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Eating self-efficacy as a predictor of long-term weight loss and obesity-specific quality of life after sleeve-gastrectomy. A prospective cohort study

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Highlights

- Preoperative eating self-efficacy significantly improved to two and five years after sleeve gastrectomy
- Initial improvement in eating self-efficacy predicted higher weight loss at five years follow-up
- Greater improvement in eating self-efficacy from before- to five years after surgery predicted higher weight loss and obesity-specific quality of life at five years follow-up

ACCEPTED MANUSCRIPT

Eating self-efficacy as a predictor of long-term weight loss and obesity-specific quality of life after sleeve-gastrectomy. A prospective cohort study

Running title: Eating self-efficacy following sleeve gastrectomy

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ABSTRACT

Background: A person's confidence to control eating, eating self-efficacy (ESE), has been identified as a target for long-term weight management in non-surgical weight loss interventions, but has to a limited extent been studied after bariatric surgery.

Objective: We investigated the association between ESE, weight loss and obesity-specific quality of life (QOL) after sleeve gastrectomy (SG).

Setting: A single-center longitudinal study

Methods: Data from adult patients were collected before SG, and at mean 16 months (\pm standard deviation [SD] 4 months) and 55 (\pm 4) months postoperatively. ESE was measured by the Weight Efficacy Lifestyle Questionnaire Short-Form. Multiple regression analyses were performed with excess BMI loss (%EBMIL) and obesity-specific QOL as dependent variables. Age, sex and other preoperative values were covariates in all models.

Results: Of 114 preoperative patients, 91 (80%) and 84 (74%) were available for follow-up 16 and 55 months after SG, respectively. Mean %EBMIL from baseline to 16 and 55 months was 76% (95% confidence interval [CI]: 71.9, 79.6) and 67% (95% CI: 61.9, 72.2), respectively. Preoperative ESE scores improved significantly at both 16 and 55 months ($P=0.002$), but did not predict postoperative %EBMIL or QOL at 55 months ($\beta=-0.08$, $P=0.485$). Greater change in ESE from 0-16 months predicted higher %EBMIL ($\beta=0.34$, $P=0.013$) at 55 months, and improvements in ESE from 0-55 months were significantly associated with higher %EBMIL ($\beta=0.46$, $P=0.001$) and obesity-specific QOL ($\beta=0.50$, $P<0.001$) 55 months after SG.

Conclusion: Significant improvements in ESE were seen at 16 months, and remained high at 55 months after SG in this cohort. Patients who improved their ESE the most also experienced the highest weight loss and obesity-specific QOL five years postoperatively. Future research should address whether enhancement of ESE corresponds to sustained improvements in eating behavior after bariatric surgery.

Keywords: Bariatric surgery, Sleeve gastrectomy, Eating self-efficacy, Obesity-specific quality of life

Background

Sleeve gastrectomy has globally become a preferred bariatric surgery treatment option, in which persistent (≥ 5 years) postoperative weight loss and remission of comorbidities are achieved in a majority of patients [1]. However, inadequate weight loss or weight regain is a concern after all bariatric procedures, [2, 3]. Obesogenic environments and compensatory neurobiological mechanisms to hedonic eating are known barriers to weight loss maintenance [4, 5]. On the other hand, specific self-regulating attitudes may potentially override weight driving forces, by providing a sense of control, and may be important factors in determining the outcome after bariatric surgery [6].

Self-efficacy is a key concept in social cognitive theory, referring to an individual's confidence in his or her ability to respond adequately to perceived obstacles [7]. Previous studies have demonstrated that self-efficacy is an important predictor of behavioral change in areas such as tobacco dependence, cardiac rehabilitation and exercise [8, 9]. Specific to weight loss, the self-efficacy concept has shown to be strongly associated with self-regulating skills for weight management, specifically eating behavior and physical activity [10-12]. Within this theoretical framework, personal factors, behavior and environmental influence interact reciprocally. Environmental factors, e.g. availability of food, or personal factors, e.g.

former weight loss experience, do not impact a person's eating behavior directly. Instead they influence individual confidence in reaching the desired weight loss. Individuals may understand that a particular behavior (restrictive eating) will lead to a certain outcome (weight loss), but such knowledge does not influence their (eating) behavior unless they believe in their ability to adhere to it consistently [7]. A person's self-efficacy typically varies from one coping area to another, and tends to change over time [6]. Previous mastery or failed behavioral experiences may enhance or inhibit self-efficacy, respectively, and can be modified by treatment [13-15].

Eating self-efficacy refers to a person's confidence to control eating in challenging situations [16]. A few cross-sectional studies found significant associations between eating self-efficacy, and weight loss after bariatric surgery [10, 17]. Non-surgical weight loss interventions performed to increase eating self-efficacy were followed by superior improvements in eating behavior [18, 19]. By comparing eating self-efficacy four years after either bariatric surgery or non-surgical treatment for obesity, Batsis et al. found that weight loss was associated with improvements in current eating self-efficacy, and that these improvements were more pronounced in the surgical group [17]. However, prospective data to examine fluctuations in eating self-efficacy before and after bariatric surgery are needed to explore eating self-efficacy as a possible predictive measure for weight loss after surgery.

Since restricted stomach volume and hormonal changes, induced by sleeve gastrectomy, dominate the regulation of food intake and appetite the first 12 to 18 months postoperatively, we further examined changes in eating self-efficacy during the critical weight regain phase, reported to start at approximately 18 months [20, 21].

Self-efficacy is related to positive emotions, effective problem solving and life satisfaction, and may provide individuals with a sense of control over their environment [6]. Hence, self-

efficacious individuals tend to perceive high quality of life [22]. However, prospective long-term data on quality of life after sleeve gastrectomy are sparse although considered an important outcome after bariatric surgery [23]. In their cross-sectional study, Batsis et al. found eating self-efficacy scores to be highly related to quality of life, as measured by a generic quality of life questionnaire [17]. Disease-specific quality of life questionnaires contain characteristics and complaints most relevant to a disease (e.g. obesity), and tend to be more sensitive to change than generic measures [24].

Collectively, there is a need to explore the predictive value of eating self-efficacy on long-term outcome after bariatric surgery, both in terms of weight loss and obesity-specific quality of life. Since eating self-efficacy may change over time and be subject to interventions, such investigations may assist health professionals in support of patients before and after surgery.

Objective

We investigated the predictive value of eating self-efficacy on weight loss and obesity-specific quality of life at 55 months after sleeve gastrectomy.

Methods

Eligible patients underwent sleeve gastrectomy during a seven-month period in 2012-2013 at Voss Hospital, Western Norway. About 230 bariatric operations are performed annually with 90% being sleeve gastrectomy. Five dedicated surgeons performed the operations according to a standardized procedure, using a 32 French tube. Eligibility criteria have been described previously [10, 25]. In brief, patients were accepted if they had a body mass index (BMI) ≥ 40 kg/m², or ≥ 35 kg/m² with at least one obesity-associated comorbidity, age 18 to 65 years, no alcohol or drug abuse, and no active psychosis.

After informed consent, anthropometric, demographic and self-reported data were collected three months before sleeve gastrectomy, i.e. before initiation of preoperative dietary restriction, and during the second year at mean 16 months (\pm standard deviation [SD] 4 months) after surgery. For follow-up during the fifth year, mean 55 (± 4) months after sleeve gastrectomy, questionnaires on eating self-efficacy and obesity-specific quality of life were sent to the patients by mail, requesting information about weight, medically treated comorbidity, any late complications or revisional surgery. The Regional Committee for Medical and Health Research Ethics approved the study.

Outcomes

Definitions of weight outcome

Weight loss was presented as change in BMI ($\Delta\text{BMI} = \text{initial BMI} - \text{postoperative BMI}$) and percent excess BMI loss ($\% \text{EBMIL} = \Delta\text{BMI} / (\text{initial BMI} - 25) \times 100$). Inadequate weight loss was reported in patients with revisional surgery for low weight loss, or $\% \text{EBMIL} < 50\%$. The number of patients gaining more than 10 kg of weight from 16 to 55 months postoperatively is reported [3].

Patient reported outcome measures

Eating self-efficacy was measured by the Weight Efficacy Lifestyle Questionnaire Short-Form (WEL-SF) comprising eight questions representing the patients' "confidence in ability to resist eating" related to emotional eating situations (three items), availability of food (two items), social pressure (one item), positive activities (one item) and physical discomfort (one item). Summed scores range between 0 and 80, with higher scores indicating higher eating self-efficacy. WEL-SF is psychometrically validated for bariatric surgery patients, and is available in English and Norwegian [10, 16].

Obesity-specific quality of life was measured by the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) questionnaire, a 31-item questionnaire comprising a total score and scores on five sub-domains; physical function, self-esteem, sexual life, public distress and work. Scores are transformed into a scale from 0 to 100, where high scores indicate high obesity-specific quality of life [24]. This measure holds strong psychometric properties, and has been validated for Norwegian bariatric surgery patients [26].

Statistics

Continuous variables are presented as means \pm SD or 95% confidence intervals (CI).

Categorical variables are presented as counts and percentages. As appropriate, the independent t-test and chi square test were used.

Mixed effect modelling was performed to study changes in variables over time. Effect sizes of change were calculated and assessed for clinical relevance, according to standard criteria: Trivial (< 0.2), small (0.2 to < 0.5), moderate (0.5 to < 0.8), and large (≥ 0.8) [27].

Multiple regression analyses were performed with %EBMIL and IWQOL-Lite (both at 55 months) as the dependent variables, and WEL-SF as the predictor. We studied whether preoperative WEL-SF predicted %EBMIL, adjusting for age, sex and preoperative BMI. Next we studied whether change in WEL-SF from baseline to 16 months or from baseline to 55 months after surgery predicted %EBMIL, adjusting for age, sex, preoperative BMI and preoperative WEL-SF in both models.

In the analysis on whether preoperative WEL-SF predicted IWQOL-Lite at 55 months, we adjusted for age, sex, preoperative BMI and preoperative IWQOL- lite. Further, we studied whether change in WEL-SF from baseline to either 16 or 55 months postoperatively predicted IWQOL-Lite, controlling for %EBMIL from baseline to 16 or 55 months, respectively, and

adjusting for age, sex, preoperative BMI, preoperative IWQOL-Lite and preoperative WEL-SF in both models.

Unstandardized and standardized beta-coefficients with CI are reported. As described, the clinical importance of regression analysis results was estimated by change in the dependent variables associated with a two-SD difference in the independent variables [28].

Two-sided P values ≤ 0.05 were considered statistically significant. Statistical Package for Social Sciences for Windows version 23.0 (SPSS, Chicago, IL, USA) was used.

Results

The study's inclusion, attrition and follow-up flow are shown in Supplementary Figure 1. Out of 127 eligible patients undergoing sleeve gastrectomy, 114 (67% women) with a mean age of 41.9 ± 11.4 years and a mean initial BMI of 42.7 ± 4.6 kg/m² were included. Participation rates were 80% and 74% at 16 and 55 months, respectively. The preoperative characteristics were similar in patients participating at follow-up after 55 months and those who declined (Supplementary Table A).

Preoperative BMI decreased significantly to 16 months postoperatively ($P < 0.001$). Further, there was a small, but statistically significant increase in BMI from 16 to 55 months postoperatively ($P < 0.001$) (Table 1, Supplementary Figure 2a). This corresponds to 76% (CI: 71.9, 79.6, $P < 0.001$) and 67% (CI: 61.9, 72.2, $P < 0.001$) %EBMIL from baseline to 16 and 55 months, respectively. Δ BMI was 13.1 kg/m² (CI: 12.1, 13.7, $P < 0.001$) from baseline to 16 months, and 11.4 (CI: 10.5, 12.4, $P < 0.001$) kg/m² from baseline to 55 months. Inadequate weight loss (including six patients with revisional surgery due to low weight loss) was seen in 25/83 (30.1%) of patients at 55 months. Twenty-five of 79 patients (32%) regained weight of ≥ 10 kg from 16 to 55 months.

Eating self-efficacy (WEL-SF) increased significantly from baseline to both 16 and 55 months after sleeve gastrectomy ($P = 0.002$), with a non-significant change from 16 to 55 months ($P=0.926$) (Table 1, Supplementary Figure 2c). Mean change from baseline to 55 months after sleeve gastrectomy was 6.8 (CI: 2.7, 10.9, $P = 0.002$). The effect size was 0.4, indicating a small, clinically relevant improvement in eating self-efficacy from baseline to 55 months postoperatively.

Preoperative IWQOL-Lite score increased significantly to both 16 and 55 months (<0.001), with a non-significant change between 16 and 55 months ($P=0.633$) (Table 1, Supplementary Figure 2b). The effect size was 1.5, indicating a large clinically relevant improvement in obesity-specific quality of life from baseline to 55 months.

We conducted three multiple regression analyses with %EBMIL at 55 months as the dependent variable (Table 2a). Preoperative score on WEL-SF did not predict weight loss at 55 months postoperatively ($P=0.485$). However, change in WEL-SF scores from baseline to 16 months predicted weight loss at 55 months ($P=0.013$), as did change in eating self-efficacy from baseline to 55 months ($P<0.001$).

We conducted three multiple regression analyses with obesity-specific quality of life (IWQOL-Lite) after 55 months as the dependent variable (Table 2b). Preoperative WEL-SF score did not predict obesity-specific quality of life 55 months after sleeve gastrectomy ($P=0.266$), nor did change in WEL-SF scores from baseline to 16 months ($P = 0.177$). However, change in WEL-SF scores from baseline to 55 months, revealed a highly significant correlation to obesity-specific quality of life at 55 months after sleeve gastrectomy ($P<0.001$).

Compared to patients with successful weight loss, patients with inadequate weight loss reported significantly lower eating self-efficacy (mean difference 13.0, CI: 5.8, 20.1,

P=0.001) and obesity-specific quality of life (mean difference 15.1, CI: 8.2, 22.0, P < 0.001) at 55 months postoperatively.

Discussion

We prospectively determined the association between eating self-efficacy, weight loss and obesity-specific quality of life after sleeve gastrectomy. Associations were investigated during the short-term postoperative phase (0 to 16 months), where most of the surgically induced weight loss occurs, and the long-term postoperative period where weight regain may follow. The purpose was to identify 1) whether patients' self-efficacy toward eating is associated with weight loss after surgery, with a potential to override homeostatic weight regain mechanisms, and 2) whether improvements in eating self-efficacy would correspond to higher quality of life.

Overall, the majority of patients in this cohort achieved profound and persistent weight loss associated with clinically significant improvements in eating self-efficacy and obesity-specific quality of life. This supports former research on sleeve gastrectomy as an effective treatment option for severe obesity [3]. Still, similar to previous reports, close to one third of the patients did not achieve the predefined limit for a successful weight loss over time [3, 25]. There is no international recognized definition for what constitutes a suboptimal weight loss outcome (failure) after bariatric surgery, though the most commonly reported measure is less than 50% excess weight loss (EWL) [29]. Since the formula of %EWL is based on an ideal BMI = 25 kg/m², %EBMIL provides the same information. Defining inadequate weight loss as less than 50% EBMIL has obvious limitations on an individual level given that metabolic health benefits may occur even at lower levels. Nevertheless, as the intention was to assess associations between eating self-efficacy and weight change as continuous variables, defining a lower cut-off for successful weight loss would not affect the main results of this study.

We found no association between preoperative levels of eating self-efficacy and weight loss at 55 months after sleeve gastrectomy treatment, reflecting the observations in patients undergoing non-surgical interventions [30]. In a recent review of a large number of pretreatment characteristics for weight control after non-surgical interventions, including psychosocial factors such as eating self-efficacy, only fewer prior weight loss attempts had a positive impact on weight loss outcome [30]. Social cognitive theory addresses previous “mastery experience” as the most important source for high self-efficacy expectations [7]. Thus, several prior failed weight loss attempts, as is typical for bariatric surgery patients, may impair their confidence in managing their weight, wherein eating is a key issue. Consequently, their efforts toward a restrictive food intake may decrease.

Instead, we found a significant increase in eating self-efficacy during the initial weight loss phase, and the improvement of eating self-efficacy remained stable 55 months after sleeve gastrectomy. This is in accordance with the above observations in non-surgically treated patients where treatment itself significantly improved participants’ eating self-efficacy [30]. In our cohort, greater improvement in eating self-efficacy from baseline to 16 and 55 months predicted greater weight loss at 55 months, and patients with inadequate weight loss reported significantly lower eating self-efficacy at 55 months than did patients with a successful weight loss. Thus, reported eating self-efficacy closely mirrored weight loss at the same follow-up time point. This indicates that, due to surgically induced initial weight loss, patients’ confidence in their ability to control eating increases, and is subsequently maintained in correspondence with weight change. As such, bariatric surgery may result in a feeling of cognitive control through a profound mastery weight loss experience.

The question arises whether improvements in eating self-efficacy in patients with sufficient weight loss simply mirror changes in body weight, or whether these changes in eating self-efficacy may themselves contribute to a successful outcome after bariatric surgery. In this

regard, our study is limited by lack of data on the patients' eating behavior. On the other hand, evidence for the predictive impact of domain-specific self-efficacy on disparate forms of health enforcing behavior may support the latter assumption [6, 19]. This assumption is also in line with basic concepts of self-efficacy, suggesting that individuals will not make an effort to reduce weight unless they believe they have the necessary competence, eating self-efficacy, to change eating behavior. Since eating self-efficacy clearly is modifiable, our observations warrant further studies of eating self-efficacy as a contributing cognitive factor for sustained weight loss after bariatric surgery.

Overall, obesity-specific quality of life improved significantly in this cohort of patients treated with sleeve gastrectomy. At 55 months, the mean IWQOL-Lite score in was 83.5 (CI: 79.7, 87.3), slightly below the level of 91.8 ± 12.0 reported for the US general population [31]. To our knowledge, long term quality of life outcome after sleeve gastrectomy has not been addressed in larger cohorts previously [23, 32]. The association between change in eating self-efficacy and obesity-specific quality of life also suggests an important contribution of patients' perceived control over eating to other life areas. All domains of the IWQOL-Lite revealed strong correlations with improvement in eating self-efficacy (data not shown), with the most profound association occurring in the domain "self-esteem". These findings are in line with former results on the impact of general self-efficacy on generic quality of life after bariatric surgery [22].

Although we had a strong set of independent variables in this study, we cannot rule out residual and unmeasured confounding. For example, it could be interesting to investigate in future studies how patient-reported mood or distress relates to eating self-efficacy, weight loss and obesity-specific quality of life.

Strengths of the present single center study are the prospective design of follow-up from before sleeve gastrectomy up until the fifth year after treatment. High acceptance of the study among operated patients and prospective follow-up reduces bias introduced by attrition, loss to follow-up and recall difficulties. Furthermore, we add novel insights by recording eating self-efficacy from baseline through short- and long-term postoperative phases believed to be influenced first by surgically-induced restriction of food intake and later by possible homeostatic compensation and weight regain.

Conclusion

The majority of patients maintained significant weight loss and improvements in eating self-efficacy and obesity-specific quality of life at 55 months following Sleeve gastrectomy. Preoperative eating self-efficacy did not predict either weight loss or quality of life at 55 months follow-up. Nevertheless, greater improvement in eating self-efficacy between baseline and 16 months after sleeve gastrectomy predicted better weight loss outcome at 55 months postoperatively. Improvement in eating self-efficacy at 55 months was significantly associated with both weight loss and obesity-specific quality of life. Further research should address whether interventions targeting enhancement of eating self-efficacy, during and after the initial phases of weight loss after bariatric surgery, can contribute to improvements in eating behavior.

Conflict of interest

The authors declare that they have no financial interests to disclose.

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Table 1 **Change in Weight, Weight Efficacy Lifestyle Questionnaire Short Form and Impact of Weight on Quality of Life Lite across time**

Measures	Preoperative (N=114)		Within 16 months (N=91)		Within
	55 months (N=84)	P-value	P-value		
CI 95%	Mean	CI 95%/SD	Mean	CI 95%	Mean
	0 to 55 months	16 to 55 months			
BMI (kg/m²)	42.7	(41.9, 43.5)	29.6	(28.7, 30.4)	31.2
(30.3, 32.1)	< 0.001	< 0.001			
Body weight (kg)	124.7	(121.5, 128.2)	86.1	(83.7, 88.4)	90.4
(87.7, 93.7)	< 0.001	< 0.001			
% EBML	NA		75.6	(71.9, 79.6)	66.9
(61.9, 72.2)	< 0.001	< 0.001			
IWQOL-Lite total	52.1	(48.8, 55.3)	84.8	(81.1, 88.5)	83.5
(79.7, 87.3)	< 0.001	0.633			
WEL-SF	53.6	(50.5, 56.7)	59.8	(56.2, 63.0)	60.1
(56.2, 63.3)	0.002	0.926			

SD = Standard deviation. WEL-SF = Weight efficacy lifestyle questionnaire short form. BMI = Body mass index. IWQOL-Lite = Impact of Weight on Quality of Life – Lite
Change over time was analyzed by mixed effect modelling.

Table 2 a) Multiple regression analysis with % excess BMI loss after 55 months as the dependent variable

Model 1 *	b	(95% CI)	β	P-value
Age	-0.34	(-0.79, 0.10)	-0.17	0.131
Gender	1.47	(-9.19, 12.15)	0.03	0.783
BMI baseline	-1.29	(-2.37, -0.20)	0.26	0.021
WEL –SF baseline	-0.11	(-0.42, 0.20)	-0.08	0.485
Model 2 **				
	b	(95% CI)	β	P-value
Age	-0.29	(-0.74, 0.15)	-0.15	0.192
Gender	4.06	(-6.77, 14.90)	0.08	0.457
BMI baseline	-0.93	(-2.01, 0.14)	-0.20	0.089
WEL –SF baseline	0.08	(-0.29, 0.46)	0.06	0.643
Change WEL-SF (0-16 months)	0.45	(0.09, 0.79)	0.34	0.013
Model 3 ***				
	b	(95% CI)	β	P-value
Age	-0.25	(-0.67, 0.17)	-0.12	0.247
Gender	-0.50	(-10.53, 9.52)	-0.01	0.920
BMI baseline	-1.33	(-2.34, 0.32)	-0.27	0.010
WEL –SF baseline	0.25	(-0.09, 0.60)	0.18	0.149
Change WEL-SF (0-55 months)	0.542	(0.24, 0.84)	0.46	0.001

*Prospective model with only baseline variables as predictors. **Prospective model with change in WEL-SF (0 – 16 months) as main predictor adjusted for baseline variables. ***Prospective association model with Change in WEL-SF (0 – 55 months) as the main independent variable adjusted for baseline variables. BMI = Body Mass Index (kg/m²). EBMI = Excess Body Mass Index Loss. WEL-SF = Weight Efficacy Lifestyle Questionnaire Short Form. b = Unstandardized correlation coefficient. β = Standardized correlation coefficient. CI = Confidence Interval.

b) Multiple regression analysis with Impact of Weight on Quality of Life Lite summary score after 55 months as the dependent variable

Model 1 *	b	(95% CI)	β	P-value
Age	-0.29	(-0.60, 0.02)	-0.20	0.069
Gender	3.33	(-4.60, 11.25)	0.09	0.406
BMI baseline	-0.67	(-1.45, 0.13)	-0.19	0.096
IWQOL baseline	-0.31	(-0.53, -0.10)	0.36	0.005
WEL-SF baseline	-0.13	(-0.36, -0.10)	-0.13	0.266
Model 2 **	b	(95% CI)	β	P-value
Age	-0.16	(-0.46, 0.15)	-0.11	0.299
Gender	3.87	(-3.64, 11.41)	0.11	0.307
BMI baseline	-0.26	(-1.04, 0.51)	-0.08	0.494
%EBMIL (0-16 months)	0.30	(0.10, 0.49)	0.35	0.003
IWQOL baseline	-0.27	(-0.49, -0.05)	-0.30	0.016
WEL-SF baseline	0.01	(-0.27, 0.28)	0.01	0.963
Change WEL-SF (0-16 months)	0.16	(-0.08, 0.40)	0.17	0.177
Model 3 ***	b	(95% CI)	β	P-value
Age	-0.09	(-0.35, 0.17)	-0.06	0.477
Gender	0.30	(-5.96, 6.16)	0.01	0.924
BMI baseline	-0.44	(-1.07, 0.20)	-0.12	0.172
%EBMIL (0-55 months)	0.25	(0.11, 0.39)	0.34	< 0.001
WEL-SF baseline	0.21	(-0.01, 0.43)	0.20	0.064
IWQOL baseline	-0.24	(-0.41, 0.07)	-0.27	0.008
Change WEL-SF (0-55 months)	0.43	(0.24, 0.62)	0.50	< 0.001

* Prospective model with only baseline variables as predictors. ** Prospective model with change in WEL-SF (0 - 16 months) as the main predictor adjusted for baseline variables and EBML (16 months). *** Prospective association model with change in WEL-SF (0 - 55 months) as the main independent variable adjusted for baseline variables and EBML (55 months). IWQOL-Lite = Impact of Weight on Quality of Life questionnaire Lite. BMI = Body Mass Index (kg/m²). EBML = Excess Body Mass Index Loss. WEL-SF = Weight Efficacy Lifestyle Questionnaire Short Form. b = Unstandardized correlation coefficient. β = Standardized correlation coefficient. CI = Confidence Interval.