001$
<i>BMI</i>					
Normal	27	29.3	35	21.0	$\chi^2 = 2.97$
Over weight	43	46.7	95	56.9	$P = 0.23$
Obese	22	23.9	37	22.2	

**Table 2** Effect of physicians' knowledge on referral for bariatric surgery.

Statement	Referral status				Significance
	Yes ( <i>n</i> = 92)		No ( <i>n</i> = 167)		
	No.	%	No.	%	
<i>Definition of morbid obesity that requires surgery in a patient without co-morbidities</i>					
Correct	75	81.5	116	69.5	$\chi^2 = 4.46$
Wrong	17	18.5	51	30.5	<i>P</i> = 0.04
<i>Definition of morbid obesity that requires surgery in a patient with co-morbidities</i>					
Correct	61	66.3	86	51.5	$\chi^2 = 5.30$
Wrong	31	33.7	81	48.5	<i>P</i> = 0.02
<i>Definition of bariatric surgery</i>					
Correct	85	92.4	145	86.8	$\chi^2 = 1.85$
Wrong	7	7.6	22	13.2	<i>P</i> = 0.17
<i>Describing the procedure of vertical bandage gastroplasty</i>					
Correct	26	28.3	45	26.9	$\chi^2 = 0.05$
Wrong	66	71.7	122	73.1	<i>P</i> = 0.82
<i>Information about liposuction operation</i>					
Correct	44	47.8	78	46.7	$\chi^2 = 0.03$
Wrong	48	52.3	89	53.3	<i>P</i> = 0.86
<i>Bariatric surgery safety in adolescents</i>					
Correct	4	4.3	6	3.6	<i>P</i> = 0.75*
Wrong	88	95.7	159	96.4	
<i>Likelihood of postoperative wound complication association with increasing BMI</i>					
Correct	61	66.3	100	59.9	$\chi^2 = 1.04$
Wrong	31	33.7	67	40.1	<i>P</i> = 0.31
<i>The average percentage of the excess weight that is lost in 5 years after bariatric surgery</i>					
Correct	24	26.1	34	20.4	$\chi^2 = 1.120$
Wrong	68	73.9	133	79.6	<i>P</i> = 0.290
<i>Dumping syndrome</i>					
Correct	44	47.8	58	34.7	$\chi^2 = 4.261$
Wrong	48	52.2	109	65.3	<i>P</i> = 0.039
<i>The risk of early death after bariatric surgery</i>					
Correct	3	3.3	4	2.4	<i>P</i> = 0.70*
Wrong	89	96.7	163	97.6	

\* Fisher's exact test.

were more liable to be in the non referring group (OR = 1.4, 95% CI: 1.1–2.9 and OR = 1.8, 95% CI: 1.2–3.6, respectively). Physicians who didn't know the average percentage of the excess weight that is lost in 5 years after bariatric surgery were more likely for non referral (OR = 1.4, 95% CI: 1.2–2.4).

#### 4. Discussion

The global rise in morbid obesity and associated co-morbid diseases concerns a wide range of specialists. Obesity needs to be treated within the health care system as any other complex disease, with empathy and without prejudice. Both health care providers and patients should know that obesity treatment is a lifelong task.<sup>13</sup> Despite numerous studies that have defined optimal BMI targets for patients, numerous provider-level barriers exist in the effective management of obesity in primary care.<sup>14</sup> Although bariatric surgery has been proven to be an effective, enduring treatment available for morbid obesity, the rates of referral for surgery are not consistent with the number of individuals affected.<sup>15</sup>

The results of our study demonstrated the effect of PCPs' characteristics and knowledge on referral practice. Compared with non-referring PCPs, referring physicians were more liable to be females, FPs and had normal BMI. It seems that female physicians are more interested in the personal appearance and body shape. Also FPs practiced referral process of obese patients for bariatric surgery more than GPs. However, little is known about the level of knowledge and comfort with bariatric surgery among FPs.<sup>16</sup> The results of our study showed that misconceptions about bariatric surgery exist in the family practice community as well as in GPs. Educational programs need to be designed to assist PCPs in referring obese patients for bariatric surgery when indicated.<sup>15</sup> Patients were most positive if the physician had initiated the referral, which supports the gate keeper role of the GPs.<sup>10</sup>

Referral process was practiced more frequently by physicians with normal BMI than over weight and obese physicians. Previous researches determined that patients have more confidence in weight counseling made by non obese physicians than those who used to be obese.<sup>17,18</sup> Nonetheless, the manner by which clinicians discuss obesity with patients does affect pa-

**Table 3** Factors associated with non referral for bariatric surgery, results of multiple logistic regression analysis.

Factors	OR (95% CI)
<i>Gender</i>	
Males (R)	1
Females	0.5 (0.3–0.9)
<i>Specialty</i>	
GP (R)	1
FP	0.5 (0.3–0.8)
<i>BMI categories</i>	
Normal weight (R)	1
Over weight	1.6 (1.2–3.3)
Obese	1.2 (1.1–2.8)
<i>Definition of morbid obesity that requires surgery in a patient without co-morbidities</i>	
Correct (R)	1
Wrong	1.4 (1.1–2.9)
<i>Definition of morbid obesity that requires surgery in a patient with co-morbidities</i>	
Correct(R)	1
Wrong	1.8 (1.2–3.6)
<i>Definition of bariatric surgery</i>	
Correct (R)	1
Wrong	1.3 (1.2–3.5)
<i>The average percentage of the excess weight that is lost in 5 years after bariatric surgery</i>	
Correct (R)	1
Wrong	1.4 (1.2–2.4)
<i>Total knowledge score</i>	
High (R)	1
Low	1.5 (1.1–3.9)

tients' receptiveness to counseling.<sup>19</sup> However, Balduf, in his study, reported that referring providers had higher BMI than non-referring ones.<sup>20</sup>

In the current study, referring physicians were more knowledgeable about bariatric surgery, morbid obesity that requires surgical interference in a patient with or without co-morbidities. The same result was reported by Buldof.<sup>20</sup> This may be due to lack of formal training of PCPs in nutrition, obesity, and counseling on weight-related topics,<sup>14,21–25</sup> and perceived inability to change patient behaviors.<sup>25</sup> Several studies attribute this to lack of known effectiveness of treatments,<sup>21,25</sup> negative attitudes toward obese patients,<sup>19,26,27</sup> beliefs that patients are not interested or ready for treatment,<sup>17,18,25,28</sup> and beliefs that obesity is the responsibility of the patient.<sup>29</sup>

Many physicians are unfamiliar with morbid obesity management and surgical referral guidelines. Even though the perception of surgical effectiveness was quite high, the referrals for surgery were relatively low.<sup>13</sup> Kaminsky and Gadaleta<sup>29</sup> reported that although prejudice may not be verbal in nature, the lack of response from professional and non-professional medical personnel regarding the obese patients' needs leads one to assume that obese patients continue to be a target of unfavorable opinion. Like other forms of prejudice, this most likely is due to a lack of understanding of the disease of morbid obesity, the root causes and the medical consequences if untreated. A plan for continued education of the

medical and non-medical communities is essential to break-down the barriers in place due to ignorance and indifference. In a previous study, it was documented that PCPs expectations regarding obesity management were to improve their professional intervention through formation, education and easy-to-use tools, rather than improving their collaboration with other health professionals.<sup>30</sup>

In addition to provider-related barriers, several previous studies have identified system-level barriers to obesity care. These include lack of payment by insurance companies for weight-related counseling and care,<sup>25,27</sup> lack of time during patient visits,<sup>19,22</sup> lack of available teaching materials for patients<sup>22,25</sup> and lack of infrastructure support/places to refer patients.<sup>31</sup>

## 5. Conclusions

The results of our study showed that misconceptions about bariatric surgery exist among the PCPs despite the increasing frequency of these procedures. Educational programs need to be designed to assist them in treating obese patients. Attitudes and knowledge about surgery for morbid obesity should be positively changed in medical school curriculum to expose information from this ever-growing field. Training in the referral process should ensure that PCPs obtain the skills necessary to expand their scope of practice, when appropriate and determine when and why a patient should be referred.

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