Feasibility of implementing a meditative movement intervention with bariatric patients

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ABSTRACT

Successful interventions are needed to help improve obesity rates in the United States. Roughly two-thirds of adults in the United States are overweight, and almost one-third are obese. In 1991, the National Institutes of Health released a consensus statement endorsing bariatric surgery as the only means for sustainable weight loss for severely obese patients. However, approximately one-third of bariatric patients will experience significant post surgical weight gain.

Purpose of study: This study is designed to determine if meditative movement (MM) would be a feasible physical activity (PA) modality to initiate weight loss in bariatric surgery patients who have re-gained weight.

Methods used: A feasibility study was recently completed in 39 bariatric patients at Scottsdale Bariatric Center (SBC) during regularly scheduled bariatric support groups at SBC. A short demonstration of MM was presented after which a short focus group was conducted to gauge interest level, acceptability and the potential demand for MM programs in this population. Attitudes and intentions surrounding MM were also collected.

Findings: Approximately 75% of participants indicated they would consider practicing MM as part of their post surgical PA routine.

Conclusions: MM may be a feasible PA modality in bariatric patients to improve bariatric surgery weight outcomes.

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1. Introduction

1.1. Statement of the problem

While obesity rates have plateaued within the last decade (Flegal, Carroll, Ogden, & Curtin, 2010), two-thirds of the United States population is currently classified as overweight (defined as a BMI of 25–29.9 kg/m2) or obese (a BMI greater than 30 kg/m2) (Flegal, Carroll, Ogden, & Curtin, 2010). Obesity is a serious issue, not only because of its impact on morbidity and mortality rates, but also due to the financial burden it puts on both the individual and society.

Obesity is associated with increases in cardiometabolic disease, certain types of cancer, premature death, osteoarthritis, and breathing problems (CDC, 2010). Additionally, in 2005, an estimated $190 billion, or approximately 21% of the United States health care expenditures, was spent on obesity-related issues (Cawley & Meyerhoefer, 2012).

In general, surgical interventions are more effective than behavioral treatments in both the short and long term (Buchwald & Williams, 2004; NIH, 1998). However, for certain bariatric patients, between the first and second years following surgery, weight loss often stabilizes and a substantial proportion of individuals begin to regain lost weight (Hsu, Sullivan, & Benotti, 1997; Hsu et al., 1998). It is estimated that more than 20% of bariatric surgery patients will regain a significant amount of weight that was initially lost (Meguid, Glade, & Middleton, 2008). While statistics vary per procedure and intervention, approximately 30–40% of surgically treated patients regain up to one-third of their initial weight loss long term (Bond et al., 2008) at the 5-year mark.

1.2. Physical activity (PA) and bariatric surgery

Although PA is recognized as an integral part of the non-surgical management of obesity for weight loss and weight loss maintenance (Jakicic et al. 2001; Wing & Phelan, 2005), the relationship between PA levels and weight loss or maintenance following bariatric surgery is unknown. There are currently no randomized controlled trials of physical activity and weight loss in bariatric patients, however...
observational studies have found that post-surgical exercise is positively associated with improved weight outcomes.

There are currently no standard PA recommendations for bariatric surgery patients; however walking to the point of volitional fatigue with small increases in daily step counts is a common recommendation (Petering & Webb, 2009). The American College of Sports Medicine (ACSM) has no specific guidelines for bariatric patients but does indicate that aerobic exercise should be the focus of a post-bariatric surgery program, as it burns the most calories and is the best way for a previously sedentary individual to ease into physical activity (ACSM, 2011). Additionally, the American Society for Bariatric Surgery (ASBS) recommends initiating walking from postoperative day one (Silver, Torquati, Jensen, & Richards, 2006).

1.3. Meditative movement

Alternative forms of exercise are gaining in popularity in the general population, especially those that include a focused, meditative or mind–body component (La Forge, 2005). Meditative movement (MM) has recently been proposed as a category of exercise with some elements of practice that differ substantially from conventional versions of exercise (Larkey, Jahnke, Etter, & Gonzalez, 2009). In contrast to many other forms of PA, many of the MM practices are low impact, and moderate- to low-intensity and encourage people to move slowly and gently. The most current comprehensive definition of MM was generated by Larkey et al., 2009 and includes four components: focus of the mind; some form of body movement or postural positions; focus on breathing and a deep state of relaxation. Some of the most common examples of MM are tai chi (TC), qigong (QG) and yoga. These types of meditative activities may be beneficial and more feasible to initiate for physically de-conditioned individuals such as the overweight/obese or in bariatric patients.

Tai chi easy (TCE) is a simple MM form that was developed by Dr. Roger Jahnke and formulated into a standardized research intervention protocol by a team of researchers (Jahnke, Larkey, & Rogers, 2010). The TCE intervention combines simplified TC movements with QG methods that include gentle flowing movements and slow shifts of body weight while incorporating deep, soothing breathing. It has been used in several prior projects (Jahnke, Larkey, & Rogers, 2010; Larkey et al., 2012) and one recently completed randomized controlled trial (RCT) with breast cancer survivors showing reduction in fatigue and depression, and improved sleep and physical function (Larkey et al., 2011).

There is growing evidence that MM practices may help with weight loss and/or maintenance in overweight or obese populations, possibly by reducing maladaptive eating behaviors. A 12-week yoga program reduced incidences of binge eating in a group of obese females (McVey, O’Halloran, & McGartland, 2009). Specifically, women perceived an overall reduction in the quantity of food they consumed, decreased eating speed, and an improvement in food choices throughout the program. A meditation-based intervention also found significant decreases (p < .001) in binge eating disorder in obese females, and time spent meditating was significantly associated (p < .01) with less binge eating episodes (Kristeller & Hallett, 1999). And in bariatric patients, the practice of mindful eating has been shown to be effective in maintaining weight loss post surgery (Engstrom, 2007).

Given the absence of interventions using MM in the bariatric population, a feasibility study was conducted to determine the overall interest in, acceptability of and potential demand for MM programs in bariatric surgery patients as well as their attitudes and intentions towards MM using a questionnaire based on the theory of planned behavior (TPB) (Ajzen, 2006). According to the TPB, behavioral beliefs produce a favorable or unfavorable attitude toward the behavior; normative beliefs result in perceived social pressure or subjective norm; and control beliefs give rise to perceived behavioral control. When combined, attitude toward the behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention (Fig. 1). In general, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person’s intention to perform the behavior in question.

Intention, when supported by these predictors, is more likely then to result in behavior change. Our study was designed to explore bariatric patients’ responses to a direct experience of TCE and to rate TPB factors that could best predict enrollment and adherence to such an intervention.

2. Methods

2.1. Recruitment sites and study population

This is a cross-sectional study with a qualitative component in a convenience sample of 39 bariatric patients at Scottsdale Bariatric Center (SBC), located in the southwestern United States. The SBC performs bariatric surgery on approximately 350 men and women annually (Blackstone & Cortes, 2010). The mean age of the study participants was 49.42 ± 14.41 years. Reflecting the demographic statistics of the SBC population, 67% of the subjects were female, and 80% were White, non-Hispanics.

Participants were recruited by research staff during ongoing and regularly scheduled post surgical support group meetings at SBC. Three separate support groups were invited to participate in the study with purposeful selection across time post-surgery: 1) 0–4 months 2) 1 month; and 3) > 4 months. The largest study support group was the 1-month post-surgery group (n = 16), followed by 0–4 months (n = 13). Individuals over 4 months post-surgery had the smallest attendance (n = 10). These decreasing numbers of participants is consistent with how the SBC program usually observes declining participation in the support process over time.

2.2. Ethical considerations

The institutional review boards associated with the university that conducted this research and the hospital where the data were collected approved this study, and all participants were provided a written information letter. An informed consent was not necessary for this study and not provided.

2.3. Procedures

During regularly scheduled weekly support groups, an information letter was placed on the chairs when participants entered the room with a description of the study as “...testing the feasibility of engaging bariatric patients in a meditative movement intervention as a potential strategy for continued weight loss.” Participants were told that they were invited to participate in a demonstration of MM at the end of their session that day, and then join in a brief focus group to share their responses, and a short survey, and that they were welcome to join or simply leave at the end of the support group session if they preferred not to participate.

At the end of the support group session, for those that remained, members of the research team described the current study and answered questions regarding the study. The research team included the principal investigator and a research assistant. A brief, 2–3 minute oral presentation was given on MM, including what it is and what benefits have been shown in a wide variety of participants. After answering any questions, a short demonstration using a 5–7 minute protocol based on Tai chi easy (TCE) (Jahnke, Larkey, & Rogers, 2010) was presented with an invitation to the support group members to participate if physically able and/or interested. Approximately 95% of those that remained after the support group participated in the study.
2.4. Study measures

A standardized group of questions was developed for the post-surgical focus groups to obtain their thoughts, feelings and intentions around MM (Fig. 2).

Demographic data were obtained and includes age, gender, ethnicity and race. Subjects were asked if they had participated in PA (not defined) over the past 30 days, and the answer was coded as yes/no. A questionnaire reflecting TPB constructs was utilized to collect participant information on the perceptions of being “able” to perform MM, attitudes about the movements introduced, and expectations that others would support them in the practice of MM. The current study instrument, which we entitled the MM and TPB Questionnaire, was a slightly modified version of a measure validated in a bariatric population using TPB to predict general exercise intentions and behaviors (Hunt & Gross, 2009). The original question items were predominantly left intact, with the word “exercise” being replaced by “MM.” For example, the question “Most people who are important to me want me to exercise regularly over the next two weeks” was revised to “The people important to me would support my learning about MM.”

For the construct of attitude, the internal consistency reliability (Cronbach’s alpha) ranged from 0.78 to 0.90. For the construct of subjective norms, internal consistency values ranged from 0.58 to 0.80, with the values for the subjective factor score being significantly higher (Cronbach’s alpha 0.90 to 0.94). For the construct of perceived behavioral control, the Cronbach’s alpha ranged from 0.78 to 0.82.

The feasibility study TPB questionnaire was broken down into the standard components of attitude, subjective norms, perceived behavioral control and intention. The TPB component of behavioral attitudes was broken down into two 5-question measures: attitudes about learning and attitudes about trying MM. The subjective norm component was comprised of 2 questions, and both the subjective norms and perceived behavioral control sections each contained 3 questions. All of the questions were 5-point scales; 1 indicating “least likely,” “strongly disagree” and the “most negative” of responses. An answer of 5 indicated a “very positive” response, “strongly agree,” or “most likely.” Each of the components and subcomponents were summed into a total score for that specific TPB construct with higher scores representing a more positive attitude toward regular exercise behavior (Table 1). A complete list of study questions is presented in Fig. 3.

3. Data analysis

Descriptive statistics were run to determine patterns and frequencies of participant characteristics and responses. Additionally, Spearman’s rho correlations were run to examine potential associations among TPB constructs and participant characteristics. Differences in TPB questionnaire responses by post-surgical groups were explored using a Kruskal–Wallis one-way analysis of variance (ANOVA). Based on the mean age, subjects were separated into those ≤ 48 years and those ≥ 49 years and TPB construct scores were compared between the groups. Data are presented as means and standard deviations and an α-level of 0.05 was used to determine statistical significance.

4. Results

Data were analyzed using PASW (Predictive Analytics Software) Version 18 for Windows (Chicago, IL). Demographic characteristics of the study subjects are reported in Table 2. The results indicated that 71% of participants indicated a positive attitude about learning more about MM, and 65% reported a positive attitude about trying MM in the short term.
All associations between age, group status, PA participation in the 30 days prior to the study and TPB construct scores were non-significant except for a weak inverse correlation between group assignment and PA participation (r = −0.41; p = 0.01). Those patients 1-month post surgery had the highest incidence of reported PA. There were no significant differences or discernable trends between post surgical group status and any of the TPB constructs measured. Additionally, separating the groups into those above and below the mean age resulted in no significant associations between the two in terms of PA, group assignment or the TPB questionnaire responses.

Sample responses to the open-ended focus group questions were as follows: (a) regarding physical sensations, a common response of participants was that the MM exercises were “relaxing,” “peaceful” and “gentle.” One subject indicated that the movements were “too gentle” and that she preferred more high intensity activities after her surgery. Being physically active was a new and exciting state for her, and doing low-impact activities reminded her of her “old life” that she wanted to leave behind. Many others in the groups echoed this sentiment as well. (b) A large proportion of subjects indicated a willingness to incorporate MM into their post surgical exercise regimes given its low impact nature. However, one male participant who reported being retired military explained the movements reminded him of Middle Eastern religious practices and that he was unwilling to engage in TCE under any circumstances. (c) The demonstration exercises were described as “perfect” for after surgery, “very gentle” and “helpful for breathing.”

Seventy-five percent of the participants provided high scores, i.e., scores closer to 5, on the subjective norm questions of social support around MM practice and questions surrounding perceived behavioral control. Aggregate questions asking about intention to practice MM scored the lowest, i.e., scores closer to 1, among participants, with only 69% indicating a positive intention towards the behavior. However, 75% of individuals answered positively on the individual question within

<table>
<thead>
<tr>
<th>TPB component</th>
<th>Total n = 39</th>
<th>Score mean (SD)</th>
<th>Total score possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude-Learning</td>
<td>39</td>
<td>21.08 (7.05)</td>
<td>30</td>
</tr>
<tr>
<td>Attitude-Trying</td>
<td>20</td>
<td>19.60 (6.81)</td>
<td>30</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>20</td>
<td>7.45 (1.64)</td>
<td>10</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>20</td>
<td>11.20 (3.02)</td>
<td>15</td>
</tr>
<tr>
<td>Intention</td>
<td>39</td>
<td>10.36 (3.52)</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 1
Theory of planned behavior component score totals.

1. Attitude
   For me, the idea of learning about Meditative Movement (MM) during the next 3 months would be...
   Very Disagreeable --1---2---3---4---5-- Very Agreeable
   Very Annoying --1---2---3---4---5-- Very Interesting
   Very Unpleasant --1---2---3---4---5-- Very Pleasant
   Very Tiring --1---2---3---4---5-- Very Energizing
   Very Useless --1---2---3---4---5-- Very Useful
   Very Unsatisfying --1---2---3---4---5-- Very satisfying

2. Subjective norm
   The people important to me would support my learning more about MM.
   Strongly Disagree --1---2---3---4---5-- Strongly Agree
   I think that people who are like me are interested in trying out practices like MM.
   Strongly disagree --1---2---3---4---5-- Strongly Agree

3. Perceived Behavioral Control
   For me, to participate in MM during the next 3 months would be...
   Very Difficult --1---2---3---4---5-- Very Easy
   I think I would be able to participate in MM during the next 3 months.
   Strongly Disagree --1---2---3---4---5-- Strongly Agree
   I am confident that I can overcome obstacles that could hamper my participation in MM during the next 3 months.
   Strongly Disagree --1---2---3---4---5-- Strongly Agree

4. Intention
   I will learn more about MM during the next 3 months.
   Very Unlikely --1---2---3---4---5-- Very Likely
   I would be willing to consider practicing MM regularly during the next 3 months.
   Very Unlikely --1---2---3---4---5-- Very Likely
   I will try to practice MM regularly during the next 3 months.
   Very Unlikely --1---2---3---4---5-- Very Likely

Fig. 3. TPB Questionnaire.
the intention component, “I would be willing to consider practicing MM regularly during the next 3 months.”

5. Discussion

In this feasibility study to determine if MM would be a viable PA modality in post bariatric patients, approximately 75% of participants indicated a positive attitude towards MM in general and a willingness to engage in MM post-surgery. These results are promising as bariatric patients may regain up to one-third of their initial excess weight loss (Bond et al., 2008) by post-surgical year five.

There are currently no standard PA guidelines in terms of frequency, intensity, duration or even mode of exercise for bariatric patients although walking to volitional exhaustion is a common recommendation. MM is an appealing PA modality for this population that should be explored for several reasons. Immediately after surgery, patients are typically weak and frail with limited range of motion. MM, and specifically TCE, is a gentle, low impact activity suitable for deconditioned individuals in the recuperative process. MM has been shown to lead to additional and more vigorous PA (Dechamps, Lafont, & Bourdel-Marchasson, 2007), which can contribute to attenuated weight re-gain in this population. PA has been positively associated with the successful maintenance of surgical weight loss (Livhits et al., 2010a, 2010b). Finally, MM may cultivate mindfulness and healthier eating patterns, which could also be associated with longer-term weight loss for bariatric surgery patients.

While the study obtained positive feedback on MM in a bariatric surgery population, the sample was small (n = 39), and many participants did not provide complete answers to study questionnaires, limiting the implications of this research. However, the researchers find it encouraging that the questions that were answered suggest that MM may be a viable PA modality in bariatric patients.

Correlational analyses found no significant associations between the subject characteristics of age, group or participation in PA during the 30 days prior to the study and to any of the TPB construct questions and may reflect a small sample size. There was a weak inverse correlation between PA and group (r = −.41; p = 0.01), but the meaning of this relationship, if any, is unclear. As expected, all of the individual TPB questions were significantly associated with each other. Those subjects that felt more positive and supported around MM expressed that same positivity across all of the TPB variables. Surprisingly, the question “For me, the idea of trying MM over the next 3 months would be very disagreeable to very agreeable” was not significantly related to any other TPB question. Reasons for this anomalous result are unclear.

Future randomized controlled trials are needed to fully explore the relationship between MM and post-surgical weight gain. And although the current study participants were predominantly White (80%) and female (69%), this does reflect the national statistics for bariatric surgery patients (Martin, Beekley, Kjorstad, & Sebesta, 2009). Trials with larger sample sizes and varying control groups will be important to conduct so that the true impact of MM on post-surgical weight gain, if any, can be ascertained.

References


Table 2

Demographics characteristics of feasibility participants.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Total n = 39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (n = 37)</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>11</td>
</tr>
<tr>
<td>Females</td>
<td>26</td>
</tr>
<tr>
<td>Age (years) (n = 36)</td>
<td></td>
</tr>
<tr>
<td>49.4 ± 14.4</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>18–76</td>
</tr>
<tr>
<td>Ethnicity (n = 34)</td>
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</tr>
<tr>
<td>Hispanic</td>
<td>7</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>27</td>
</tr>
<tr>
<td>Race (n = 33)</td>
<td></td>
</tr>
<tr>
<td>33 White</td>
<td></td>
</tr>
<tr>
<td>Group status*</td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>16</td>
</tr>
<tr>
<td>Group 2</td>
<td>13</td>
</tr>
<tr>
<td>Group 3</td>
<td>10</td>
</tr>
<tr>
<td>PA in last month (n = 38)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>07</td>
</tr>
</tbody>
</table>

* Group 1 = 1 month post surgery; group 2 = 0–4 months post surgery; group 3 = >4 months post surgery.

