J Metab Bariatr Surg. 2023 Dec;12(2):44-56
https://doi.org/10.17476/jmbs.2023.12.2.44
pISSN 2287-2930·eISSN 2508-5956

Journal of Metabolic and Bariatric Surgery JMBS

Original Article

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Increasing Accessibility to Metabolic Bariatric Surgery: A Qualitative Study Based on In-Depth Interviews of Korean Adult Patients With Severe Obesity

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OPEN ACCESS

Received: Sep 25, 2023
Revised: Nov 22, 2023
Accepted: Nov 23, 2023
Published online: Nov 28, 2023

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Funding
No funding was obtained for this study.

ABSTRACT

Purpose: After the initiation of national health insurance coverage in 2019, the number of metabolic bariatric surgeries (MBSs) in Korea has been increasing. Despite evidence regarding its efficacy, many candidates are hesitant regarding surgery for the treatment of severe obesity. This study interviewed patients who received MBS to further understand potential barriers and increase the accessibility of MBS.
Materials and Methods: Eight interviewees who received MBS after 2019 participated. The interviews began in mid-July 2022 over approximately a month. Each one-on-one interview lasted a few hours and was done in person. The interviews were transcribed, and the results were analyzed based on grounded theory.
Results: This study focused on the quality of life before and after MBS. On a scale of 1 to 10, all patients had a high degree of satisfaction in quality of life after surgery (average score: 8.9, sleeve gastrectomy: 8.8, and bypass surgery: 9). Scores did not differ depending on procedure type, but factors that caused satisfaction and dissatisfaction were distributed differently between the 2 procedures.
Conclusion: Quality of life is significantly improved for patients undergoing MBS despite discomfort after surgery. Further promotion of the understanding of obesity as a chronic progressive disease is needed for both surgical candidates and the public to increase acceptance of MBS.

Keywords: Qualitative research; Bariatric surgery; Quality of life; Metabolic surgery; Roux-en-Y gastric bypass

INTRODUCTION

Severe obesity is a growing concern worldwide and has a significant impact due to obesity-related co-morbidities and overall health-related quality of life [1]. Metabolic bariatric surgery (MBS) has been proven to be the most effective and long-lasting treatment of obesity [2]. Nonetheless, the low penetration rate of MBS at a reported 0.5 to 1% remains to be elucidated [3].

Conflict of Interest

None of the authors have any conflict of interest.

Author Contributions

Conceptualization: Jun M; Data curation: Chung Y, Jun M; Formal analysis: Chung Y, Jun M; Investigation: Chung Y, Jun M, Jeon D, Paik B, Kim YJ; Methodology: Chung Y, Jun M; Project administration: Kim YJ; Supervision: Kim YJ; Writing - original draft: Chung Y, Jun M; Writing - review & editing: Chung Y, Jun M, Jeon D, Paik B, Kim YJ.

With the initiation of coverage of MBS by the Korean National Health Insurance Service in 2019, cases surged in the initial year. Conferences, campaigns, and various media have attempted to proclaim severe obesity as a disease and the long-lasting weight loss and resolution of metabolic disorders after MBS. However, the number of MBS cases remained stagnant despite increased financial accessibility and abundant data on the benefits and safety of MBS.

The disparity of understanding and knowledge on obesity and MBS exists among the public, candidates for MBS, and healthcare providers [4]. The perceptions and experiences of individuals who undergo the operation are valuable in further understanding and bridging the gap between metabolic bariatric surgeons and MBS candidates. This study interviewed patients who received MBS to further understand their motivation, decision process regarding surgery, and change in quality of life after surgery. To increase accessibility to MBS, this qualitative study aimed to recognize potential barriers.

MATERIALS AND METHODS

Patients with severe obesity who had undergone MBS (including sleeve gastrectomy [SG], SG plus duodenojejunal bypass [DJB], and Roux-en Y gastric bypass [RYGB]) at H+ Yangji Hospital after the implementation of the national health insurance coverage in 2019 were recruited randomly regardless of gender, age, or type of surgery. Patients who had had a follow-up period longer than 6 months were asked to participate in the order they visited the outpatient clinic. Patients who agreed to participate were enrolled.

Eight interviewees responded that they were available for an in-depth interview during the study. The in-depth interviews were conducted from mid-July over approximately a month. Each interview lasted from 1 hour to 2 hours and was done 1-on-1 and in person. Questions involved life before surgery, the decision process regarding surgery, and life after surgery. The final set of interview questions was derived from research team meetings and prior research. The relevant questions are listed in **Table 1**. Before recruitment and conducting the interviews, approval from the Institutional Review Board (IRB) was obtained (IRB 2022-07-012-002).

Each participant was requested to summarize their interview through mind mapping. Mind mapping helps the moderator guide the interviewee's expression of self in an unfamiliar environment. This method has the advantage of verifying the interviewee's expressed feelings during the interview [5,6]. In this study, factors affecting happiness and unhappiness before and after surgery were mapped out. The participants were instructed to divide the content into

Table 1. Questionnaire

Category	Key questions
Life before surgery	Experiences as an individual with obesity (self image, relationship with family and friends, social life, stigma etc.)
Introduction to MBS and process of decision on surgery	Understanding obesity as a disease that requires treatment (“Is obesity a disease or not? What are the reasons you believe so?”) Introduction to and information on MBS (sources and reliability) Process of decision on surgery (motivation, process, and doubts including moments of hesitation and biggest fears)
Life after surgery	Expectations before surgery (purpose or goal, methods to achieve goal and fulfillment) Major changes after surgery (physical, mental, and social changes) Changes in social networks and social support systems after surgery (reactions including awareness and attitude from people and one’s reception) Challenges and felt needs after surgery (difficulties that required assistance) Future plans and goals

MBS = metabolic bariatric surgery.

4 sections (before and after surgery, happiness and unhappiness) and provide a maximum of 5 related subjects for each area. The interviews were concluded after this process.

All interviews were transcribed, and the results were analyzed based on grounded theory [7]. The analysis consists of 3 parts: comprehensive background information of the 8 interviewees, the decision process regarding pursuing surgery, and change in the quality of life based on the 2 categories of surgery (the SG group vs. the bypass component group). The rationale for the categorization is discussed in more detail in the background information section.

RESULTS

1. Background information

The following (**Table 2**) is a summary of the background information of the 8 interviewees. Data were compiled based on the opinions and recollections of the participants. Discrepancies with actual information may exist.

The mean age of the 8 interview participants was 41.5 years. Three were male, and 5 were female. The average time from surgery to the day of the interview was 291 days (excluding the participant who had been interviewed 1,064 days after the surgery). The interviewees included 4, 3, and 1 participant who underwent SG, RYGB, and SG plus DJB, respectively. The participants were categorized into 2 groups: the SG group and the bypass group, which included RYGB and SG plus DJB. The malabsorptive component of the surgery and the similarity of quality of life after SG plus DJB were considered more comparable to RYGB than SG.

2. Process of deciding on and pursuing surgery

The reasons for and process of deciding on surgery were examined by summarizing the interview content of all participants regardless of surgical method. The background information from above is inevitably closely related to the reasons and process.

1) Personal history with obesity and its discomforts and process of deciding on surgery

The personal history of becoming obese and its discomforts and the process of deciding on MBS were examined (**Table 3**). Most interviewees were not obese during childhood but had gained weight after specific life events such as working night shifts, pregnancy, living abroad, and being diagnosed with type 2 diabetes mellitus (T2DM). Most interviewees did not experience specific discomfort due to obesity. However, some expressed dissatisfaction due to reactions from family members (such as their children feeling embarrassed about their parents being obese) and worsening metabolic disorders such as hypertension of

Table 2. Background information of interviewees

Subject	Sex	Age	Type of surgery	Days from surgery	PreOP BMI	Current BMI	Occupation	Metabolic disorder	Comorbidities
1	F	56	SG c DJB	363	32	29	Self employed	Present	T2DM, HTN, DL
2	M	34	SG	258	39	32	Studying for civil servant exam	None	T2DM, HTN, thyroid disorder
3	F	39	SG	193	40	29	Office job	Present	T2DM, DL, NAFLD
4	M	43	RYGB	360	36	25	Office job	Present	T2DM, HTN, DL, OSA, NAFLD
5	F	52	SG	384	44	24	Domestic caregiver	Present	DL, NAFLD
6	F	40	RYGB	193	31	22	Domestic caregiver	Present	T2DM, DL
7	F	42	SG	1,064	43	22	Professional	Present	Endometriosis
8	M	26	RYGB	285	37	28	Office job	Present	T2DM, diabetic retinopathy

PreOP = preoperative, BMI = body mass index, F = female, M = male, SG = sleeve gastrectomy, DJB = duodenojejunal bypass, RYGB = Roux-en Y gastric bypass, T2DM = type 2 diabetes mellitus, HTN = hypertension, DL = dyslipidemia, NAFLD = nonalcoholic fatty liver disease, OSA = obstructive sleep apnea.

https://doi.org/10.17476/jmbs.2023.12.2.44

Table 3. Personal experience of obesity

Subject	History with obesity	Experienced discomfort related to obesity	Process of deciding on surgery
1	I started gaining weight after the birth of my first child and even more after my second. Even though I actually enjoyed exercising. I used to go to the gym and also swim. I continued doing it after giving birth but it didn't help me control my weight.	I didn't feel any discomfort (due to being overweight). Money can solve most problems such as food and clothes. However, there was one thing; I never bought fancy clothes.	One day, while watching YouTube, I came across a video of Professor Kim saying that you can improve diabetes if you get bypass surgery. What is that? I searched and read postings by Professor Kim. Improvement of diabetes... (The internal medicine doctor who diagnosed me with diabetes) nobody ever told me. I visited monthly for prescriptions.
2	I was not slim from childhood and weighed 80 kg when I became an adult. After I started consuming alcohol, I gradually gained more weight and weighed 100 kg by the time of my military service. While serving in the military, I lost 20 kg but gained it back afterwards by drinking alcohol again and weighed around 90 or 100 kg. After that, I continued to gradually gain weight, reaching 110–120 kg over time.	I am self-employed but I do have another venture but I didn't have much stress because I didn't need to be mindful of others' perspective of me.	I didn't have immediate plans for marriage but diabetes... My standard of decision was diabetes.I have heard about people suffering from diabetes and I wouldn't have gotten surgery if I were simply obese. But if I was diagnosed with diabetes, I was thinking about getting surgery so I wouldn't have to suffer in the future. And this is why I ended up getting surgery.
3	I lived in the United States for 7 years and gained 27 kg during that time. Since I gained weight gradually those years, I didn't realize it that much.	The people around me didn't make me feel self-conscious and since I was focused on my studies, I didn't pay much attention to what others thought. My friends and family didn't pressure me to lose weight, and personally, I didn't feel any discomfort. For example, I had a brand I normally wore, and even though my sizes were getting bigger, I could still wear clothes from the brand. My workplace was far from my home. Since I drove, I didn't experience any inconvenience from public transportation. So, throughout my life, I didn't really feel any discomfort.	I wasn't afraid of the surgery itself, but my father discouraged me because it was surgery.
4	Eventually diabetes happened. Before diabetes, it was easy for me to lose weight but after diabetes, my weight wouldn't go down even with exercise. Even with excessive exercise, my weight wouldn't go down.	I didn't have any other reasons. I had high blood pressure and fatty liver before diabetes but they were well controlled with medication.	(Were there any objections to the surgery from those around you?) I never mentioned it. I made all the decisions regarding all surgeries.
5	I didn't feel that I was chubby until my 20s but I started it maybe due to my age... but I also loved drinking alcohol. I gained even more weight. But then my mom said she wanted to see me slim one last time before she passed away. And our son is turning 30 soon and will get married soon. So, it would be better to be a beautiful mother, I guess.	There were many inconveniences due to being overweight.	My elder sister said that since I couldn't lose weight on my own and considering my age, why not seek medical help to lose weight? She mentioned an article from the JoongAng newspaper, so I searched for it. I looked into what sleeve gastrectomy was and decided to do it afterwards without much hesitation.
6	Before the surgery, I had never been that overweight. But with diabetes, I felt lethargic a lot. It's just so easy to let go of things. I felt like I had no other choice but to live this way and die. Other people thought I was foolish. You are too young to think like that. Those sort of responses.	I felt a lot of pressure from my in-laws. Before marriage, I always maintained a weight of 71 kg. I was tall. But after marriage, I developed diabetes but didn't gain weight shortly after. But about two years into the marriage, I started gain weight rapidly and my mother-in-law would say really hurtful things like why my son married a pig.	(My husband) He wouldn't let me at first. Why would you remove something that is perfectly fine? I said it wasn't about removing but that it was done so and so. But I really wanted this surgery. I was curious about how much my life could change with surgery. It was my last resort. So, he agreed.
7	I started doing night shifts in my 20s and 30s. My body weight had a 40 kg difference when I left my job from when I started. During that time I was diagnosed with endometriosis and also had to go through in vitro fertilization because of infertility which made me gain more weight. The hormone makes you gain weight. It was difficult to physically play with the baby and I became irritated at the smallest things. I didn't have peace of mind.	I was over 40 and I didn't want to be an embarrassing mother before my child entered school. She's a daughter. So, I started searching online and on YouTube about dieting because I didn't want to be an embarrassing mother. That's when I came across an advertisement on sleeve gastrectomy from a plastic surgery clinic an, and I wondered if such a thing existed. Although I was not a binge eater, I thought, maybe I should just get a consultation.	Not mentioned
8	I was first diagnosed with diabetes in middle school. I think I was around 100 at that time. It wasn't about the weight back then. I had excessive thirst, so I went to the doctor to see if something was wrong, and that's when I found out I had diabetes. Because I had diabetic retinopathy, I quit drinking and smoking. The reason I expedited the surgery was because my diabetic retinopathy was severe.	I didn't particularly feel any discomfort due to obesity. But when I went places, I did feel like people looked at me thinking that I was someone who failed at self -control.	(My family) Didn't try to stop me, but I explained to them what would happen after the surgery and how my blood sugar levels would change with surgery and continuous management. They didn't try to dissuade me or anything like that.

https://doi.org/10.17476/jmbs.2023.12.2.44

T2DM due to increased body weight. Most eventually decided on MBS to overcome these concerns, especially when they experienced sudden fatigue, when concerned family and friends recommended surgery, or after finding information on MBS through various media platforms, including YouTube.

2) Information sources for introduction to and pursuit of surgery

Most participants obtained information through recommendations by acquaintances, healthcare personnel, or media, including YouTube or television (**Table 4**). All participants emphasized that the content, not just the medium, on MBS was significant. For instance, information on obesity is abundant. However, most information was unrealistic or too vague to be of substantial help, and accessible information on life after surgery is lacking. Some felt that the name of surgeries hindered their understanding of the procedure and even made some feel apprehensive about choosing surgery despite knowing that they were candidates. Such negative initial perceptions appeared to hinder many potential candidates from eventually choosing MBS. The felt future needs of the participants are summarized in **Table 5**.

3) Difficulties after surgery

The most common difficulties experienced after surgery were related to diet (**Table 6**, **Supplementary Table 1**). Some participants expressed discomfort with having to eat a limited selection of foods at designated times. However, some stated that dietary adjustments were not a problem. Some participants mentioned uncomfortable experiences during social gatherings when other people questioned the reason for their decreased portions and related to physical symptoms such as dumping syndrome, hypoglycemia, or chest tightness.

Table 4. Sources of information on metabolic bariatric surgery

Type of source	Answers (participant number)
Acquaintance(s)	A friend of mine who used to play sports had lost weight and he told me that he had received this (MBS) (2).
	I know someone who had the surgery once. The person talked about it as if it was nothing. The person didn't get it done here. It's been a long time since the person got surgery.
Healthcare personnel	The internal medicine doctor from my neighborhood recommended surgery. I was diagnosed with diabetes on January 8, 2021. At first, I managed it with medication… But later, the doctor mentioned that surgery is also a method of treatment for diabetes. The doctor also said that the success rate of improving diabetes and losing weight for people with obesity was less than 5%. Not even 5 people can succeed out of a hundred people. Surgery is an option but many people do not know about it and there may be a difficult decision. The doctor recommended that I go in for a consultation. I didn't watch YouTube. I did not have any information (3).
	The doctor's word is the best. So, I did ask about… during my first consultation… I heard that the surgery improves diabetes and I don't have it. I asked if it would be effective for me as well (7).
	On the internet, (internal medicine doctors) don't recommend (the surgery). Because the perception of metabolic surgery for obesity is like that… Honestly, local hospitals don't have an understanding of MBS and they don't recommend it. Maybe internal medicine doctors from larger general hospitals might have an idea. Otherwise, they don't think about it or consider it as metabolic surgery but only as weight loss surgery (4).
	My internal medicine doctor from the local clinic strongly discouraged me from getting surgery. The endocrinologist there asked why I would consider it when I was perfectly fine (6).
	I live near Mok-dong, and my endocrinologist at Mok-dong Hospital suggested that I get it (surgery) after noticing a gradual decrease in my HbA1c levels. The doctor offered to write a referral letter for me to go to the recommended hospital. Before that, I had never heard of such a surgery (8).
	I think it's best if your doctor recommends it like my experience. It Is more reliable when the doctor explains what the operation is and the changes it can bring compared to searching (for information) by yourself. I was already using insulin at a different hospital (not the hospital that recommended surgery). However, I hadn't heard about this surgery when I went to the previous hospital (8).
Mass media (TV, YouTube etc.) and Online social networks	You know those health related programs on TV… I wish they would introduce this procedure a lot. On mass media… I do watch dramas too but I enjoy watching such health programs and I enjoy watching them more after getting the surgery. Honestly, people do not search for these terms by themselves. TV is the most accessible source (to newly introduce MBS) but such information is not shared (5).
	I saw it on YouTube, and I watched all the data on YouTube where a guy films himself and talks about it. It's all case by case. You have to find out what works for you by yourself. Some things work for others while it doesn't for me when some things work for me but not for others (4).
	Because I wasn't consciously taking care of myself, I thought I had given up. But I found myself looking up about diabetes remission. I was on medication, insulin injections, and also had hyperlipidemia when I came across an online community on diabetes in the middle of the night. I looked around without joining. They were discussing this type of surgery. I thought it was too extreme (6).

https://doi.org/10.17476/jmbs.2023.12.2.44

Table 5. Future needs to increase accessibility to metabolic bariatric surgery

Future needs regarding information on metabolic bariatric surgery (participant number)
Even now, there is some information, but it seems unrealistic. Nobody fully mentions the difficulties of everyday life after surgery (2).
But the dietitian doesn't understand because she hasn't gotten the surgery. She doesn't have the experience. I also don't drink water after meals. When I drink water, it stays here (pointing to the area between the throat and stomach). I even hear bubbling sounds. It gathers and overflows. So I eat but never drink during meals. I can't because I know those feelings (1).
Regardless of the weight loss, many believe that you will not be able to eat after the surgery. Because there isn't detailed information on this, these kinds of perceptions made me believe that this option had nothing to do with me. But in reality, my stomach has expanded little by little, and now I can even eat half a bowl of rice (7).
(Would you share your personal experience if it were to help others?) Yes. I would. The period for losing weight is at this time. If you don't know… There are people who failed to lose weight even in the support group online community. The period for effective weight loss should be mentioned. Literally, you have to endure the first 3 months and get through it to start feeling the changes in your body. If you have diabetes, if you see my initial test results… everything is red (abnormal levels). The results have gradually improved and they are all black (within normal range) now (4).
I became happy after getting the surgery. So, I want to tell people about it when I see anyone who is large. Can I tell them about it? I really want to tell them about it. They might also have the same desires as us but may not know about their options. Should I let them know? (6).
At first, the term "stomach resection" sounded so serious. Even for bypass and resection… I felt like it was too extreme for me. Do I really need to undergo surgery? Even if the purpose of the bypass is different, when I hear "gastric band," I feel offended and imagine my stomach being restricted like you would do with a goose. It's just the name itself… I hope there is an improvement in the perception of this surgery. I, too, initially thought that this surgery was dangerous just based on its name. But after undergoing the surgery, I realized that it's better not to delay it. Even if people have some concerns, the benefits of this surgery far outweigh the risks. That is why I want the awareness of it to improve (8).

Table 6. Difficulties after surgery

Type of difficulty	Answers (participant number)
Diet-related	It's difficult to follow the timing and choose the right items (for the diet). After the surgery, I couldn't eat much initially, and I ended up being on intravenous fluids for two months due to dehydration. The most uncomfortable thing was not knowing when I would feel normal again (3).
Physical discomfort	I experience low blood sugar. Initially, I start sweating and feel lightheaded. I feel like I might faint and then my body goes limp. Then I fell asleep. After that, I am careful again about what I eat. After some time, because of my old habits, I overeat. Then if I continue to eat, it happens again (4).
Change in relationships	I don't see my friends with excuses and avoid eating with other people. (8).
None	I don't have any issues (7).

4) Satisfaction, regrets, concerns, and fears related to surgery

All 8 interviewees expressed high satisfaction with their lives after surgery (**Table 7**, **Supplementary Table 2**). Based on a scale from 1 to 10, the satisfaction of the participants ranged from 7 (lowest) to 10 (or even higher, indicating a significant level of satisfaction). Although initial fears about surgery existed, most successfully overcame these and expressed satisfaction with their current lives. Many participants also reported having no worries or regrets about the surgery.

5) Final goals after surgery

When asked about their goals after surgery, the most common responses were weight loss and maintenance (**Table 8**, **Supplementary Table 3**). Some also mentioned goals related to managing diabetes. Weight loss was sometimes pursued for aesthetic purposes in conjunction with blood sugar control and hypertension management.

Table 7. Satisfaction, regrets, concerns, and fears related to surgery

Category	Answers (participant number)
Satisfaction	(Based on a scale from 1 to 10. One being the lowest and 10 being the highest) I am extremely satisfied with my current life. On a scale of 1 to 10, it's 50. (That means I am very satisfied)… (Even when I was severely obese) I wasn't a hermit. Although I was overweight, I was active. But now that I lost the weight, I realize that the happiness I felt then wasn't happiness. Even though I had somewhat of a social life and there were no restrictions in finding a job due to my weight and I was focused on my career and not on how I looked, but now that I've lost weight, I don't actually remember what I was like then. Because I didn't know, I don't know if I was happy. What I feel now is completely different from what I felt then (7).
Regrets	I have never experienced regret. I knew everything beforehand. The most uncomfortable thing after bypass would be dumping syndrome. I knew how it would happen and how it would feel. I made an informed choice, so there are no issues(4).
Concerns	I did (have fear about the surgery). Rather than the surgery itself, I was concerned about how close my life would be to a normal life afterwards. Whenever I meet friends, I usually drink alcohol… and if I join group activities and can't live a normal life, wouldn't it be uncomfortable? Because of these thoughts, I set diabetes as the criteria… When I'm eating just a spoonful, I wonder what others would think. And not being able to drink alcohol… I questioned if I really needed to undergo this surgery to the extent of discomfort (2).
Fears	I had no fear about the surgery(1).

https://doi.org/10.17476/jmbs.2023.12.2.44

Table 8. Final goals after surgery

Category	Answers (participant number)
Weight loss	The goal now is to lose more weight because the last time I checked my blood pressure, it was around 123/70. But if I stop taking the medication, it can increase by 10. So, it could go up to 130/90 or sometimes even higher at 135/93 or 123/70 when it's low. That's why I need to continue to lose weight. If it goes up a little, my blood pressure goes up again (4).
Maintenance	I want to maintain my weight without straining my health. I don't take medication for diabetes, but I do take medication for thyroid issues and high cholesterol. I didn't take medication for diabetes from the beginning (2).
Diabetes	I have concerns about diabetes. I want to do everything I can for remission (of diabetes) (6).

Table 9. Disclosure of surgery

Category	Answers (participant number)
Disclosure	I am open about my situation. I opened up because I wanted to live more comfortably. I didn't think that whispering behind my back would have a big impact on my life but rather not discussing my (surgical) experience would be more uncomfortable. (After explaining why I had the surgery) Not being able to eat certain foods or doing overtime at work... That's how I opened up (to others) (3).
Undisclosed	My family doesn't know about the surgery. Only my sister and husband know but my son doesn't know. (I didn't tell my other two sisters because) There was no need to tell them... Why would I need to tell my son? He's in his 30s. He was raised by my mother. Thirties is young. But sometimes he is old-fashioned. If I did mention it, he would probably tell me to lose weight through exercise. And it's difficult for me to talk about it. I didn't tell them because I didn't want to listen to them questioning if surgery is needed to actually lose the weight, although I didn't want to lose the weight (5).

6) Disclosure of surgery

Responses regarding the disclosure of their surgery related to obesity varied among the interviewees (**Table 9**, **Supplementary Table 4**). Some participants shared this information with their families while others did not. Those who did not disclose the information to their family explained they did not feel the need to.

Many participants disclosed the surgery to their workplaces since it was necessary for obtaining a medical absence. However, the level of detail shared varied among individuals. Some chose not to disclose the surgery to friends, and others disliked others discussing or gossiping about their journey regardless of the content.

7) Awareness of obesity as a disease

The surgery examined in this study, MBS, is closely related to obesity. To understand perceptions of obesity as a disease and whether it requires treatment, participants were asked if they considered obesity as a disease that required medical attention (**Table 10**). The results revealed 3 categories. 1. Obesity was always (even before surgery) considered a disease. 2. Obesity itself is not a disease but, with its metabolic effects, can be considered a disease. 3. Obesity is a disease, but I never felt the need for weight loss.

Actual recognition of obesity, based solely on body weight, as a disease was uncommon. However, most participants recognized obesity as a disease due to various physical discomforts and related co-morbidities (e.g., diabetes, hypertension, depression, restricted mobility). Some participants who considered obesity a disease but had never attempted or felt the need for weight loss. While some had given up on weight loss, others responded that they did not consider weight loss because they did not feel the need to "treat" every illness.

3. Changes in quality of life depending on surgery type

At the end of the interview, participants were requested to summarize their feelings and thoughts during the interview by drawing a mind map that reflected the factors that made their lives happy or unhappy before and after surgery. Examples are shown in **Fig. 1**.

Based on the 8 mind maps, quality of life before and after surgery was categorized and analyzed separately for participants who underwent SG or procedures with a bypass

https://doi.org/10.17476/jmbs.2023.12.2.44

Table 10. Awareness of obesity as a disease

Category	Answers (participant number)
Obesity was always (even before surgery) considered a disease.	(Obesity is a disease) That's right. I don't have a binge eating disorder and neither do most people. We eat normally, yet we wonder why it happens. It seems like it's a hormonal issue. I thought it didn't apply to me. But there were no other options. Other diets are temporary and don't last (7).
	I consider it a disease. I knew it was a disease even before but I lacked the willpower to manage it. I thought it was a disease when the weight exceeded 110 and it became increasingly difficult to move... My motivation to move was lacking... (Even the number itself is a disease) Yes, that's correct (8).
Obesity itself is not a disease but with its metabolic effects it can be considered a disease.	Yes, (obesity is) a disease that seems to be accompanied by depression. I personally think of obesity as a form of depression. It seems to be related to that. Instead of physical scars or wounds, it's a mental issue, which can lead to self-doubt and low self-esteem. Since no one else knows about it, it may not be evident on the outside but it can exist internally (1).
	Obesity itself is not considered a disease but the heavier you are the more diseases you have. Naturally, being non-obese is thought to be healthier then that also means that being obese is a disease (2).
	I didn't think of myself as being sick. It didn't resonate with me. When I saw statistics on TV about the likelihood of developing heart disease, it was just words to me. But when I underwent a health checkup and saw the numbers on the chart, that's when I realized it was a disease. That was how it was for me (3).
	I never thought of it as a disease, but later on, I realized that it was. Once diabetes happens with it, it becomes a disease. I realized that I couldn't lose the weight even if I tried (4).
	Yes, obesity is a disease. At that time, before surgery, I didn't know it. But recently, I realized that it was a disease (5).
	I think, for me, it's not about the number (on the weight scale). But the word "obesity" felt like a disease to me. With obesity, everything can become diseased. Your mind, your body... That's why I thought of it as a disease (6).
	Even if it's not just about the number right away, it becomes difficult to move around and it requires more effort which makes you more irritable. That's why I used to be peevish a lot before the surgery. I guess I also felt timid because of my heavy physique. That's why I thought of it as a disease (8).
Obesity is a disease but I never felt the need for weight loss.	(However, I didn't really think about treating obesity) That's right. But we don't always think about treating every disease. Just like how not everyone receives treatment for a minor skin condition, some people consider obesity as something they need to bear (2).
	I considered it a disease. (But I didn't go on a diet because) At that time, I just let myself go. (It's a disease, but not a disease that can be cured)... I didn't want to make the effort. I knew I had to fix myself. I had to take action. But I didn't do it. I just found everything bothersome (6).

component. The content was organized into 5 categories: physical health, psychological, social, diet, and other aspects.

1) Participants who underwent gastric sleeve surgery

Factors contributing to happiness and unhappiness before and after surgery were examined for 4 participants who underwent SG (**Table 11**).

2) Participants who underwent surgery with a bypass component

Factors contributing to happiness and unhappiness before and after surgery were examined for 3 participants who underwent surgery with a bypass component (**Table 12**).

Table 11. Factors contributing to happiness before and after sleeve gastrectomy

Category	Unhappy	Happy
Before surgery		
Physical	Headache, endometriosis, foot pain, cerebral infarction, HbA1c 9.7%, diabetes, fatigue, health	
Psychological	Lower quality of life, feeling intimidated, stress	Own type of self confidence
Social	Family	Children, family, myself, being with friends, friends
Diet		
Others	Clothes, 2019 November, studying, job	Shopping, traveling, shopping, home
After surgery		
Physical	Hair loss, hypotension, sagging skin, fatigue	Medication, diabetes remission, stamina, vigor, decreased body weight
Psychological	Obsessive and compulsive thoughts on diet restriction	Improved self-confidence, improved satisfaction
Social		Reaction from family (children), my son, my mom, myself, thank you, sister, family happiness, friend
Diet	Restricting food, diet, restaurants, menu	
Others	Returning to work, studying, hospital	Size free clothing, resting, shopping, traveling, home

https://doi.org/10.17476/jmbs.2023.12.2.44

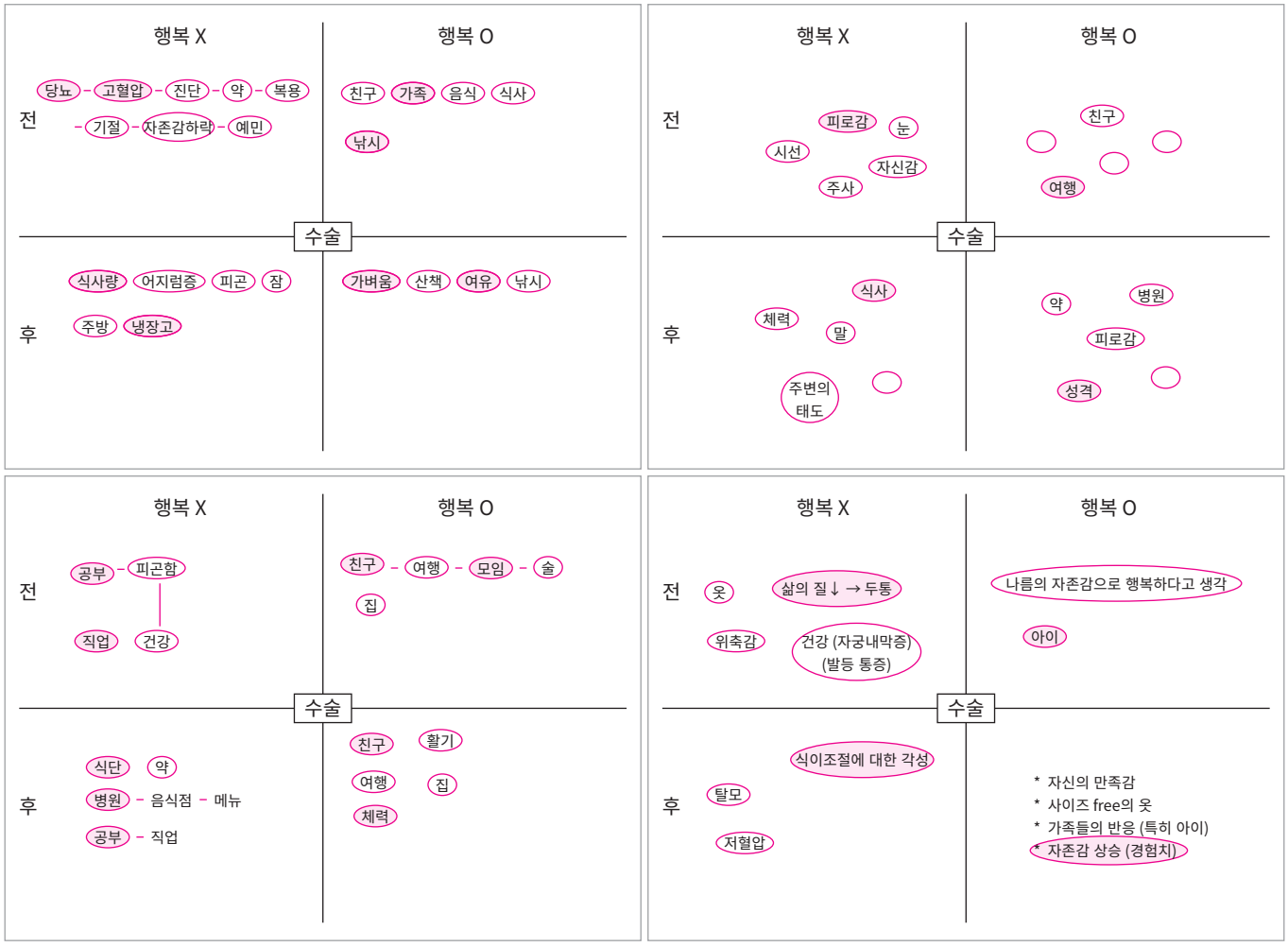

Fig. 1. Example of mind maps done by participants.

Table 12. Factors contributing to happiness before and after surgery with a bypass component

Category	Unhappy	Happy
Before surgery		
Physical	Fatigue, eyes, insulin injection, diabetes, insulin, diabetes, hypertension, snoring, fatty liver disease, unable to donate blood, diabetes/hypertension, medication, syncope	
Psychological	Low self-esteem, the eyes of others, powerlessness, decreased self-confidence, feeling sensitive	
Social	In-laws	Friend, family, friend
Diet		Food, alcohol, eating, food, meals
Others		Marriage, traveling, fishing
After surgery		
Physical	Stamina, dumping, using a continuous positive airway pressure machine, dizziness, fatigue, sleep	Decreased amount of medication, decreased fatigue, no need for insulin, diabetes remission, able to donate blood, discontinued hypertension medication, light body weight
Psychological	Words (language), the attitude of others, no freedom, compulsive thoughts about body weight	Personality, degree of happiness, increased self-confidence, I am satisfied about everything, laid-back personality
Social		
Diet	Meals, food, diet restriction, amount of food, refrigerator, kitchen	
Others		Decreased visits to the hospital, exercise, fishing, going on walks

https://doi.org/10.17476/jmbs.2023.12.2.44

Table 13. Comparison of the number of factors contributing to happiness before and after surgery between gastric sleeve and gastric bypass participants

Category	Unhappy						Happy					
	Physical	Psychological	Social	Diet	Others	Total	Physical	Psychological	Social	Diet	Others	Total
Before surgery												
Sleeve gastrectomy	8	3	1	-	4	16	-	1	5	3	5	14
Bypass component	13	7	1	-	0	21	-	-	3	5	3	11
After surgery												
Sleeve gastrectomy	4	1	-	4	4	13	5	2	7	-	5	19
Bypass component	6	4	-	6	-	16	7	5	-	-	4	16

3) Comparison of factors contributing to happiness before and after surgery by type of surgery
Comparing the quality of life of participants who underwent SG and surgery with a bypass component (**Table 13**), SG and bypass participants had an average of 4 and 5.3 factors that contributed to their unhappiness before surgery, respectively. For factors that contributed to happiness after surgery, SG and bypass participants had an average of 4.8 and 4 factors, respectively. Regarding factors that made life unhappy after surgery, SG and bypass participants an average of 3.3 and 4 factors, respectively.

For both groups, diet (e.g., eating, drinking alcohol, meals) contributed to happiness before surgery but became a contributor after surgery. Consistent with these findings, "food" was not a factor that had made the participants unhappy before surgery nor was it a contributor to happiness after surgery.

The physical factor was a commonly mentioned (e.g., fatigue, injections, diabetes, hypertension, fatty liver, inability to donate blood, fainting, headaches, stroke) contributor to unhappiness before surgery among the participants. It was a major contributor (e.g., resolution of diabetes, vitality, increased stamina, weight loss, decreased medication intake) to happiness in both groups after surgery. However, various physical factors (e.g., hair loss, hypotension, sagging skin, fatigue, dumping syndrome) also contributed to unhappiness after surgery.

In summary, although no significant differences existed in the average scores of overall satisfaction with quality of life after surgery based on the surgical method, factors contributing to happiness and unhappiness before and after surgery varied.

DISCUSSION

Based on the interview survey results, life before and after surgery for an obese individual was illustrated (**Fig. 2**). First, participants had become obese due to various factors such as night shifts, childbirth, living abroad, and the onset of diabetes which led to discomfort in their lives or concern from others. This concern and discomfort prompted the pursuit of surgery. Among the 8 participants, 6 had been diagnosed with diabetes before surgery, and most of them also had obesity-related comorbidities (e.g., hyperlipidemia, hypertension, non-alcoholic fatty liver disease). Given the close relation of these metabolic disorders with obesity, most participants experienced complete or partial remission of these conditions.

Second, the participants expressed a high level of satisfaction with the surgery and desired to recommend it to others. All the participants emphasized that their quality of life significantly improved after surgery. The satisfaction level for MBS for the participants was high with an average score of 8.9 out of 10 (gastric sleeve: 8.8, gastric bypass: 9). Accurate, pertinent

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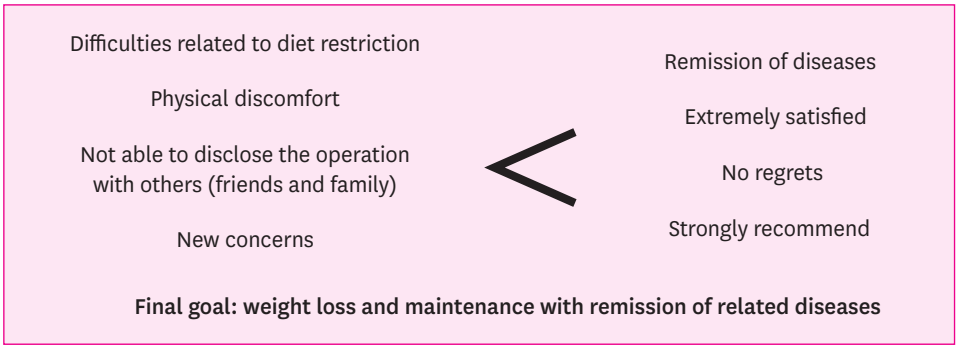

Fig. 2. Changes in life after surgery.

information facilitated understanding the purpose and effects of MBS although difficulties existed in overcoming doubts and fears about surgery. Satisfaction after surgery was found to be unanimously high. Despite discomforts after surgery, such as dietary restrictions and physical symptoms, most participants strongly expressed satisfaction exceeding any discomfort and absence of regret. Further, they would recommend the surgery to others. Their ultimate goals included additional weight loss with maintenance or preserving the change in symptoms related to obesity (**Fig. 2**).

Only about half of the participants disclosed their surgery to others. Reasons for those who did disclose the surgery included being indifferent to the opinions of others or needing to inform their workplace for a leave of absence. Conversely, reasons for not disclosing included feeling no need to share or being reluctant for others to discuss their condition without their knowledge. This inability to or discomfort with sharing information with close family members is a significant obstacle in deciding on MBS as a treatment for severe obesity. This sensitivity to perceptions—or misconceptions—of obesity among the public remains a substantial reason to forgo surgical treatment.

Third, many participants desired to increase awareness of MBS so others would receive treatment for obesity and live a "new life" as they had. The participants professed the need for more promotion through broadcasting media emphasizing that the public does not understand the concept of treating obesity let alone choosing MBS. The most influential recommendation and advocacy for 2 participants came from their local internal medicine doctors, who had been treating their diabetes and informed them about MBS. They pursued MBS without much concern because it had been recommended by a trusted medical specialist. Conversely, 4 participants who had also been receiving diabetes treatment for diabetes had never heard about MBS from their medical doctor. Some faced opposition from their doctors once they mentioned they were considering MBS. Surgery is a specialized field difficult for the public to understand. Most of the participants felt that the recommendation of MBS as a treatment by a "doctor or specialist" would greatly assist in the decision to choose surgery.

Interestingly, some felt that the terminology of the surgery was off-putting. Despite the recommendation for surgery by their medical specialists, these participants felt doubt and fear because of the name of the operations. The term "sleeve gastrectomy" in Korean might be interpreted as "removing the stomach," and participants perceived the wording as frightening. Misunderstanding and stigma regarding obesity remain prevalent. Even the participants who chose to undergo MBS could not come to a consensus on whether

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obesity was a medical condition. Reconsidering the verbiage surrounding the operations and improving public awareness may help promote the understanding of obesity as a progressive chronic disease that requires medical and surgical treatment. These efforts will eventually allow candidates for MBS to receive the required help and attention.

Finally, although numerous studies have been conducted on changes in body weight and remission of obesity-related comorbidities, qualitative research related to the change in quality of life after MBS remains lacking. This study is significant since it attempts to understand the experience of the patient undergoing MBS and the low penetration rate of MBS to a greater extent.

The limitations of the study are the short time frame of the study, possible selection bias of the participants, and limited funding. Participants willing to partake in the in-depth interviews may have had greater satisfaction with the surgery than those who did not undergo MBS. Although participants who had a follow-up of at least 6 months were included, the improvement in quality of life might be considered short-term and unsustainable in the long term. Large-scale qualitative studies are necessary to further understand the long-term effects on the quality of life of the patients undergoing MBS.

CONCLUSION

In conclusion, quality of life is significantly improved for patients undergoing MBS, exceeding any expected and experienced discomfort after surgery. However, more than half of the participants feeling uncomfortable disclosing undergoing MBS to their acquaintances implicates the existing stigma on obesity in society. Despite these misconceptions about severe obesity and MBS, the recommendation of MBS by a primary care physician was considered the most trustworthy and persuasive method. Further promotion of the understanding of obesity as a chronic progressive disease is needed for not only candidates but also primary care physicians and the public to increase acceptance of MBS as the most effective method of treatment for severe obesity.

SUPPLEMENTARY MATERIALS

Supplementary Table 1

Difficulties after surgery (supplement to **Table 6** of the manuscript)

Click here to view

Supplementary Table 2

Satisfaction, regrets, concerns, and fears related to surgery (supplement to **Table 7** of the manuscript)

Click here to view

Supplementary Table 3

Final goals after surgery (supplement to **Table 8** of the manuscript)

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Supplementary Table 4

Disclosure of surgery (supplement to **Table 9** of the manuscript)

Click here to view

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