Evaluation of a Bariatric Monitoring Pass for Primary Care Physicians

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Keywords
Long-term follow-up bariatric patients · Bariatric/metabolic surgery · Primary care · General practitioners

Abstract
Introduction: There are a growing number of patients undergoing bariatric surgery requiring lifelong follow-up. Therefore, follow-up care can no longer be covered by specialized outpatient clinics alone due to the sharp rise in the number of bariatric patients. Bariatric Patients in Primary Care: Postoperative Nutrition and Lifestyle Management (BagEL) is a survey to evaluate a newly developed structured disease management program including nutrition and lifestyle management in primary care. Methods: The study is conceived as a randomized cohort study with a control group. An expert questionnaire for general practitioners (GPs) was developed to assess the usability of a structured postoperative care system regarding nutrition and lifestyle management for bariatric patients in primary care. A structured follow-up program in primary care with a so-called bariatric monitoring passport (BMP) was provided for patients in the intervention (INT) group and the existing information sheet “Metabolic surgery and perioperative care” for the control (CON) group. 124 patients, who met inclusion criteria and who underwent a bariatric procedure first time, served as ambassadors for delivery of the expert questionnaire and study documents to their individual GPs. Results: A total of 39 (31.5%) different GPs from 124 ambassador patients responded. For the primary outcome “Does the aftercare-booklets support treatment of bariatric patients?” GPs of the INT group rated the new designed aftercare booklet (INT) significantly more helpful for treating bariatric patients than the one from the CON group \((p = 0.041)\). Discussion/Conclusion: These results suggest that GPs are welcoming supportive tools like our BMP to improve the care of long-term follow-up of bariatric patients and should actively participate in the development of lifelong disease management plans necessary to cope with the rapidly growing number of patients.

Introduction

Obesity is one of the major global health problems, which increases the risk of a wide range of associated conditions including hypertension, hyperlipidemia, diabetes
type 2, or musculoskeletal disorders. These associated issues and obesity itself contribute to increased morbidity and mortality rates and form a major burden for healthcare systems [1, 2].

Bariatric surgery (BS) is currently the only available alternative in case conservative long-term weight loss therapies fail in regard to obesity grade III (BMI ≥40 kg/m²) [3–5]. BS is associated with improvement of comorbidities up to remission of diabetes type 2 and decreases overall mortality [6–8]. Therefore, BS is proposed as a new treatment option for diabetes type 2 in mildly obese patients with BMI <35 kg/m² who were not able to achieve glucose homeostasis with lifestyle modifications and medical treatment [9].

BS is defined as a group of surgical procedures performed to facilitate substantial weight loss by reducing the size of the stomach (e.g., sleeve gastrectomy [SG]) and/or limiting absorption in the small intestine (e.g., Roux-en-Y gastric bypass [RYGB] or one anastomoses or omega-loop gastric bypass) [10]. In general, the more malabsorptive the procedure, the better are the results in terms of weight loss [11], overall improvements of the quality of life, and reduction in the risk of coexisting diseases [6], but in parallel, the risk of complications including nutrient deficiencies rises [12–14]. These complications negatively affect long-term outcomes. Furthermore, not all BS recipients are able to maintain long-term weight loss. In fact, almost 40% of BS recipients experience excessive weight regain (≥25% of lowest weight) years after their surgery [15], while others are dissatisfied postsurgery for other reasons, such as conflicts related to their relationships and identity, the presence of skin folds and skin irritation, and the reemergence of psychological conflicts [16].

To achieve good long-term nutrition outcomes following BS, nutritional screening and prescribing appropriate supplementation to prevent nutrient deficiencies are recommended starting even prior to the operation [17]. Furthermore, regular monitoring of health status and comorbidities with a multidisciplinary team is recommended [18].

Adequate follow-up programs are necessary to support patient’s adherence to prescribed nutritional and lifestyle changes and facilitate the early recognition of complications like weight regain or excessive weight loss [19–21]. Taking into account the accumulating numbers of bariatric patients, follow-up has to be at least partly transferred to primary care over time [18].

To facilitate informed postoperative monitoring in a primary care setting, we developed a structured monitoring program including a “bariatric monitoring passport” (BMP). The passport provides information about necessary follow-up appointments, laboratory tests to detect or prevent malnutrition, and questions regarding nutrition and physical activity for the general practitioner (GP) and the patient. International recommendations [10, 18] and the validated follow-up program of the outpatient clinic for obesity of the Medical University of Vienna built the basis of the passport content.

This study was designed to investigate if the developed BMP is feasible in daily routine for GPs to treat patients who underwent BS. This study is part of the BagEl – Bariatric Patients in Primary Care: Postoperative Nutrition and Lifestyle Management – supported by the Medical Scientific Fund of the Mayor of the City Vienna (project number 18038).

**Materials and Methods**

A questionnaire (see online suppl. Material 1; for all online suppl. material, see www.karger.com/doi/10.1159/000524584) for GPs was developed to assess the usability of a structured postoperative care system regarding nutrition and lifestyle management for bariatric patients in primary care described in a so-called bariatric monitoring passport (see online suppl. Material 2). Furthermore, the structure, the content, the comprehensibility of the content, and the effect on the treatment time and quality were questioned.

The new questionnaire was evaluated as follows: randomly selected physicians received all study materials and completed the questionnaire either in a structured face-to-face or phone interview. All physicians welcomed the idea providing a BMP for regular follow-up appointments and rated the wording of the questionnaire as understandable [22].

This study was conducted as a prospective, double-blind, randomized controlled intervention trial. Therefore, the BMP was used for the intervention (INT) group and the existing information sheet “Metabolic surgery and perioperative care” (https://www.meduniwien.ac.at/hp/fileadmin/chirurgie/Downloads/AKH_Leitf_metabol_chirurgie_400x210.pdf) for the control (CON) group.

Eligible patients, who acted as ambassadors for establishing contact with the GPs, had to meet the following inclusion criteria: 18 years or older, any first-time BS intervention (one-anastomosis gastric bypass, RYGB, or SG), and being operated between July 1, 2016, and August 31, 2017, at the Visceral Surgery Department of the Medical University of Vienna. Specific exclusion criteria included pregnancy (a possible existing pregnancy was excluded by questioning) and breastfeeding.

Patients were randomly assigned to the INT) or CON group, stratified by gender (male/female), type of operation (one-anastomosis gastric bypass, RYGB, SG), time of follow-up appointment (12 [274–456 days postoperatively] or 18 [457–638 days postoperatively] months after operation), and age at operation (≥50/<50) with the help of a randomization tool of the Medical University of Vienna.
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Vienna (“Randomizer,” https://www.meduniwien.ac.at/randomizer/).

During the period of the 12- and 18-month follow-up appointment or the 18- and 24-month follow-up, patients were expected to visit their individual GPs with the study material. GPs were asked to carry out a treatment based on the documents provided by the patients and to evaluate them afterward with the help of the standardized questionnaire. GPs could use franked envelope to return the questionnaire or answer remotely via SurveyMonkey®.

Study material consisted of a personal introduction letter, the BMP (INT) (see online suppl. Material 2), or the folder (CON) (https://www.adipositaschirurgie-ges.at/app/download/11085202060/Nachsorge+Folder.pdf?t=1498482583) and the expert questionnaire (see online suppl. Material 1).

Statistics

Descriptive statistics of all parameters of interest were compiled. For continuous variables, the mean, standard deviation, minimum, maximum, and median were calculated; for categorical variables, absolute and relative frequencies were calculated, both with respect to the INT and CON groups.

The preplanned primary objective was to investigate whether the newly developed BMP is more useful for GPs than the state-of-the-art information sheet. To address the primary objective, a Wilcoxon test at level alpha = 0.05 was used to compare question 2 (ordinal, on a scale from 1 to 5) of the GPs’ questionnaire between GPs of INT and CON groups. All statistical analyses were conducted using IBM® SPSS® Statistics for Windows, Version 24 (IBM Corp., Armonk, NY, USA), and R: A Language and Environment for Statistical Computing (Vienna, Austria).

Some results are presented in tables and figures without p values because they are purely descriptive in nature and no statistical hypothesis were formulated in the study protocol. Since the presentation of unplanned exploratory p values introduces a multiple testing problem and may shift the attention away from the primary findings, p values for all findings according to current guidelines [23] are not presented.

The research complied with the Declaration of Helsinki [28]. Ethical clearance was given by the Local Ethical Committee of the Medical University of Vienna (Ref: 2079/2017). GPs participating in this study did not need to provide informed consent due to expert panel.

Results

Work Flow: Patient “Ambassadors” and GPs

Patients who underwent their first BS (N = 216) were checked for eligibility to act as an ambassador of the outpatient clinic of the General Hospital of Vienna to deliver study materials to their individual GPs. 13 (6.0%) of those did not fulfill the inclusion criteria, 35 (16.2%) of the subjects fulfilling the inclusion criteria declined participa-
tion, and 44 (20.4%) were excluded for other reasons (19 wrong phone number, 25 not reachable after three attempts). Finally, 124 (57.4%) patients were included in the study to have aftercare appointments at their GPs shown in Figure 1.

Baseline characteristics of the included patients are shown in Table 1. In total, 82 (66.1%) were female and patients had a mean age of 43 years, ranging from 19 to 73 years. 52 (41.9%) of the participating patients attended a 12- or 18-month follow-up appointment at the outpatient clinic, whereas 72 (58.1%) did not show up (nonattenders).

Results

124 patient ambassadors were asked to contact their individual GP. A total of 39 (31.5%) GPs responded by returning the questionnaire by post (59.0%) or participation via online questionnaire (41%).

In total, 33 (84.6%) of the GPs who responded regularly take care of patients after BS. 6 (15.4%) GPs had not provided bariatric aftercare before the respective patient ambassador showed up. The average number of treated bariatric patients per week is 2.7 as reported by 27 (69.2%) respondents.

Regarding specific training for bariatric aftercare in the last 5 years, 4 (10.3%) attended one and 4 (10.3%) did not know anymore. The remaining 31 (79.5%) answered no. All respondents’ characteristics are shown in Table 2.

For the primary outcome “Does the aftercare-booklets support treatment of bariatric patients?,” GPs of the INT group rated the new designed aftercare booklet significantly better than those of the CON group shown in Figure 2. 18 (46.2%) GPs from the INT group answered with either “very helpful” (13 [(33.3%)] or “helpful” (5 [12.8%]), compared to 16 (41.0%) (8 [20.5%] for each answer) in the CON group. “Not at all helpful” was not chosen by any group and “not helpful” only by one GP in the CON group (2.6%). “Moderate” was chosen 4 times (1 [2.6%] in the INT group and 3 [7.7%] in the CON group).

A reduction in the estimated time expenditure for treatment by using the aftercare booklets was stated by twice as many GPs within the INT group (10 [52.6%]) compared to the CON group (5 [25.0%]) shown in Figure 4. All of the respondents of the INT group (n = 19) only voted for “very good” and “good,” whereas in the CON group, a few GPs found the design (3, 15.0%), content (3, 15.0%), and comprehensibility (2, 10.0%) only “satisfying” or “sufficient.”

Discussion

Guidance programs after BS are necessary for prevention and detection of vitamin and other nutrient deficiencies, weight regain, and other complications like mental health problems [18, 24]. Therefore, a follow-up

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Table 1. Baseline characteristics of patients in each group

| Baseline characteristics of patients ambassadors in each group | INT (n = 57) | CON (n = 67) |
|---------------------------------------------------------------|-------------|-------------|
| Sex                                                          |             |             |
| Female, n (%)                                                | 39 (68.4)   | 43 (64.2)   |
| Age, years (mean)                                            | 20–72 (44)  | 19–73 (42)  |
| Type of operation, n (%)                                     |             |             |
| Sleeve                                                       | 11 (19.3)   | 12 (17.9)   |
| Y-Roux                                                       | 19 (33.3)   | 18 (26.9)   |
| Omega loop                                                   | 27 (47.4)   | 37 (55.2)   |
| Attenders at the outpatient clinic, n (%)                    |             |             |
| 12-month aftercare appointment                                | 23 (40.4)   | 29 (43.3)   |
| 18-month aftercare appointment                                | 15          | 18          |
| Nonattenders, n (%)                                          | 34 (59.6)   | 38 (56.7)   |
| 12-month aftercare appointment                                | 23          | 23          |
| 18-month aftercare appointment                                | 11          | 15          |

Table 2. Respondents’ characteristics in each group

| GPs’ characteristics (respondents) in each group | INT (n = 19) | CON (n = 20) |
|---------------------------------------------------|-------------|-------------|
| Patient care after bariatric procedures           |             |             |
| Yes                                               | 16 (41.0)   | 17 (43.6)   |
| No                                                | 3 (7.7)     | 3 (7.7)     |
| Treatment of bariatric patients per week           |             |             |
| Patients (mean), n                                | 1–5 (2.2)   | 1–10 (3.2)  |
| No answer                                         | 6           | 6           |
| Specific training for bariatric aftercare in the last 5 years, n (%) |             |             |
| Yes                                               | 3 (7.7)     | 1 (2.6)     |
| No                                                | 14 (35.9)   | 17 (43.6)   |
| Don’t know                                        | 2 (5.1)     | 2 (5.1)     |
program seems to be compulsory for the rest of life. A tight follow-up routine among a multidisciplinary team (nutritionists, dieticians, psychologists, patients council, physicians, and surgeons) after BS is recommended to support bariatric patients best possible long-term outcome [18]. A study investigating compliance of patient attending their follow-up appointments at the outpatient clinic at the General Hospital of Vienna showed that adherence at the 6-month interval postoperatively is the highest with 74.7% and at 12 months 57.0%. Thereafter, the dropout rate rises rapidly. At 24 months, only 14.0% of bariatric patients continue to keep to recommended outpatient visits [25]. Adherence to monitoring visits is influenced by factors including emotional disappointment to dissatisfaction regarding the expected amount of weight loss and improvements in obesity-related comorbidities [26]. Main reasons named in the study are on the one hand the long waiting time on-site and on the other hand the difficulty of getting a prompt appointment [25]. Both owed to the increasing numbers of patients seeking for professional postoperative monitoring but a lack of specifically trained physicians and aftercare possibilities in the specialized clinic setting as well as in primary care.

The standardized treatment scheme of the General Hospital of Vienna includes pre- and postoperative appointments to be guided into new necessary habits within a multidisciplinary team of a dietitian, endocrinologist, surgeon, and psychologist. Patients receive documents with recommendations on daily habits and necessary examination intervals. Standardized orientation documents for GPs are not provided.

Out of our study several conclusions can be drawn in regard of implementation to primary care. First of all, a

![Fig. 2. GPs’ response on the question whether the aftercare booklet supports GPs’ treatment, Wilcoxon test 2 (ordinal, on a scale from 1 to 5) (p = 0.041).](image-url)
supporting tool like a pass for long-term follow-up appointments after BS is rated as helpful by 97.4% of participating GPs. Second, all GPs from the INT group would recommend the newly designed BMP. Third, only 10.3% of all surveyed GPs attended an advanced training for BS and aftercare needs in the last 5 years.

As of the number of patients undergoing BS is on the rise, available long-term treatment options for lifelong care additionally to the operating centers are becoming more important. International guidelines recommend transfer to primary care 2 years after operation. Previous studies have shown that adherence to follow-up care and nutritional supplements can be poor, leading to an increased risk of nutritional deficiencies and weight regain [27, 28]. Therefore, GPs must be aware and informed of the needed treatment management and continuous improvement. Parretti et al. [29] state in their population-based study that patients who had BS often not receive the recommended nutritional monitoring after discharge from specialist care. GPs and patients should be supported to engage with follow-up care [29]. There has been little previous research focusing on the long-term care patients receive in primary care following discharge from specialist’s follow-up. In 2019, Mahawar et al. [30] reported that, in addition to poor compliance of patients with respect to regular intake of medication, the neglect of GPs to prescribe supplements was a barrier. Thus, patient and GP education were recommended. Several survey studies have reported a lack of confidence among GPs in managing patients who have undergone BS, as well as a desire for more education [31, 32]. This suggests either to improve educational level of GPs or to provide documentation for working routine like the presented BMP. There have been some attempts to improve GPs’ awareness and knowledge regarding the management of patients following BS in primary care. Different international obesity as-

![Fig. 3. GPs’ response on design, content, and comprehensibility of the aftercare booklets.](image-url)
associations and various scientific working groups have published guidelines covering long-term treatment options and recommendations after BS [18, 33]. However, GPs are still lacking the link between recommendations and ready-to-use documents. This study is the first to evaluate GPs’ needs in daily routine for the follow-up appointment while using a checklist which combines existing recommendations and knowledge transfer.

Patients perceive their GPs as competent, trustworthy, and trustful source of information [34], indicating a good physician-patient relationship that could support the compliance to annual follow-up visits in primary care facilities. A transfer of bariatric aftercare to primary care is – in addition to the patient’s perception of the GP as a trustworthy person [34] – positive from the GP’s point of view. Kallies et al. [35] described in their questionnaire survey primary care providers as “very supportive” in postoperative support. GPs have largely positive attitudes toward BS and its efficacious and valuable option for the treatment of obesity and related comorbidities [36]. Additionally, recent studies have shown improvements in BS safety, largely due to the advancements in laparoscopic surgical techniques [37], which also makes this kind of obesity therapy more popular. In contrast as mentioned above, GPs are concerned over providing long-term care [36] due to a lack of knowledge [38, 39] and missing education programs [31, 40]. Educational strategies to address these barriers should target continuous knowledge transfer regarding topics in the long-term treatment after BS. For the best long-term results, structured follow-up programs on a regular basis are the key element.

To the authors’ knowledge, this is the first study to investigate the usability of a disease management record for GPs for the long-term care after BS. There are several limitations to this study. This study is limited by a low survey response rate, which affects its generalizability. The questions were constructed using clinical knowledge, literature review, and a prestudy. There is potential for bias in the survey questions written by study investigators, though every attempt to avoid this was made. The results

![Fig. 4. GPs' responses on treatment time, better care when using an aftercare booklet, recommendation of the investigated booklets, and existence of comparable booklets.](image-url)
of this study may not directly reflect all GP’s attitudes and referral patterns in communities across Austria. This study is limited in its inability to directly compare results with nationwide rates – since none are existing by now.

Conclusion

These results suggest that GPs are welcoming supportive tools like our BMP to improve long-term follow-up of bariatric patients. International Clinical Consensus is that long-term follow-up care following BS is important to optimize patient outcomes and reduce the risk of preventable harms [17, 18, 41]. Therefore, lifelong disease management provided by GPs is necessary to cope with the rapidly growing number of patients. The importance of appropriate tools in follow-up should be emphasized to GPs. Future research should aim to implement the recommended passport and help to develop appropriate strategies to roll out this system.

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Statement of Ethics

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments, or comparable ethical standards. Ethical clearance was given by the Local Ethical Committee of the Medical University of Vienna (Ref: 2079/2017). GPs participating in this study did not need to provide informed consent due to expert panel. However, all patients agreed to data collection in an interdisciplinary electronic registry of the Medical University of Vienna.

Conflict of Interest Statement

Tamara Ranzenberger, Bettina Dreschl, Gerhard Prager, Tanja Stamm, Felix Langer, Alexandra Kautzky-Willer, Bianca Itariu, and Karin Schindler declare no conflict of interest. Michael Krebs has received research support from Sanofi, AstraZeneca, Fit for Me, and Ipsen as well as speaker and consulting fees from Astra-Zeneca, Novartis, Novo Nordisk, Lilly, Merck, Böhringer, Roche, and Sanofi. Elias Meyer reports funding for unrelated research from Novartis.

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Author Contributions

K.S. and T.R.-H.: developed the aim of this study. K.S., M.K., T.R.-H., and E.L.M.: concept of study design. T.R.-H.: data acquisition and drafting of manuscript. E.L.M.: statistical analysis. E.L.M., T.R.-H., and M.K.: interpreted the data. All authors: critical revision approval of the final version.

Data Availability Statement

The data set used in this study is accessible upon reasonable request to the corresponding author via michael.krebs@muv.ac.at.

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