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ORIGINAL CONTRIBUTIONS

Status of the Field of Bariatric Surgery: a National Survey of China in 2018

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Abstract

Background Due to the slow development of bariatric surgery in mainland China, we aimed to provide fact-based status reports and recommendations for the development of bariatric surgery in mainland China by investigating the basic context, social environment, and perioperative treatment options of surgeons who perform bariatric surgery.

Study Design A questionnaire was prepared based on a literature review, consultations with experts and current issues. The three-part questionnaire was sent to medical professionals in the field of bariatric surgery. The results were gathered, and analysis was performed after collecting the data.

Results In total, 98.5% of respondents were employed at public grade 3 class A hospitals, 70.8% were chief physicians and professors, 53.2% were trained at other institutions before their first bariatric surgery, 65.0% were previously engaged in gastrointestinal surgery, 76.9% were currently engaged in multiple fields of general surgery, 39.5% believed that low self-acceptance was the primary obstacle, 39.0% regarded news media networks as the most valued publicity platform, 48.0% accepted patients less than 16 years old, and 46.0% accepted patients greater than 65 years old. Additionally, 84.6% of respondents addressed comorbidities, 73.4% developed exercise guidance for patients, 81.6% believed that the total hospitalization cost was greater than 50,000 (CNY), 41.5% chose oral purgative for bowel preparation, 40.0% allowed patients to resume oral intake of liquids on the first day after surgery, and 70.7% routinely placed an abdominal drainage tube.

Conclusion Bariatric surgery has great potential in mainland China, but many inconsistencies exist. This field is still in its infancy, and much work is needed.

Keywords Bariatric surgery · Obesity · Diabetes · ERAS · Survey · Mainland China

Introduction: Bariatric Surgery in Mainland China

The number of people with diabetes is expanding rapidly worldwide. According to estimates from the International Diabetes Federation (IDF) in 2017, 114 million people aged 20–79 are currently diagnosed with diabetes in mainland China, and 61.3 million people who have diabetes are unaware of their condition. China spends $11 billion a year on diabetes and its complications. At present, China ranks first worldwide in terms of the number of people suffering from diabetes [1]. China now faces a major obesity problem, with 43.2 million obese adult men and 46.4 million obese adult women, according to 2014 data from an article in The Lancet [2]. As a large number of uncounted overweight teenagers come of age, the reality will become worse. The total number of obese people in the USA is slightly lower than that in China, but the number of bariatric surgeries performed in the USA is 33 times higher than that in China [3]. As bariatric surgery becomes more widely accepted, a larger number of people suffering from obesity and complications will benefit. Due to continued advances in the treatment of diabetes and the development of bariatric surgery, the efficacy of this approach has been recognized by more physicians [4]. Bariatric surgery has clear effects on body weight, glycemic control, and diabetes-related complications [5]. Hundreds of thousands of bariatric procedures are performed every year worldwide [6]. Doctors in mainland China are actively developing bariatric surgery, but the field is still in its infancy. Approximately 6000 cases of bariatric surgery were performed in mainland China

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in 2016 [3]. At present, a large space exists for the development and utilization of bariatric surgery in China. With the promotion of standardized bariatric surgery, more obese diabetic patients will benefit from it. Similar to surgical treatment for tumors, bariatric surgery as a treatment for obesity and diabetes should also benefit from enhanced recovery after surgery (ERAS). Achieving ERAS requires a multimodal or multidisciplinary team (MDT) in clinical application [7]. For surgeons who perform bariatric surgery, building an MDT is helpful for patient recovery. The MDT approach also contributes to the promotion of bariatric surgery [8]. Although there have been few cases of Chinese surgeons performing bariatric surgery, these surgeons actively carried out ERAS. However, due to the short history of bariatric surgery development, major differences in basic characteristics, the social environment, and perioperative treatment options still exist among surgeons who perform bariatric surgery in China. These differences may be important factors affecting the prognosis of patients. Therefore, with the help of the Chinese Society for Metabolic & Bariatric Surgery (CSMBS) and the Surgery Branch of the Chinese Medical Association (CMA), our questionnaire was distributed in two ways: academic conferences and emails. With the data gathered by this questionnaire, we conducted an analysis of surgeons who perform bariatric surgery and case managers at some hospitals in mainland China. We aimed to systematically understand the problems and needs related to the development of bariatric surgery in China, with the hope of providing fact-based status reports and recommendations for the development of bariatric surgery in China.

Methods: a Survey of Surgeons Who Perform Bariatric Surgery

Survey Development and Content To prepare a questionnaire on the status of the bariatric surgery field in China, it was necessary to explore the literature and consult experts in bariatric surgery in mainland China, focusing on the current issues discussed at professional conferences. The three-part questionnaire included a total of 30 questions involving the doctor's gender, age, professional titles, professional direction, degree of specialization, learning channel, type of hospital, region, first operation date, annual number of operations, acceptance of new surgeries, MDT, ages of patients, comorbidity treatment, plastic surgery demand, surgical choice, hospitalization time, hospitalization expenses, preoperative preparation, postoperative feeding time, drainage tube conditions, and postoperative exercise guidance.

Respondents and Outcome Analysis The respondents included members of the CSMBS and the Surgery Branch of the CMA and a small number of case managers and nonspecialists who had performed bariatric surgery. CSMBS and CMA are academic organizations. Views of the members are representative and help to reflect the current situation and development of the industry. The questionnaires were issued at academic conferences and by email. In total, 102 questionnaires were distributed, and 65 valid questionnaires were returned. All valid questionnaires were analyzed.

Results: Medical Professionals' Choices

The Basic Characteristics of Surgeons Who Perform Bariatric Surgery The respondents included 62 surgeons and 3 case managers. They came from 21 provincial administrative regions in mainland China (Table 1: distribution area summary) (Fig. 1: map of distribution area).

In this survey, 92.3% of respondents were male medical staff, 7.7% were female medical staff, 98.5% were employed in public grade 3 class A hospitals, and only 1.5% worked in private hospitals. With respect to the professional titles of the respondents, 70.8% of the respondents were chief physicians, 15.4% were deputy chief physicians, 6.2% were attending physicians, and 7.6% were physicians. Regarding the age of the doctors, 4.6% were less than 30 years old, 20% were between 31 and 39 years old, 33.8% were between 40 and 50 years old, and 41.6% were more than 50 years old. The doctors received specific

Table 1 Distribution area summary

S/N	Province	Number (%)
1	Beijing	7 (10.8%)
2	Chongqing	3 (4.6%)
3	Fujian	1 (1.5%)
4	Guangdong	4 (6.2%)
5	Hebei	1 (1.5%)
6	Heilongjiang	4 (6.2%)
7	Henan	4 (6.2%)
8	Hubei	1 (1.5%)
9	Hunan	2 (3.1%)
10	Jiangsu	4 (6.2%)
11	Jilin	4 (6.2%)
12	Liaoning	8 (12.3%)
13	Ningxia	1 (1.5%)
14	Qinghai	1 (1.5%)
15	Shandong	3 (4.6%)
16	Shaanxi	2 (3.1%)
17	Shanxi	1 (1.5%)
18	Shanghai	7 (10.8%)
19	Sichuan	5 (7.7%)
20	Tianjin	1 (1.5%)
21	Xinjiang	1 (1.5%)

Figure 1 Map of distribution area

training before their first bariatric surgery; 20.2% of the doctors self-learned through surgery videos, 53.2% visited other institutions for surgical training (face-to-face), 1.3% completed remote network courses, and 25.3% learned through other forms of learning. Before performing bariatric surgery, 1.0% of the respondents were engaged in the thyroid/galactophore/hernia surgery department, 65.0% were engaged in the gastrointestinal surgery department, 28.0% were engaged in the hepatobiliary surgery department, and 6.0% were engaged in other departments (Fig. 2).

After performing bariatric surgery, 23.1% of respondents were engaged only in the field of bariatric surgery, and 76.9% were not engaged only in the field of bariatric surgery.

The Social Environment Although China is currently the country with the largest number of diabetes patients worldwide and among the countries with the greatest number of obese people, the number of bariatric surgeries performed is still very small relative to the population. To explain this observation, 39.5% of respondents believed that low self-acceptance was the primary

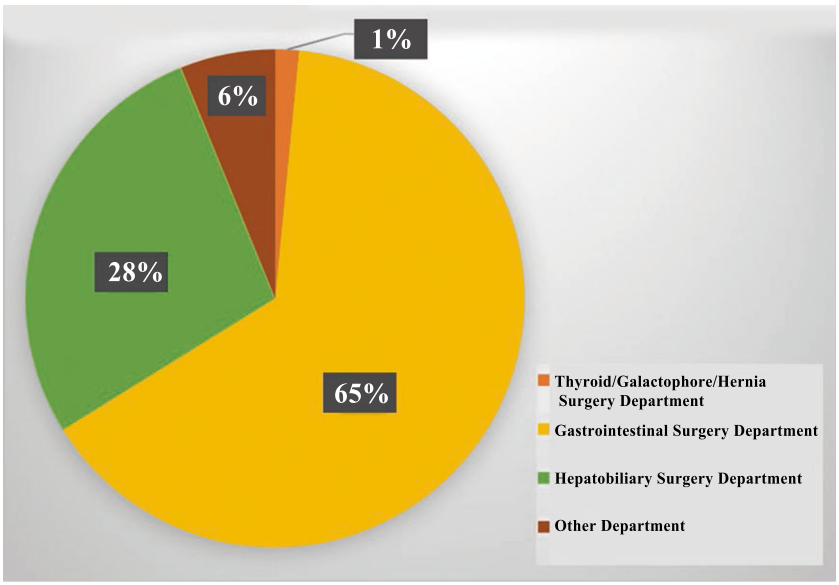

Fig. 2 Professional direction before performing bariatric surgery

factor, 24.2% believed that the main factor was the high cost and the low proportion of insurance reimbursement, 23.1% believed that the main factor was family reasons, and approximately 13.2% believed that resistance from other aspects of society led to fewer surgical patients. With respect to the publicity strategy for bariatric surgery, 39.0% of respondents regarded networks and news media as the most important publicity platform, and 34.0% believed that reputation was the most important factor because previous patients encourage new patients to undergo surgery. In terms of the most effective approaches, 8.0% of respondents named newspaper/advertisement, 8.0% named radio, and 11.0% named television as an effective publicity strategy (Fig. 3).

An investigation of the respondents' surgical history showed that 32.3% of respondents carried out their first bariatric surgery 6–8 years ago, 9.2% carried out their first bariatric surgery less than 2 years ago, 26.2% carried out their first bariatric surgery 3–5 years ago, 18.5% carried out their first bariatric surgery 9–11 years ago, and 13.8% carried out their first bariatric surgery more than 12 years ago. In terms of the number of operations, 49.2% of respondents had less than 50 cases per year, 23.1% had 50–100 cases per year, 10.8% had 100–150 cases per year, 7.7% had 150–200 cases per year, and 9.2% had more than 200 cases per year. In addition to basic laparoscopic bariatric surgery, 27.7% of respondents actively carried out other types of invasive weight loss measures (such as endoscopic treatment), 44.6% said they would not carry out such procedures, and another 27.7% remained uncertain. Regarding the minimum age for patients undergoing bariatric surgery, 22.0% of respondents accepted patients who were younger than 14 years old, 26.0% accepted patients who were 15–16 years old, 18.0% accepted patients who were 17–18 years old, 11.0% accepted patients who were 19–20 years old, and 23.0% accepted patients who were more than 21 years old (Fig. 4a: minimum patient age range). Regarding the maximum age for patients undergoing bariatric surgery, 37.0% of respondents accepted patients who were younger than 62 years old, 5.0% accepted patients who were 62–63 years old, 12.0% accepted patients who were 64–65 years old, 15.0% accepted patients who were 66–67 years old, and 31.0% accepted patients who were more than 67 years old (Fig. 4b: maximum patient age range).

The Perioperative Treatment Options of Bariatric Surgeons It is of great importance to select the appropriate bariatric surgery. When a patient had indications for multiple surgical methods, 71.0% of respondents selected laparoscopic sleeve gastrectomy, 8.0% selected laparoscopic gastric bypass, and 21.0% selected to follow the patient's wishes in developing a surgical plan (Fig. 5: selection of surgical methods).

When a patient's body mass index (BMI) was greater than 55 kg/m^2, 40.0% of respondents selected laparoscopic sleeve gastrectomy, 27.7% selected laparoscopic gastric bypass, 26.2% selected laparoscopic sleeve gastrectomy followed by laparoscopic gastric bypass, and 6.1% selected other approaches. Regarding a perioperative MDT (Q1), 95.4% of respondents would build an MDT, while 4.6% would not. Additionally, 80.0% of respondents would communicate with the anesthesiologist before surgery (Q2), and 20.0% would not. When a patient who underwent bariatric surgery also had other diseases (Q3) (such as nonacute gallstones or chronic appendicitis), 84.6% of respondents would treat these diseases together during the operation, 3.1% would not treat the additional diseases, and 12.3% were uncertain. With respect to postoperative plastic surgery needs (Q4), 43.1% of respondents recommended patients for plastic surgery, 13.8% would not recommend patients for plastic surgery, and 43.1% were not sure. Regarding the development of exercise guidance for patients after surgery (Q5), 73.4% of

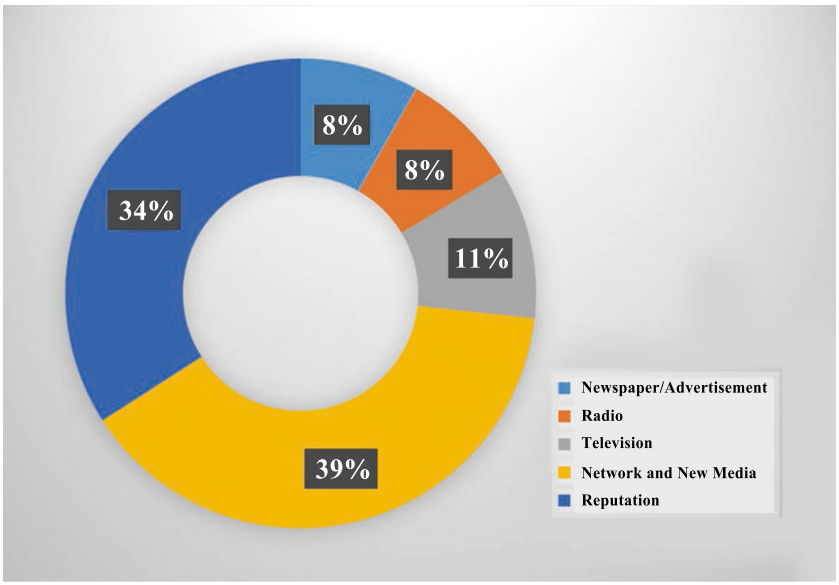

Fig. 3 The publicity strategy for bariatric surgery

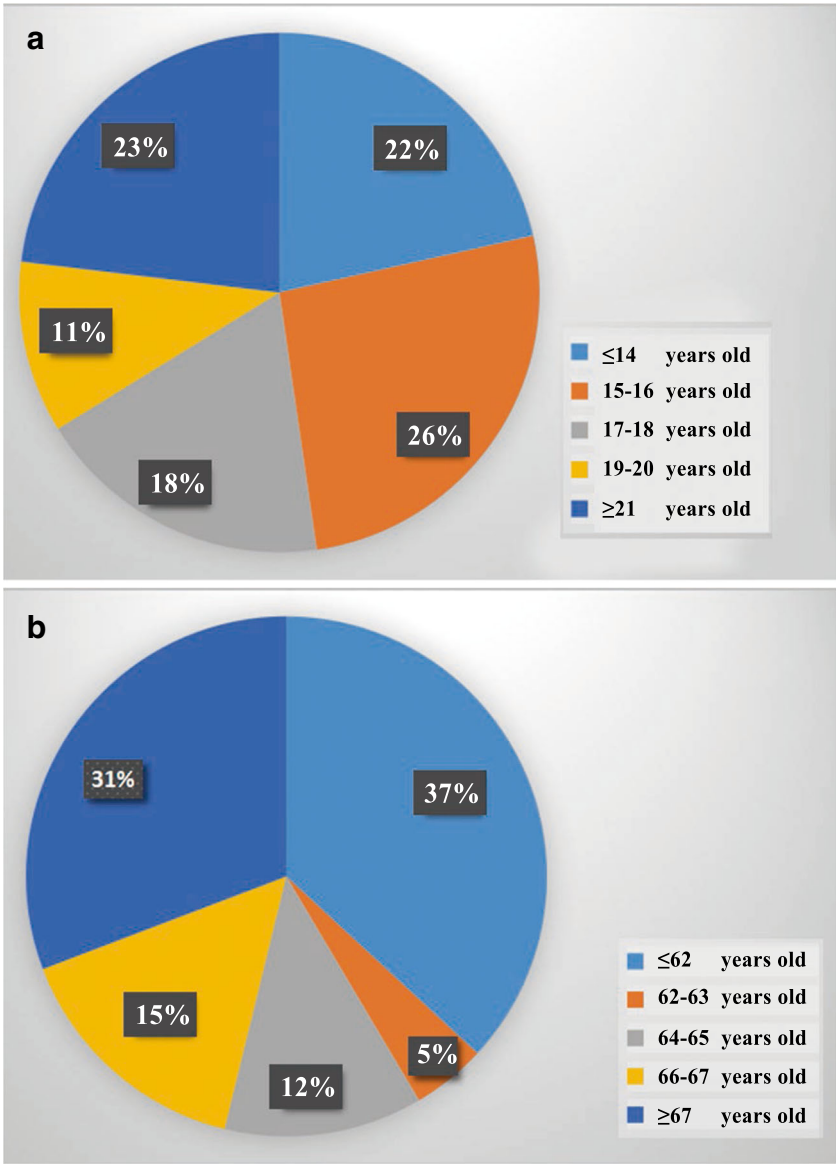

Fig. 4 **a** Minimum patient age range. **b** Maximum patient age range

respondents developed exercise guidance, 4.6% did not develop exercise guidance, and 20.0% were uncertain (Fig. 6).

With respect to hospitalization expenses, 1.5% of respondents believed that the total cost was less than 40,000 (CNY), 16.9% believed that the total cost was 40,000–50,000 (CNY), 58.5% believed that the total cost was 50,000–60,000 (CNY), and 23.1% believed that the total cost was more than 60,000 (CNY). In terms of hospitalization time, 4.6% of respondents believed that the hospitalization time was less than 4 days, 26.2% believed that the hospitalization time was 4–6 days, 49.2% believed that the hospitalization time was 6–8 days, and 20.0% believed that the hospitalization time was greater than 8 days. The specific problems associated with perioperative management, such as preoperative bowel preparation, indwelling nasogastric tube, postoperative feeding time, drainage tube conditions, and off-bed activity time, are summarized in Table 2

With respect to serious nutritional complications after bariatric surgery, 73.8% of respondents believed that the probability of severe anemia requiring readmission for treatment after surgery was less than 2.0%, 20.0% believed that this probability was between 3.0 and 5.0%, 3.1% believed that this probability was between 6.0 and 8.0%, and 3.1% believed that this probability was greater than 9.0%.

Discussion: Interpretation of Medical Professionals' Choices

With the development of China's economy, the number of obese and diabetic people in China is growing rapidly [9],

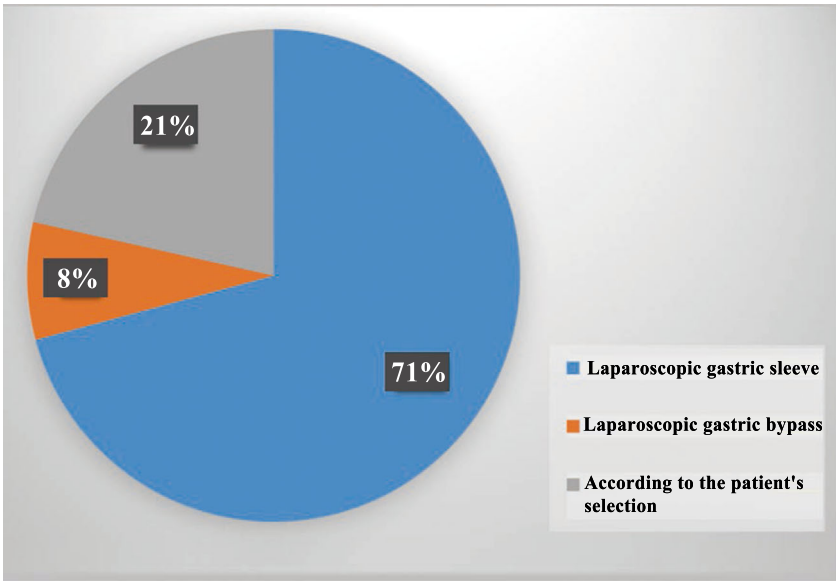

Fig. 5 Selection of surgical methods

and bariatric surgery, which is a distinct and effective treatment, is highly respected by the majority of medical professionals [4]. Bariatric surgery has been performed in large numbers around the world, and many obese and diabetic patients benefit from this approach. However, the number of bariatric surgeries performed annually is very small in mainland China, despite the prevalence of diabetes and obesity. In 2016, only 6240 bariatric surgeries were performed in mainland China [3] (excluding endoluminal and revisional procedures). To further elucidate the reasons for the slow progress of bariatric surgery in China and its current state of development, we conducted investigations based on the advantages of working with the CSMBS and the Surgery Branch of the CMA. According to the data from the questionnaire, there were 65 valid questionnaires, and approximately 4000 cases of bariatric surgery were performed every year, accounting for more than 60.0% of the annual operations in mainland China. Therefore, we also conducted a status analysis based on the results of the questionnaire.

At present, bariatric surgery in China is seriously underutilized. The authors believe that this underutilization is mainly due to the following four reasons: (1) the main reason for the small number of bariatric surgeries performed lies in the low acceptance of surgery among obese people. Elderly people tend to think that overweight children are healthy and have good physical strength, and this kind of thinking is deeply rooted. When these children grow up, they remain unaware that obesity is a disease, even after the appearance of accompanying symptoms, such as hypertension, hyperlipidemia, diabetes, and even sleep apnea/hypopnea syndrome. Under the influence of this belief, when such patients visit the hospital for treatment, they find it difficult to accept surgery as a treatment for obesity. (2) Pressure from relatives and friends is the second reason. Chinese family values are holistic rather than independent. When a patient indicates that he/she desires bariatric surgery, his/her family can become an obstacle. People are afraid of surgery and choose it only when they have to, instead of evaluating the pros and cons, because they think that losing weight through surgery is farfetched. (3) Another problem is that the basic medical insurance in most cities in mainland China does not cover bariatric surgery. Some cities even classify bariatric surgery as plastic surgery, which places an enormous financial burden on the patient, as all expenses are borne by the patient. At present, bariatric surgery costs more than 50,000 (CNY) in most cities in China, and the annual per capita GDP in mainland China is approximately 58,500 CNY (8600 US dollars) [10]. Some obese patients have developed serious respiratory and circulatory problems, and they want to accept bariatric surgery, which will not only increase the risk of surgery but also significantly increase the cost of hospitalization. (4) Doctor acceptance still needs to be improved. Acceptance of bariatric surgery by doctors from many other departments is low. They do not recognize bariatric surgery enough. They do not recommend it when they see obese patients, which is also one of the reasons why it is underutilized.

Most doctors who are currently performing bariatric surgery in China are chief physicians who engaged mainly in gastrointestinal and hepatobiliary surgery before performing bariatric surgery; such doctors have extensive surgical experience. However, due to the short overall development time of bariatric surgery, an optimal system has not yet been developed. Most doctors undergo brief training by attending a training course at a medical institution (face-to-face) that has previously performed bariatric surgery. Generally, this type of training course has a short training time, based mainly on explanations and surgical demonstrations. However, personnel who receive this type of training are unable to obtain a general understanding of the patient from preparation for

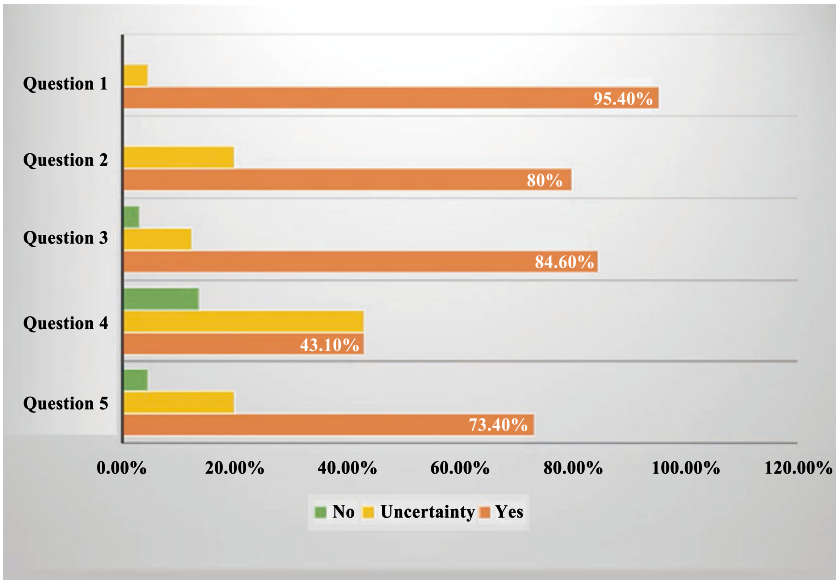

Fig. 6 Q1: Will a perioperative multidisciplinary team (MDT) be established during the perioperative period? Q2: Will you communicate with an anesthesiologist before surgery? Q3: When a patient undergoes bariatric surgery and has other diseases (such as nonacute gallstones or chronic appendicitis), will you treat both diseases together? Q4: Do you recommend plastic surgery after bariatric surgery? Q5: Will you give exercise guidance after bariatric surgery?

admission to postoperative discharge, which can cause some problems during the initial stage of the operation, thereby affecting the remaining stages of the operation.

Poor publicity work by healthcare providers is one of the reasons for the poor general understanding of bariatric surgery in society. In China, many patients do not understand that obesity and its complications are already a pathological condition and that surgery is an effective approach. Unlike malignant tumors, bariatric surgery needs more promotion and publicity. The general population, and even some doctors, have always believed that obesity and diabetes are medical diseases. In the information age, most surgeons now view online news media as the most important publicity platform, which is indeed the main trend. In addition, nearly the same number of doctors believe that their reputations and word-of-mouth advertising are important. Medical ethics are crucial factors, but the transmission of this information is slow. To ensure that more people understand bariatric surgery, traditional media, such as radio, television, and newspapers, should not be ignored.

New technologies are developing very rapidly, especially for endoscopic techniques, and we need to learn more treatment techniques to provide more options for patients. In the survey, we found that many doctors (44.6%) viewed this idea negatively. At present, endoscopic treatment is often performed by digestive physicians, which may be one of the reasons for this tendency. Moreover, at present, the relationship between doctors and patients is relatively strong, and the development of new technologies may put this relationship at risk. However, doctors can still learn new technologies and stay up to date on the direction of development. Endoscopic treatment can play an important role not only in the treatment of obesity but also in the treatment of complications after bariatric surgery [11].

Regarding the choice of surgical procedure, in clinical work, different bariatric surgeries have different risks and

Table 2 Perioperative conditions in bariatric surgery

Responses (percentages) to a questionnaire on perioperative conditions in bariatric surgery

	Number (%)
1. For a bariatric surgery, would bowel preparation be administered?	
No	24 (36.9%)
Yes, oral purgative	27 (41.5%)
Yes, enema	3 (4.6%)
Yes, both	2 (3.2%)
According to the operative methods	9 (13.8%)
2. For a bariatric surgery, would a nasogastric decompression tube routinely be placed?	
No	49 (75.4%)
Yes	16 (24.6%)
3. When would patients be allowed to resume oral intake of liquids?	
Operation day (6 h after the operation)	6 (9.2%)
Postoperative day 1	26 (40.0%)
Postoperative day 2	20 (30.8%)
At passage of gas	11 (16.9%)
At bowel sounds	2 (3.1%)
4. For a bariatric surgery, would an abdominal drainage tube routinely be placed?	
No	4 (6.2%)
Yes	46 (70.7%)
According to the operative methods	12 (18.5%)
According to the intraoperative situation	3 (4.6%)
5. When would patients be allowed to become ambulatory after the operation?	
Operation day (6 h after the operation)	19 (29.2%)
Postoperative day 1	41 (63.1%)
Postoperative day 2	5 (7.7%)

benefits. Within the scope of indications for bariatric surgery, the risks and benefits of surgery should be fully evaluated and informed. Each patient's expected degree of bariatric surgery effect is different, and his/her degree of tolerance of nutritional complications and other problems is also different. Thus, personal preferences will be generated, and doctors will give full guidance and supervision. In studies on many bariatric surgery centers, doctors also perform operations such as one anastomosis gastric bypass and sleeve gastrectomy with jejunal bypass (SG + JJB) in addition to SG and RYGB.

The opinion of the MDT is of great significance for the preoperative management of obese patients treated with bariatric surgery. MDTs will reduce surgical complications by optimizing the patient's surgical choice and preoperative care [12]. Currently, 95% of respondents indicated that they build their own MDTs for bariatric surgery. In mainland China, this practice is limited by the level of medical units, the composition of departments, the distribution of fees, and other issues. MDT implementation will face some challenges and resistance. Some surgeons and anesthesiologists may consider some cases to be of low risk and may not prescribe MDT for all patients. Even with better efficacy of bariatric surgery, patients still experience a series of problems, such as sagging skin and increased wrinkles. The number of patients undergoing plastic surgery after weight loss has risen sharply worldwide, but the number of plastic surgeries vary greatly among different hospitals [13]. At present, bariatric surgery is still in its infancy in China, and few patients undergo plastic surgery after bariatric surgery. More than half of the surveyed doctors said that after bariatric surgery, patients are not necessarily or will not be recommended for plastic surgery. Because we are in the early stage of bariatric surgery, we should learn from the experience of other doctors and make surgical choices carefully. It is generally known that plastic surgery is able to improve function and improve quality of life [14]. When a patient undergoes bariatric surgery, we should assess the patient's condition, determine whether plastic surgery is appropriate, inform the patient of the significance of plastic surgery, and provide an alternative way for patients to achieve a higher standard of living. When a patient undergoing bariatric surgery meets the surgical indications for cholecystectomy, simultaneous treatment may slightly increase the risk of bleeding and pneumonia. However, when deciding whether to treat gallbladder disease concurrently, doctors should consider the potential risks and hospitalization costs of delayed surgery [15]. The gallbladder triangle is difficult to distinguish in obese people and is a risk factor for biliary tract injury; doctors must be very cautious when handling this anatomy, as even experienced surgeons may make mistakes [16].

As in malignant tumor surgery, we should focus on enhanced recovery after bariatric surgery. The ERAS concept, which was first proposed by Kehlet in 1997 [17], has achieved remarkable results and has become the clinical path selected by the governments of the UK and Canada after nearly 20 years of development. Additionally, the ERAS concept has gradually been extended from its initial application in colorectal surgery to clinical surgical fields. A clinical study of rapid rehabilitation therapy for laparoscopic sleeve gastrectomy in 2013 showed that the ERAS treatment scheme shortens hospitalization times without increasing the incidence of complications during the perioperative period and has economic benefits [18]. The ERAS International Working Group proposed that the application of evidence-based perioperative nursing programs could reduce the incidence of complications, accelerate recovery, and shorten the length of hospital stays. In 2014, this group published perioperative rapid rehabilitation guidance for gastrectomy, providing a series of specific recommendations [19]. Moreover, there is no evidence that preoperative oral purgative is beneficial for bowel preparation; in contrast, this approach may increase the risk of dehydration and fluid and electrolyte imbalance.

ERAS has been carried out and applied in the field of bariatric surgery in China, but the development of ERAS is relatively poor. In our survey of ERAS-related issues, 41.5% of doctors chose bowel preparation by oral purgative, 75.4% placed a nasogastric decompression tube routinely, 30.8% allowed patients to resume oral intake of liquids 2 days after surgery, 70.7% placed an abdominal drainage tube routinely, and 63.1% allowed patients to become ambulatory 1 day after the operation. It is also important to ensure effective analgesic treatment and encourage early activity. In 2016, an ERAS guide for bariatric surgery was proposed. According to this guide, no randomized controlled trial (RCT) has been performed to evaluate the role and efficacy of abdominal drainage tubes in bariatric surgery. A retrospective study of gastric bypass demonstrated that there was no significant difference in the rate of postoperative fistula or secondary operation between the groups with and without abdominal drainage [20]. In this survey, 70.7% of surgeons placed an abdominal drainage tube regardless of the type of surgery. The value of applying ERAS to bariatric surgery has been gradually accepted by medical centers at home and abroad, but the initiative of medical and nursing personnel in implementing this approach is poor. Based on this observation, we should change traditional concepts, improve programs, formulate Chinese guidelines and norms for the implementation of ERAS, and develop measures to ensure the safety of doctors and patients, all of which will guarantee the smooth implementation of ERAS. However, we should not consider shortening the length of hospital stay and reducing postoperative complications to be the only criteria for evaluating the feasibility of the ERAS program. Additionally, we should establish a three-dimensional treatment plan based on the psychological, physiological, and social environments of both doctors and patients to promote the rapid development of bariatric surgery in China. Chinese bariatric surgery has a promising future, but this field is still in its infancy; thus, much work must be done.

Since this study is a survey, it has some limitations. (1) Although the participants in this survey are representative, it

does not include all the bariatric surgeons in China, and thus, it cannot reflect all the data on bariatric surgery in China. (2) This survey mainly focused on the occupational environments and situations of doctors. A small number of perioperative management problems occurred at the same time, but the long-term prognosis and follow-up were not carried out. The postoperative follow-up of bariatric surgery was of great significance. (3) This survey and study help to identify problems, but the solutions to the problems are not addressed. In further research, we will focus on these problems.

Conclusion: Present and Future

In conclusion, the number of hospitals that perform bariatric surgery has gradually increased in mainland China, mostly among public grade 3 class A hospitals, and these surgeries are carried out by experienced chief physicians. However, at present, the relatively poor degree of specialization of surgeons who perform bariatric surgery and the relatively insufficient degree of standardized training before surgery have led to an insufficient understanding of bariatric surgery among people with obesity and diabetes, and there is still much room for promoting this procedure through publicity. Significant differences still exist in perioperative management options and the establishment of enhanced recovery after surgical treatment in different regions and at different hospitals; thus, much work is needed.

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Compliance with Ethical Standards

Conflict of Interest I have not received payment or services from a third party for any aspect of the submitted work at any time. I have no financial relationships with others. I have no patents. Concerning conflicts of interest, the submitted work could not influence or potentially influence readers. There are no other relationships/conditions/circumstances that present a potential conflict of interest.

Ethical Approval Statement This is a retrospective study. For this type of study, formal consent is not required.

Informed Consent Statement Informed consent was obtained from all individual participants included in the study.

Appendix Sample of the Questionnaire

Survey of the field of bariatric surgery

S/N	Part 1 (1–10) Part 2(11–20) Part 3(21–30)
1	Your gender is: A. male; B. female
2	Your age range is: A. ≤ 30; B. 31–39; C. 40–50; D. ≥ 50
3	Your professional title is: A. chief physician; B. deputy chief physician C. attending physician D. physician
4	What was your surgery department before performing bariatric surgery: A. thyroid/galactophore/hernia surgery department; B. gastrointestinal surgery department; C. hepatobiliary surgery department; D. other department
5	Do you engage only in the field of bariatric surgery now: A. yes; B. no
6	What training did you receive before your first bariatric surgery? A. surgery videos; B. visited other institutions for surgical training (face-to-face); C. network courses; D. other forms of learning
7	What do you think is the biggest resistance for obese people to accept bariatric surgery? A. low self-acceptance; B. high cost and the low proportion of insurance; C. family reasons; D. social environmental factor
8	The type of your hospital is: A. public grade 3 class A hospital; B. public grade 2 class A hospital; C. public grade 1 class A hospital; D. private hospital
9	The location of your hospital: A. Northeast China; B. East China; C. North China; D. Central China; E. South China; F. Southwest China; G. Northwest China
10	What is the most effective publicity strategy? A. networks and new media; B. reputation; C. newspaper/advertisement; D. radio E. television
11	Your bariatric surgery history is: A. less than 2 years; B. 3–5 years; C. 6–8 years; D. 9–11 years; E. more than 12 years
12	Do you actively promote other weight loss programs? A. yes; B. no
13	The number of bariatric surgeries you perform per year? A. less than 50 cases; B. 50–100 cases; C. 100–150 cases; D. 150–200 cases; E. more than 200 cases

(continued)

Survey of the field of bariatric surgery	
S/N	Part 1 (1–10) Part 2(11–20) Part 3(21–30)
14	The minimum age for patients undergoing bariatric surgery: A. younger than 14 years old; B. 15–16 years old; C. 17–18 years old; D. 19–20 years old; E. more than 21 years old
15	The maximum age for patients undergoing bariatric surgery: A. younger than 62 years old; B. 62–63 years old; C. 64–65 years old; D. 66–67 years old; E. more than 67 years old
16	Would you build an MDT? A. yes; B. no
17	Do you communicate with the anesthesiologist before surgery? A. yes; B. no
18	When a patient who undergoes bariatric surgery also has other diseases, would you treat these diseases together during the operation? A. yes; B. no
19	Would you recommend your patients for plastic surgery after bariatric surgery? A. yes; B. no
20	When a patient had indications for multiple surgical methods, you choose: A. laparoscopic sleeve gastrectomy; B. laparoscopic gastric bypass; C. follow the patient's wishes in developing a surgical plan; D. other
21	Would you develop exercise guidance for patients after surgery? A. yes; B. no
22	What are the hospitalization expenses for your surgery patients? A. less than 40,000 (CNY); B. 40,000–50,000 (CNY); C. 50,000–60,000 (CNY); D. more than 60,000 (CNY)
23	What is the hospitalization time for your surgery patients? A. less than 4 days; B. 4–6 days; C. 6–8 days; D. greater than 8 days
24	Incidence of severe anemia after bariatric surgery: A. less than 2.0%; B. between 3.0 and 5.0%; C. between 6.0 and 8.0%; D. greater than 9.0%
25	When a patient's BMI is greater than 55 kg/m^2, what kind of bariatric surgery would you choose? A. laparoscopic sleeve gastrectomy; B. laparoscopic gastric bypass; C. laparoscopic sleeve gastrectomy followed by laparoscopic gastric bypass; D. other approaches
26	For a bariatric surgery, would bowel preparation be administered? A. no; B. yes, oral purgative; C. yes, enema; D. yes, both; E. according to the operative methods
27	For a bariatric surgery, would a nasogastric decompression tube routinely be placed? A. yes; B. no
28	When would patients be allowed to resume oral intake of liquids? A. operative day (6 h after the operation); B. postoperative day 1; C. postoperative day 2; D. at passage of gas; E. at bowel sounds
29	For a bariatric surgery, would an abdominal drainage tube routinely be placed? A. yes; B. no; C. according to the operative methods; D. according to the intraoperative situation
30	When would patients be allowed to become ambulatory after the operation? A. operation day (6 h after the operation); B. postoperative day 1; C. postoperative day 2

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