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Therapeutic resources and motivation for behavioral changes in adults referred for bariatric surgery

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Abstract

Bariatric surgery is considered an important strategy to control obesity, however it must be indicated only after the failure of clinical treatments. The aim of this study was to investigate the degree of obesity, the presence of comorbidities and therapeutic resources used in the treatment of obesity in patients referred for bariatric surgery, as well as to identify the stage of motivation for changing their dietary behavior. This was a cross-sectional study that investigated 44 patients referred for bariatric surgery in the municipality of Diadema-SP. The electronic medical records were consulted to collect anthropometric data, biochemical tests, presence of comorbidities and previous treatments for obesity. Face-to-face interviews were conducted with a sub-sample (n=16) for a more detailed investigation of the therapeutic resources: dieting, physical exercise and use of drugs. The motivational stage for changing behavior was assessed by a questionnaire based on the trans-theoretical model, containing 5 closed questions about changes in eating habits within the previous six months. It was found that 91% of individuals had grade II and III obesity, 43% arterial hypertension and 34% diabetes mellitus. Among the interviewees, 88% reported monitoring with SUS for more than 2 years, 81% underwent pharmacological treatment, 38% practiced physical exercise, 88% followed some diet and 19% reported monitoring with a nutritionist. The most observed motivational stage for changing dietary behavior was action (56%). It is concluded that the individuals referred for bariatric surgery had a high degree of obesity and risk of comorbidities, and that several therapeutic strategies, mainly pharmacological treatments and trending diets, had already been adopted.

Keywords: Obesity. Bariatric surgery. Therapy. Behavior. Diet. Motivation.

INTRODUCTION

Obesity is defined as a chronic disease, of a multifactorial origin, characterized by excessive accumulation of body fat, which increases the risk of health complications and mortality from cardiovascular disease[1]. Recent evidence indicates that the prevalence of obesity has doubled in 73 countries around the world, and the comorbidities resulting from being overweight affect about 2 billion people[2].

In Brazil, according to data from the Surveillance of Risk and Protection Factors for Chronic Diseases study by telephone survey[3], overweight increased from 42.6% to 55.7% in recent years. In the same period, cases of obesity increased by 67%, from 11.8% in 2006 to 19.8% in 2018.

In view of the epidemic scenario, obesity has become one of the greatest public health challenges of the 21st century[4]. Obesity

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control includes a variety of therapies that must be applied according to the degree of obesity and the presence of comorbidities. National and international protocols indicate multiprofessional approaches that include: guidelines for changes in lifestyle, healthy eating habits, increased level of physical activity, dietary advice, use of behavioral strategies, pharmacological treatments and referrals for bariatric surgery[5,6,7,8].

Surgical treatment of obesity has been considered an important strategy adopted in the remission of comorbidities related to severe obesity, generating a significant impact on weight reduction, body fat percentage and long-term metabolic changes[9,10]. The systematic review and meta-analysis conducted by Chang *et al*.[11] had the main objective of evaluating the effectiveness and risks of bariatric surgery, for which it consulted 164 clinical studies (37 randomized clinical studies and 127 observational studies), analyzing the outcomes of bariatric surgery in about 161,756 adult patients. The results revealed significant effects on the reduction of BMI (from 12 to 17 kg/m^2) after 5 years of bariatric surgery, a remission percentage of 92% in cases of diabetes mellitus in randomized clinical studies and 86% in observational studies, and 75% of arterial hypertension remission in randomized clinical studies and 74% in observational studies.

Despite the benefits observed after performing bariatric surgery, it is worth mentioning that there are strict criteria that must be followed in the preoperative period for referral of the patient to this type of procedure and for the successful results. One of the criteria adopted by the Ministry of Health includes the patient's commitment to participate in all stages of the preoperative period, including a detailed assessment (psychological, nutritional, clinical, cardiological and endocrinological), as well as changes in lifestyle, such as adherence to the calorie restriction plan aiming at weight loss, use of pharmacological therapy if necessary, interest in changing the diet, improving their attitudes towards food discipline and food selection, which are all practices that need to be maintained after surgery[4,8].

In Brazil, the performance of bariatric surgery by the Unified Health System (SUS) has been guaranteed since 1999 and currently must comply with the definitions of Ordinance GM/MS No. 424 of March 19, 2013. According to the current guidelines, the indication for performing bariatric surgery must meet the following criteria: individuals with a BMI ≥50 Kg/m^2; or individuals with a BMI ≥40 Kg/m^2, with or without comorbidities, without success in the longitudinal clinical treatment performed in Primary Care and/or Specialized Outpatient Care, for at least two years, and who have followed clinical protocols; or individuals with a BMI ≥35 kg/m^2 and with comorbidities, such as high cardiovascular risk, diabetes mellitus, difficult to control systemic arterial hypertension, sleep apnea, degenerative joint diseases, and who were also unsuccessful in longitudinal clinical treatments performed for at least two years and who have followed clinical protocols[12].

Brazil is considered one of the countries where most bariatric surgeries are performed, behind only the United States, which leads the rankings as the country with the largest number of bariatric surgeries in the world[13]. National data reveal that more than 61 thousand bariatric surgeries were performed by SUS in the last 10 years, reaching a growth of 200% in this period. In the state of São Paulo, there were 14,843 in the same period, 1,490 in the last year, being an average of 124 surgeries per month[14].

Despite the increasing number of bariatric surgeries performed at SUS, after the indication for the procedure, there is a waiting list lasting approximately 2.2 to 3.4 years[15]. Thus, in order to contribute with actions that should be sustained throughout life by the patient undergoing surgical treatment for obesity, evaluating the therapeutic resources adopted by the patient referred for surgery and their

degree of motivation for behavioral change contribute significantly to understanding and directing a more effective therapeutic approach in the preoperative phase.

In this sense, the present study aimed to investigate the degree of obesity, the presence of comorbidities and therapeutic resources used in the treatment of obesity in patients who received a referral and were awaiting evaluation for bariatric surgery by SUS in the municipality of Diadema (SP), as well how to identify the current stage of motivation for changing their dietary behavior.

MATERIAL AND METHODS

Study sample

The sample of this study was composed of obese adults, of both sexes and aged between 18 and 59 years old. The recruitment of participants was carried out using the Regulation System of the city of Diadema, which gathers all referrals made by the basic and specialized care network, under the instruction of the Municipal Secretary of Health (SMS).

Through the regulation system, all requests registered with the obesity ICD (ICD E66) were accessed, from January 2017 to October 2018. This set included referrals for specialized consultations, exams and groups, totaling 1,111 requests. In this study, two exclusion filters were performed: duplicate requests (n=54) and those less than 18 years and more than 60 years old (n = 318); resulting in 739 entries remaining.

Then, a new processing was performed to keep only requests for consultation with endocrinologists from the municipal specialty service in the database, who are responsible for referring patients to bariatric surgery. Thus, 689 records were excluded, resulting in a final sample of 50 patients referred for bariatric surgery in this period.

Then, the municipal electronic medical record system was consulted to search for information concerning this study, however only 44 electronic medical records were located, thus, excluding 6 more patients from the sample. The steps for recruiting the volunteers to participate in the study took place according to the flowchart shown in Figure 1.

Data collection in the medical record

The data collected in the electronic medical record included: weight, height, biochemical tests (fasting glucose, total cholesterol, triglycerides), presence of comorbidities (arterial hypertension, diabetes mellitus, dyslipidemia, thyroid disease, joint and psychiatric diseases) and types of treatments for obesity already indicated by the responsible physicians (medicated, meal plan).

Evaluation of anthropometric data

Weight and height were obtained by those reported in the medical records on the date the referral was made for bariatric surgery. From these data, the body mass index (BMI) was calculated, dividing the body weight expressed in kilograms by the height expressed in meters squared (m2). The degree of obesity and the risk of comorbidities were classified according to the recommendation of the WHO16 and recommendation of the Association for the Study of Obesity and Metabolic Syndrome (Abeso)4: low risk (BMI between 25.0 to 29.9 kg/m2), high risk (BMI between 30.0 to 34.9 kg/m2), very high risk (BMI between 35.0 to 39.9 kg/m2) and extremely high risk (BMI greater than or equal to 40.0 kg/m2).

Biochemical tests

The data from biochemical tests were collected through the most recent reports registered in the medical records. The analysis of biochemical tests was based on the guideline of the Brazilian Diabetes Society17, which establishes as a cut-off

point for normoglycemia a fasting blood glucose value of less than 100 mg/dL, and according to the Brazilian Directive on Dyslipidemia and Prevention of Atherosclerosis18, which establishes fasting concentrations of triglycerides <150 mg/dL and fasting total cholesterol <190 mg/dL as desirable.

Data collection in the in-person interview

In addition, all 44 volunteers were contacted by phone or through the Basic Health Unit (BHU) to schedule an interview in person to collect other information relevant to this study.

Due to the great difficulty of scheduling interviews to be carried out at the UBS, the attempt was made to meet with the family health support teams (FHS), who made previous contact with users and accompanied the researchers to their homes. In total, 16 interviews were conducted, 4 at the UBS, inside a reserved room, and 12 interviews at homes. However, it was not possible to contact 39% (n=17), meanwhile 23% (n=10) were not at home at the time of the visit and 2% (n=1) refused to participate in the study.

Using this final sub-sample (n=16), a questionnaire with closed questions was applied to characterize the socioeconomic profile (education and family income) and the therapeutic resources adopted in their treatment of obesity. The following variables were investigated: time of follow-up in the SUS for the treatment of obesity, if they exercise regularly (yes or no), if they follow a diet (yes or no) and the type of diet already tried (soup, detox, points, low carb, Dunkan and nutritionist's prescription).

Stage of dietary behavior change

The motivational stage for changing dietary behavior was identified through the application of the trans-theoretical model, initially suggested by Prochaska and DiClemente19, through studies with smokers. Since then, the trans-theoretical model has been applied in clinical practice to other behaviors such as physical activity, changes in eating behavior and lifestyle for weight control in overweight adults20,21.

According to this model, processes and principles of changes arising from a given intervention occur through the following stages22:

(1) Pre-contemplation when the person has no intention of changing his behavior within the next six months;

(2) Contemplation when the person already intends to change the behavior within the next six months;

(3) Decision when the person intends to act in the near future, such as the following month;

(4) Action when there has been a change for less than six months; and

(5) Maintenance when the change has been going on for more than six months and the chances of returning to the old dietary habit are low.

The questionnaire for the classification of the motivational stage for behavior change was composed of five multiple choice questions, proposed by Ling and Horwath23, and adapted by Zaccarelli24, to identify stages of change for the adoption of healthy eating habits. The following questions formed this questionnaire: (1) Have you ever changed your eating habits by trying to eat healthier? (2) Are you currently eating or trying to eat healthier? (3) How long have you been eating or trying to eat healthier? (4) During the past month, have you thought about changes you could make to eat healthier in the near future? (5) How confident are you that you will make changes in order to eat healthier in the next month? According to the response algorithm obtained, the stage of behavior change was determined as mentioned by Zaccarelli24.

Ethical aspects of research

This study was approved by the Research Ethics Committee of Centro Universitário São Camilo, under protocol number 2.920.383. All volunteers interviewed signed an informed consent form (ICF).

Data analysis

Statistical analysis was performed using the STATISTICA 7.0 software, considering a significance level of 0.05. Parametric data are presented as mean ± standard deviation and nonparametric data as median (minimum-maximum). Categorical variables are presented in absolute number and frequency.

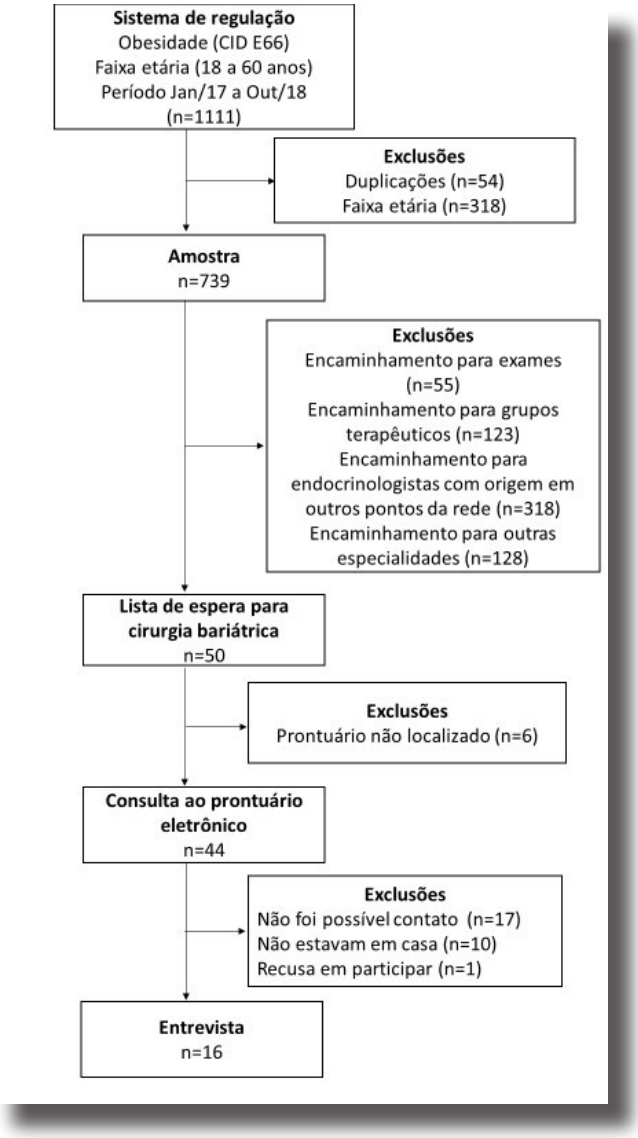

Figure 1 – Flowchart of the steps involved in recruiting research volunteers. Diadema-SP, 2019.

RESULTS

The results of this study reveal the profile and therapeutic resources used in the treatment of obesity in patients referred for bariatric surgery by SUS in the municipality of Diadema-SP. The sample of this study had a mean age of 41.3±9.5 years and 91% (n=40) were female. According to the BMI, the results show that most of the sample, 75% (n=33), had morbid obesity (BMI≥40.0 kg/m2) and a very high risk for the development of comorbidities. Some medical records did not report any record of anthropometric information (Table 1).

According to biochemical tests, it was observed that 27% had elevated fasting blood glucose and triglycerides, in addition to 23% having had high total cholesterol. The records of comorbidities pointed to 43% of people with arterial hypertension, 34% with diabetes mellitus or altered fasting glucose, 7% with dyslipidemia and 9% with thyroid diseases (Table 1). Table 2 presents the descriptive anthropometric and biochemical profile of the sample of this study. It is noticed that the average weight was 115.6±16.2 kg and the BMI was 44.2±5.9 kg/m2.

The sample of patients interviewed in person was made up of 88% women (n=14) and the average age was 40.4±9.5 years. The sociodemographic characteristics and therapeutic resources adopted are described in Table 3. This was a group that mostly studied until high school (63%) and has a family income between 1 and 3 minimum wages (56%). Most (88%) reported a history of follow-up at SUS for over 2 years for the treatment of obesity, where 81% underwent drug therapies. The regular practice of physical exercise was mentioned by 38% of the sample, and 69% reported practicing two times or less per week. The majority (88%) had

already followed some type of diet, most of which are trending/fad diets. Among the diets carried out previously, the most cited were the Soup Diet (56%) and Detox Diet (50%). Only 19% reported following-up with a nutritionist to treat obesity.

Regarding the identification of the motivation for changing eating behavior through the application of the trans-theoretical model, it was observed that most of the interviewed participants were in the action stage (56%), followed by the maintenance (25%), contemplation (13%) and decision (6%) stages (Figure 2). There were no participants classified in the pre-contemplation stage. When asked about what kind of changes they have made or intend to make in their diet, the most cited by the participants were: increase the consumption of vegetables, decrease the amount of food eaten and decrease the consumption of soft drinks and pasta (Figure 3).

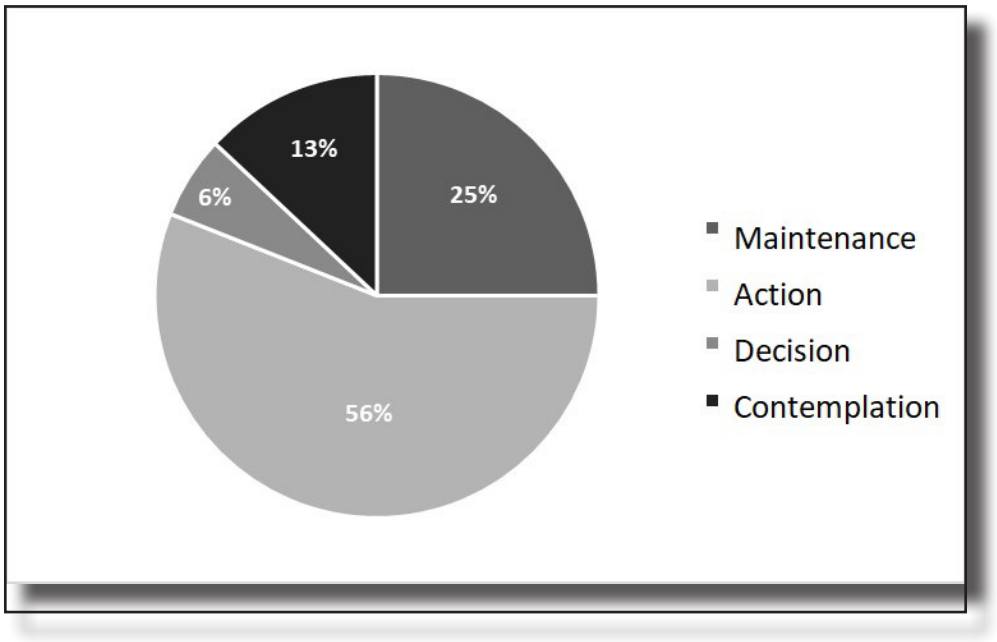

Figure 2 – Motivational stage for changing dietary behavior according to the trans-theoretical model. Diadema-SP, 2019.

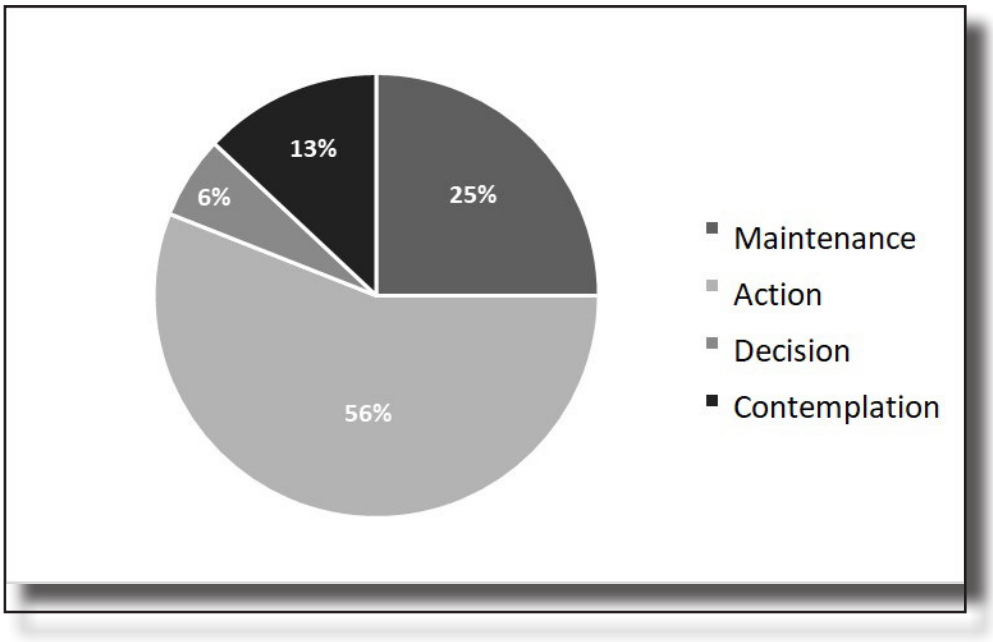

Figure 3 – Dietary changes made or intended to be made in individuals referred for bariatric surgery. Diadema-SP, 2019.

Table 1 – Characteristics of patients referred for bariatric surgery by SUS. Diadema-SP, 2019.

		Total samplen= 44		
	Variable	Category	N	%
	Sex	Female	40	91
		Male	4	9
	Nutritional Status	Overweight	1	2
		Grade II obesity	7	16
		Grade III obesity	33	75
		No anthropometric data	3	7
	Comorbidity risk	Little elevated	1	2
		Very high	7	16
		Extremely high	33	75
		No anthropometric data	3	7
Altered laboratory tests	Fasting glucose (>100 mg/dL)	No	18	41
		Yes	12	27
		No information	14	32
	Triglycerides (>150 mg/dL)	No	18	41
		Yes	12	27
		No information	14	32
	Total cholesterol (>190 mg/dL)	No	16	36
		Yes	10	23
		No information	18	41
Comorbidities	Systemic Arterial Hypertension	No	25	57
		Yes	19	43
	Diabetes Mellitus and Altered Fasting Glucose	No	29	66
		Yes	15	34
	Dyslipidemia	No	41	93
		Yes	3	7
	Thyroidopathy	No	40	91
		Yes	4	9
	Joint diseases	No	42	95
		Yes	2	5
	Psychiatric illnesses	No	42	95
		Yes	2	5
Previous treatment reported in the medical record		Medication	24	55
		Food plan	3	7
		Medication + Food plan	4	9
		No treatment reported	13	30

Table 2 – Anthropometric and biochemical variables of patients referred for bariatric surgery by SUS. Diadema-SP, 2019.

	Total sample n= 44	
	Average	Standard deviation
Weight (kg)	115,6	16,2
Height (m)	1,6	0,1
BMI (kg/m2)	44,2	5,9
Blood glucose (mg/dL)	117	56
Triglycerides (mg/dL)	155	107
Total cholesterol (mg/dL)	179	36

Table 3 – Sociodemographic characteristics and therapeutic resources used to treat obesity in patients referred for bariatric surgery by SUS. Diadema-SP, 2019.

Variable	Categoria	Amostra entrevistada n = 16	
		n	%
Education	Ensino Fundamental	5	31
	Ensino Médio	10	63
	Pós-Graduação	1	6
Family income	Até 1 salário mínimo	2	13
	1 a 3 salários mínimos	9	56
	3 a 6 salários mínimos	2	13
	Não soube informar	3	19
Follow-up time for weight loss in SUS	1 a 2 anos	2	13
	2 a 3 anos	4	25
	3 a 4 anos	2	13
	Mais de 4 anos	8	50
Regular physical exercise	Sim	6	38
	Não	10	63
Weekly frequency of physical exercise	< 2 vezes	11	69
	a 3 vezes	2	13
	> 3 vezes	3	18
Already performed diet	Sim	14	88
	Não	2	13

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...continuation - Table 3

Variable	Category	Amostra entrevistada n = 16	
		n	%
	Soup	9	56
	Detox	8	50
	Points	5	31
	Low carb	3	19
	Dunkan	2	13
	Nutritionist	3	19

DISCUSSION

It is already well documented and evidenced in the literature that obesity and higher BMI values significantly increase the development of comorbidities, including cardiovascular diseases and mortality from all causes25,26. Thus, we showed through this study that the sample referred by SUS for the bariatric surgery procedure fit this risk profile, as most of them presented morbid obesity and a very high risk for comorbidities.

A systematic review carried out in Brazil, in 2015, described the anthropometric and comorbidities profile of patients undergoing bariatric surgery by SUS. It was found that 79% were female, the mean BMI was 48.6 kg/m2, 60.8% had arterial hypertension and 22% diabetes mellitus. This study concluded that the patient operated on by SUS had a risk and comorbidity profile similar to those described in international studies, except for the high prevalence of arterial hypertension, which may increase the risk of adverse perioperative and postoperative outcomes27. In the present study, the prevalence of hypertension and diabetes mellitus remained below the data presented in the study cited above.

The predominance of females (91%) in the present study was compatible with other studies in the literature28,29, which reveals that women are four times more likely to seek bariatric surgery than men. In fact, the most recent results of the Vigitel3 population study conducted in Brazil point out that obesity affects mainly women in our country; about 20.7%.

The biochemical profile of the evaluated sample reveals similar concentrations of glucose, triglycerides and total cholesterol to the study by Silva et al.29, where improvement in arterial hypertension, diabetes mellitus and dyslipidemia was observed after bariatric surgery.

The analysis of the therapeutic resources used to treat obesity was hampered by the amount of information recorded in the medical record, in which it was observed that in 30% of the cases there was no reference to any type of prescribed treatment. It is important to mention that, in some cases, not even anthropometric data and biochemical tests were recorded in the medical record in a part of the sample. The poor quality of medical record information was pointed out by Pavão et al.30 in a study conducted in hospitals in Rio de Janeiro, which reinforces the importance of health professionals in reporting these records.

These results converge to an emergency and an ample need for a complete report of the medical records by health professionals involved in the public health system. The implementation of an effective electronic medical record system is capable of promoting integration between health professionals and managers involved in the different levels of SUS care. The information recorded in medical records should serve as a basis for analyzing the population's health situation, favoring the structuring of actions aimed at each public, in addition to providing information to the Ministry of Health31.

In the interviewed sample, it was noted

that a large portion, about 81%, used pharmacological treatment to treat obesity. According to the most recent Brazilian Obesity Directive4, pharmacological treatment is adjuvant to lifestyle change therapies through nutritional guidance and physical activity and this should not be used as treatment in the absence of the others. Thus, it becomes relevant to note that a much smaller percentage of interviewed individuals reported monitoring with a nutritionist (19%) and regular physical exercise (38%). These findings indicate the need for actions in primary and secondary health care to reinforce therapies related to changes in lifestyle with regard to obesity.

The interview with the volunteers revealed that 88% of the patients were on some type of diet. However, it is worth mentioning that the diet guided by a nutritionist was practiced by a minority of the sample, which indicates that the other participants adhered to diets without any professional guidance, following the various trending diets available on social media. The main fad diets carried out in this study were soup, moon diet and point diet, as observed in our study. A similar result was observed by Araújo et al.32 who observed a great influence of popular diets on the eating habits of individuals with overweight and obesity.

Dieting and physical exercise have been indicated as the first line of treatment for obesity within the public system. However, for a large number of individuals with morbid obesity, attempts at lifestyle changes culminate in recurring failures. In these cases, the failure of the numerous treatments used and weight fluctuation, aggravate the clinical picture. Thus, in the organization of care for patients with obesity, bariatric surgery should be a therapeutic resource offered by the Specialized Hospital Care services, after the failure of previous treatments in the areas of Primary Care and Specialized Outpatient Care8.

In the study conducted by Leão et al.33 with patients seen at an outpatient clinic, 22.9% of the sample did not have strategies for weight loss. The same author pointed out that 20.8% had reported guidance by a nutritionist, corroborating the result found in our study, which was 19%. National and international guidelines suggest that professional guidance for weight loss is a motivating factor for changing behavior and lifestyle habits. The Brazilian Obesity Directive4 reinforces that frequent contact with professionals and their time spent with the patient help in weight loss and in maintaining behavioral changes in lifestyle.

In the present study, 87% of the sample had been followed by primary care for 2 years or more, and as previously described, they had a morbid obesity profile and a high risk of comorbidities and cardiovascular disease. Thus, it is noted that the indication criteria for performing bariatric surgery were met, such as a minimum of two years of clinical protocols and follow-up in Primary Care and/or Specialized Outpatient Care, as well as BMI values and the presence of comorbidities that increase cardiovascular risk8.

However, an important point of emphasis in the clinical follow-up of patients with obesity refers to the degree of motivation for behavioral change to promote weight loss. According to a systematic review published by Cochrane, despite limited evidence on the use of the trans-theoretical model in weight loss interventions, when it is associated with interventions for lifestyle changes (diet guidelines and/or physical activity), there is still evidence of better eating habits and physical activity, but it still needs to be confirmed with randomized clinical studies20.

The trans-theoretical model has been

applied in scientific research and in clinical practice to classify individuals in stages of motivation to change dietary behavior, which allows targeting strategies for each of the stages, in order to stimulate the desired behavior modification and promote weight loss20,34,35. Despite not being a validated questionnaire, it has been indicated by the Ministry of Health within the strategies of primary care given to individuals with chronic diseases and obesity8.

In this study, it was noted that the maintenance stage was observed in 25% of the sample, which indicates incorporation of dietary changes for more than six months. However, most are in the action phase (56%), which indicates that eating behavior has been incorporated for less than six months. This result suggests and reinforces the possible fluctuations observed in eating behavior during the clinical treatment of obesity. In general, it is observed that individuals in the most advanced stages of motivation for behavior change, that is, in the maintenance and action stages, have healthier eating practices and greater awareness of health practices36.

It was possible to observe results similar to those in the study by Sbrocco et al.37, in which the action phase was present in 47% of obese women participating in a program for weight control. These results and the findings of our study may indicate that individuals in the action stage are the most likely to seek treatment, with changes already made in eating behavior33,37,38.

The motivation to adhere to changes in lifestyle, including eating habits, is the great challenge faced by health professionals involved in the treatment of obesity. The Ministry of Health itself endorses, among the strategies for the care of people with chronic diseases such as obesity, that methods should be used to identify the stage of motivation for behavioral change in lifestyle and weight loss8.

The change in habits in the preoperative period is pointed out by Andrade and Lobo39 as the main goal to be achieved, since, according to the authors, it would facilitate the acceptance of the postoperative diet and reduce the chances of complications. The change in the dietary profile and a more active routine have been identified as responsible for the improvement of the metabolic profile observed in patients after surgery39,40.

Although dietary changes have already been identified by classifying the stage of behavior change by applying the trans-theoretical model, the investigation of dietary changes already carried out or with the intention of being carried out reveals that some eating practices still need to be achieved (Figure 3). As an example, the consumption of whole grains, reduction in the consumption of salt, increase in the consumption of fruits, less consumption of sweets and sugar, the need to control the amount or desire to eat are still practices that need to be achieved by most respondents. These results reinforce the need for constant monitoring by nutritionists and even a multidisciplinary team in the preoperative phase of bariatric surgery.

This study has limitations due to the difficulty of reaching a more representative sample of the population referred for bariatric surgery in the municipality of Diadema, which was justified by the high rate of loss during the in-person interview. The absence of complete records in the electronic medical record and the adoption of systematization, through well-defined technological resources, also limited the complete analysis of the sample of individuals recruited by the electronic system.

CONCLUSION

The present study showed that the individuals in this sample have an anthropometric profile and risk of comorbidities that meet the criteria for indication for bariatric surgery. It was noted that the vast majority of respondents adopted other previous resources for weight reduction, mainly pharmacological therapy and adherence to trending diets. Regarding the motivational stage for behavior change, most patients were in the action stage, which indicates that clinical monitoring in specialized care should still be encouraged to consolidate lifestyle changes in order to achieve better results in the postoperative period of bariatric surgery.

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