

ORIGINAL ARTICLE

Evaluation of an exercise programme for post-bariatric surgery patients: views of participants

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Summary

Objective

Exercise programmes typically are evaluated with fitness assessments and psychological survey measures but seldom include participants' insights. The purpose of this study was to evaluate the benefits, facilitators and barriers of a 12-week exercise programme for post-bariatric surgery patients from the participants' perspective.

Method

Over a 2-year period, 20 patients recently having undergone bariatric surgery completed a 12-week programme that included participation in structured exercise and in focus groups designed to supplement standard evaluation data and provide insight into participants' views.

Results

Participants were highly adherent to the programme, and focus group results reflected a clear positive evaluations. Benefits included helpful information, developing commitment, physical fitness and social support; notably, weight was seldom mentioned. Participants cited structure, accountability and group support as facilitators of exercise. Participants cited few barriers, although very few had set plans for continuing exercise after programme completion.

Conclusion

Participants saw many benefits to the exercise programme, and those benefits reflected lifestyle changes rather than a focus on weight. Programme structure, accountability and the support of the group were facilitators to exercise. Participants cited few barriers. However, the lack of plans for continued exercise suggested the need for a transition phase to help participants continue an active lifestyle after the 12-week structured programme.

Keywords: Behaviour change, motivation, physical activity, self-efficacy.

Background

Bariatric surgery has become an increasingly popular option for persons with obesity who have struggled to obtain a healthy weight. According to the American Society for Metabolic and Bariatric Surgery, approximately 196,000 individuals undergo this surgery each year (1). While individuals who have had bariatric surgery experience a significant amount of weight loss post-surgery, many individuals eventually regain a significant

portion of the weight that was originally lost (2). Given the prevalence of bariatric surgery, effective short-term and long-term postoperative obesity treatment is essential. A viable solution to the problem of regaining weight post-surgery may be found in the implementation of physical activity programmes for surgery patients. Post-surgery weight loss typically results in improved quality of life, although the persistence of improvement needs further investigation (3). Physical activity following bariatric surgery has been found to enhance the decrease in

disease risk and improvement in overall quality of life (2,4,5). Physical activity is a widely recognized strategy for weight maintenance (6) and should therefore be considered in post-bariatric surgery treatment.

The benefits of physical activity for weight loss, maintenance and improving quality of life are well established (7,8); yet a vast majority of the population consistently fails to meet the recommended activity guidelines. In a small sample of bariatric patients, Thomas *et al.* (9) reported that <24% participated in at least 30 min of daily moderate-to-vigorous intensity physical activity (MVPA). Even individuals who do meet recommended physical activity guidelines may struggle with effective weight loss due to challenges such as metabolic adaptation and energy balance (10). Bariatric surgery has been established as a viable treatment for weight loss, but there is a gap in literature supporting the use of physical activity as a post-operative adjunctive treatment. Many patients who receive bariatric surgery experience a weight regain, with 33–50% of initial weight loss regained within 12–18 months without proper diet and exercise intervention (2).

Moderate intensity exercise has been found to be effective for long-term weight control. Bariatric surgery improves insulin sensitivity and glycaemic control, which can be further enhanced when coupled with physical activity. Balance, muscular strength and endurance, flexibility and cardiorespiratory endurance are consistently improved in individuals post-bariatric surgery as a result of exercise (2,5,11). These improvements lead to improved functional ability for activities of daily living and increased self-reported quality of life (5,12). Specific exercise recommendations for this population have yet to be established; however, a meta-analytic review by Livhits and colleagues (13) found that 11 out of 13 studies indicated physical activity participation resulted in greater post-operative weight loss at 12 and 24 months compared with individuals who did not participate in physical activity over the same time period. Additionally, a meta-analytic review by Moya and colleagues (14) found that higher volumes of physical activity correlated to greater weight loss in individuals who had bariatric surgery.

Although patients are typically made aware of the benefits of physical activity participation post-bariatric surgery, many face barriers that make participation difficult (4,15,16). In fact, a recent meta-analysis indicated that although step count typically increases 3 to 6 months following surgery, objectively measured MVPA decreases slightly (17). Barriers to MVPA may take any number of forms from not having time to exercise, not feeling comfortable in a gym, not knowing what to do or not feeling confident in their abilities (4,18). Lifestyle change

interventions may be effective in promoting long-term weight loss and maintenance, improved physical and psychological health and improved quality of life (19). Many studies have found that quality of life improves as weight is lost both before and after surgery (20–22). Specifically, patients indicated that as physical functioning abilities increased, mood and self-confidence also improved (22).

In efforts to provide post-surgery patients with an opportunity to become physically active, the Bariatric Exercise and Lifestyle Transformation (BELT) programme was created. The BELT programme was developed through a collaborative partnership between the Department of Kinesiology at The University of North Carolina at Greensboro and the Bariatric Surgery Program in the Cone Health system in the south-eastern United States. BELT was a 12-week exercise programme for individuals post-bariatric surgery (6 weeks to 6 months post-surgery), and participants were admitted on a rolling basis. The programme's structure was similar to standard cardiac rehabilitation with three 1-h meetings per week. Each session was facilitated by several graduate student trainers and supervised by a registered clinical exercise physiologist. Exercise sessions met from 06:30 to 07:30 h and included approximately 30 min of aerobic exercise and 30 min of functional resistance training. Bi-weekly educational sessions on exercise benefits, proper diet and behaviour change strategies (e.g. goal setting) were included in the programme.

The purpose of this study was to evaluate the benefits, barriers and facilitators of the BELT programme from the perspective of participants who completed the programme. This information was then used in efforts to improve the programme moving forward to increase the number of programme participants and develop a more specific behavioural component to supplement the existing programme.

Materials and method

This study focused on individuals who completed the BELT programme and participated in a focus group designed to provide greater insight into the participants' views. The interview questions were aimed at understanding participants' views on how the programme fits with their goals, evaluation of programme structure, personnel and environment, suggestions for improving the programme, as well as their plans for continuing exercise/physical activity and ideas on how the programme could help them in the transition and staying active.

Participants

BELT was offered to patients who underwent bariatric surgery through Cone Health, where an average of 172 bariatric surgery procedures per year were performed over the time span of the study. Recruitment occurred through announcements at pre-surgery information sessions and post-surgery support groups and by flyers placed in the waiting room at the bariatric surgeons' office. Data were not available as to how many people inquired about the BELT programme or how many decided not to participate. Potential reasons for the relatively low number of patients captured in the programme include the early morning time of operation (06:30 h), long travel distance for some (the exercise facility is located centrally in a healthcare system with a radius of approximately 30 miles) and alternative plans for exercise.

Over a 2-year period, 27 individuals, post-bariatric surgery, participated in a 12-week structured exercise programme. Of the 27 participants who began the programme, 20 completed it, and all 20 (17 women, 3 men; 10 African-American, 10 Caucasian/European) participated in focus groups designed to supplement the standard evaluation data and provide insight into participants' views. Participants ranged in age from 24 to 62 years (48.3 ± 11.4), with a recorded body mass index ($\text{kg}\cdot\text{m}^{-2}$) at programme entrance of 38.8 ± 8.0 . Two types of bariatric surgery were reported, laparoscopic banding (14 participants, 70%) and laparoscopic Roux-n-Y (six participants, 30%). Participants were 144 (± 82) days post-surgery upon beginning the programme.

The BELT programme operates on a rolling enrolment admission, so that at any one time, the group of individuals in the programme might each be at differing time-points to completion. Focus groups were conducted when a small group of individuals that started at similar times were nearing completion. Individuals were all within 2 weeks of pre-completion or post-completion when they participated in the focus group. All participants were residents of Greensboro, NC, or its surrounding area in the south-eastern United States and had undergone bariatric surgery at the same local hospital.

Measures

A semi-structured interview guide was developed to address participants' views about (1) goals and benefits of the BELT programme specifically and exercise/physical activity in general; (2) specific aspects of the programme that serve as facilitators of participation/adherence or barriers to participation/adherence; and (3) plans for continuing exercise/physical activity after the 12-week programme. The guide was designed to focus the

conversation around the aforementioned topics using broad, open-ended questions. Each question from the guide was presented to the group, and the group members answered in a conversational format. If the conversation drifted too far from the original question or did not fully address the information requested, the interviewer asked for clarification or redirected the responses back to the question. The same interview guide was used for each focus group. See Appendix A for the complete interview guide.

Physical fitness testing using standard accepted functional fitness testing protocol (sit-and-stand, arm curl and 6-min walk) (23) was administered pre-programme and post-programme participation. Participants were also given a short questionnaire at the same time regarding exercise behaviours and sitting time questions from the International Physical Activity Questionnaire (24).

Data collection

During the 2-year data collection period, six focus group interviews were conducted. Each focus group had two to six participants and lasted between 30 and 60 min. The interviews were conducted by a moderator who did not work directly with the participants during their 12 weeks in the programme to allow participants to voice thoughts and feelings about programme policies and personnel without those involved being present. Additionally, notes were taken by a neutral researcher not familiar with participants to provide contextualization and aid in interpretation of responses. Participants were instructed that their responses would remain anonymous and that no BELT programme personnel that they worked directly with would know what the participant said about the programme, the individual personnel or the overall experience. Participants were encouraged to report both positive and negative thoughts, experiences and overall impressions of the programme for the sake of future improvements. All interviews were audio-recorded, and recordings were destroyed after transcription to protect the privacy of the participants.

Data analysis

A qualitative descriptive approach was used in the collection and analysis of the focus group data (25). The interest was in the participants' experiences in the programme itself, and this type of approach allowed for a deeper understanding of the essence of experiences (26). Upon completion, the interviews were fully transcribed verbatim, and three researchers independently read the transcripts prior to discussing results. Researchers met initially to agree upon the main themes of the interviews.

The themes were based primarily on the responses given by participants with secondary consideration given to the topics from the interview guide. This was done in accordance with accepted practice in the analysis of qualitative research (27) to ensure that any bias researchers may have of expected outcomes was minimized. The main themes included, 'benefits,' 'facilitators and barriers' and 'plans for continuing activity.' The data were coded into these themes separately by each of the individual researchers to establish trustworthiness of the results (28). The team then met to triangulate data; any disagreement on coding was discussed until a consensus could be reached as to the meaning of the data (29). Next, similar responses within each main theme were grouped together into sub-themes, and the research team again individually coded the results into the sub-themes and met to discuss and resolve discrepancies among these sub-themes. Once consensus was reached on all coded data, the team analysed the final coding for meaning and summarize the results.

Results

The purpose of this study was to evaluate the benefits, barriers and facilitators of the BELT programme from the perspective of participants who completed the programme. Basic information regarding pre-programme and post-programme data on functional fitness testing (23) and sitting time (24) is provided as a reference of the outcomes experienced by participants (see Table 1).

The themes and subthemes that emerged from coding the focus group interviews are discussed in the following paragraphs along with anecdotal evidence from participants. The findings indicated that participants had overwhelming positive responses to the programme; felt there were numerous positive benefits and facilitators (increased knowledge of physical activity, social support and exercise enjoyment); and nearly all participants overcame barriers to complete the 12-week BELT programme in its entirety and planned to continue exercise.

Table 1 Pre-programme and post-programme data (paired *t*-tests; mean \pm SEM)

| Variable | Pre | Post | <i>p</i> -value |
|---------------------------------------|----------------|----------------|-----------------|
| Body mass index (kg m ⁻²) | 38.8 \pm 1.9 | 36.4 \pm 1.8 | <0.001 |
| Sit and stand (repetitions) | 12.8 \pm 0.5 | 15.2 \pm 0.9 | <0.001 |
| *Arm curl (repetitions) | 15.6 \pm 0.7 | 17.2 \pm 0.7 | 0.083 |
| 6-min walk (m) | 538 \pm 18 | 575 \pm 19 | <0.001 |
| Daily sitting time (min) | 387 \pm 38 | 313 \pm 29 | 0.070 |

*Five-pound (2.27 kg) women; 12-lb (5.45 kg) men.

Benefits

Several participants cited gaining information and knowledge about exercise, improved health and fitness, developing an exercise habit or commitment and social support of the group as important benefits of participating in the BELT programme. Notably, weight loss was seldom mentioned.

Knowledge and information

Participants noted that increasing knowledge was important for making a lasting lifestyle change. They cited the value of the information gained regarding proper execution of exercise movements, effective goal setting and strategies for alleviating anxiety or fear surrounding exercise settings. One participant noted, 'It's meeting my goals so far. I'm learning how to properly use machinery. I'm learning how to properly execute the different exercises.'

Fitness and health

Participants reported feeling an increased amount of energy, gaining muscular endurance and strength, changes in body composition (i.e. fat loss or increased muscle tone) and improved affect as result of participating in the BELT programme. It was noted that the BELT programme encouraged participants to 'get the exercise and learn it will be a lifestyle change.' Another participant mentioned the progress she has seen:

My first day I was ten minutes in and I thought I was going to die. But now my resistance is up. Like [the trainer] said I'm up to 9, and that is pretty hard. And doing thirty minutes at the pace I'm doing and watching those calories burn, I love that!

Support of the group

Participants reported gaining a supportive social network through their shared experiences in the BELT programme. As one participant explained, 'having people around you who have been through the same thing,' was an important aspect of the programme. Participants also felt they were able to support one another through emotional and physical support. Another participant stated:

It's not like I can call all my skinny friends and say, 'let's go to the park and walk.' We have a commonality. We do. We've been through some stuff to get to this point so that's one of our melding factors that we've all had the surgery, we've all gone through it, we're the same in that respect.

Commitment and exercise habit

Participants indicated that they experienced a change in their lifestyle habits, felt more comfortable with exercising and had more positive attitudes and feelings towards exercise after participating in the programme. One participant noted: 'It was kind of a challenge for me to get up at 4:30 in the morning and come in and work out ... it makes me feel good. I did complete this. I didn't quit, you know. This is something I've done on my own.'

Facilitators and barriers

Structure, accountability and support were cited as the main facilitators of exercise by nearly all participants. Lack of time and motivation were acknowledged as barriers, but the early hour of the programme did not deter most individuals. It should be noted that all these participants completed the 12-week programme, and overall, the programme had a 25% attrition rate.

Structure and accountability

Participants noted enjoying the structure of the programme, including the 12-week duration, set schedule and consistency of programme staff and facilities. Other facilitators included favouring having a set routine and feeling a sense of commitment to attending workout sessions. One participant noted, 'I just like having it hold you accountable every morning to be here. If you have people counting on you, you'll be here.'

Social support, progress and encouragement

Participants felt supported through being 'part of a team,' and that they could relate to one another because they were 'around people kind of in the same boat.' They were able to provide each other encouragement and ideas for improvement and progression throughout the programme. One participant indicated that observing participants at different stages in the programme was particularly helpful for support: 'I see folks that have been here throughout the program and how they look and how they can perform. I'm going to reach that stage. So it encourages me.'

Time

Lack of time was indicated as a barrier to programme participation. Many participants had trouble attending sessions due to the early morning time frame and having work constraints. Other participants noted they were

'not a morning person,' which deterred them from attending consistently.

Motivation and doubts

Many participants noted feeling nervous before entering the programme, being uncomfortable with their bodies or feelings of laziness. One participant speculated a possible reason for lack of participation among other patients who were post-bariatric surgery: 'I wonder how many people are out there though that were offered this program and just were too self-conscious to go through it.'

Plans for the future

Participants were asked about their plans for the future upon completion of the BELT programme. Many participants indicated their intent to continue exercising after finishing the programme due to the benefits gained from taking part in the 12-week exercise sessions. However, although all 'wanted' to continue exercise, few had specific plans. Examples of exercise-specific plans included joining a gym, group exercise classes, walking or running. One participant mentioned continuing to exercise and helping others become involved, 'My goal is to continue but I am planning on branching out and doing more new things now that the program is over. I'm going to try and get the family involved. I'm excited about that.'

A few participants indicated feeling apprehensive about being able to continue exercising on their own after completing the BELT programme. It was mentioned that not having a group to exercise with made participants nervous about being able to continue with their current activity level. Losing access to the exercise facility also was a concern to some individuals, due to the expense of other gym memberships. Most participants, however, felt hopeful about their ability to continue exercising after termination of the BELT programme.

Discussion

The purpose of the present study was to investigate the perceptions of participants regarding benefits, barriers and facilitators experienced, while in the BELT programme, a 12-week exercise programme specifically designed for individuals' post-bariatric surgery. Results indicated that participants clearly saw benefits of the BELT programme. Participants experienced increased fitness performance in almost all post-programme physical assessment testing, and these fitness gains were reflected in participants' assessment of the benefits of participation in the BELT programme. Individuals felt that BELT contributed in important ways to the overall

successes experienced in their personal weight-loss journeys. This outcome lends additional support to recommendations that individuals who have had bariatric surgery receive educational and exercise interventions after surgery in efforts to facilitate a lasting lifestyle change for weight loss, weight maintenance and positive health behaviours (30–32).

While most individuals were new to exercise and hesitant in the beginning stages of the sessions, the programme structure, encouragement and feedback from the staff and the support of the group facilitated their physical activity experience. Barriers of time and self-doubts were overcome as participants stayed with the programme, which is consistent with previous exercise interventions in individuals who were overweight or obese (16,18). Notably participants were highly adherent to the 12-week programme with few dropouts, and focus group results reflected clear positive evaluations. The 25% attrition rate was much lower than the average 50–65% dropout rates generally seen in exercise programme participation (33). However, few participants had clear, specific plans for continuing their physical activity at the end of the BELT programme. Their responses pointed to the need to build in a transition phase and help participants maintain their physical activity after the structured programme came to an end. It should be noted that bariatric surgery alone does not inherently change physical activity behaviour. Longitudinal research suggests that physical activity may not increase, and sedentary behaviour may not decrease post-surgery, particularly in those having significant family responsibilities (34). To this end, it is important that any physical activity intervention focuses on both long-term adherence and reduction of sedentary behaviour. Without a clear transition plan, it becomes easy for the individual to regress to former inactive behaviour.

Many of the participants who enter the BELT programme were previously sedentary and may lack the physical ability to perform strength exercises using bodyweight that are necessary for activities of daily living, therefore suggesting the integration of more active lifestyle decisions aimed at increasing abilities to complete functional activities in daily life (e.g. climbing stairs, carrying groceries and household chores) (2). For example, helping the individual realize that she already has the ability to walk to the store and back by doing so every day at lunch time will help her to create a mastery experience for walking ability. This foundation may then be used to gradually increase the amount of time she walks each day for exercise, as this is consistent with recommendations to start exercise at low-intensity efforts while being mindful of weight bearing activities for individuals with joint pain (35). The trend in daily sitting time for some participants

was reduced greatly; these participants reported moving more and generally leading more active lifestyles than they had prior to participation. The non-significant changes seen in reported sitting time may be attributed to the small sample size combined with the few participants who were not able to alter their lifestyle beyond the addition of an exercise routine. Recent research demonstrated that sedentary time was not reduced post-bariatric surgery in individuals who had no specific physical activity training (34). It is also possible that this trend could hold in individuals who have participated in physical activity interventions if the programme does not include focus on specifically decreasing sedentary behaviour.

In combination with mastery experiences, the BELT programme provides participants with vicarious experiences from current and past participants, as well as verbal persuasion and encouragement from peers, trainers and staff, all of which aid in increasing self-efficacy for exercise (36). Indeed, a recent study found that interpersonal support (e.g. social support and friendly comparison) may be more beneficial than intrapersonal support (e.g. individual goal setting) in facilitating lasting behaviour change in adults (32). Individuals repeatedly report social support as one of the most helpful aspects of post-operative success in weight loss (37). Social support was one of the favourable aspects of the BELT programme and should be further investigated in promoting lasting behaviour change in bariatric populations. These components may serve as the foundation for creating a transition programme to enhance exercise adherence and feelings of efficacy in exercise settings as participants leave the BELT programme.

This information may be used to enhance the existing BELT programme using participant feedback as a guide. As well as maintaining the consistent programme structure, a behavioural change intervention programme may specifically aim to increase participant knowledge about exercise and health; provide social support and foster a sense of community among programme participants; and address potential barriers while developing action plans to continue exercise upon programme completion (15,16). Similar programmes might be specifically structured with behavioural components to promote accountability and foster social support among participants, in addition to providing a supportive exercise setting. Long-term weight loss, with or without bariatric surgery, is most effective in interventions that are the focused on behaviour change (38). To this end, obesity is influenced by learned behaviours (39). Post-operative interventions such as BELT strive for long-term success in promoting lifestyle modification for patients following bariatric surgery through inclusion of behavioural interventions.

Adoption of the aforementioned strategies may aid in promoting adherence.

Limitations of this study include a sample consisting of only participants who completed the programme. As noted earlier, a high rate of participants completed the programme and that may suggest the programme attracts participants who are motivated to participate. Without including those who drop out, it is difficult to assess all the challenges faced by all participants. These limitations prohibit generalizability of the results to other populations. Another limitation is that the early morning time of BELT limited the number of patients volunteering to participate in the programme. However, Bond *et al.* (40) reported higher levels of daily physical activity in bariatric surgery patients whose longest MVPA periods occurred in the morning versus other times of the day.

In sum, this research examined participant perspectives of the 12-week BELT exercise programme. The main findings include the positive health benefits participants gained by participating in this programme (e.g. overall health and well-being, not solely weight loss), the importance of social support from programme peers and support staff, the need to identify potential barriers and to develop plans to deal with barriers and continue exercise upon programme completion. These findings will be used to enhance the existing BELT programme and may help guide similar programmes to develop behavioural change interventions aimed at increasing participant exercise knowledge, enhancing social support networks and promoting continued activity upon programme completion. Future research should aim to focus on decreasing potential barriers to physical activity participation while enhancing programme social support and providing education and resources to facilitate long-term exercise.

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Appendix A

BELT programme – focus group

Focus group purpose – get participants' views on how the programme fits with their goals, evaluation of programme structure, personnel and environment, suggestions for improving the programme, as well as their plans for continuing exercise/physical activity and ideas on how the programme could help them in the transition and staying active.

Group interview outline

Programme meeting your goals.

- Why did you start in the BELT programme (what were your goals)?
- Did your goals change at all over the programme?
- Did the programme meet your goals?
- What are the most important things you have gotten from the programme?
- Did you have any difficulties/problems/barriers with the programme?
- How could the programme better meet your needs? Please give any suggestions for improving the programme.
- Anything else you'd like to add?

Programme structure

- What was good about the programme structure? What could be improved?
- Consider: exercise activities, progression/combinations of exercises, daily schedule/organization, contact with instructors/exercise leaders and so forth.

- Educational sessions – what was good or could be improved; their fit with the programme.

Programme personnel/staff

- What was good and what could be improved about the staff
- Consider: their knowledge, experience, interactions with you and so forth.

Programme environment

- What was good and what could be improved about the programme environment?
- Consider: facilities, accessibility, equipment, comfort, general atmosphere and so forth.

Plans for continuing exercise/physical activity after BELT programme

- Do you plan to continue coming to the programme after the 12-week programme?
- What would make a continuing programme better for you?

- Do you plan to continue with exercise/physical activity on your own, outside of the programme?
- What exercise/physical activities will you do?
- Do you anticipate any problems/barriers in continuing with exercise/PA on your own?
- How could the BELT programme help you continue with your outside activities?

Distance version of BELT option

We are considering a 'distance' version of the BELT programme with fewer face-to-face exercise sessions and more online instruction/information.

- What do you think?
- Do you have any specific suggestions?
- What would make a distance programme helpful to BELT participants?

Other

- Is there anything else about this programme or your participation in it that you would like to share?