Assessment of factors influencing consultations after bariatric surgery

Abstract. Background. Bariatric surgery programs are recognized as the best alternative for patients with severe obesity. Many studies conclude that bariatric surgery programs that include these pre- and postoperative consultations (PPC) by the multidisciplinary team have better overall outcome. The purpose of the present study was to evaluate factors that affect PPC during a bariatric surgery program in Mexico and assess the possible impact on the patients’ post-operative course. Materials and methods. In accordance with the the International Federation for the Surgery of Obesity and Metabolic Disorders guidelines, all patients included were between 18 and 65 age when bariatric surgery was performed. Preoperative assessment of patient eligibility for bariatric surgery included consultation with the main surgeon, a dietician, an internist, and a psychologist. If non-eligible cases were detected, these issues were addressed and fully treated before surgery was considered. Results. A total of 110 patients were included in this study. Eighty-one (74 %) patients were women and 29 (26 %) were men. We observed that women had significantly more consultation attendance than men (54.3 % versus 24.1 %, p = 0.005). Patients with higher initial BMI had significantly more consultation attendance than those with lower BMI (42.9 kg/m$^2$ versus 38.6 kg/m$^2$, p = 0.007). When consultation attendance was evaluated according to occupation, teaching workers had significantly (p = 0.003) more consultation attendance (71.4 %) while the students group had less consultation attendance (0). Patients who had higher percentage of excess of weight loss (EWL) had significantly more general, medical, nutritional and psychological consultation attendance than those with lower percentage of EWL (p = 0.04, p = 0.032, p = 0.039 and p < 0.001). Conclusions. Consultation attendance with the multidisciplinary team is associated with better outcomes after bariatric surgery. “Nonattending” patients are at least partly responsible for any suboptimal results observed. Although this is certainly a factor for some patients, many other non-dependent reasons, such as cultural, social, economic or motivational reasons can also affect the loss of consultations in other patients. Keywords: bariatric surgery; consultation attendance; multidisciplinary team; assessment of factors

Introduction
Overweight is recognized as one of the most important challenges in public health sector worldwide, as the number of people affected with obesity is increasing day by day. This has a negative effect on society as it burdens the health care system. Obesity is a chronic, metabolic disease with multifactorial causes, such as hyperphagia, bad eating habits, sedentary lifestyle, genetics and socio-cultural factors [1].

Bariatric surgery programs are recognized as the best alternative for patients with severe obesity. Patients who choose to have bariatric surgery are not only more positive in their attitude towards life after the surgery but also more inclined to achieve the results of surgery [2]. In addition to bariatric surgery, a number of nonsurgical and psychological interventions are shown to play an important role in achieving its long-term results. Many studies conclude that bariatric surgery programs that include these pre- and postoperative consultations (PPC) by the multidisciplinary team have better overall outcome [3–5].

The purpose of the present study was to evaluate factors that affect PPC during a bariatric surgery program in Mexico and assess the possible impact on the patients’ post-operative course.

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Material and methods

Study Design

A retrospective cohort study was performed in patients who underwent bariatric surgery at Bariatric and Metabolic Surgical Center at Boca del Río, Veracruz, Mexico, between January 2018 and April 2019. The study was approved by ethics committee. Data analysis was performed between March 2020 and April 2020. The procedures included in this analysis were sleeve gastrectomy, one anastomosis gastric bypass and single anastomosis sleeve ileal bypass. The patients were divided in two groups, those who attended PPC those who did not. Both groups were compared with different pre- and postoperative variables, with the primary outcome the percentage of excess of weight loss (percentage of EWL) and quality of life.

Patients

In accordance with the guidelines of the International Federation for the Surgery of Obesity and Metabolic Disorders, all patients included were between 18 and 65 age when bariatric surgery was performed. The criteria to perform the bariatric surgery were BMI ≥ 40 kg/m², BMI between 30 and 35 kg/m² with comorbidities or BMI ≥ 30 kg/m² with uncontrolled diabetes mellitus. All patients who did not complete at least 1 year of follow-up and those who underwent a revisional bariatric surgery were excluded from the analysis. Follow-up data were obtained from measurements recorded in the electronic health records during the follow-up from January 2018. Preoperative assessment of patient eligibility for bariatric surgery included consultation with the main surgeon, a dietician, an internist, and a psychologist. If non-eligible cases were detected, these issues were addressed and fully treated before surgery was considered.

Based on main surgeon’s experience and general guidelines, advice was given to the patients concerning the choice for which bariatric operation was selected. In our center, PPC were free of charge before the surgery and one year after the surgery. PPC were performed both physical and virtually. Recommendations were given to attend physical consultations, however, when patients were not able to attend them, we offered online interventions, using instruments such as phone calls or webinars. During the preoperative education and consent processes, patients were informed that PPC were important and a requirement for our approach to patient care and factors related to success in the process. All patients were encouraged to read the information posted on our webpage that included illustrated and video explanations of the surgery, preoperative and postoperative process, expectations, complications, diets and section of “frequently asked questions”. After the initial information, all the patients had to meet the main surgeon, dietitian, psychologist and internal medicine specialists, in some cases, patients were referred to cardiologist, endocrinologist, endoscopist, psychiatrist or nephrologist. The initial consultation was carried out by the main surgeon and was oriented to detect comorbidities, risk factors for surgery and the appropriate procedure required for each case. It also included a session to respond to specific questions to understand the expectations of the program. The initial consultation by dietitian provided the preoperative diet and assessed the alimentary habits, food allergies and anthropometric measurements of the patients. During the initial psychological consultation, mental and emotional status of the patients were evaluated, psychological questionnaires were applied based on Beck’s depression inventory and Hamilton’s anxiety scale, and the quality of life was assessed through Bariatric Analysis and Reporting Outcome System (BAROS). Consultation by internal medicine specialist was carried out several weeks before surgery or the day prior to surgery for patients without major comorbidities. It had the intention to detect comorbidities that contraindicate the surgery or give perioperative recommendations. Postoperative medical consultations were scheduled at 24 and 48 h, 1 week, 1, 2, 6, 9 and 12 months. Nutritional consultations were scheduled at 1 and 2 weeks, and 1, 2, 4, 6, 8, 10 and 12 months with psychological consultations given at 24–48 h and 1, 3, 6, 9 and 12 months. In some cases, it was necessary to schedule extra consultations depending of the patient’s demand. Patients were highly encouraged to attend initial postoperative consultations to estimate the presence of comorbidities, complaints, medications adjustment and strict diet adherence. During the following postoperative consultations chronic comorbidities were evaluated, the diet of the patient was individualized according to his motivations and any self-sabotage conducts, adaptation and emotional concerns were approached.

Definition of attendance

In order to detect consultation attendance, in bariatric surgery, some publications have considered, mostly arbitrarily, the number of appointments that the patient attended [6, 7]. According to previous publications, we defined consultation attendance when the patient accomplished, during the first year after the surgery, more than 7 medical consultations, nutritional attendance when completed more than 5 nutritional consultations, and psychological attendance when more than 5 psychological consultations were achieved. The patients analyzed in this document attended all the preoperative consultations, since it is a requirement to qualify for bariatric surgery in our center, accordingly the number of preoperative consultations were not included in our definition of consultation attendance. General consultation attendance was considered when the patients accomplished all the three criteria. Consultations with internal medicine or sport medicine specialist were not included in the analysis, since for these areas, the number of consultations depended of the patient’s demand.

Statistical analysis

Categorical variables were expressed as number of cases and percentages. Non-parametric variables were expressed in medians, standard deviation and ranges. Variables were compared and analyzed with t test. A p value ≤ 0.05 was defined as statistical significance. Analyses were performed with the use of SPSS software, version 22.
## Results

A total of 110 patients were included in this study. Eighty-one (74%) patients were women and 29 (26%) were men. We observed that women had significantly more consultation attendance than men (54.3% versus 24.1%, p = 0.005) (table 1).

Patients with higher initial BMI had significantly more consultation attendance than those with lower BMI (42.9 kg/m² versus 38.6 kg/m², p = 0.007) (table 2).

When consultation attendance was evaluated according to occupation, teaching workers had significantly (p = 0.003) more consultation attendance (71.4%) while the students group had less consultation attendance (0) (table 3).

Patients who had significantly more consultation attendance to dietitian (80%) and psychologist (75.4%) consultations than medical consultations (60%) (p = 0.002) (table 4).

Patients with more consultation attendance had significantly higher improvement in quality of life than those with less consultation attendance (5.0 versus 4.0, p < 0.001) (table 6).

We also recorded significantly higher consultation attendance in those patients who underwent face-to-face consultations (p = 0.001) (table 7).

Finally, evaluation of age, place of residence, marital status or type of consultations did not have statistical differences on consultation attendance.

## Discussion

Most bariatric surgery centers have standardized their PPC; however, loss of follow up is a persistent problem. A consultation for postoperative meal initiation and progression should be arranged with a dietician who is knowledgeable of the postoperative bariatric diet and should receive education in a protocol-derived staged meal progression based on their surgical procedure. In addition, pre- and postoperative support by a psychology/psychiatric must be provided to the patients [8].

International surveys indicate progressively low rates of consultation attendance in the postoperative period: 50% in the first year, 30% in two years, and < 10% in ten years [9]. In our study, the general consultation attendance was

### Table 1. Comparison of consultation attendance according to gender

| Gender       | Total | Attendance | No attendance | p   |
|--------------|-------|------------|---------------|-----|
| Women, n (%) | 81 (73.6) | 44 (54.3) | 37 (45.7) | 0.005 |
| Men, n (%)   | 29 (26.4) | 7 (24.1)  | 22 (75.9) |     |

### Table 2. Comparison of attendance according to BMI

| Parameter                  | Total | Attendance | No attendance | p   |
|----------------------------|-------|------------|---------------|-----|
| Average BMI, kg/m²         | 40.6 ± 8.4 (30.2–68.2) | 42.9 ± 9.1 (30.4–58.4) | 38.6 ± 7.2 (30.2–68.2) | 0.007 |

Note: BMI — Body mass index.

### Table 3. Attendance according to occupation or profession, n (%)

| Parameters     | Total | Attendance | No attendance | p   |
|----------------|-------|------------|---------------|-----|
| Trade and sale | 20 (18.1) | 11 (55.0) | 9 (45.0) |     |
| Construction   | 10 (9.1) | 1 (10.0)  | 9 (90.0) | 0.003 |
| Teaching       | 14 (12.7) | 10 (71.4) | 4 (28.6) |     |
| Home           | 19 (17.3) | 9 (47.3)  | 10 (52.7) |     |
| Office employees | 19 (17.3) | 12 (63.1) | 7 (36.9) |     |
| Health         | 6 (5.5)  | 1 (16.6)  | 5 (83.4) |     |
| Students       | 8 (7.3)  | 0         | 8 (100.0) |     |
| Others         | 14 (12.7) | 6 (42.8)  | 8 (57.2) |     |

### Table 4. Attendance according to area of specialty, n (%)

| Area         | Attendance | No attendance | p   |
|--------------|------------|---------------|-----|
| Medical      | 66 (60)    | 44 (40)       | 0.002 |
| Nutritional  | 88 (80)    | 22 (20)       |     |
| Psychological| 83 (75.4)  | 27 (24.6)     |     |
46.3% in the 1st year. In the present study, pre- and post-operative variables were evaluated in order to determine if they affected consultation attendance.

Gender evaluation showed higher consultation attendance in females. This outcome was discordant with some studies that did not find a relation between gender and compliance [10, 11]. We believe this finding has social and cultural components, since unlike women; men stay longer at work, leading to decrease in attendance of men. Beside this, the spread of the aesthetic model of thinness [12] could contribute to increased desire to lose weight, in women, consequently increasing the attendance. In this study, BMI was associated with higher consultation attendance. Factors that influence this conduct might be related to the remarkable and faster benefits obtained with bariatric surgery (such as decrease in knee pain, glucose, triglycerides and/or weight) that are observed in higher BMI patients when compared with lower BMI patients. We believe that the reward that occurs in those patients, affects consultation attendance positively. However, other researchers did not find the same association [13].

Table 5. Attendance according to %EWL

| Area        | Attendance | Total patients, n (%) | Average %EWL           | p   |
|------------|------------|-----------------------|------------------------|-----|
| General    | Attendance | 51 (46.3)             | 42.9 ± 9.1 (12.5–153.0) | 0.04|
|            | No attendance | 59 (53.7)             | 38.6 ± 7.2 (9.4–154.2)  |     |
| Medical    | Attendance  | 66 (60.0)             | 67.9 ± 28.3 (12.5–154.2) | 0.032|
|            | No attendance | 44 (40.0)             | 56.4 ± 26.2 (9.6–129.1) |     |
| Nutritional| Attendance  | 88 (80.0)             | 66.2 ± 27.0 (9.6–153.0)  | 0.039|
|            | No attendance | 22 (20.0)             | 51.6 ± 28.7 (25.0–154.2) |     |
| Psychological| Attendance | 83 (75.4)             | 69.3 ± 26.9 (12.5–154.2) | < 0.001|
|            | No attendance | 27 (24.6)             | 45.0 ± 22.5 (9.6–86.0)  |     |

Note: %EWL — Percentage of excess of weight loss.

Table 6. Attendance according to Bariatric Analysis Reporting and Outcome System (BAROS) initial and final

| Parameter                        | BAROS inicial | p       |
|----------------------------------|---------------|---------|
| Total                            | −2.2 ± 0.9 (−4.5–(−0.5)) |         |
| Attendance                       | −2.2 ± 1.0 (−4.5–(−0.5)) |         |
| No attendance                    | −2.3 ± 0.8 (−4.5–(−0.7)) | 0.720   |

BAROS final

| Total                            | 4.5 ± 1.2 (2.0–7.7) |         |
| Attendance                       | 5.0 ± 1.0 (2.5–7.7)  |         |
| No attendance                    | 4.0 ± 1.1 (2.0–6.2)  | < 0.001 |

Note: BAROS — Bariatric Analysis Reporting and Outcome System.

Table 7. Compliance according to face-to-face consultation

| Parameter      | Face-to-face consultations | p   |
|----------------|----------------------------|-----|
| Total          | 11.1 ± 6.6 (1–30)          |     |
| Compliance     | 14.1 ± 8.5 (1–30)          |     |
| No compliance  | 6.8 ± 5.2 (2–28)           | 0.001|

Non face-to-face consultations

| Total          | 9.7 ± 5.5 (2–28)           |     |
| Compliance     | 10.8 ± 5.7 (2–24)          |     |
| No compliance  | 8.8 ± 5.2 (2–28)           | 0.069|
Work-related compliance was evaluated showing that teaching workers and office employees showed increased attendance compared with construction, health workers and students. Our literature review did not find publications evaluating work-related attendance in bariatric surgery. It is believed that attendance-related to work has multifactorial influences such as culture, economy and social status. In our series, age, place of residency and marital status did not affect the consultation attendance.

In this study face-to-face consultations had higher consultation attendance that those performed virtually. Although, remote consultations offer advantages to monitor patients after bariatric surgery [14], fears have been expressed that they may be clinically risky and/or are less acceptable to patients or staff [15] and they bring leading to significant decrease in consultation attendance. Our data showed that nutritional and psychological consultations were carried out more frequently than medical consultation after 1–2 months of surgery. This could be due to the empathy showed by the dietician or due to the patient’s needs.

Weight loss was evaluated showing, clearly, that consultation attendance is associated significantly to higher percentage EWL. Several publications have shown similar results. El Chaar et al. [16] showed that more than 25 % follow up visits are associated with greater weight loss. This was also corroborated by Shen et al. [17] who found that follow-up frequency impacted weight loss success in two different bariatric procedure. Dixon et al. [18] who found that a follow-up frequency less than 13 times in 2 years especially in males was associated with less weight loss. In another retrospective review Weichman et al. [19] found that less than 7 % follow-up visits per year was associated with less loss of excess of body weight. In addition, our findings showed that higher percentage of EWL was associated to attendance to each specific area (medical, nutritional and psychological).

Although it is well known that, after bariatric surgery, weight loss occurs even without nutritional or psychological consultations [20] the outcomes presented here indicates that all the evaluated areas are relevant to obtain higher weight loss, as reported by previous publications [21, 22]. In our opinion, quality of life should be the main intention of a bariatric procedure and it is expected that quality of life improves when weight loss increases [23]. Bariatric surgery produces an overall improvement of quality of life, as shown in the present study. However, CA was associated with higher improvement in quality of life.

The present results should be interpreted taking into account some considerations. Firstly, patients have no economic limitations for follow-up as some other authors have described [24], since the initial payment included one-year free follow-up. Secondly, patients that were not able to attend physical consultation were contacted by phone or video call, which could decrease the quality of the consultation. Third, our definition of consultation attendance was based on other publications, however, in our knowledge, there is not global accepted definition for attendance after bariatric surgery. Finally, as this is a retrospective study the information can be not completely precise.

**Conclusions**

Hence, we conclude that consultation attendance with the multidisciplinary team is associated with better outcomes after bariatric surgery. “Nonattending” patients are at least partly responsible for any suboptimal results observed. Although this is certainly a factor for some patients, many other non-dependent reasons, such as cultural, social, economic or motivational reasons can also affect the loss of consultations in other patients.

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Оцінка факторів, що впливають на стан пацієнта після баріатричної хірургії

Резюме. Вступ. Програми баріатричної хірургії визна-ні найкращою альтернативою для пацієнтів із морбідним ожирінням. У багатьох дослідженнях дійшли висновки, що програми баріатричної хірургії, які містять до- та післяопераційні консультації спеціалістів багатопрофільної команди, мають кращі загальні результати. Метою даного дослідження була оцінка факторів, що впливають на до- та післяоперативні консультації спеціалістів під час програми баріатричної хірургії в Мексиці, та оцінка їх можливого впливу на післяоперативний курс реабілітації пацієнтів.

Висновки. Створення баріатричної хірургії в Мексиці, та оцінка їх можливого впливу на післяоперативний курс реабілітації пацієнтів. Створення баріатричної хірургії в Мексиці, та оцінка їх можливого впливу на післяоперативний курс реабілітації пацієнтів.
раційна оцінка показань пацієнтів до баріатричної хірургії містила консультації з оперуючим хірургом, дієтологом, терапевтом та психологом. За умов виявлення протипоказань чи наявності супутніх захворювань дані питання розглядалися до прийняття рішення про проведення операції. Реезультати. Усього в дослідження були включені 110 пацієнтів. З цього числа жінки становили 81 особу (74 %) і 29 (26 %) — чоловіки. Установлено, що жінки отримували консультації спеціалістів вірогідно частіше, ніж чоловіки (54,3 проти 24,1 %, p = 0,005). Пацієнти з вищим початковим індексом маси тіла відвідували спеціалістів вірогідно частіше, ніж пацієнти з нижчим індексом маси тіла (42,9 проти 38,6 кг/м², р = 0,007). При оцінці частоти консультацій за професією хворих педагогічні працівники вірогідно частіше (р = 0,003) відвідували спеціалістів багатопрофільної команди (71,4 %), тоді як студенти рідше відвідували суміжних спеціалістів. Пацієнти, які мали більший відсоток перевищення маси (EWL), вірогідно частіше відвідували спеціалістів із питань харчування, способу життя та психологічних аспектів, ніж пацієнти з меншим відсотком EWL (р < 0,001). Висновки. Проведення консультацій спеціалістами багатопрофільної команди асоціюється з кращими результатами після баріатричної операції. У пацієнтів, яким такий огляд не проводився, частіше спостерігаються неоптимальні результати. При проведенні таких консультацій слід також звертатися на культурні, соціальні, економічні та мотиваційні причини з боку пацієнтів. Ключові слова: баріатрична хірургія; консультації спеціалістів; багатопрофільна команда; оцінка факторів