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TITLE: Experience and expectations of patients on weight loss: The Learning Health System Network Experience

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ABSTRACT

Objective: Weight perception and degree of confidence in achieving healthy lifestyle can be determinants of engagement in obesity interventions. This study explored patients' perceived need for weight loss, the degree of self-confidence in ability to lose weight, and sought to identify factors associated with patients' self-confidence in ability to lose weight.

Methods: The authors analyzed data from a survey mailed to primary care patients within 5 sites of the Learning Health Systems Network (LHSNet) that explored participants' prior experience with weight management.

Results: Among the 2263 participants who completed the survey section on "Patients' Experience with Weight Management", perceived need to lose 51 pounds or more was statistically significant among those with class III obesity compared to other BMI groups (p value: <0.001). Reported desire to lose weight was also significantly higher among those with highest BMI than those who were overweight (p value: <0.001). However, this same group had the lowest belief in ability to lose weight (p value: <0/001). On multiple regression analysis, being female, higher BMI, and need to lose >10 pounds were each independently associated with less belief in being able to lose weight.

Conclusions: Patients had varying perceptions on weight loss; those with category III obesity had the highest desire to lose weight but had the least confidence in ability to lose weight. Higher BMI, female gender and need to lose >10 pounds were associated with decreased self-confidence in ability to lose weight.

INTRODUCTION

In 2016, more than 650 million adults worldwide aged 18 years and older have a body mass index in the obese category. The worldwide prevalence of obesity nearly tripled between 1975 and 2016; it has been linked to more deaths than underweight (1). The United States Preventive Services Task Force (USPSTF), the United States National Institutes of Health, the American Heart Association, American College of Cardiology, and The Obesity Society (AHA/ACC/TOS) have independently developed guidelines on assessment and management of obesity that primarily involve multicomponent behavioral or lifestyle interventions (2,3, 4).

Weight perceptions and confidence in one's ability to achieve a healthy lifestyle can be determinants of engagement in overweight and obesity interventions. A prior study done in a large institution showed that while individuals with higher body mass index (BMI) were more likely to report that their physician had told them that they had overweight, such conversations were less likely to change their personal view of their weight or motivate them to

lose weight (5). A deeper insight on patient experience and expectations regarding weight loss can therefore assist clinicians in planning patient-centered intervention strategies and refining existing interventions to better ensure outcome success.

Studies evaluating perceptions of individuals who have overweight or obesity had consisted of small size and had yielded contrasting observations, from those who had realistic perception of obesity and recognized the need to lose weight, to those whose perception of obesity was below its true prevalence (6, 7). To address this limitation and obtain a more robust insight on the personal experiences and expectations regarding weight loss among patients who have overweight and obesity, data was analyzed from a survey of primary care patients within the Learning Health Systems Network (LHSNet). The LHSNet survey was conducted to identify barriers to successful weight loss and patients' expectations regarding primary care physicians' assistance in weight management (8). A section of this survey specifically explored participants' prior experience with weight management, their perceived need for weight loss, and the degree of self-readiness and self-confidence in ability to lose weight which is the primary focus of our study. The investigators further sought to identify factors that were associated with patients' self-confidence in ability to lose weight.

METHODS

The LHSNet is composed of 9 sites and includes data on approximately 10 million patients. Details of the LHSNet structure and sites have been described elsewhere (9, 10). Each LHSNet site hosts a local common data model (CDM) DataMart and share common data elements across sites. The LHSNet CDM contains outcome data on patient cohorts including the “weight cohort”. The building of the weight cohort centered on cohorts of children and adults across the LHSNet that were assembled and identified as having overweight or obesity based on PCORnet obesity algorithm, focusing on individuals with at least one other height and weight measurement in the previous 5 years. Weights of pregnant women were excluded from 6 months before to 3 months after delivery date. Patients within the weight cohort at 5 of the 9 LSHNet sites served as the sampling population for the survey. These 5 sites contributed the majority of patients within the weight cohort. The study was deemed exempt by Mayo Clinic Institutional Review Board (IRB) which served as the IRB of record for the participating study sites. Protocol approved passive consent was obtained from all study participants before study initiation. Five LHSNET sites participated in this study.

Survey Instrument

The Weight Management Survey was developed by the LHSNet weight cohort work group based on previously developed questions/scales of patient beliefs, behaviors, and experiences (11-16). The development and detailed features of the survey had been described in a recently published study (8). The survey had 5 main sections one of which was Patients’ Experience with

Weight Management. This section consisted of 7 items with combined close and open ended questions. The first item asked the question “Have you gained or lost weight recently”; for a “yes” response to weight loss, an additional open ended question asked how weight loss was achieved. Items 2 and 3 asked “Do you think you need to lose weight (yes/no)” and “How much do you think you need to lose (10 lbs. or less, 11-25 lbs., 26-50 lbs., 50 lbs. or more)”. Items 4 and 5 asked the respondents to rate, on a Likert scale of 1-10, how much they DESIRE to lose weight, and how much they BELIEVE they can lose weight respectively. For items 6 and 7, respondents checked off listed factors that “would motivate you to seek weight information” and “major barriers to your losing weight”. Copy of the survey is available upon request from the authors.

The survey was purposefully developed to be brief and anonymous. Surveys were delivered and returned via US Postal Service (USPS). Only one mailing was done.

Data Collection

Each of the 5 participating LHSNet sites ran a query on its local CDM DataMart to identify patients who fit study criteria. Eligible patients were 18 years or older with available weight and height (for BMI calculation). The query randomly selected 4000 patients per site who met the criteria with additional stratification of 1000 patients per BMI category: overweight [BMI, 25-

29.9 kg/m²], obesity class I [BMI, 30-34.9 kg/m²], obesity class II [BMI, 35-39.9 kg/m²], obesity class III [BMI, >40 kg/m²]), totaling 20000 for the network.

From the 20,000 selected patients, 19,964 had valid addresses. The surveys were mailed during a 4-week period from October 27, 2017, through November 22, 2017; data collection lasted four months from October 27, 2017, through March 1, 2018. Three hundred thirteen (313) mailed surveys were returned by the USPS as “undeliverable.” Of the remaining 19,652 delivered surveys, 2799 (14.2%) were returned as completed with an additional 1033 (5.2%) refusal to participate. The Mayo Clinic Survey Research Center received and entered the data from all returned surveys using a dual data entry system. A detailed flow diagram of study participants has been presented elsewhere (8).

Data Analysis

Quantitative data on experience and expectations of patients were analyzed using chi-square tests to compare categorical variables across BMI category groups and analysis of variance (ANOVA) to compare continuous variables across groups. A single multiple linear regression model using the respondents’ self-reported belief in their ability to lose weight as dependent variable was used to analyze data for potentially associated characteristics.

Qualitative data from patients’ responses on weight loss measures that had been used in the past were grouped into major themes.

RESULTS

Among the 2263 participants who completed the survey section on “Patients’ Experience with Weight Management”, 648 (29%) had overweight, 619 (27%) had class I obesity, 474 (21%) had class II obesity and 522 (23%) had class III obesity. Demographic characteristics differed by weight category; persons in the class III obesity category were younger, more likely to be female, more likely to be non-white and to have some college education or more (Table 1).

When asked if they have lost weight recently, 920 participants positively responded to the question. Major themes identified as measures taken to lose weight were: dietary interventions (diet modification, diet programs), exercise, change in eating/physical activity patterns and surgery, with the largest percentage of responders having attempted dietary management (53.15%, N=489). Weight loss programs, medications and surgery were utilized more by those in the higher BMI categories; 23 of 37 participants who had bariatric surgery and 15 of 31 participants who took weight loss medications had a BMI of 35 and above (Table 2).

Table 3 describes the respondents’ weight management expectations by BMI category groups. Higher proportion of those with class III obesity had expectations regarding the need to lose weight and the need to lose >50 pounds compared to the other BMI groups (p value: <0.001). Lower BMI categories were associated with perceived need for lesser weight loss.

To the survey questions which asked the responders to rate, on a scale of 1-10, their desire to lose weight and belief on their ability to lose weight, those with BMI of 40 and higher reported

significantly higher desire to lose weight than those with BMI in overweight category (8.7 +/- 1.8 SD vs. 7.7 +/-2.2 SD, p value: <0.001). However, the same group that had the greatest desire to lose weight had the lowest belief in ability to lose weight (6.5 +/-2.7 SD vs. 7.7 +/-2.2 SD, p value: <0.001).

In a multiple regression analysis, being female, having higher BMI, and needing to lose >10 pounds were independently associated with lesser belief in being able to lose weight. Similarly, presence of medical condition that limits physical activity, food cravings and uncertainty on food choices were inversely associated with belief in ability to lose weight. Greater desire for weight loss was positively associated with increased belief in ability to lose weight (Table 4).

DISCUSSION

Results from this study yielded several observations that were associated with participants' weight loss experiences and expectations. The majority of respondents who were able to achieve weight loss did so through lifestyle measures, mainly diet modification. Indeed, data adequately supports the effectiveness of behavior based interventions with or without pharmacologic agents for weight loss (17-18). Statistical comparison of the weight loss methods by BMI category was not done; however, a trend towards non-behavioral methods among participants in higher BMI categories was observed.

Patients who had overweight or had obesity recognized the need for weight loss. Those with higher BMI perceived the need to lose more weight and expressed greater desire to lose weight. More than 50% of those with class II obesity desired to lose at least 26 pounds and majority of those with class III obesity would like to lose over 50 pounds. The average behavioral weight loss programs that focused on lifestyle measures (nutritional counseling, physical activity and improvement in sleep pattern) result in 5-7% weight loss; slightly higher percentage of weight loss (8-10%) had been achieved in more intensive, comprehensive programs (18-20). Hence, a weight loss goal of ≥ 50 pounds may not be generally achievable through non-surgical and non-pharmacological interventions. This unrealistic weight loss goals and expectations had previously been seen among patients who had sought behavioral, pharmacological and surgical treatment for obesity, (21-24) and had been reported as a barrier to effective weight loss intervention outcomes (25). Assistance with goal-setting, problem-solving and a multi-faceted weight loss intervention program with regular feedbacks and motivational support would be helpful in moving patients forward to successfully achieving realistic weight loss goals.

Interestingly, the same group of patients who would benefit most from weight loss interventions; i.e., those with higher BMI and those who felt the need to lose >10 pounds, had the least confidence in their ability to lose weight. While an independent correlation between greater desire to lose weight and increased belief in ability to lose weight was seen in multiple

regression analysis, the perceived confidence in being able to lose weight decreased with higher BMI. One plausible explanation would be the increased likelihood that this group of patients may have already tried several weight loss measures but were unsuccessful in their attempts at losing weight, which consequently decreased their perceived confidence in their ability to lose weight. This had been observed even among well motivated individuals who have had several unsuccessful quit attempts at smoking cessation (26). Frustration with multiple failed efforts at weight loss eventually prompted most patients to seek bariatric surgery (27). The survey did not ask responders for the frequency of attempts at weight loss; this is a gap that would be interesting to investigate further.

This inverse relationship between desire and confidence to lose weight may also partly be due to ambivalence to come forward and seek help due to stigma-related cognitions commonly experienced by those with higher BMI. In a semi-structured interview conducted among a small group of individuals with diverse backgrounds and levels of obesity, reluctance in presenting their concerns to their primary care physicians stemmed from self-consciousness to their features and uncertainty as to how they would be perceived (28). This highlights one of the many challenges faced by individuals with obesity. While a discussion on stigmatization associated with overweight and obesity is beyond the scope of this paper, it is well reported in literature to impact motivation for lifestyle behavior change, self-confidence, and obesity management outcomes (29-31).

In his social cognitive theory, Albert Bandura defined self-efficacy as confidence in one's ability to perform a task which affects whether thought is translated into action (32). Individuals are likely to pursue a course of action if perceived to be attainable within their capabilities. Judgments of self-efficacy also determine how much effort people will expend and how long they will persist in the face of obstacles or aversive experiences. The role of self-efficacy in driving behavioral changes and predicting success in weight loss interventions, have been increasingly recognized in recent years (33-34). Coaching and other strategies that improve self-efficacy have been shown to positively impact lifestyle behaviors that potentially contribute to sustained weight loss and challenge us to rethink our approach to weight loss management (35-37).

An association between being female and decreased confidence in ability to lose weight was also seen on multiple regression analysis. Several factors may have contributed to this observation. Females not only tend to experience transitional events in life that trigger weight gain such as pregnancy and menopause but are also more vulnerable than men to weight stigmatization (38). There is also a bidirectional relation between depression and obesity that has been observed more among women than men that may impact one's self-confidence (39, 40). Likewise, women more likely have had prior weight loss attempts which might have been unsuccessful thereby lowering their self-confidence in ability to lose weight. Further studies that explore gender associated aspects of obesity may be needed.

The major strength of this study is the inclusion of 5 diverse sites and large sample groups. The surveys were also anonymously completed which helped reduce potential barriers in patients' participation at reporting personal perceptions and experiences. This anonymity however prevented linking the participants' data to health records which is one limitation of this study. The survey asked the participants if they had previously lost weight and what measures helped them to lose weight. It did not ask how much weight loss was achieved or any behavioral change made as well as the number of attempts at weight loss and measures used for weight loss maintenance which would have provided additional relevant information regarding patients' experience. The 12% response rate may have resulted in a study sample not being representative of the general population of patients with overweight and obesity receiving health care at study sites; however, it should be noted that response rates of mailed surveys have steadily declined in recent years (41). Participants were also mainly non-Hispanic whites; hence, results may not be generalized to other ethnic groups.

SUMMARY

Participants in this study had varying expectations regarding weight loss, both on perceived need and on belief in ability to lose weight. Those with higher BMI had perceived need for greater, potentially unrealistic weight loss but also reported being least confident at their ability to lose weight. In a multiple regression analysis, being female, having higher BMI, and needing to lose 11 pounds or more were independently associated with lesser belief in being able to

lose weight. Results from this study affirmed the importance of incorporating goal-setting, problem solving and self-efficacy skills through motivational interviewing, coaching or other strategies in weight management programs.

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Table 1: RESPONDENTS' CHARACTERISTICS

Characteristic	Body Mass Index, kg/m ²				p†
	25.0 – 29.9 (N=648*)	30.0 – 34.9 (N=619*)	35.0 – 39.9 (N=474*)	≥ 40.0 (N=522*)	
Age, years	62.0±14.7	60.5±13.6	58.4±13.2	54.1±14.2	<0.001
Sex					<0.001
Male	309 (47.7)	280 (45.2)	166 (35.0)	134 (25.7)	
Female	339 (52.3)	339 (54.8)	308 (65.0)	388 (74.3)	
Race					0.016
White, non-Hispanic	591 (93.5)	554 (92.9)	420 (91.3)	453 (88.6)	
Other	41 (6.5)	42 (7.1)	40 (8.7)	58 (11.4)	
Education					<0.001
High school graduate or less	123 (19.2)	118 (19.4)	95 (20.5)	113 (22.2)	
Some college	204 (31.9)	210 (34.5)	170 (36.6)	229 (44.9)	
Four year college degree or more	313 (48.9)	280 (46.1)	199 (42.9)	168 (32.9)	

*Due to missing data, the sum of the response categories for a given characteristic may not equal the total number of respondents.

†Age was compared across groups using analysis of variance (ANOVA) and categorical variables were compared across groups using the chi-square test.

Table 2: WEIGHT LOSS METHOD THEMES BY BMI*

Weight loss method	BMI 25-29.9 (N=257)	BMI 20-34.9 (N=256)	BMI 35-39.9 (N=185)	BMI 40 and up (N=222)
Diet/diet program "ate less/ate different" "change eating habit" "count calories/portion control"	154 (59.9%)	138 (53.9%)	90 (48.6%)	107 (48.1%)
Exercise "walk/jog" "sports/swim/train"	80 (31.1%)	80 (31.2%)	43 (23.2%)	45 (20.2%)
Weight loss medication	10 (3.9%)	6 (2.3%)	5 (2.7%)	10 (4.5%)
Weight loss surgery "bariatric surgery"	4 (1.5%)	10 (3.9%)	9 (4.8%)	14 (6.3%)
Others (illness, weight loss program, stress) "got sick, had cancer" "depressed; stressed"	77 (29.9%)	77 (30.0%)	74 (40.0%)	81 (36.4%)

*Percentage may not add up to 100% since categories are not mutually exclusive

Table 3: WEIGHT MANAGEMENT EXPECTATIONS

Characteristic	Body Mass Index, kg/m ²				p†
	25.0 – 29.9 (N=648*)	30.0 – 34.9 (N=619*)	35.0 – 39.9 (N=474*)	≥ 40.0 (N=522*)	
Do you think you need to lose weight?					<0.001
No	162 (25.0)	36 (5.8)	7 (1.5)	4 (0.8)	
Yes	486 (75.0)	583 (94.2)	467 (98.5)	518 (99.2)	
How much do you think you need to lose?*					<0.001
10 pounds or less	155 (32.0)	41 (7.1)	1 (0.2)	3 (0.6)	
11 to 25 pounds	267 (55.0)	248 (42.9)	61 (13.1)	12 (2.3)	
26 to 50 pounds	62 (12.8)	240 (41.5)	197 (42.4)	53 (10.2)	
51 pounds or more	1 (0.2)	49 (8.5)	206 (44.3)	449 (86.9)	
How much do you DESIRE to lose weight? (0-10)*					<0.001
mean±SD	7.7±2.2	7.9±2.0	8.4±2.0	8.7±1.8	
median (25 th , 75 th)	8 (6, 10)	8 (7, 10)	9 (7, 10)	10 (8, 10)	
How much do you BELIEVE you can lose weight? (0-10)*					<0.001
mean±SD	7.7±2.2	7.1±2.4	6.6±2.5	6.5±2.7	
median (25 th , 75 th)	8 (6, 10)	7 (5, 9)	7 (5, 9)	7 (5, 9)	
What are the major barriers to your losing weight?*					
Not enough time to do physical activity	113 (23.3)	111 (19.0)	92 (19.7)	94 (18.2)	0.196
Medical condition that limits ability to do physical activity	106 (21.8)	180 (30.9)	162 (34.7)	250 (48.3)	<0.001
Do not have access to healthy food choices	12 (2.5)	22 (3.7)	20 (4.3)	46 (8.9)	<0.001
Do not have access to a facility to do physical activity	32 (6.6)	54 (9.3)	42 (9.0)	79 (15.3)	<0.001
Cannot afford a gym membership	51 (10.5)	107 (18.4)	109 (23.3)	171 (33.0)	<0.001
Pressure from my family or peers to not lose weight	6 (1.2)	8 (1.4)	7 (1.5)	16 (3.1)	0.086
Food cravings that prevent me from losing weight	192 (39.5)	234 (40.1)	230 (49.3)	262 (50.6)	<0.001
Not sure which foods to eat to help lose weight	47 (9.7)	101 (17.3)	67 (14.4)	91 (17.6)	0.001
Not enough time to do physical activity	113 (23.3)	111 (19.0)	92 (19.7)	94 (18.2)	0.196
Medical condition that limits ability to do physical activity	106 (21.8)	180 (30.9)	162 (34.7)	250 (48.3)	<0.001
Do not have access to healthy food choices	12 (2.5)	22 (3.7)	20 (4.3)	46 (8.9)	<0.001
Do not have access to a facility to do physical activity	32 (6.6)	54 (9.3)	42 (9.0)	79 (15.3)	<0.001

*Data are summarized only for patients who indicated that they think they need to lose weight.

†Categorical variables were compared across groups using the chi-square test and continuous variables were compared across groups using analysis of variance (ANOVA).

Table 4: CHARACTERISTICS POTENTIALLY ASSOCIATED WITH BELIEF IN BEING ABLE TO LOSE WEIGHT*

Characteristic	Estimate	(95% C.I.)	P
Age, per 10 years	-0.0	(-0.1, 0.1)	0.553
Female	-0.7	(-1.0, -0.5)	<0.001
White, non-Hispanic	-0.5	(-0.9, -0.1)	0.013
Desire to lose weight (0-10), per 1 point	0.4	(0.4, 0.5)	<0.001
Education			0.601
High school graduate or less	Reference		
Some college	0.0	(-0.3, 0.3)	
Four year college degree or more	-0.1	(-0.4, 0.2)	
Body Mass Index, kg/m ²			<0.001
25.0 – 29.9	Reference		
30.0 – 34.9	-0.5	(-0.8, -0.2)	
35.0 – 39.9	-0.9	(-1.3, -0.5)	
≥ 40.0	-0.9	(-1.4, -0.5)	
How much do you think you need to lose?			0.036
10 pounds or less	Reference		
11 to 25 pounds	-0.3	(-0.7, 0.1)	
26 to 50 pounds	-0.4	(-0.9, 0.0)	
51 pounds or more	-0.8	(-1.3, -0.2)	
Barriers to losing weight			
Not enough time to do physical activity	-0.1	(-0.4, 0.2)	0.388
Medical condition that limits ability to do physical activity	-0.3	(-0.5, -0.0)	0.022
Do not have access to healthy food choices	0.1	(-0.4, 0.7)	0.579
Do not have access to a facility to do physical activity	0.0	(-0.4, 0.4)	0.929
Cannot afford a gym membership	-0.2	(-0.5, 0.1)	0.175
Pressure from my family or peers to not lose weight	-0.2	(-1.0, 0.5)	0.590
Food cravings that prevent me from losing weight	-0.5	(-0.7, -0.3)	<0.001
Not sure which foods to eat to help lose weight	-0.4	(-0.7, -0.1)	0.009

*Data were analyzed using a single multiple linear regression model with the respondent's self-reported belief in their ability to lose weight (0-10) as the dependent variable. For each explanatory variable the estimated regression coefficient is presented along with a corresponding 95% confidence interval. For categorical variables with > 2 categories the p-value corresponds to the multiple degree of freedom test comparing across all categories simultaneously.