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Quality of Life Outcomes of Web-Based and In-Person Weight Management for Adults with Serious Mental Illness

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The authors have no conflicts of interest to disclose. All study procedures were approved by the appropriate institutional review boards. All participants completed written informed consent. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or other affiliated institutions.

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Abstract

Adults with serious mental illness have high rates of obesity, with associated negative impacts on health-related quality of life. The present study utilized data from a randomized controlled trial (N=276) to examine the effectiveness of in-person and online-delivered weight management interventions, compared to usual care, for improving health-related quality of life in this population. Participants completed quality of life assessments at baseline, 3 months, and 6 months. Mixed effects models examined group by time interactions. Compared to usual care, in-person MOVE was associated with improvements in loneliness (t=−2.76, p=.006) and mental health related quality of life (t=1.99, p=0.048) at six months, and webMOVE was associated with improvements in weight-related self-esteem at six months (t=2.23, p=.026) and mental health-related quality of life at three months (t=2.17, p=0.031) and six months (t=2.38, p=.018). Web-based and in-person weight management led to improvements in health-related quality of life for adults with serious mental illness.

Among adults with serious mental illness such as schizophrenia and affective psychoses, obesity and its associated impacts on health and functioning are widespread. Obesity is 1.5 to 2 times more prevalent among adults with schizophrenia than in the general population (Annamalai et al., 2017; Hales et al., 2017). One in three adults with serious mental illness meet criteria for metabolic syndrome (Mitchell et al., 2013), and individuals with serious mental illness die, on average, 10-30 years earlier than their counterparts without serious mental illness (Walker et al., 2015). In addition, obesity has significant negative impacts on health-related quality of life (Kolotkin et al., 2008). The impact of weight management interventions on health-related quality of life for this population is unknown, despite an overwhelming consensus that patient-reported quality of life outcomes are an essential component of understanding the impact of treatment on patient well-being and assessing cost-effectiveness of interventions (Acquadro et al., 2003; Kaplan, 2003). In addition, quality of life outcomes are frequently used by key decision makers and stakeholders such as regulatory agencies and payers to influence service provision, public health policy, and reimbursement decisions (Fontaine & Barofsky, 2003). It is therefore vital to examine whether weight loss interventions for individuals with serious mental illness have a significant impact on health-related quality of life.

Standard weight loss interventions are less effective for individuals with serious mental illness (Janney et al, 2018) and must be tailored to the needs of this group. Serious mental illness is associated with psychosocial barriers which hinder access to treatment and motivation, as well as cognitive impairment which impacts comprehension, planning, and organization (Firth et al., 2016). When appropriately tailored, weight management interventions can successfully lead to weight loss for individuals with serious mental illness (Cabassa et al., 2010). Whether these interventions lead to improvements in health-related quality of life in this population has been understudied. In fact, the association of weight loss

with improvements in health-related quality of life in general is equivocal. Weight loss interventions in other populations have been variably associated with no improvement in health-related quality of life (e.g., Maciejewski et al., 2005) or significant improvement in health-related quality of life (e.g., Williamson et al., 2009). For adults with serious mental illness, two randomized controlled trials of weight management interventions that reported on health-related quality of life found negative results (Goldberg et al., 2013; Usher et al., 2013).

To improve access and engagement, behavioral interventions for individuals with serious mental illness can be delivered online. In a recent randomized controlled trial, a web-based adaptation of a weight management program tailored for adults with serious mental illness and augmented with peer coaching (webMOVE) was associated with significantly lower weight among obese participants compared to a usual care control. In-person delivery of the same content (MOVE) was not associated with reduced weight (Young et al., 2018). Both webMOVE and in-person MOVE were associated with increases in physical activity compared to usual care (Muralidharan et al., 2018). Whether a web-based weight management intervention with peer coaching can improve health-related quality of life outcomes among adults with serious mental illness is unknown. The present study examined the impact of in-person MOVE and webMOVE on psychiatric symptoms and health-related quality of life, compared to a usual care control, among individuals with serious mental illness who are overweight or obese.

Methods

Participants and Procedures

The present study utilized data from a randomized controlled trial of a web-based weight management intervention for adults with serious mental illness (Young et al., 2018). Participants were recruited at the Greater Los Angeles VA Medical Center. Participants met the following inclusion criteria: chart diagnosis of schizophrenia, schizoaffective disorder, affective psychoses, post-traumatic stress disorder; body mass index above 30 or over 28 with 10-pound or greater weight gain in the past three months; and age 18 and older. Participants were excluded for: dementia, pregnancy/nursing, bariatric surgery history, recent psychiatric hospitalization, current attendance of weight loss programming, or no control over diet. Eligible participants completed written informed consent and measures of psychiatric symptoms, loneliness, and health-related quality of life. Participants were then randomized to one of three treatment conditions: WebMOVE, in-person MOVE, or usual care. Participants repeated assessments at 3 months and 6 months after randomization by blinded assessors. See supplement for CONSORT diagram.

Intervention Conditions

In-Person MOVE.—In the United States Department of Veterans Affairs (VA), the MOVE! program is an in-person weight management program for Veterans who are overweight or obese. The in-person MOVE condition tested in the present study is a manualized version of MOVE!, tailored for adults with serious mental illness (Goldberg et al., 2013). In-person

MOVE included 24 group and/or individual sessions delivered by a health care provider over six months. The sessions included psychoeducation, goal-setting, and weekly weigh-ins.

WebMOVE.—WebMOVE consisted of interactive online programming and peer coaching support, which participants had access to for 6 months. The online programming included 30 interactive modules with the same curriculum as in-person MOVE presented via text, audio, and video. Individuals could set goals and track their activity and weight. To facilitate engagement, peer coaches, who themselves were Veterans in recovery from serious mental illness, conducted weekly coaching calls with participants to provide reminders, support, and problem-solving. Peer coaches were paid VA employees who each received rigorous training and supervision, which included review of a detailed manual with specific instructions for each coaching call and experiential training.

Usual care.—Participants in usual care were given information on weight management, and could attend standard services, including the standard VA MOVE! program.

Measures

Revised Behavior and Symptom Identification Scale (BASIS-R).—The BASIS-R (Eisen et al., 2004) is a widely-used self-report measure. Weighted scores were calculated in three domains, using established weights: psychosis (BASIS-Psychosis), depression and daily functioning (BASIS-Depression/Functioning), and interpersonal relationships (BASIS-Interpersonal). The BASIS-R is valid for use in individuals with serious mental illness (Niv et al., 2007).

Three-Item Loneliness Scale.—This measure assesses the respondent's perceptions of social isolation using three items: "How often do you feel you lack companionship?", "How often do you feel isolated from others?", and "How often do you feel left out?" The scale has satisfactory reliability and validity in population level studies (Hughes et al., 2004).

General Life Satisfaction.—The Lehman Quality of Life Interview – Brief Version (Lehman, 1988) is a validated, self-report measure that has been used extensively in studies with participants with serious mental illness. In the present study, one question was utilized: "How do you feel about your life in general?" Respondents rated this question on a scale of 1 (terrible) to 7 (delighted).

Impact of Weight on Quality of Life – Lite (IWQOL-Lite).—The IWQOL-Lite is a self-report measure that assesses weight-specific quality of life over the past week in overweight individuals (Kolotkin et al., 2001). Physical function (IWQOL-PF; including items such as "Because of my weight I have trouble tying my shoes") and self-esteem (IWQOL-SE; including items such as, "Because of my weight I am afraid of being rejected", and "Because of my weight I am embarrassed to be seen in public places") were examined.

Veterans RAND 12-Item Health Survey (VR-12).—The VR-12 is a 12-item questionnaire measuring health-related quality of life (Kazis et al., 2004) that produces two

domain scores: the Physical Component Summary (VR-PCS) and Mental Component Summary (VR-MCS).

Data Analysis

At baseline, descriptive statistics were calculated and global tests of differences between the three groups were performed for demographics, BMI, and all outcome variables. Linear mixed effects models with group, time, and group-by-time interaction terms were used to examine differences in change from baseline to the three-month and six-month time points, comparing each active intervention to the usual care group. The following outcomes were examined: BASIS-Psychosis, BASIS-Depression/Functioning, BASIS-Interpersonal, General Life Satisfaction, Loneliness Scale total, IWQOL-PF, IWQOL-SE, and VR-12 PCS and MCS. Analyses were conducted using SAS version 9.4

Results

Participant characteristics are displayed in Table 1 and descriptive statistics for all outcomes measures at each time point are displayed in Table 2. There were no significant differences at baseline between the conditions on any demographics, BMI, or outcome variables. Results from linear mixed models are displayed in Table 2. Comparing in-person MOVE and usual care, in-person MOVE was associated with a greater decrease in the Three Item Loneliness Scale total score at six months ($t=-2.76$, $p=.006$). Comparing WebMOVE and usual care, there was a greater increase in IWQOL-SE at six months ($t=2.23$, $p=.026$). There were significant increases in both active interventions in VR-12 MCS compared to usual care: for WebMOVE, at three months ($t=2.17$, $p=0.031$) and six months ($t=2.38$, $p=.018$), and for in-person MOVE at six months ($t=1.99$, $p=0.048$). There were no significant group differences on any of the BASIS scales, General Life Satisfaction, IWQOL-PF, or VR-12 PCS.

Discussion

In the present study, both in-person and web-delivered weight management interventions were associated with improvements in some quality of life outcomes among individuals with serious mental illness, compared to a usual care control condition. While previous studies of WebMOVE have demonstrated its efficacy for weight loss and increasing physical activity (Young et al., 2018; Muralidharan et al., 2018), this is the first study to demonstrate that a web-delivered weight management program can improve quality of life outcomes in this population.

Specifically, both WebMOVE and in-person MOVE were associated with improvements in mental health-related quality of life. Notably, these improvements occurred in the absence of significant change in psychiatric symptoms. WebMOVE may have impacted mental health-related quality of life indirectly, by providing a sense of meaning or purpose or decreasing isolation through contact with peer coaches. Similarly, improvements in mental health-related quality of life occurred in the in-person MOVE condition in the absence of significant changes in mental health symptoms or weight; these improvements may have been associated with increased physical activity or with common factors associated with

group interventions (e.g., decreased social isolation, camaraderie). The latter hypothesis is corroborated by the significant decrease in loneliness in the in-person MOVE condition. Future studies could compare interventions that explicitly target social support and loneliness to the impact of in-person weight management on this outcome.

Additionally, participation in webMOVE was associated with increases in weight-related self-esteem. This makes sense, given that participants with obesity in the webMOVE condition exhibited significant weight loss (Young et al., 2018), and that weight-related self-esteem is highly correlated with successful weight loss (Kolotkin et al., 2001). Post-hoc analyses indicated that weight loss was inversely correlated with change in weight-related self-esteem in both the webMOVE and in-person MOVE conditions. Thus, weight loss was personally meaningful to study participants, resulting in improved self-concept, decreased self-consciousness in social situations, and increased confidence regarding venturing out into public. These improvements could potentially spill over into improved social functioning and community integration, key components of holistic recovery for individuals with serious mental illness.

The present study focused on comparison of each of the active interventions to a usual care control. In post-hoc analyses, comparison of the two active interventions on quality of life outcomes revealed no significant differences. Future studies could examine predictors of response to in-person versus web-based weight management to inform clinical guidelines regarding which individuals would be mostly likely to benefit from each.

Regarding limitations, the present study was conducted at one urban site and warrants replication in other geographical locations. In addition, participants were Veterans and mostly males; thus, findings may not generalize to other populations. Third, there was a fair amount of attrition, though rates of attrition did not differ by intervention condition, and a 25% attrition rate is on the low end of what has previously been reported in intervention studies with individuals with serious mental illness (Kanuch et al., 2016). Finally, there was heterogeneity in the sample with regard to mental illness diagnosis; future studies may examine diagnosis as a moderator of treatment response.

In summary, among adults with serious mental illness, weight management interventions delivered in-person or online may promote holistic recovery across physical health, health behavior, and quality of life outcomes. Given the vital importance of quality of life outcomes in assessing treatment efficacy and cost-effectiveness, these findings make a significant contribution to the literature, and indicate that health care systems should increase access to weight management programming for individuals with serious mental illness. Mental health clinics and programs, whose typical focus is the improvement of mental health, could integrate weight management as a standard component of care to support the overall mission of holistic health. Weight management could be offered in-person for those individuals who prefer and are able to attend this service, and when there is sufficient clinical staffing. When individuals have barriers to attending in-person weight management services, such as lack of transportation, or when clinician staffing is limited, an online option with peer coaching could be offered. Integrating whole health focused interventions in mental health settings,

while maximizing options, flexibility and support, has the potential to reduce weight, improve life expectancy, and increase overall quality of life.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Baseline Participant Demographics by Treatment Group (N=276)[a]

	WebMOVE		In-person MOVE		Usual Care	
	n=93		n=95		n=88	
	n	%	n	%	n	%
Age (M±SD)	54.7 ± 8.9		53.7 ± 9.6		54.2 ± 9.9	
Gender (male)	85	91	88	92.6	86	97.7
Race[b]						
Caucasian	37	40	40	42	34	39
African-American	44	47	47	50	47	53
American Indian	8	9	5	5	3	3
Asian	1	1	4	4	2	2
Pacific Islander	1	1	0	0	4	5
No response	7	8	7	7	3	3
Ethnicity (Hispanic)	15	16	16	17	9	10
Education (Highest Degree)						
Less than HS	2	2	5	5	6	7
HS or some college	64	69	60	63	56	64
College 2- or 4- year degree	24	26	27	28	22	25
Some grad school or degree	3	3	3	3	4	5
Body Mass Index (M±SD)	34.2 ± 5.3		34.9 ± 5.0		34.4 ± 5.6	

[a] M, mean; SD, standard deviation; HS, high school

[b] Participants could choose more than one

Table 2.

Descriptive statistics and linear mixed models for outcomes

Variable/ Treatment Group	Baseline			3 months			6 months			Baseline to 3 months[a]				Baseline to 6 months[a]			
	n	Mean	SD	n	Mean	SD	*n*	Mean	SD	Est.[b]	*t*	*df*	*p*	Est.[b]	*t*	*df*	*p*
BASIS-Depression[b]																	
WebMOVE	92	1.63	0.82	70	1.47	0.94	77	1.39	0.87	0.04	0.30	439	0.765	−0.05	−0.39	439	0.695
In-person MOVE	95	1.51	0.80	78	1.30	0.85	81	1.35	0.94	0.00	0.02	439	0.987	0.06	0.49	439	0.623
Usual Care	87	1.58	0.85	67	1.38	0.87	74	1.38	0.76	Ref	--	--	--	Ref	--	--	--
BASIS-Interpersonal[b]																	
WebMOVE	87	1.46	0.90	64	1.39	0.94	70	1.34	0.91	−0.21	−1.58	395	0.115	−0.27	−1.91	395	0.057
In-person MOVE	90	1.39	0.85	74	1.22	0.78	79	1.23	0.79	−0.24	−1.85	395	0.066	−0.26	−1.89	395	0.060
Usual Care	81	1.30	0.86	60	1.35	0.82	69	1.42	0.93	Ref	--	--	--	Ref	--	--	--
BASIS-Psychosis[b]																	
WebMOVE	93	1.46	1.10	70	1.20	1.14	77	1.12	1.08	−0.03	−0.23	435	0.819	−0.17	−1.06	435	0.289
In-person MOVE	94	1.29	1.02	78	1.21	1.07	78	1.23	1.17	0.05	0.33	435	0.745	0.05	0.34	435	0.735
Usual Care	87	1.46	1.08	67	1.34	1.06	73	1.36	1.15	Ref	--	--	--	Ref	--	--	--
General Life Satisfaction[c]																	
WebMOVE	93	4.42	1.37	70	4.67	1.36	77	4.86	1.38	0.11	0.49	442	.627	0.28	1.34	442	0.182
In-person MOVE	95	4.42	1.53	79	4.82	1.43	81	4.90	1.32	0.28	1.30	442	.193	0.35	1.73	442	0.085
Usual Care	88	4.52	1.18	67	4.52	1.40	74	4.64	1.31	Ref	--	--	--	Ref	--	--	--
Three-Item Loneliness Scale[d]																	
WebMOVE	93	6.27	1.96	70	5.56	2.00	77	5.64	1.96	−0.16	−0.55	442	0.579	−0.51	−1.77	442	0.077
In-person MOVE	95	6.44	1.94	79	5.66	2.09	81	5.53	2.09	−0.29	−1.02	442	0.308	−0.79	−2.76	442	0.006
Usual Care	88	6,43	1.99	67	5.99	1.99	74	6.34	1.91	Ref	--	--	--	Ref	--	--	--
IWQOL- PF[e]																	
WebMOVE	93	59.11	25.47	70	62.41	24.53	77	64.12	23.50	−1.97	−0.63	442	0.528	1.12	0.35	442	0.726
In-person MOVE	95	58.94	25.26	79	63.94	25.39	81	62.22	25.90	−2.85	−0.93	442	0.351	−1.12	−0.36	442	0.721

Variable/ Treatment Group	Baseline			3 months			6 months			Baseline to 3 months[a]				Baseline to 6 months[a]			
	n	Mean	SD	n	Mean	SD	*n*	Mean	SD	Est.[b]	*t*	*df*	*p*	Est.[b]	*t*	*df*	*p*
Usual Care	88	57.33	23.64	67	61.93	24.03	74	61.08	23.03	Ref	--	--	--	Ref	--	--	--
IWQOL-SE[e]																	
WebMOVE	93	58.04	25.56	70	64.01	24.15	77	66.18	25.35	4.07	1.09	442	0.277	8.25	2.23	442	0.026
In-person MOVE	95	61.08	27.48	79	63.47	27.71	81	66.41	28.25	−0.19	−0.05	442	0.960	5.09	1.39	442	0.165
Usual Care	88	62.08	27.69	67	62.25	29.63	74	62.42	24.95	Ref	--	--	--	Ref	--	--	--
VR-12 PCS[f]																	
WebMOVE	91	43.16	10.65	69	41.19	12.53	75	39.66	12.11	−0.55	−0.32	431	0.746	−2.64	−1.58	431	0.114
In-person MOVE	93	42.07	11.04	78	41.72	11.49	80	40.85	10.33	0.870	0.52	431	0.602	−0.48	−0.29	431	0.769
Usual Care	86	42.21	10.03	66	40.09	10.27	73	41.08	10.33	Ref	--	--	--	Ref	--	--	--
VR-12 MCS[f]																	
WebMOVE	91	39.39	11.21	69	42.46	12.33	75	41.67	11.11	3.79	2.17	431	0.031	3.99	2.38	431	0.018
In-person MOVE	93	40.22	10.82	78	42.12	12.08	80	42.01	12.14	2.57	1.50	431	0.134	3.28	1.99	431	0.048
Usual Care	86	40.64	12.10	66	39.92	11.23	73	38.98	10.79	Ref	--	--	--	Ref	--	--	--

[a] Difference in mean change

[b] Scores range from 0 to 4, with higher scores indicating more severe symptom severity

[c] Respondents rated this question on a scale of 1 (terrible) to 7 (delighted)

[d] Respondents rate each item on a scale from 1 (hardly ever/never) to 3 (often). The items are summed to produce a total score

[e] Raw scores were converted to standard scores with a range of 0 (worst) to 100 (best)

[f] Scores range from 0 to 100, with higher scores indicating better functioning

Notes: BASIS= Revised Behavior and Symptom Identification Scale; IWQOL=Impact of Weight on Quality of Life – Lite; PF=Physical Function; SE=Self-Esteem; VR-12= Veterans RAND 12-Item Health Survey; PCS=Physical Component Summary; MCS=Mental Component Summary.

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