

Weight regain after Bariatric Surgery increases the request for Traditional Chinese Medicine Results from the cross-sectional BARBQTCM survey

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Research

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Abstract

Background: To investigate patient attitudes towards Traditional Chinese Medicine (TCM) after bariatric surgery with special emphasis on postoperative weight regain (WR).

Methods: We retrospectively compared experiences with Complementary Additive Medicine (CAM) and the desire for additional TCM between patients with stable weight (SW) and WR by means of the disease-specific BARBQTCM survey during postoperative follow-up in a single bariatric center.

Results: Out of 467 participating patients, 150 (32.1%) had WR after bariatric surgery. Median age was 49 years and 78.4% of the patients were female. 233 patients (49.9%) had already had experience with CAM and 125 (26.8%) with TCM. 381 patients (81.6%) were interested in using TCM at the time of the survey. Acceptance of TCM was lower in men (OR 0.35, $P < 0.01$) and decreased with age (OR 0.95, $P < 0.001$). Overall, the request for TCM was lower in the SW cohort compared to the WR group (77.3% versus 90.7%; OR 0.29, $P < 0.01$). There was a positive correlation between preoperative experience with CAM and postoperative request for TCM (OR 5, $P < 0.001$). The proportion of patients who were interested in outpatient TCM twice or more monthly was higher in patients with WR than in those with SW (94.0% versus 84.2%, $P < 0.01$).

Conclusions: The overall acceptance of CAM and TCM was high in our bariatric surgical patients. WR increased the rate of acceptance of TCM. We conclude that CAM and TCM should be offered during postoperative follow-up after bariatric surgery as part of an integrative medical approach.

Background

Obesity is a disease that has reached pandemic proportions around the world. It is a risk factor for heart disease, diabetes mellitus, liver and joint disorders, cancer and social & mental disorders commonly known as Psycho-Social Metabolic Syndrome (PSALMS). The World Health Organization estimates that 1.9 billion adults worldwide are overweight with a body mass index (BMI) greater than 25 kg/m² and 650 million are obese with a BMI more than 30 kg/m² (1).

Surgical treatment of overweight patients has clear advantages over any other conventional treatment approaches (2). Unfortunately, a large number of patients who have lost weight after bariatric operations regain weight in the long term (3). There are various medical, behavioral, surgical and endoscopic options that can be used to effectively tackle weight regain (WR) (4-6). Before the decision to offer surgery is made, various treatment options are first attempted, including medical weight loss regimens, nutritional counseling, and psychiatric evaluation (7).

Complementary and traditional medicine have been a topic of discussion in some regions of the western hemisphere whether it is esoteric or evidence-based.

David L. Sackett, the founder of the modern "Evidence-based Medicine (EbM)" underlined three essential cornerstones of EbM: (1) relevant external scientific evidence in combination with (2) patients' values and preferences leading to (3) solid internal clinical experience and vice versa. Meta-Analyses and Systematic Reviews (MASR) achieve the highest level of scientific evidence according to the requirements of the Scottish Intercollegiate Guidelines Network (SIGN).

A review of the recent English scientific literature concerning "obesity," "acupuncture" and "acupressure" revealed 11 MASR (8-16) and another 6 MASR when searching for "obesity" and "Traditional Chinese Medicine (TCM) herbal therapy" (17-22). Although all 17 meta-analyses found positive and significant effects of acupuncture and TCM herbs on weight loss compared to placebo and lifestyle modification alone in non-surgical patients, it is not clear whether Complementary Additive Medicine (CAM) and TCM can contribute to weight stabilization after bariatric surgery (23).

According to the EbM concept of Sackett, TCM has been proven to have a broad-based cornerstone of relevant external evidence to support its use in the field of weight control and obesity. In view of a generally growing acceptance of CAM and TCM (24), in this study we wanted to gain insight into patient attitudes toward CAM and TCM after bariatric interventions, especially in those with WR.

We hypothesized that patients with a secondary increase in weight may be more interested in TCM therapy than patients who retain a stable weight. We therefore compared experiences with CAM and the desire for a complementary TCM treatment between patients with stable weight (SW) and patients who experienced weight regain (WR) during postoperative follow-up period.

To the best of our knowledge, this is the first study to investigate CAM and TCM preferences of obese and overweight patients after bariatric surgery using a disease-specific questionnaire.

Methods

This is a retrospective single-center sub-analysis of the prospectively-collected multi-center BARBQTCM survey (BARiatric Basic Questionnaire for Traditional Chinese Medicine). The anonymous BARBQTCM questionnaire is a self-rated 7-item disease-specific inventory focussing on overweight, obesity and PSALMS. It includes demographic parameters, former treatments for obesity, prior experience with CAM, request for TCM therapies, disease-specific complaints that patients would treat with TCM, frequency with which patients would visit a TCM outpatient clinic per month, and the amount of money patients would be willing to spend per month for TCM therapies (Supplementary Materials). We analyzed the data from the Center for Bariatric Surgery, Bern, Switzerland. We received permission from the ethics committee (EK-Nr E17-N01-02) to perform the study. It was conducted according to the criteria of Good Clinical Practice, as edited by the Medical Faculty of the Sigmund Freud University in Vienna and the Declaration of Helsinki of 1964, updated in Fortaleza, Brasil 2013.

Inclusion criteria were age over 18 years and treatment at an outpatient obesity center. Exclusion criteria were patients who did not have bariatric surgery, missing information about surgical intervention, and

missing information about post-operative weight course.

We defined WR as a secondary weight gain of more than 10 kg after bariatric surgery. Our primary outcome was the correlation between WR and the request for support by TCM. In addition, we analyzed differences between patients who had WR and those without WR.

The dataset was analyzed using a combined script written in Perl (Larry Wall and Mike Loukides. 2000. Programming Perl. O'Reilly & Associates, Inc., USA.), Python (Python Software Foundation. Python Language Reference, version 2.7. <http://www.python.org>) and R (R Core Team (2017), R Foundation for Statistical Computing, Vienna, Austria, <https://www.R-project.org/>). The descriptive analysis was followed by assessing the statistical differences between both groups. This was performed using the Kruskal-Wallis test for continuous variables and Chi-square test for discrete variables. We considered results as statistically significant if P was less than 0.05. Numerical variables are given as median and 95% Confidence Interval (95% CI) and categorical variables as numbers and percentages. In the percentages, we deducted missing information from the denominator throughout. Variables which yielded a statistically significant difference were then analyzed using multi- and univariate logistic regression (including stepwise regression) for their correlation with WR.

Results

500 patients completed the BARBQTCM questionnaire. We excluded 33 patients (6.6%) who did not undergo surgery (n=10), indicated no details about the surgical intervention (n=3), and/or did not give information about post-operative weight course (n=20), leaving 467 patients for final analysis.

317 patients (67.9%) were satisfied with a SW course after the initial postoperative weight loss, whereas 150 patients (32.1%) suffered from a secondary WR. Median age was 49 years old, and 78% of the participants were female; this was not significant between the two groups (Table 1). Median BMI at the time of survey was higher in the WR cohort compared to the SW group (32kg/m² versus 29kg/m², respectively, P<0.001) as presented in Table 1.

Prior to the survey, patients with WR had taken more weight loss drugs than those with a stable weight (68.7% versus 46.7%, respectively, P<0.001; Table 1). Half of the WR patients had prior experience with CAM and one third of patients tried out TCM in the past. There was no significant difference in both study cohorts concerning CAM experience (Table 1).

Out of 389 patients (389/467: 83%) who underwent a single bariatric surgery, most patients underwent a roux-en-Y gastric bypass (RYGB; 269/389: 69.2%) or sleeve gastrectomy (SG; 59/389: 15.1%). A minority underwent gastric banding (GB; 41/389: 10.5%) followed by One Anastomosis Gastric Bypass (OAGB; 19/389: 4.9%) and one biliopancreatic diversion. Another 78 patients (78/467: 16.7%) had undergone multiple bariatric procedures including conversion surgery and additional endoscopic suturing and gastric balloon application. Of the patients with two or more bariatric interventions, the majority (52/78: 66.6%) were part of the WR cohort (P<0.001). Within the other surgical groups (GB, SG, OAGB, RYGB) the

proportion of SW patients was over 50% (52.4%, $P<0.01$; 93.2%, $P<0.001$; 68.4%, NS; 74.7%, NS; respectively) as presented in Figure 1.

At the time of the BARBQTCM survey, 233 patients (49.9%) have had prior experience with CAM. Most popular complementary methods included TCM (acupuncture and phytotherapy: 26.8%), homeopathy (22.9%) and body detox programs (14.3%). The complete CAM portfolio is presented in Table 1. There was a strong positive correlation between preoperative CAM experience and postoperative request for TCM (OR 5, $P<0.001$).

The vast majority of the survey participants (381/467: 81.6%) were open to using TCM (Table 2). Overall, request for TCM was higher in the WR group (136/150: 90.7%) than in the SW group (245/317: 77.3%; $P<0.001$). Of the TCM treatments offered, WR patients were more open to using TCM patient training, acupressure, acupuncture and herbal therapy more frequently than SW patients ($P<0.01$, respectively, Table 2). The interest in TCM was lower in males (OR 0.35, $P<0.001$) and decreased with older age (OR 0.97, $P<0.01$, data not shown). Acceptance rate of TCM was higher in patients who had already previously used CAM (OR 4.8, $P<0.001$), as well as in those having used movement therapy (OR 1.96, $P<0.01$), diet (OR 4.4, $P<0.001$) and detox treatments (OR 3.67, $P<0.05$) for weight loss (data not shown). Patients having no experience with CAM were more likely to refuse TCM as an additional treatment option (OR 0.21, $P<0.001$).

More than half of the BARBQTCM participants suffered from weight problems (62.5%) followed by fatigue (58.7%), sleep disorders (53.5%) and pain in the joints and bones (52.2%). A subgroup comparison revealed significant differences between the TCM usage of WR patients compared to the SW cohort regarding weight problems (83.3% versus 52.7%: $P<0.001$), fatigue (66.7% versus 54.9%: $P<0.05$), cravings (63.3% versus 39.1%: $P<0.001$), bone and joint pain (60.7% versus 48.3%: $P<0.05$) and lethargy (53.3% versus 42.3%: $P>0.05$). The complete range of disorders and complaints is presented in Table 2.

Out of all BARBQTCM participants, 49 patients (10.5%) refused outpatient TCM treatment. The vast majority reported interest in visiting a TCM outpatient clinic one to two times per month (61.2%). 61 patients (13.1%) reported interest in visiting a TCM ward less than once per month and 37 patients (7.9%) would go three or more times a month. 281 patients with SW (88.6%) and 137 patients with WR (91.3%) stated that they wanted to receive outpatient TCM treatment (Figure 2). When comparing both study cohorts, more SW patients were interested in outpatient TCM treatment once per month on average (≤ 1 monthly: 53.9% versus 45.3%, NS) whereas more WR patients were interested in visiting the TCM outpatient clinic two or more times monthly (≥ 2 monthly: 26.5% versus 40.7%, $P<0.01$) as presented in Figure 2.

Half of the surveyed patients (54.8%) would spend up to 100 Swiss Francs (CHF) and one fifth of the study participants (19.3%) would even spend 101 to 200 CHF for TCM therapies. 68 patients (14.6%) were not willing to spend money on TCM. Comparing the study groups, more SW patients were interested in spending 1 to 50 Swiss Francs for TCM treatment (1-50 CHF monthly: 18.6% versus 16.0%, NS)

whereas WR patients were interested in spending a larger amount of money (51-200 CHF monthly: 53.3% versus 62.7%, NS) as shown in Figure 3.

Among all BARBQTCM participants, the request for TCM correlated with the acceptance of outpatient TCM treatment once a month (OR 4.43, $P < 0.001$), and to the willingness to pay for the treatments up to 200 Swiss Francs per month (0 CHF: OR 0.3, $P < 0.001$; 1-50 CHF: OR 3.6, $P < 0.05$; 51-100 CHF: OR 7.9, $P < 0.001$; 101-200 CHF: OR 8.3, $P < 0.01$; >200 CHF: OR 0.47, $P = 0.4$).

Discussion

In the present study, we aimed to analyse the importance of CAM and TCM for overweight and obese patients after bariatric surgery. The main finding of our study is that patients who had undergone bariatric surgery were highly interested in TCM (82%), and those who experienced WR were even more so (91%). To our knowledge, the desire for CAM and TCM in this clinical scenario of patients after bariatric surgery has not yet been described in literature.

In the BARBQTCM survey, TCM and acupuncture use was reported in 27% of patients in the SW group and in 33% in the WR patients. Interest in TCM exceeded 80% which is much higher than 2% of surveyed patients using acupuncture in the National Health Interview Survey (NHIS) 2002 and 2012 (24). Comparable rates of TCM herbal use (obese women: 26.2%) were reported from a survey in Taiwan prior to professional obesity treatment (25). In contrast to our data, two NHIS analyses of more than 31 000 adults in the USA found that obesity correlated with reduced usage of CAM therapies (OR 0.83 and 0.82, $P < 0.0001$). Yoga (OR 0.35, $P < 0.0001$), tai qi (OR 0.59, $P < 0.05$) and even acupuncture (OR 0.56, $P < 0.05$) were utilized less frequently by obese patients (26, 27). One could argue that TCM is more common in eastern countries compared to western countries. On the other hand, another NHIS analysis investigated CAM use among 15 400 people with chronic diseases in the USA (28), including hypercholesterolemia, hypertension, diabetes and obesity (i.e. PSALMS). Nearly two thirds of the survey participants had more than one comorbidity. Of that cohort, up to 30% of participants used CAM, which is nearly equal to the findings from the BARBQTCM survey. Summing up findings from that analysis and the BARBQTCM survey, CAM is a viable and accepted treatment option for at least one third of obese patients with a concomitant PSALMS including multiple chronic complaints.

The BARBQTCM single-center analysis gives insight about patients with WR after bariatric surgery, which comprises at least one third of our survey participants. Gastric bypass (RYGB and OAGB) had acceptable WR rates and sleeve gastrectomy (SG) achieved best weight loss results in the BARBQTCM cohort. Patients with a history of multiple revisional bariatric procedures reached WR rates of 67%. In addition, we found that gastric banding (GB) was the index operation most frequently followed by WR. Our observation does not coincide with results from a study by Courcoulas et al. who did not observe higher WR after GB compared to RYGB or SG during a seven to 10 year follow up (29, 30). In contrast to those findings Baig et al. reported the highest WR proportion after SG (35%), followed by RYGB (15%) and OAGB (3%) in a large cohort of more than 9600 indians (31). Clapp et al. confirmed a WR rate of 28%

after SG at 7-year follow up (32). The lack of knowledge of the time between surgery and our survey might have influenced the percentages of patients who have regained weight in the different intervention groups. Since SG is a novel intervention that has been introduced more recently in our center and the other interventions are “older,” it is possible that SG patients have not yet had the time to regain weight. This could also explain why patients with several bariatric procedures had more weight regain, since 88% of these patients initially had a GB, the oldest intervention, that was removed followed by a conversion to another procedure.

In general, revisional bariatric surgery is associated with high complication and readmission rates and a greater overall morbidity as revealed in a MBSAQIP (Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program) database analysis of more than 2700 conversion procedures (33). Another multicenter study experience revealed WR in one quarter of RYGB patients, who were treated with endoscopic transoral outlet reduction. Those revisional procedures resulted in chronic pain in 18% of patients, nausea in 14%, and repeat endoscopic procedures in 8% of patients (34). In this context, one could imagine the difficult situation chronic overweight patients are in, after already having undergone multiple procedures, and being open to alternative medical treatments. The willingness to accept CAM and TCM might have been influenced by previous positive experiences with the respective treatments, since we found a correlation between postoperative willingness for CAM or TCM and preoperative usage.

In the scientific literature, acupuncture has been shown to be effective in treating different addictions. There exist 11 MASR on the treatment of food addiction and obesity by acupuncture (8-12, 14-16, 23, 35), which underline that body acupuncture should be combined with lifestyle modifications such as diet and exercise and with other therapy variations including ear acupuncture, electroacupuncture and acupressure to improve outcome. A recent network meta-analysis of 2283 patients from 34 trials emphasized the superiority of the combination of TCM therapies over placebo, pharmacotherapy and life style modification alone for both body weight and BMI reduction (15). Furthermore, phytotherapy has been shown to interact with pathophysiological hunger pathways (36). These findings are verified by another 6 MASR (17-22). All 17 MASR report significant body weight and BMI reduction with a high procedure safety and low adverse events. Nevertheless, they conclude that findings have to be treated with caution due to data heterogeneity and unclear and high risk of bias.

A weak point of our work is that there were many confounding factors in the survey. We found that previous experiences with CAM and TCM increased the request for TCM. However, since there was also an interest in CAM in patients without WR, other factors such as satisfaction with weight, satisfaction with ones' body image and other factors could have influenced their response.

We also consider the definition of the weight regain of 10 kg to be a weak point of the study. There are currently various measures of weight regain that might be assessed and that might be more accurate (3). A more precise documentation of the weight course could have examined whether there is a correlation between the amount of WR and the request for CAM or TCM.

As already mentioned, the questionnaire did not include information about the time between surgery and our survey. It would be interesting to investigate if there was a correlation between desire to benefit from CAM or TCM and the time from surgery.

Due to the unicentric setting, it is not clear whether our results can be transferred to other populations. However, the results of the entire BARBQTCM trial including 5000 patients from Austria, Germany and Switzerland will reveal if patients in the respective countries have similar attitudes towards CAM and TCM.

Despite these limitations, we believe our data to be informative and convincing given the large number of included patients treated by one medical team, thereby reducing influencing factors from medical treatments, thus allowing for robust statistical results.

Conclusions

We were able to show that TCM might play a crucial role in the weight management of obese patients who have undergone bariatric surgery. We also found that overall willingness to attend outpatient TCM sessions was high, and even higher in patients with WR. The extent of the benefit of such multimodal therapy regimens on weight loss outcomes is yet to be determined.

In the context of EbM, external scientific evidence and patients' preferences definitively support an integrative medical approach, combining conventional and complementary medicine in the struggle against the world's most heavyweighted pandemic. We want to stress our conclusion that multicenter network research with standardized programs and the acquisition of longterm results will establish and consolidate the third cornerstone of Evidence-based Medicine, which contributes to a solid internal clinical experience.

Declarations

Ethics approval: We received permission from the ethics committee (EK-Nr E17-N01-02) to perform the study.

Consent for publication: not applicable.

Availability of data and materials: not applicable.

Competing interests: The authors have no competing interests to declare.

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data collection. CT, JZ and PP were major contributors in developing and revising the manuscript. SR, JZ and PP developed the project and monitored the course of the study. PP is the guarantor.

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Tables

Table 1: Demographic data, Conservative and Complementary Additive Medicine (CAM) treatment

BARBQTCM participants	Overall (n=467)	Stable Weight (n=317)	Weight Regain (n=150)	P - value
<i>Patient Characteristics</i>				
Female gender	362 (77.5%)	243 (76.7%)	124 (82.7%)	NS
Age‡ (years)	49 [24-70]	49 [23-70]	49 [29-70]	NS
BMI** (kg/m ²)	30 [21-44]	29 [21-45]	32 [24-44]	<0.001
<i>Conservative Weight Loss treatment</i>				
Nutrition counselling	434 (92.9%)	293 (92.4%)	141 (94.0%)	NS
Dietary intervention	405 (86.7%)	266 (83.9%)	139 (92.7%)	<0.05
Movement therapy	257 (55.0%)	174 (54.9%)	83 (55.3%)	NS
Weight loss drugs	251 (53.7%)	148 (46.7%)	103 (68.7%)	<0.001
Psychotherapy	94 (20.1%)	60 (18.9%)	34 (22.7%)	NS
Hypnosis	34 (7.3%)	24 (7.6%)	10 (6.7%)	NS
<i>Experience with CAM**</i>				
TCM***	125 (26.8%)	76 (24.0%)	49 (32.7%)	NS
Homeopathy	107 (22.9%)	71 (22.4%)	36 (24.0%)	NS
Detox treatment	67 (14.3%)	41 (12.9%)	26 (17.3%)	NS
Metabolic Balance	56 (12.0%)	42 (13.2%)	14 (9.3%)	NS
Colonic Irrigation	12 (2.6%)	7 (2.2%)	5 (3.3%)	NS
Other CAM therapies	14 (3.0%)	9 (2.8%)	5 (3.3%)	NS
No CAM Experience	234 (49.9%)	159 (50.2%)	75 (50.0%)	NS

‡ Data are medians with 95% CI in parentheses. * BMI: Body Mass Index, **CAM: Complementary

Additive Medicine; ***TCM: Traditional Chinese Medicine: Acupuncture and herbal therapy

Table 2: TCM treatment options and Patients' complaints to be treated with Traditional Chinese Medicine (TCM)

BARBQTCM participants	Overall (n=467)	Stable Weight (n=317)	Weight Regain (n=150)	P - value
<i>TCM* treatment options</i>				
TCM Acceptance total	381 (81.6%)	245 (77.3%)	136 (90.7%)	<0.001
Acupressure	261 (55.9%)	156 (49.2%)	105 (70.0%)	<0.001
Acupuncture	256 (54.8%)	148 (46.7%)	108 (72.0%)	<0.001
TCM diet counselling	230 (49.3%)	149 (47.0%)	81 (54.0%)	NS
Herbal therapy	195 (41.8%)	119 (37.5%)	76 (50.7%)	<0.01
TCM cooking course	192 (41.1%)	124 (39.1%)	68 (45.3%)	NS
TCM patient training	172 (36.8%)	100 (31.5%)	72 (48.0%)	<0.001
<i>Patients' complaints to be treated with TCM</i>				
Weight problems	292 (62.5%)	167 (52.7%)	125 (83.3%)	<0.001
Fatigue	274 (58.7%)	174 (54.9%)	100 (66.7%)	<0.05
Sleep disorders	250 (53.5%)	160 (50.5%)	90 (60.0%)	NS
Bone & Joint Pain	244 (52.2%)	153 (48.3%)	91 (60.7%)	<0.05
Cravings	219 (46.9%)	124 (39.1%)	95 (63.3%)	<0.001
Lethargy	214 (45.8%)	134 (42.3%)	80 (53.3%)	<0.05
Digestive Problems	193 (41.3%)	126 (39.7%)	67 (44.7%)	NS
Depression	169 (36.2%)	105 (33.1%)	64 (42.7%)	NS
Skin problems	169 (36.2%)	111 (35.0%)	58 (38.7%)	NS
Hot flashes	164 (35.1%)	106 (33.4%)	58 (38.7%)	NS
Hair loss	164 (35.1%)	105 (33.1%)	59 (39.3%)	NS
Sweats	148 (31.7%)	95 (30.0%)	53 (35.3%)	NS
Flatulence	140 (30.0%)	91 (28.7%)	49 (32.7%)	NS
Loss of Libido	126 (27.0%)	71 (22.4%)	55 (36.7%)	<0.01
Diabetes mellitus	94 (20.1%)	56 (17.7%)	38 (25.3%)	NS
No TCM treatment	59 (12.6%)	50 (15.8%)	9 (6.0%)	<0.01

*TCM: Traditional Chinese Medicine

Figures

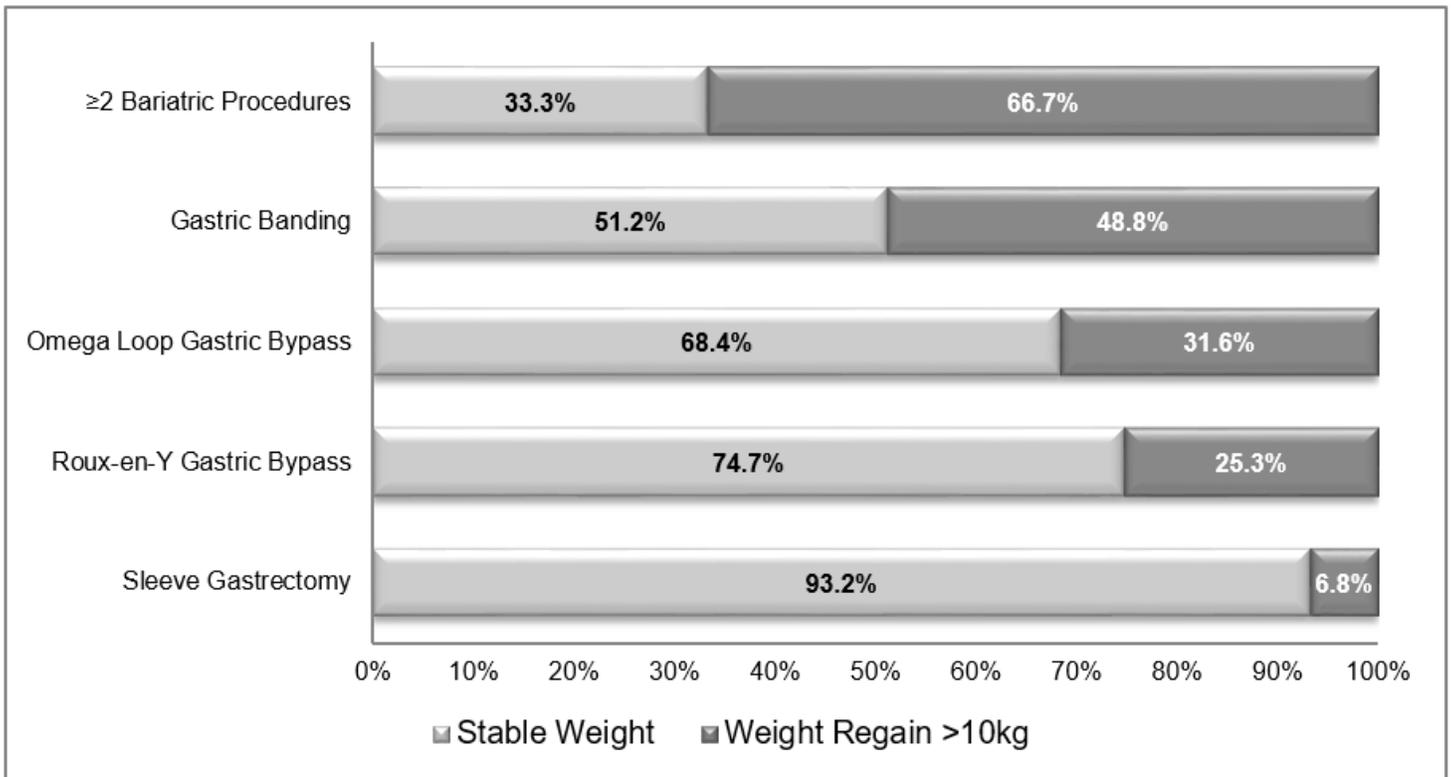


Figure 1

Weight Regain rates after diverse bariatric procedures

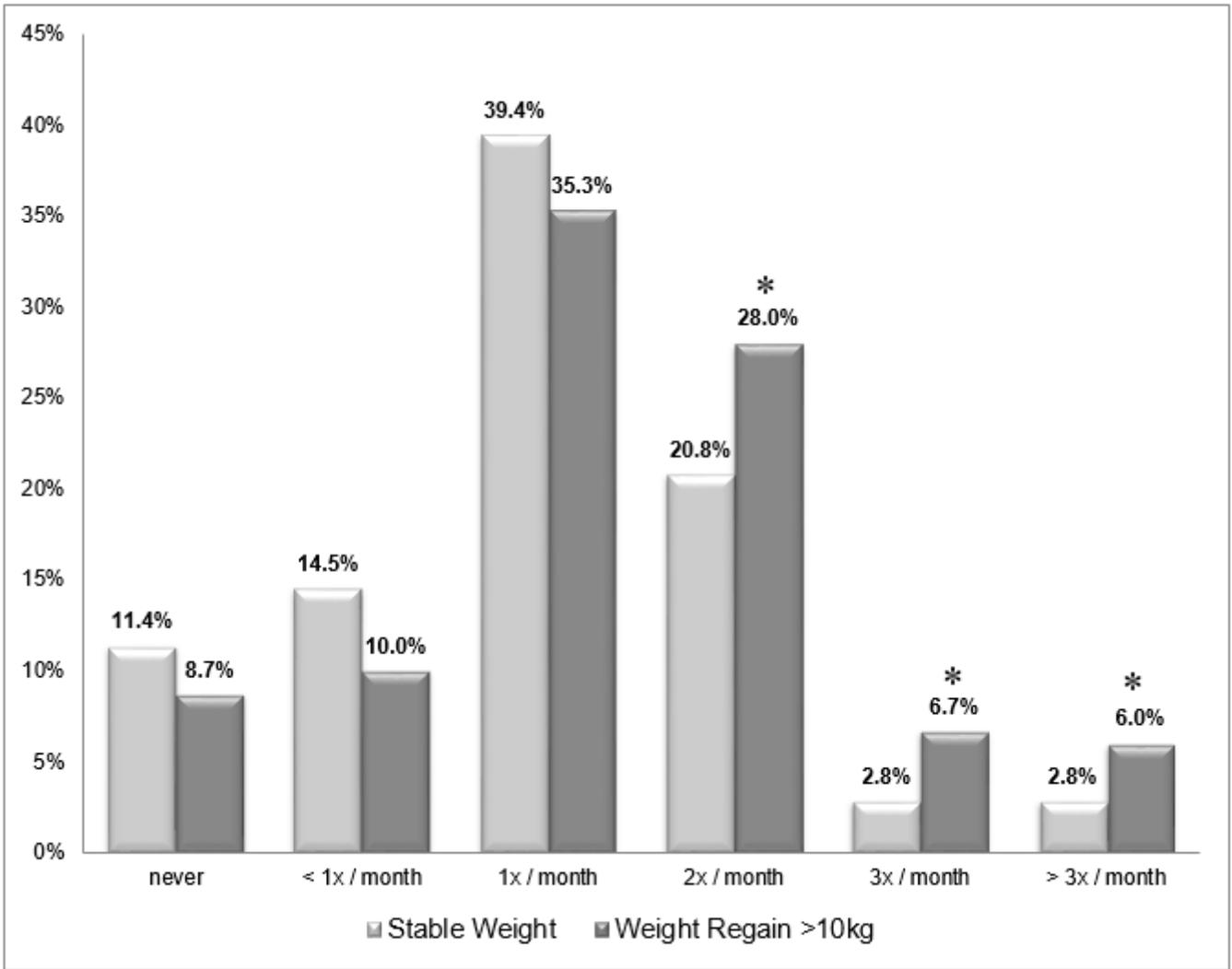


Figure 2

Frequency of visits to a TCM outpatient clinic (*more WR patients were interested in visiting the TCM outpatient clinic two or more times monthly, $P < 0.01$, respectively; the other differences between the two cohorts were not significant)

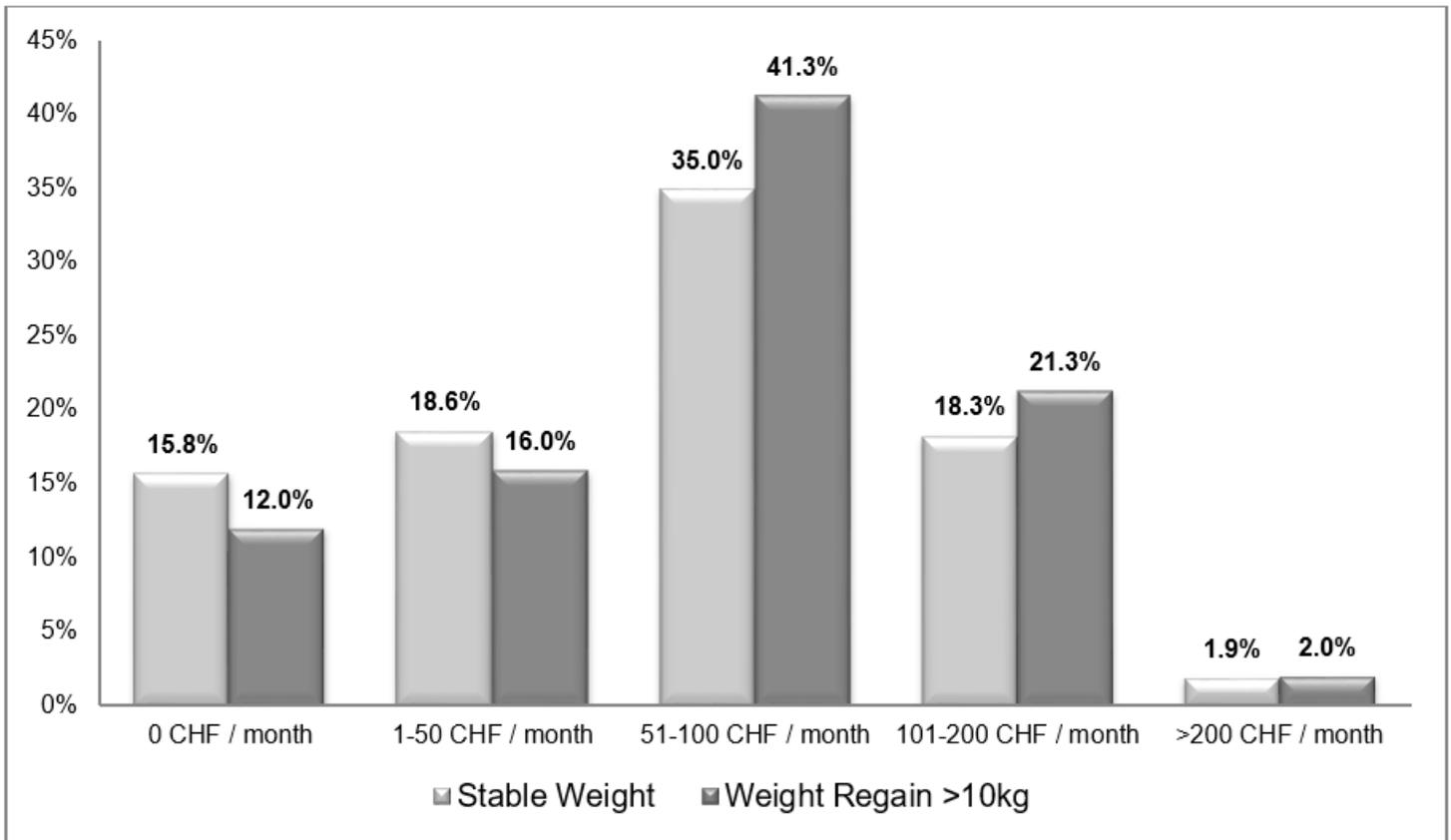


Figure 3

Amount of Swiss Francs (CHF) that patients were willing to pay monthly for TCM (Differences between the two cohorts were not significant)