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## Research Article

# Reciprocal Relationship between Compliance with Post-Op Follow-Up and Weight Loss after Bariatric Surgery

## Methods

Our data was gathered from bariatric out-patient clinic follow-up at the university Hospital of Coventry and Warwickshire (UHCW), Coventry, UK between 2009-2013, 164 post-bariatric surgery (BS) patients with similar initial BMI were included (70 LAGB, 70 sleeve gastrotomies and 24 Roux-en Y gastric by-passes (RYGBP)). Calculations of percentage excess weight lost (%EWL) were calculated based on a BMI of 25 and were recorded at intervals of 1-2 months, 3-4 months, 5-6 months, 8-9 months, and 10-12 months if attendance allowed. Data was analyzed using Microsoft Excel 2010.

## Results

One hundred and sixty four post-BS patients with similar initial BMI were included in our study (70 LAGB, 70 sleeve gastrotomies and 24 Roux-en Y gastric by-passes (RYGBP)). The average BMI of the LAGB group was 51.4, 52.5 for the gastric sleeve and 50.7 for the RYGBP group with no significant difference between the groups at baseline. 65.2% of patients were female and this proportion did not differ significantly between groups. Attendance at post-op appointments steadily declined with 83.75% patients attending at 1-2 (P=ns), 52.25% at 5-6 (P=0.011) and 61.25% at 10-12 months (P=0.002) (Figure 1). The number of appointments attended by LAGB, Sleeve and By-Pass patients did not differ significantly (Median 3-4; P=0.1-0.46). EWL Figures at 10-12 months were available for 36 LAGB (51.42%), 43 Sleeve (61.42%), and 16 (66.67%) RYGBP patients. LAGB patients with poor compliance (3 or less appointments) lost significantly less weight than those with 4 or more appointments (%EWL 15.9 vs. 33.7; P=0.01-0.004), while the same did not affect %EWL for Sleeve and By-Pass patients (P=0.26-0.72) (Figure 2). Interestingly, initial weight loss also affected subsequent attendance. Patients who managed to achieve >20% EWL at 1-2 months attended significantly less appointments compared to those with ≤20% EWL (P=0.0012) (Figure 3).

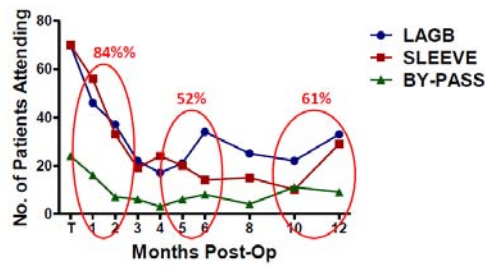
## Discussion

Our data assessed the number of clinic attendances and %EWL Figures at 10-12 months for 36 LAGB, 43 gastric sleeve and 16 RYGBP patients seen at a regional UK centre. The number of follow-up clinics attended by the three patient groups did not differ significantly. Importantly it was noted that LAGB patients with poor compliance (≤ 3 clinic attendances) lost significantly less excess weight than those with better compliance (≥ 4 clinic attendances). This relationship was

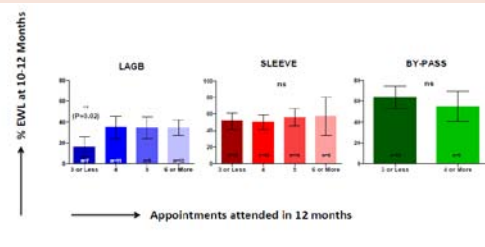
## Introduction

Obesity is a large and growing health problem in the UK with high associated costs to the NHS. Bariatric surgery is proven as an effective treatment for obesity associated with long term weight loss and a reduction in obesity related comorbidities [1]. The NICE guidance highlights the importance of follow-up post-surgery [2]. The guidelines state that in order to be eligible for surgery the patient must commit to long term follow-up and that in order for a centre to offer bariatric surgery it must ensure that it can provide regular MDT post-op assessment and support for at least two years [2]. This should be followed by lifelong follow-up at least annually in the community [2]. NICE recommends that follow-up should include dietary, nutritional and physical activity assessment, advice and support along with individualized psychological support and information regarding access to peer support groups [2]. NICE have created these guidelines due to their observation that practice differs across the country and that there is a real risk of harm if nutritional deficiencies are not identified and managed [3]. The rationale behind the NICE, and therefore the British obesity and metabolic surgery society (BOMSS) guidelines are based upon a number of papers that demonstrate the importance of follow-up on the success of bariatric surgery. Studies have demonstrated a significantly improved percentage excess weight loss (%EWL) in laparoscopically adjusted gastric band (LAGB) patients who returned for follow-up more frequently in the first post op year when compared to those who returned less frequently [4,5]. Other studies have shown that laparoscopic gastric bypass patients who did not attend clinic without being prompted had significantly worse %EWL and similar results have been demonstrated with sleeve gastrotomy patients [1,6]. Follow-up improves outcome via general and specific interventions. The general interventions are those focused on by the NICE guidance as outlined earlier. LAGB patients require the specific intervention of adjustment of the gastric band in order to ensure sufficient constriction to lead to weight loss.

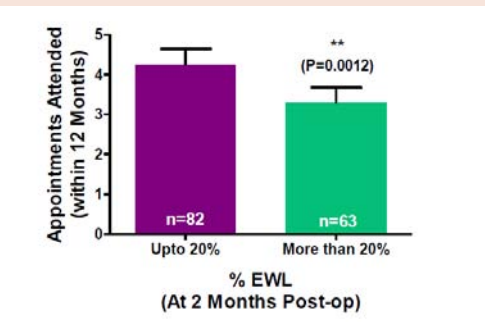
In this single-centre retrospective study we investigate the relationship between compliance with post-op follow-up appointments and the effect on excess weight loss in patients undergoing LAGB, gastric sleeve and Roux-en Y gastric bypass (RYGBP) operations.



**Figure 1:** Percentage out-patient clinic follow-up against time.



**Figure 2:** %EWL at 10-12 months against number of clinic appointments attended. LAGB patients who attended  $\leq 3$ .



**Figure 3:** Early weight loss against subsequent compliance.  $>20\%$  EWL in first 2 months post-op is associated with poorer subsequent compliance with follow-up.

not observed in patients of the gastric sleeve and RYGBP groups. This data corroborates that of a previous US paper by Shen and colleagues who also described improved %EWL in LAGB patients who attended over six follow-up appointments when compared to those who attended  $\leq 6$  appointments [4]. They also failed to demonstrate any such relationship in RYGBP patients [4]. Of interest, analysis of our data suggest that patients who achieved  $>20\%$  EWL in the initial 1-2 months attended significantly less appointments thereafter than those who achieved  $<20\%$  EWL in the same period. This phenomenon has not been commented on in the literature as far as we are aware. This effect is independent of the type of surgery performed. We speculate that this finding may represent a sort of tortoise-and-the-hare situation in which impressive early results lead to complacency and therefore lack of compliance with follow-up thereafter. It should be noted that this finding did not translate into a worse %EWL at 12 months for these patients.

The majority of the aspects covered in follow-up are independent of the type of bariatric surgery performed and are the areas focused on in the NICE guidelines. However there are some aspects of follow-up that are unique to the surgery performed, namely the LAGB. The LAGB causes weight loss by creating a small gastric pouch and narrow stomal opening which slows gastric emptying; this leads to satiety with smaller amounts of food, a reduced appetite and behavior modification [4]. If the LAGB causes no constriction of the stomach and therefore no restriction of stomach volume it will not cause weight loss; this surgery relies on proper adjustment to be effective [4]. Other surgical techniques such as the RYGBP and gastric sleeve rely on a fixed restriction, GI hormone modification and, in the case of the RYGBP, an element of malabsorption [1,4]. As such the follow-up focusses on the generic elements of bariatric surgery follow-up as outlined earlier. Even so studies have demonstrated improved %EWL in patients with RYGBP who attend follow-up without prompting (76 vs. 65 %EWL) and gastric sleeve patients who attended 100% of follow-up (82 vs. 74 %excess BMI loss) [1,6].

It should be noted that though the literature has demonstrated the importance of the number of clinic visits and number of LAGB adjustments on %EWL, it has found no relationship between %EWL and total saline volume in the LAGB [4,5]. This suggests that follow-up benefits LAGB patients not just in terms of physical constriction of the stomach but also in terms of motivation, emotional support and dietary counselling [4]. One study, which demonstrated improved weight loss in LAGB patients who were seen in a centre where they were free to self-refer for band adjustments, suggested that the improved weight loss may not be due to the number of adjustments but rather to these patient's increased internal motivation [5]. In addition the optimal frequency of band adjustments is not known [5].

On average RYGBP patients lose 66-68 %EWL in the first year post-op [4]. In comparison weight loss goals are met after 2-3 yrs in LAGB patients [7]. This requirement for frequent adjustment and longer period of weight loss, arguably requiring greater motivation, explains the greater importance of follow-up for LAGB patients. However it should not be inferred that follow-up is not of importance in gastric sleeve and RYGBP patients but rather that follow-up does not seem to have as strong an effect on %EWL. Better compliance with follow-up is also associated with significantly better quality of life scores in terms of how the patient usually feels and the way that they approach food [1]. Some centres have reported improved %EWL in their patients by improving their pre and post-op education programs. A programme championed by Cottam and colleagues focusses on simplicity, patient empowerment and allowing patients to select their surgery, with the result that patients take full credit for their weight loss [8]. Another group provides an online patient contact at any time as part of their 30 month follow-up [1].

There are a variety of criticisms that could be made of this current study. The first is that we do not have the 12 month %EWL data for a significant proportion of our patients (51.42% of LAGB patients, 61.42% of gastric sleeve patients and 66.67% of RYGBP patients). As such this reduces the size and power of the study. Although there was no significant difference at baseline between the BMIs or gender make-up of the LAGB, RYGBP and sleeve gastrectomy groups, these



cohorts were not matched on any other variables such as pre-op weight loss, eating habits or other behaviors and this omission may have skewed the data. In addition our outcomes differ from those reported in the literature. In this study we record 61.25% post op follow up at 1 year. This is significantly lower than the 85% follow-up Figure seen in the literature [4]. Our %EWL Figures at 1 year of 30.3% for LAGB are also poorer than those seen in the literature of 38-47% [4]. In addition to these issues our study does not follow-up patients beyond 12 months; it would be interesting to note whether we continued to see a relationship between follow-up compliance and %EWL at later time points and whether the strength of this relationship grew or diminished.

### Conclusion

This study has demonstrated that LAGB patients that have greater compliance with follow-up appointment attendance achieve significantly better %EWL than those who do not. We failed to show this relationship in gastric sleeve and RYGBP patients and this is presumably due to the need for regular band adjustment in LAGB patients. Previous studies have returned similar results [4,5]. It should not be inferred however that follow-up is not of importance in gastric sleeve and RYGBP patients but rather that follow-up does not seem to have as great an effect on %EWL [1,6]. However it should be noted that even modest reductions in weight may still lead to improvements in a variety of co-morbidities such as diabetes, hypertension and asthma [9]. Better compliance with follow-up is associated with significantly better quality of life scores [1]. Our data adds to the evidence that suggests that LAGB patients should be counselled pre-op that better compliance with follow-up is likely to lead to improved weight loss. Finally our data suggests that high weight loss in the initial 1-2 months post-op may lead to reduced compliance thereafter. The

reasons for this and non-compliance with follow-up generally would benefit from further investigation to allow the creation of strategies to improve compliance and therefore maximize the benefit of bariatric surgeries

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