

DOI: <https://doi.org/10.56936/18290825-1.v19.2025-38>**EVALUATION OF KNOWLEDGE AND ATTITUDE REGARDING MORBID OBESITY AND BARIATRIC SURGERY PRACTICE: AN OBSERVATIONAL ANALYTICAL STUDY IN A NATIONALLY REPRESENTATIVE SAMPLE OF ARMENIAN POPULATION****SHAHBAZIAN S.S.<sup>1,2</sup>, TER-AVETIKYAN Z.A.<sup>1,3</sup>, BADALOVA ZH.E.<sup>2\*</sup>**<sup>1</sup> Department of General Surgery, Yerevan State Medical University, Yerevan, Armenia<sup>2</sup> Department of Surgery, "Shengavit" Medical Center, Yerevan, Armenia<sup>3</sup> "Surgery" Medical Center, Yerevan, Armenia

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**ABSTRACT**

*The study evaluated the level of knowledge regarding morbid obesity (including its risk factors, signs, and symptoms as well as associated comorbidity) and bariatric surgery. The study has targeted also the attitude of participants toward bariatric surgery and barriers to surgical treatment of morbid obesity in cohorts with BMI higher than 40 kg/m<sup>2</sup>.*

*A total of 600 questionnaires were distributed. The final number of participants who met the inclusion criteria was 570 patients.*

*The adopted questionnaire consisted of three parts. The first part was to verify the social-demographic and clinical characteristics of the cohort. The second part was consisted of questions revealing the level of awareness to morbid obesity. The third part was directed to revealing the barriers to bariatric surgery (psychological, physician related, financial issue related as well as the barriers related to the lack of awareness of bariatric surgery, its safety, availability, etc.)*

*The study demonstrated that the overwhelming majority of the survey respondents demonstrated moderate to good awareness about the inquired topics concerning morbid obesity. The poorest knowledge (with incorrect answer or answer "Don't know") regarding morbid obesity was observed in rural area residents as well as in secondary school and Secondary Vocational Education level having respondents. The level of awareness regarding morbid obesity was strongly associated with data categories of BMI, comorbidity burden index, history of another operation and positive family history of morbid obesity. Strong relationship was revealed in data categories regarding history of operation and smoking with barrier types as well as BMI and comorbidity data categories. The data obtained are also discovering the dominant association of BMI higher than 55 kg/m<sup>2</sup> with doctors-related issues, association of Comorbidity Burden Index 21-30 with the financial issue related barriers.*

*The association of psychological barriers was dominantly revealed with rural residence and with university diploma while the urban residents mainly stated physician related barriers. The knowledge related barriers were mostly demonstrated by respondents with positive family history of morbid obesity and positive history of another operation*

**KEYWORDS:** morbid obesity, bariatric surgery, barrier, knowledge, comorbidity**CITE THIS ARTICLE AS:**

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## INTRODUCTION.

Obesity is a multi-factorial pathology, associated with a combination of genetic, environmental, and metabolic factors [Qasim, M et al., 2017, Flores-Dorantes MT et al., 2020] From a public health perspective, obesity is a major risk factor for multiple comorbidity conditions and complications, increasing the cost of medical care and deteriorating the quality of life of patients. Being overweight and obese are among the risk factors for disability and death.

Morbid obesity accounts for 44% of diabetes, 23% of coronary heart disease, and 7 to 41% of cancer, and is also associated with hypertension, cardiovascular disease, sleep apnoea, and liver failure. Approximately 80-90% of alcoholic fatty disease occurs in obese people, the high degree of steatosis, reflecting the degree of fat accumulation in the liver. All this, in turn, results in reduction of life expectancy [Kitahara C et al., 2014; Bhandari M et al., 2019].

The obesity-directed measures (diet regulation, radical lifestyle revision, drug intervention), unfortunately, do not have proper efficiency and do not lead to reliable improvement of the condition [Kitahara CM et al., 2014]. With the use of traditional therapy, no more than 10% of patients with morbid obesity can achieve the desired treatment result. The results of long-term observation of large groups of patients showed that despite the use of various weight loss programs, including diet therapy, drug therapy, and physical exercises, they not only did not lead to a decrease in body weight over a 10-year period, but also led to increase of BMI and comorbidity. Currently, the widely used surgical approach, bariatric surgery, is the only one that has been proven effective in reducing body weight in patients for more than 10 years [Qasim, M et al., 2017].

Due to its increasing popularity, laparoscopic sleeve gastrectomy (LSG) is currently the most common bariatric treatment performed globally [Varela JE, Nguyen NT, 2015; Mocian F et al., 2021].

LSG was first used as a first-stage approach for superobese patients, but because of its safety and effectiveness, comparative technical simplicity, short learning curve, shorter duration of procedure and recovery period, feasibility even for extremely obese patients, and likelihood of revision and conversion to malabsorptive surgery, it is now widely accepted

as a stand-alone procedure [Angrisani L et al., 2015; Hirpara D et al., 2016; Gentileschi P et al., 2020].

It has been demonstrated that bariatric surgery is more successful than medicinal therapy in maintaining weight loss and lowering mortality. It is the most successful therapeutic approach for treating obesity and its concomitant conditions. In spite of the fact, is still a glaringly underutilized intervention. Less than 1% of candidates undergo surgery despite these well-established benefits for a variety of reasons, including monetary burden, lack of resources, patient-physician relationship, and perceptions and attitudes of both parties.

Bariatric surgery may be hampered by a number of variables, including attitudes and views held by patients and doctors, interactions between patients and doctors, resource scarcity, and financial problems. Furthermore, long-term weight control is linked to high-risk failure and weight return, even in individuals who do undergo bariatric surgery and/or alternative weight loss therapies. Long-term patient support and supervision after the weight reduction period may be even more crucial for promoting long-term weight loss maintenance than medication. It was shown that monthly patient interaction combined with longitudinal follow-up enhanced long-term weight loss.

This observational correlative analytical study conducted in a representative sample of population aimed to evaluate the level of knowledge regarding morbid obesity (including its risk factors, signs and symptoms as well as associated comorbidity) and bariatric surgery. The study has targeted also the attitude of participants toward the bariatric surgery and barriers to surgical treatment of morbid obesity in a cohort with BMI higher than 40 kg/m<sup>2</sup>.

## MATERIALS AND METHODS

This observational correlative analytical study was carried out between April and November of 2023 in a representative sample of 20-60 years old Armenian patients, admitted to Shengavit MC with endocrine, vascular, metabolic or another disorder, associated with morbid obesity (BMI was higher than 40 kg/m<sup>2</sup>). The sample of patients included in the study consisted of Armenia residents living in the country for 18 years or more. Random sampling was used to select participants. A total of 600 questionnaires were distributed. The response rate

was 97.0% (582 participants returned the questionnaire). Twelve participants were excluded because of being representative of other nationality. The final number of participants who met the inclusion criteria was 570 patients. The determined representative sample included 570 patients.

The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in the approval by human research committee. The protocol was approved by the Ethics Committee of Named after M. Heratsi Yerevan State Medical University. All participants gave written informed consent to participate in the trial and to use their data.

Data were generated by using structured interview with self-administered and newly designed knowledge and attitude questionnaire. Content validity of the questionnaire was assessed. The purpose was to indicate whether the questionnaire instrument appears logical to a group of experts. A panel of bariatric surgeons ( $n = 2$ ), endocrinologists ( $n = 2$ ), two experienced researchers with an academic degree, and two bariatric patients evaluated the questionnaire for content validity. The panel members have used the questionnaire in a pilot survey with 18 patients and provided feedback on how well each questionnaire point measures the construct in a question. The evaluation was addressing several key points: the goals of measurement, the target population, analysis of concepts (important aspects) targeted by the measurement, selection of questions, as well as concision or relevancy. The time to complete the questionnaire was indicated approximately 25 to 30 min.

The designed questionnaire consisted of domains with total 50 questions (Tables 1a 1b). The first part was to verify the social-demographic and clinical characteristics of respondents (eleven criteria, including age, gender, education level, area of residency, employment status, marital status and presence in family at least one child, health insurance coverage, estimated monthly income level, health status, smoking, a family history of obesity). Total amount of questions was 15.

The second domain was aimed to reveal the participant's knowledge of morbid obesity (including its risk factors, signs and symptoms as well as associated comorbidity) and bariatric surgery. Total amount of questions - 10.

The third domain of the questionnaire examined the attitude of participants toward the bariatric surgery and barriers to surgical treatment of morbid obesity as well as their attitude towards the efficacy of these measures in Armenia. This domain was divided into 4 subsets with 4 different barrier types, determined as the most popular and included in the survey. The subsets A, B, C and D contained the questions regarding attitude and barriers to bariatric surgery. The subset A was composed of questions assessing knowledge of bariatric surgery, its essence, indications, availability in Armenia etc. The subset B was composed of questions revealing the attitude to doctors, Health care facilities and Health care system generally. The questions included in the subsets CD revealed psychological barriers and financial issue-related barriers respectively. Total amount of questions in all four subsets of this domain was 25 questions. The questions of the second (regarding morbid obesity related knowledge) and third (regarding barriers to bariatric surgery) domains were designed to be answered with "Yes", "No" or "Don't know" (tables 1a, 1b).

#### **Data Processing and Statistical Analysis:**

Data were analyzed by the Statistical Package for Social Sciences (SPSS) software version 23.0 (SPSS®: Inc., Chicago, IL, USA). The frequencies and percentages were calculated. Questions related to knowledge measure were calculated by adding the correct answers, then dividing them by the overall number of questions related to the parameter of interest to be measured then multiplying the number by 100%.

A self-developed scale was used to report the results as poor knowledge (0%–32.99%), intermediate knowledge (33%–67%), good to excellent knowledge (higher than 67%). Comparisons between social-demographic and clinical data and knowledge about morbid obesity as well as social-demographic and clinical data and types of barriers to bariatric surgery were measured using the Chi-square test. Under the null hypothesis, this sum has approximately a chi-squared distribution whose number of degrees of freedom is  $(\text{number of rows}-1) * (\text{number of columns}-1)$ . The chosen level of significance was at  $(P \leq 0.05)$ . A barrier with a maximum percentage of positive answers was considered dominant for the patient.

TABLE 1a.

**Questionnaire, domain 1** Obesity and comorbidity regarding awareness revealing questions

N	Questions	Do you know	
		Yes	No
1.	Morbid obesity resolving is possible ?		
2.	Morbid obesity is very common in the world and in Armenia?		
3.	Beside from lack of physical activity, unhealthy diet behaviors the risk factors of obesity also include insufficient sleep, stressful life, genetics and medicines ?		
4.	Diabetes Mellitus, Hypertension, Sleep apnoea etc. are associated with advanced stages of Morbid Obesity ?		
5.	Metabolic changes, induced by Morbid obesity can induce Depression		
6.	metabolic changes, induced by Morbid obesity can be life threatening ?		
7.	Conservative treatment of obesity (regular activity, modified diet, time restricted eating, cognitive behavioral therapy etc.) usually does not provide desirable and stable result ?		
8.	Bio-active supplements are not reliably contributing to excessive weight loss ?		
9.	Weight reduction improves the chance of curability and survival?		
10.	Early management of obesity complications improves the chance of curability and survival?		

TABLE 1 b.

**Questionnaire, domain 2**

N	Barriers revealing questions	Do you know	
		Yes	No
Questions revealing barriers related knowledge of bariatric surgery, its essence, indications,availability in armenia etc.			
1.	that the procedure of bariatric surgery is low traumatic?		
2.	that the length of stay at hospital after bariatric surgery is usually 3 days?		
3.	that the age frame of bariatric surgery focus includes 18 -65 years?		
4.	that bariatric surgery is indicated for the people whose BMI>40 without complications and for people > 35 with somatic complications?		
5.	that bariatric surgery is the most reliable method of Morbid Obesity management?		
6.	the most spread type of bariatric surgery?		
7.	that bariatric surgery can be performed in Armenia with high efficacy ?		
Psychological barriers revealing questions			
1.	Do you care about your health ?		
2.	Do you generally care about your external appearance?		
3.	Do you fear of diminishing social image?		
4.	Do you fear you can not cope with restrictions?		
5.	Are you afraid of postoperative period being painful?		
6.	Are you afraid of facility and medical instruments?		
7.	Do you consider operation is complicated enough and subconsciously avoid it?		
8.	Do you think that bariatric surgery is good way to solve morbid obesity's complications?		
9.	Do you think that post-operative period is very complicated and many efforts are required to follow the rules?		
10.	Do you believe that your health problem is caused by your overweight?		
Doctors related barriers revealing questions			
1.	Do you trust in terms of saving information?		
2.	Do you trust in terms of preoperative preparation methodology?		
3.	Do you trust Health care system and medical staff in our country in terms of performance accuracy of the procedure?		
4.	Do you trust in terms of sterility and safety of the procedure?		
5.	Do you trust in terms of proper management of postoperative period?		
Financial issue related barriers revealing questions			
1.	Would you apply to the bariatric surgery if it was free?		
2.	Would you like bariatric surgery to be covered by insurance?		
3.	Would you apply to the bariatric surgery with a postoperative follow-up treatment program, which is covered by the health insurance?		



## RESULTS

**Knowledge and beliefs regarding bariatric surgery:** The data concerning relationship between knowledge regarding bariatric surgery and clinical and social - demographic characteristics of the investigated cohort are represented in the table 2 and 3.

**Relationship between knowledge regarding bariatric surgery and clinical characteristics:** The strong association was revealed in BMI ( $\chi^2=15.37$ ,  $p=0.0039$ ), comorbidity burden index ( $\chi^2=15.37$ ,  $p=0.0039$ ) and history of any operational intervention ( $\chi^2=15.37$ ,  $p=0.0039$ ) with knowledge regarding bariatric surgery. There was no any association revealed between knowledge about morbid obesity and smoking ( $\chi^2=0.0041$ ,  $p=0.9979$ ). The data obtained also allows us to conclude about the dominant association of good knowledge with BMI higher than 55 (61 vs the expected 46), with comorbidity burden index [11- 20] (112 vs the expected 96) as well as with positive family history of Obesity (166 vs the expected 147). The excellent knowledge was associated with comorbidity burden index [21-30] (32 vs the expected 22).

**Relationship between knowledge regarding bar-**

**iatric surgery and social-demographic characteristics:** As anticipated, there was no association between the age, gender and data categories of knowledge about morbid obesity and bariatric surgery ( $\chi^2=0.0351$ ,  $p=0.0015$  and ( $\chi^2=0.0048$ ,  $p=0.998$  correspondingly for age and gender categories).

There is no enough association between the marital status data and awareness regarding morbid obesity ( $\chi^2=0.0468$ ,  $p=0.999$ ). No significant association was observed between the children (at least one child per family)\_data and scores of knowledge about morbid obesity and bariatric surgery ( $\chi^2=0.029$ ,  $p=0.986$ ) and employment status ( $\chi^2=0.0122$ ,  $p=0.0999$ ).

The strong difference was revealed in educational level category and knowledge concerning morbid obesity ( $\chi^2=16.32$ ,  $p=0.1213$ ) residence area ( $\chi^2=139.81$ ,  $p<0.00001$ ), as well as in insurance status ( $\chi^2=79.10$ ,  $p<0.00001$ ), level of income ( $\chi^2=24.80$ ,  $p=3.72E-4$ ), health status (by self-estimation) ( $\chi^2=37.781$ ,  $p<0.00001$ ) and positive family history of morbid obesity ( $\chi^2=3.72$ ,  $p=0.4458$ ). There was enough evidence of these factors' high influence on the knowledge regarding morbid obesity.

TABLE 2.

Relationship of knowledge regarding morbid obesity with the clinical characteristics.

Variable	Total N (%)	Bariatric Surgery Outcomes			$\chi^2$ test	P-value
		Poor N=190 (33.33%)	Intermediate to Good N=281(49.3%)	Excellent N=99 (17.37%)		
BMI, (kg/m <sup>2</sup> ),						
35--44.9	182 (31.9%)	71 (39.01%)	81 (44.50%)	30 (16.48%)	15.375	0.004
45-54.9	294 (51.6%)	103 (53.16%)	139 (47.27%)	52 (17.69%)		
higher than 55	94 (16.5%)	16 (17.02%)	61 (64.89%)	17 (18.09%)		
Comorbidity burden index,						
1-10	246 (43.2%)	93 (37.80%)	120 (48.78%)	33 (13.41%)	17.632	0.0014
11-20	196 (34.4%)	50 (25.51%)	112 (57.14%)	34 (17.35%)		
21-30	128 (22.5%)	47 (36.72%)	49 (38.28%)	32 (25%)		
History of another operation						
Positive	299 (52.5%)	81 (27.09%)	166 (55.52%)	52 (17.39%)	12.289	0.002
Negative	271 (47.5%)	109 (40.22%)	115 (42.44%)	47 (17.34%)		
Health Status (by self-estimation),						
Excellent	61 (10.7%)	28 (45.90%)	26 (42.62%)	7 (11.48%)	37.781	<.00001
Good	303 (53.2%)	124 (40.92%)	140 (46.20%)	39 (12.87%)		
Poor	206 (36.1%)	38 (18.45%)	115 (55.83%)	53 (25.73%)		
Family history of Morbid obesity,						
Yes	274 (48.1%)	81/91.33	153	40/47.58	11.876	0.0183
No	117(20.5%)	44/39	45/57.67	28/20.32		
Don't know	179 (31.4%)	65/59.66	83/88.24	31/31.08		

TABLE 3.

Relationship of knowledge regarding morbid obesity with the social - demographic characteristics.

Variable	Total number of patients N (%)	Bariatric Surgery Outcomes			$\chi^2$ test	P-value
		Poor N=190 (33.33%)	Intermediate to Good N=281(49.3%)	Excellent N=99 (17.37%)		
Age (years),						
20-39	214 (37.5%)	71 (33.18%)	106 (49.53%)	37 (17.29%)	0.035	0.999
40-59	280 (49.1)	93 (33.21%)	138 (49.29%)	49 (17.5%)		
≥ 60	76 (13.3%)	26 (34.21%)	37 (48.68%)	13 (17.11%)		
Gender,						
M	271 (47.5% )	90 (33.21%)	134 (49.45%)	47 (17.34%)	0.005	0.998
F	299 (52.5% )	100 (33.44%)	147 (49.16%)	52 (17.39%)		
Smoking,						
Yes	179 (31.40%)	60 (33.52%)	88 (49.16%)	31 (17.32%)	0.004	0.998
No	391 (68.6%)	130 (33.24%)	193 (49.36%)	68 (17.39%)		
Educational level,						
Secondary school	31 (5.4% )	12 (38.71%)	12 (38.71%)	7 (22.58%)	16.321	0.012
Secondary Special/ Vocational diploma	241 (42.3%)	92 (38.17%)	103 (42.74%)	46 (19.09%)		
University diploma	268 (47.0%)	79 (29.48%)	151 (56.34%)	38 (14.18%)		
PhD	30 (5.26% )	7 (23.33%)	15 (50%)	8 (26.67%)		
Residence area,						
Urban	269 (47.2% )	25 (9.69%)	192 (71.38%)	52 (19.33%)	139.809	< 0.00001
Rural	301 (52.8% )	165 (54.82%)	89 (29.57%)	47 (15.61%)		
Marital Status						
Married or living together	282 (49.5%)	94 (33.33%)	139 (49.29%)	49 (17.38%)	0.0468	0.999
Single	116 (20.4%)	39 (33.62%)	57 (49.14%)	20 (17.24%)		
Divorced/separated	112(19.7%)	3 (2.68%)	55 (49.11%)	20 (17.86%)		
Widowed	60 (10.5%)	20 (33.33%)	30 (50%)	10 (16.67%)		
Presence of Children in family,						
Yes	458 (80.4%)	152 (33.19%)	226 (49.34%)	80 (17.47%)	0.029	0.986
No	112 (19.7%)	38 (33.93%)	55 (49.11%)	19 (16.96%)		
Employment Status,						
Working	318(55.8%)	106 (33.33%)	157 (49.37%)	55 (17.3%)	0.012	0.999
Non-working at the moment	210 (36.8%)	70 (33.33%)	104 (49.52%)	36 (17.14%)		
Student	42 (7.3%)	14 (33.33%)	21 (50%)	7 (16.67%)		
Insurance,						
Yes	204 (35.8%)	23 (11.27%)	144 (70.59%)	4 (1.96%)	79.097	< 0.00001
No	366(64.2%)	167 (45.63%)	137 (37.43%)	52 (14.21%)		
Income,						
<120,000 AMD	102 (17.9%)	36 (35.29%)	52 (50.98%)	14 (13.73%)	24.797	0.001
120,000–320,000 AMD	291 (51.1%)	101 (34.71%)	143 (49.14%)	47 (16.15%)		
320–600,000 AMD	161 (28.3%)	52 (32.3%)	81 (50.31%)	28 (17.39%)		
>600,000 AMD	16 (2.8%)	1 (6.25%)	5 (31.25%)	10 (62.5%)		

The data obtained also allowed us to conclude about the dominant association of poor knowledge with rural residence (165 vs the expected 100), as well as good knowledge with being insured (144 vs the expected 100) and with poor health status (by self-estimation) (115 vs the expected 101).

### Barriers to bariatric surgery as a method of Morbid Obesity management

The data regarding relationship of clinical and social - demographic variables with kind of barriers to bariatric surgery are represented in Table 4 and Table 5.

#### Relationship between type of barriers to bariatric surgery and clinical characteristics.

Comparison of clinical characteristics of participants (BMI, comorbidity, history of any operative intervention and smoking) and kinds of barriers to bariatric surgery rejected the null hypothesis with a very high probability. The comparative analysis demonstrated strong evidence of dependence between data categories concerning BMI and comorbidity and kinds of barriers to bariatric surgery ( $\chi^2 = 15.73$ ,  $p=0.01524$  and  $\chi^2=14.0217$ ,  $p=0.0294$  correspondingly for BMI and comorbidity. Another strong relationship was discovered in data categories regarding history of operation and smoking

with kind of barrier ( $\chi^2 = 8.7457$ ,  $p=0.0329$  and  $\chi^2 = 15.7577$ ,  $p=0.0013$  correspondingly for history of operation and smoking).

The data obtained are also discovering the dominant association of BMI higher than 55 with the physician related issues (31 respondents vs expected 20) as well as association of Comorbidity Burden Index 21-30 with the financial issue related barriers (41 respondents vs the expected 29). The barriers, related to lack of the knowledge regarding obesity and bariatric surgery was dominantly revealed in the respondents with positive history of another operation (114 respondents vs the expected 97) and smoking respondents (70 respondents vs the expected 58).

#### Relationship between type of barriers to bariatric surgery and social-demographic characteristics.

As anticipated, there was no association between the age and gender data categories with kind of barriers to bariatric surgery ( $\chi^2=0.0566$ ,  $p=0.9996$  and  $\chi^2=0.0192$ ,  $p=0.9992$  correspondingly for age and gender).

Comparison of clinical and some demographic characteristics of participants (education, residence area, employment status income level, family history of obesity and health status by self-estimation) and kinds of barriers to bariatric surgery rejected the

TABLE 4.

Relationship of clinical variables with kind of barriers to bariatric surgery.

Variable	Total number of patients N (%)	Barriers to bariatric surgery					
		Psychological N = 127	Knowledge - related N = 186	Doctors - related N =125	Financial issue related N = 132		
BMI, (kg/m²),							
35-44.9	182 (31.9% )	50 (27.5%)	55 (30.2%)	39 (21.4%)	38 (20.9%)	15.736	0.01524
45-54.9	294 (51.6% )	67 (22.8%)	100 (34.0%)	55 (18.7%)	72 (24.5%)		
>55	94 (16.5% )	10 (10.6%)	31 (33%)	31 (33%)	22 (23.4%)		
Comorbidity,							
1-10	246 (43.2% )	39 (15.9%)	89 (36.2%)	63 (25.6%)	56 (22.8%)	14.022	0.029
11-20	196 (34.4% )	44 (22.5%)	64 (32.7%)	43 (21.9%)	45 (23.0%)		
21-30	128 (22.5% )	28 (21.9%)	41 (32.0%)	18 (14.1%)	41 (32.0%)		
History of another operation,							
Positive	299 (52.5% )	60 (20.1%)	114 (38.1%)	60 (20.1%)	65 (21.7%)	8.746	0.033
Negative	271 (47.5% )	67 (24.7%)	72 (26.6%)	65 (24.0%)	67 (24.7%)		
Health Status (by self-estimation),							
Excellent	61 (%)	15 (24.6%)	21 (34.4%)	15 (24.6%)	10 (16.4%)	16.916	0.0096
Good	301 (%)	72 (23.9%)	104 (34.6%)	71 (23.6%)	54 (17.9%)		
Poor	208 (%)	40 (19.2%)	61 (29.3%)	39 (18.8%)	68 (32.7%)		
Family history of Morbid obesity,							
Yes	274 (48.7%)	50 (18.3%)	101 (36.9%)	60 (21.9%)	63 (23.0%)	12.891	0.045
No	117(20.5%)	38 (32.5%)	26 (22.2%)	26 (22.2%)	27 (23.1%)		
Don't know	179 (31.4%)	39 (21.8%)	59 (33.0%)	39 (21.8%)	42 (23.5%)		

TABLE 5.

Relationship of social - demographic variables with kind of barriers to bariatric surgery							
Variable	Total number of patients N (%)	Barriers to bariatric surgery				$\chi^2$ test	P -value
		Psychological N = 127	Knowledge - related N = 186	Doctors - related N =125	Financial issue related N = 132		
Age (years),							
20-39	214(37.5%)	48 (22.4%)	70 (32.7%)	47 (22.0%)	49 (22.9%)	0.056	0.999
40-59 prev	280(49.1)	62 (22.1%)	91 (32.5%)	62 (22.1%)	65 (23.2%)		
≥ 60	76(13.3%)	17 (22.4%)	25 (32.9%)	16 (21.1%)	18 (23.7%)		
Gender,							
M	271 (47.5% )	60 (22.1%)	89 (32.8%)	59 (21.8%)	63 (23.3%)	0.019	0.999
F	299 (52.5% )	67 (22.4%)	97 (32.4%)	66 (22.1%)	69 (23.1%)		
Smoking,							
Yes	179 (31.40%)	38 (21.2%)	70 (39.1%)	30 (16.8%)	41 (22.9%)	15.7577	0.0127
No	391 (68.6%)	89 (22.8%)	116 (29.7%)	95 (24.3%)	91 (23.2%)		
Educational level,							
Secondary school	31 (5.4% )	7 (22.6%)	10 (32.3%)	8 (25.8%)	6 (19.4%)	18.348	0.031
Secondary Special/ Vocational	241 (42.3%)	37 (15.4%)	86 (35.7%)	58 (24.1%)	60 (24.9%)		
University diploma	268 (47.0%)	79(29.5%)	82 (30.6%)	51 (19.0%)	56 (20.9%)		
PhD	30 (5.26% )	4 (13.3%)	8 (26.7%)	8 (26.7%)	10 (33.3%)		
Residence area,							
Urban	269 (47.2% )	48 (17.8%)	88 (32.7%)	68 (25.3%)	67 (24.9%)	7.847	0.049
Rural	301 (52.8% )	79 (26.3%)	98 (32.6%)	60 (19.9%)	64 (21.3%)		
Marital Status,							
Married or living together	282 (49.5%)	61 (21.6%)	91 (32.3%)	68 (24.1%)	62 (22.0%)	9.873	0.361
Single	116 (20.4%)	28 (24.1%)	47 (40.5%)	20 (17.2%)	21 (18.1%)		
Divorced/separated	112(19.7%)	25 (22.3%)	29 (25.9%)	24 (21.4%)	34 (30.4%)		
Widowed	60 (10.5%)	13 (21.7%)	19 (31.7%)	13 (21.7%)	15 (25%)		
Presence of Children in family,							
Yes	458 (80.4%)	102 (22.3%)	149 (32.5%)	100 (21.8%)	107 (23.4%)	0.0589	0.996
No	112 (19.7%)	25 (22.3%)	37 (33.0%)	25 (22.3%)	25 (22.3%)		
Employment Status,							
Working	318 (55.8%)	90 (28.3%)	96 (30.2%)	62 (19.5%)	70 (22.0%)	17.912	0.006
Non-working at the moment	210 (36.8%)	34 (16.2%)	76 (36.2%)	51 (24.3%)	49 (23.3%)		
Student	42 (7.3%)	3 (7.14%)	14 (33.3%)	12 (28.6%)	13 (30.1%)		
Insurance,							
Yes	204 (35.8%)	45 (22.1%)	66 (32.4%)	44 (21.6%)	49 (24.0%)	0.987	0.135
No	366(64.2%)	82 (22.4%)	120 (32.8%)	81 (22.1%)	83 (22.7%)		
Income,							
<120 000 AMD	102 (17.9%)	25 (24.5%)	35 (34.3%)	20 (19.6%)	22 (21.6%)	18.944	0.026
120–320,000	291 (51.1%)	57 (19.6%)	80 (27.5%)	74 (25.4%)	80 (27.5%)		
320–600,000 AMD	161 (28.3%)	42 (26.1%)	62 (38.5%)	28 (17.4%)	29 (18.0%)		
>600,000 AMD	16 (2.8%)	3 (18.8%)	9 (56.3%)	3 (18.8%)	1 (6.3%)		



null hypothesis with a very high probability.

The comparative analysis demonstrated strong evidence of dependence between these variables and kinds of barriers to bariatric surgery ( $\chi^2 = 18.3483$ ,  $p = 0.3134$  for education,  $\chi^2 = 7.8472$ ,  $p = 0.0493$  - for residence area,  $\chi^2 = 17.9124$ ,  $p = 0.0064$  - for employment status,  $\chi^2 = 18.9444$ ,  $p = 0.0257$  - for income level,  $\chi^2 = 12.8907$ ,  $p = 0.0448$  - for family history of obesity and  $\chi^2 = 16.916$ ,  $p = 0.0096$  - for health status by self-estimation). No association between the marital status ( $\chi^2 = 9.8730$ ,  $p = 0.3608$ ), data categories with kind of barriers to bariatric surgery was revealed. No significant association was also observed between presence in family at least one child ( $\chi^2 = 0.0589$ ,  $p = 0.9963$ ) and being or not being insured ( $\chi^2 = 0.1354$ ,  $p = 0.9873$ ) variables with kind of barriers to bariatric surgery.

The data obtained also allows us to conclude about the dominant association of psychological barriers with rural residence (79 respondents vs the expected 67) and with university diploma (79 vs the expected 59 respondents) while the urban residents mainly stated doctors related barriers (68 respondents vs the expected 59). The knowledge related barriers were mostly revealed by respondents with positive family history of morbid obesity (101 respondents vs the expected 89), and positive history of another operation (114 vs the expected 97). The differences were statistically significant ( $p = 0.0492$ ,  $p = 0.0313$ ,  $p = 0.0448$  respectively for residence area, education level and family history of morbid obesity), causing the high likelihood of refusing bariatric surgery due to revealed barriers.

## DISCUSSION

Bariatric surgery is the most effective treatment for weight loss and improvement of obesity-related comorbidity with long-term efficacy. The aim of this study was to assess patients' awareness about morbid obesity and perception of bariatric surgery, a 50 item survey questionnaire was developed and distributed to patients who had BMI higher than 40 and applied to our Medical Center with a somatic problem for conservative treatment. The questionnaire consisted of four parts. The first part was to verify the social-demographic and clinical characteristics of cohort. The second part have been consisted of morbid obesity's awareness level revealing questions. The third part was directed to

revealing the barriers to bariatric surgery (psychological barriers, physician related, financial issue related as well as the barriers related to the lack of awareness of bariatric surgery, its safety, availability etc.).

Overwhelming majority of the survey respondents demonstrated moderate to good awareness about the inquired topics concerning morbid obesity. The poorest knowledge (with incorrect answer or answer "Don't know") regarding morbid obesity was observed in rural area residents (total 54.2% given incorrect answer or answer "Don't know") as well as in Secondary school and Secondary Vocational Education level having respondents (respectively 38.71% and 38.17% given incorrect answer or answer "Don't know").

The answer "Don't know" was with the highest response rate in 28% of answers. Comparison of clinical and demographic characteristics of participants and their awareness regarding morbid obesity and bariatric operation, rejected the null hypothesis with a very high probability. Taking into consideration the middle level of awareness regarding morbid obesity, associated comorbidity with the consequent jeopardy it becomes obvious necessity to adopt a multidisciplinary approach for informing and team-implemented management of this category of patients.

Our results are complying with the conclusions of systematic review, highlighting the significance of understanding these challenges and the requirement for a multidisciplinary strategy to be used in the care of these complicated individuals. The authors considered as well that to assess the effectiveness of a structured interdisciplinary longitudinal strategy, further prospective studies are required [Kallies KJ, Borgert AJ, Kothari SN. (2019), Funk LM, Jolles SA, Greenberg CC, Schwarze ML, Safdar N, McVay].

The purpose of one another study was to collect data on individual patients' specific health knowledge before and after weight loss surgery and to investigate the association with weight loss, incidence of postoperative complications, health literacy, depression, and anxiety [Köhler H et al., 2020]. The study demonstrated "acceptable" particular knowledge of surgical candidates as well as strong information retention even years after performed training. "Good" specific knowledge and health literacy do not take the place of lifetime actual implementation of food

guidelines and physical activity, and they were not linked to improved weight loss or problems following surgery. Authors came to the conclusion that to examine the knowledge in the same patients across time, more longitudinal studies involving knowledge assessments at different times (before to training commencement, prior to and following surgery) are required. We particularly percept the results of this study as a serious predisposition for informative training organizing for morbid obesity patients. Not less alarming was the distribution of the types of barriers to bariatric surgery. The proportion of the patients answered in positive way the question “Do you think that bariatric surgery is good way to solve morbid obesity’s complication?” was about 18%, which the direct evidence and direct consequence of bariatric surgery related information insufficiency. From this point of view the primary care physicians referrals for surgical treatment of obese patients are crucial because they raise the surgical acceptability rate. According to a Canadian study, 42% of obese individuals received treatment recommendations from primary care physicians for a variety of reasons. Negative attitudes about the illness and its treatment, workload, ignorance, inadequate infrastructure, and a lack of motivation have all been identified as contributing factors [Hirpara DH et al., 2016].

Additional studies aimed to disclose patients’ and primary care physicians’ degree of awareness and attitude toward bariatric surgery. Patients’ perceptions of physicians’ attitudes on bariatric surgery were also looked into. The results of the study showed that, despite their willingness to participate in the treatment and follow-up of these patients and their basic understanding of obesity treatment, the physicians were unable to devote enough time to this problem because of the workload and the need for a multidisciplinary approach to the disease [Kallies KJ et al., 2019].

In a study of Rubio-Almanza M. et al (2018) only 67% and 81% of the respondents primary care physicians felt confident to suggest medication for obesity or bariatric surgery, respectively. Yet, bariatric surgery has shown positive impacts on morbidity and mortality in individuals with severe and complex obesity with significant and sustained weight loss [Rubio-Almanza M et al., 2018]. Carrasco, D., et al. (2022) considered it to be cost effective for society and the healthcare system due

to decreased costs related to treatment of obesity comorbidity. The most important finding of that study is the positive association between physicians’ knowledge and better adherence to obesity guidelines and feeling more confident to suggest obesity treatment. This study also shows that physicians had an ambivalent attitude towards obesity [Carrasco D et al., 2022].

In multiple studies, the authors found a significant positive association between primary care physicians’ knowledge and positive attitudes about obesity and willingness to refer patients to bariatric surgery [Turner M et al., 2016; Memarian E et al., 2021; Douglass B et al., 2023]

### CONCLUSION

The study demonstrated that the overwhelming majority of the survey respondents demonstrated moderate to good awareness about the inquired topics concerning morbid obesity. The poorest knowledge (with incorrect answer or answer “Don’t know”) regarding morbid obesity was observed in rural area residents as well as in Secondary school and Secondary Vocational Education level having respondents. The level of awareness regarding morbid obesity was strongly associated with data categories of BMI, Comorbidity burden index, history of another operation and positive family history of morbid obesity.

Strong relationship was discovered in data categories regarding history of operation and smoking with kind of barrier as well as BMI and comorbidity data categories.

The data obtained are also discovering the dominant association of BMI higher than 55 kg/m<sup>2</sup> with physician-related issues, association of Comorbidity Burden Index 21-30 with the financial issue related barriers.

The dominant association of barriers, related to lack of the knowledge regarding bariatric surgery was revealed in the respondents with positive history of another operation and smoking respondents. The association of psychological barriers was dominantly revealed with rural residence and with university diploma while the urban residents mainly stated doctors related barriers. The knowledge related barriers were mostly demonstrated by respondents with positive family history of morbid obesity and positive history of another operation.

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