Effectiveness of an Internet Community for Severely Obese Women

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Abstract. While Internet communities have become thriving sources of support, little is yet known about their effectiveness. We retrospectively sampled morbidly obese (Body Mass Index, BMI>40) women who were active for at least a year in an Internet community. We compared self-reported weight changes between women who had high online participation levels (n=71) versus those with low participation levels as control (n=69). Women who actively participated online lost on average 7.52%, while those who were passive lost 5.39% of their original body weight. For active women, there was positive, albeit weak, correlation (r=0.22, p<0.05) between online participation levels and weight loss, while no significant correlation was noted for the control. Current results indicate modest evidence supporting active participation in Internet groups as an effective weight loss strategy for the target group.

Keywords. Diabetes, Social Media, weight loss, Peer Support, Internet Groups

Introduction

Obesity is one of the major risk factors for Type 2 diabetes (T2D), and several approaches have so far been used to encourage weight-loss without surgery; to delay or even prevent development of secondary complications. Women with extra body fat are at more risk, accounting for an estimated 77% (and for men = 64%) of new cases of Type 2 diabetes [1]. Obese women are at more risk because of the natural tendency to gain weight, coupled with increasingly sedentary lifestyles with age.

Internet groups and communities have become a popular source of support, but little is yet known about their effectiveness [2]. Perhaps these sources of support might be effective for one user group and not necessarily the other, for example, the elderly, women, children or teenagers. Further, our understanding of the social interactions and camaraderie, and how it affects weight loss performance is still limited.

A basic measure of active online participation could be the number of posts a user submits to a community. Using more complex analysis, we have previously shown that we can at least try to predict weight loss based on the interaction patterns among patients in these Internet communities [3], and that persuasive technology could be used to en-

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hance outcomes [4]. The number of protocols for studying Internet systems for solving healthcare problems, such as weight loss, is increasing [5,6]. While this may seem like a promising trend, many of these protocols only concern privacy-deficient social media such as Facebook and Twitter

The goal of this study was to assess effectiveness of a popular Internet group for older women, with a focus on the morbidly obese sub-group, and to show whether there was any difference in outcomes for women who were actively participating online verses those who were passive. This is an important sub-group since physicians would normally recommend more drastic measures such as surgery or pharmaceutical treatments.

1. Methods

This paper reports on a retrospective analysis of data on older women who were active for at least one year in an Internet group, and who wanted to loose weight.

We used only the publicly available HTML data from a convenience sample American website. The site has a total of more than 200 thousand registered users. We sampled a subgroup for older women, parsing the data into a more structured form, and going through pseudonymization with one-way hashing before the data was used.

We sampled extremely obese (BMI>40) women (n=140, age>50) who were active for at least a year in an Internet group. We analysed amount of online participation, as well as the self-reported weight-related data, such as initial weight, weight goal, closing weight, height, etc. We sampled the women as '*active*' (n=71), in terms of online participation, if they posted on average more than once a week, and '*passive*' (n=69) if they posted once or less a week.

Online participation was measured by the amount of messages the participants posted or '*posts*'. These messages could be in reply to other messages, or they could be new messages. Private messages within the community were not considered in this study.

Women who underwent bariatric surgery were excluded from the study. Although drastic measures such as surgery or pharmaceutical treatments are recommended for the user group, our study only considered this Internet-based lifestyle solution.

2. Results

Table 1 summarizes the descriptive frequencies observed in the sampled data.

Table 1. Descriptive frequencies for the relative weight loss (ie, weight loss in relation to the initial weight, as a percent)

	Active	Passive
Mean weight loss	7.52 %	5.39 %
Std Dev	5.76 %	5.20 %
Mode	0.00 %	0.00 %
Minimum weight loss	0.00 %	0.00 %
Maximum weight loss	23.10 %	22.70 %
Skewness of weight loss distribution	0.83	1.27

(a) Weigh loss distribution for passive users

(b) Weigh loss distribution for active users
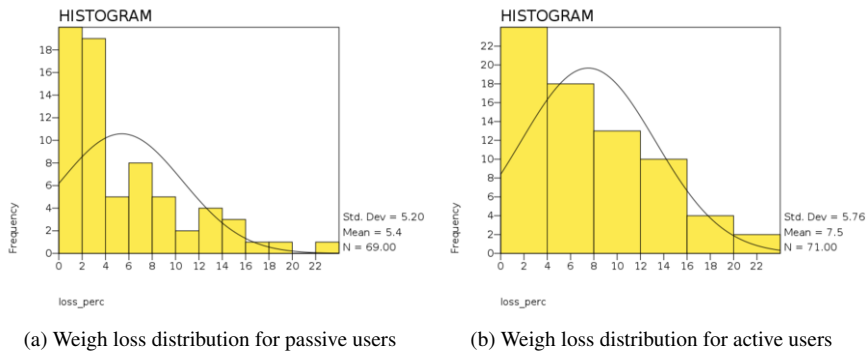
Figure 1. Relative weight loss distribution for passive and active users, with a normal distribution curve.

From the Table 1, the mean relative weight loss was 7.52% and 5.39% for active and passive women, respectively. This represents a drop of about 6% of the initial body weight for both groups combined. The modal weight loss percent was zero for both groups, and there was little difference in the other extreme, ie. maximum weight loss between the groups, which was 23.10% and 22.70%.

Fig.(1a) shows the relative weight loss distribution of the passive users, while Fig.(1b) shows the relative weight loss distribution of the active users. The distribution for passive users is highly positively skewed (1.27), while the active distribution is mildly positive (0.83). As can be observed, the majority seem to have lost less than 4% for the passive group, while the active group had a comparatively larger number of women who lost much higher percentages.

The two groups combined, Fig. (2) shows that many of the participants only posted a few posts, a couple of hundreds or less. However, there were some participants who were very active, posting in excess of a thousand posts.
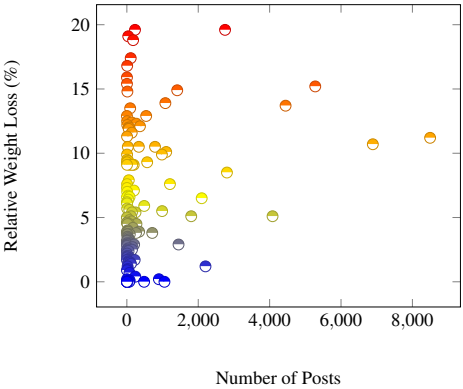
Figure 2. Number of posts vs. the relative weight loss

Using bivariate analysis with one-tailed tests, we found positive correlation (r=0.22, p<0.05) between online participation levels and weight loss for the active group. For the passive group, the correlation was positive but extremely small (0.06) and statistically insignificant (p=0.319).

3. Discussion

These results initially seem to provide a solid case for active participation in weight loss Internet groups. However, the mean weight loss was not much larger than that of the minimally active or passive group. Perhaps these results suggest that there are only marginal gains in increasing levels of participation, once one becomes part of an online community. However, given that small relative weight losses have been shown to increase insulin sensitivity, perhaps these results provide sufficient evidence of benefits for obese women at high risk of developing T2D.

While it is a reasonable assumption that the women may have had a higher than normal motivation to lose weight because of the excessive weight, we observed that the majority had only modest weight losses. This observation is consistent with previous reports in the literature [7].

It is interesting to note that those who were the most active online did not necessarily perform the best. Perhaps this points to the need for moderation, and the need to move away from the computer or smart-phone; for some real physical exercise. However, those who publicly declared ambitious weight loss goals, achieved better results. Previous studies have also reported improved results with use of weight tracking mechanisms.

While the objective measurements were modest for both groups, perhaps other less objective benefits such as emotional support or just making friends with similar patients are just as important for total quality of life. It may be important for further studies to measure both objective weight losses, as well as consider other qualitative outcomes.

Given that methodologies and measurements in this new field are still poorly understood, we argue that this study contributes to a better understanding of the new roles Internet-based societies play in healthcare.

3.1. Limitations

Our control group consists of women who already had some exposure to Internet groups. Perhaps a better control group might have been women who were not exposed to Internet groups entirely. However, strictly controlled prospective efficacy studies may also be limited for studying online social interactions because of the Hawthorn effect and other confounding factors.

Another limitation is that we do not know the start date of the decision to lose weight; we only know when they joined the Internet group. Additionally, our analyses do not include women who dropped out within a year of joining. Such women might have dropped out because they have infact gained more weight, they have joined another Internet community, or they simply were not motivated to continue. It could also be because they no longer actively write posts, but rather only follow conversations of others, and are therefore not captured on our data.

Further to that, people who have committed to lose weight likely try several remedies, many of which cannot be known or accounted for in scientific studies. On the whole, however, this is likely not important for this effect study, as long as the observed weight loss can be related to their level of online participation.

Internet data can be unreliable because human input is prone to error or even deceit. Although this limitation can be severe, it is not unique to our study, because any study or survey that relies on human input is susceptible. Since we analyse data from large amounts of participants, it's is possible any negative effects are minimized.

3.2. Future Work

For the future, it might be an idea to have well-moderated groups, as the limitations of misinformation are well-documented [8]. Smart functions that monitor performance of each individual and issue recommendations or nudges based on prescribed behavior or deviation from model behaviour may be necessary to sustain motivation for active participation.

4. Conclusions

Results indicate modest evidence supporting active participation in Internet groups as an effective weight loss strategy for the target group. Although several factors affect BMI and weight loss, decoding intricate online interactions promises a greater understanding of social media, and its relation to weight loss outcomes. This study also raised pertinent methodological questions that warrant further inquiry.

Acknowledgment

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