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Table for Two: Perceptions of Social Support from Participants in a Weight Management Intervention for Veterans with PTSD and Overweight or Obesity

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Abstract

Individuals with Post-Traumatic Stress Disorder (PTSD) are at an increased risk of being classified as overweight or with obesity in part due to PTSD symptoms (e.g., sleep disturbance, social isolation) interfering with activity and healthy eating. MOVE!+UP is a 16-week behavioral weight management program, tailored to address such barriers for people with PTSD, by combining evidence-based weight loss education and support with cognitive behavior therapy skills to reduce PTSD symptom-based weight management barriers. This qualitative study examined veterans' (n=37) perceptions of social support relevant to weight management, health behaviors, and mental health while participating in an uncontrolled pilot of MOVE!+UP. Template analysis of transcripts from one-hour semi-structured qualitative interviews identified four main categories of participant responses. Participants described positive aspects, particularly cohesiveness around a shared veteran identity, feeling less alone, accountability, and having others eat healthier and exercise with them. Conversely, relationship-based barriers included other participants' poor MOVE!+UP group session attendance and engagement, and loved ones' encouragement of making unhealthy choices. Many described having limited relationships or trouble accessing available support. Lastly, PTSD symptoms were a significant barrier to utilizing social support to facilitate weight loss. Findings suggest future behavioral weight management programs should recruit members with similar backgrounds to capitalize on shared experience, encourage consistent attendance and meaningful participation, deliver education about how to leverage social support from others outside the program, and address mental health symptoms that impede social support and healthy lifestyles.

Keywords

social support; weight management; PTSD; veterans; qualitative analysis

Despite the United States military's emphasis on fitness and exercise, veterans are more likely to be categorized as overweight or with obesity compared to both active duty members (Rush et al., 2016) and the general US population (Koepsell et al., 2012; Teachman & Tedrow, 2013). This is especially true for veterans receiving care from Veterans Affairs (VA) medical centers. A study of nearly 5 million VA primary care patients found that 41% have obesity and 37% are classified as overweight, compared to 38% and 13% in the general US population (Breland et al., 2017). To address this, VA prioritizes behavioral weight management, primarily through the MOVE! program, which is an evidenced-based intervention that includes instruction related to nutrition, physical activity, and weight loss strategies (Kinsinger et al., 2009). The program is primarily delivered in an in-person group-based format offered weekly but is also offered using telehealth modalities, with rates of synchronous telemedicine utilization increasing rapidly in response to the COVID-19 pandemic (Hoerster et al., 2020). The standard program includes 16 modules focused on healthy eating and physical activity, and supports veterans to achieve a personalized weight goal, emphasizing clinically meaningful weight loss of 5% for many (MOVE! Weight Management Program, 2020). While MOVE! promotes these standard features, there is great variability across VA in how it is resourced and delivered, with some sites, for example, incorporating in-session exercise components (Kahwati et al., 2011). MOVE! group leaders' credentials and training also can vary across sites, with the program delivered by social workers, psychologists, dietitians, nurses, and other professions. Some sites also offer adjunctive dietitian services.

MOVE! is effective at producing clinically meaningful weight loss for approximately one-third of veterans who participate in at least 8 sessions over 4 to 6 months (Kahwati et al., 2011). However, only 14% participate at this "intense and sustained" level, with barriers to engagement such as work schedule incompatibility and transportation (Littman et al., 2015; Maciejewski et al., 2018). Moreover, some groups such as veterans with posttraumatic stress disorder (PTSD) have some of the worst weight loss outcomes in MOVE! despite comparable engagement (Hoerster et al., 2014), which is especially problematic given their higher obesity burden (Dedert et al., 2010). Given the public health imperative to better target obesity among veterans, VA is working to enhance MOVE! reach and effectiveness with various targeted approaches (Masheb et al., 2017).

Research has shown that social networks and social support can significantly impact an individual's weight and the effectiveness of weight management efforts (Christakis & Fowler, 2007; Paul-Ebhohimhen & Avenell, 2009; Verheijden et al., 2005). Therefore, one potentially viable method for enhancing behavioral weight management engagement and effectiveness is through capitalizing on and enhancing social support. VA's MOVE! program already promotes social support and is primarily delivered in a supportive group format, but making social support an even greater focus might enhance its effects, particularly among

those with social support deficits, such as those with PTSD (Simon et al., 2019; Trickey et al., 2012).

Those in one's social network can both be helpful and create barriers to engaging in positive weight management behaviors (Kiernan et al., 2012; Zwickert & Rieger, 2014). Prior research (e.g., Kiernan et al., 2012; Zwickert & Rieger, 2014) has specifically described several helpful interpersonal factors such as encouraging or engaging in healthy eating or exercise with the individual; assisting with problem solving; providing affirmations; sharing a serving of food; removing high calorie foods; and complimenting healthy behaviors. Meanwhile, unhelpful or "sabotaging" example behaviors or settings included buying high calorie foods; serving large portions; eating unhealthy food or being sedentary around the individual; social settings that encourage overeating such as holidays; criticizing one's health behavior choices; weight comparisons between the individual and others; downplaying weight problems; and weight-related discrimination. While results are mixed and not all studies have found consistent positive results related to the benefit of a group setting, group cohesion, or involving significant others (Black et al., 1990; Kumanyika et al., 2009; Paul-Ebhohimhen & Avenell, 2009; Taylor et al., 2019), weight management interventions that encourage participants to elicit and use social support, include individuals from participants' social networks, and/or are held in group formats tend to be more effective (Black et al., 1990; Jovanovi et al., 2009; Paul-Ebhohimhen & Avenell, 2009; Renjilian et al., 2001; Verheijden et al., 2005).

Social factors may be especially important to consider in interventions targeting certain subpopulations, such as those with PTSD. As noted above, veterans with PTSD are at increased risk for overweight and obesity and related conditions (Dedert et al., 2010), and VA's MOVE! program is less effective for them, despite comparable engagement to those without PTSD (Hoerster et al., 2014). This is likely in part because PTSD is associated with engaging in less physical activity and poorer eating habits (Hall et al., 2015) due to barriers such as hypervigilance, sleep problems, stress, depression, medication side effects, physical health problems, chronic pain, emotional eating, and more frequent binge eating (Baron et al., 2013; Buis et al., 2011; Dorflinger & Masheb, 2018; Hall et al., 2015; Klingaman et al., 2016; Talbot et al., 2013). Given the tendency for individuals with PTSD to withdraw socially or have lower quality social support (Simon et al., 2019; Trickey et al., 2012), incorporating social support enhancement strategies may be especially pertinent to the success of behavioral weight management interventions delivered to veterans with PTSD and obesity or overweight.

To address the unique barriers to weight loss veterans with PTSD face, a 16-week behavioral weight management program (MOVE!+UP), was designed and piloted in a large VA medical center. MOVE+UP! is based on MOVE! but enrolls only Veterans with a PTSD diagnosis and includes content to assist Veterans with overcoming PTSD-specific barriers to weight management. Hoerster et al. (2021) includes a full description of the intervention, its development, and a quantitative and qualitative evaluation. In brief, the intervention was developed over 5 cohorts (total N=44), with iterative changes made to the intervention after each cohort. Veterans in the first four cohorts (n=5-11) received a version of MOVE!+UP that was intended to augment concurrent participation in standard MOVE! so that they

would receive support for both weight management and PTSD specifically, in an efficient fashion. Minor changes to content and structure were made between cohorts with the goal of enhancing concurrent engagement in MOVE!, physical activity and healthy eating changes, and weight loss. Despite these minor changes across cohorts 1-4, Veterans did not experience meaningful weight loss in any of the first four cohorts with only 12.5% of participants losing more than 5% of baseline weight (average percentage baseline weight loss of 0.7%, $SD = 3.6$), with quantitative data and qualitative interviews suggesting this was likely in part because Veterans did not attend the standard MOVE! program despite substantial encouragement and attempts at coordination. To address this and other challenges identified by Veterans in cohorts 1-4, the study team combined MOVE! and MOVE!+UP into a single intervention, which was piloted in a final cohort ($n=10$), and which represents the final version of the intervention.

The final MOVE!+UP intervention is described in greater detail below in the Method section but in short, it involves 16 weekly 2-hour group sessions co-led by a veteran peer counselor and a psychologist, a weekly group walk, and two sessions with a dietician. While much of the content is comparable to the standard MOVE! program's evidence-based support for weight management, it incorporates cognitive behavioral skills to address PTSD-specific barriers. While both MOVE! and MOVE!+UP emphasize increasing social support by using a group format, MOVE!+UP enhances this focus by including a veteran peer support counselor, providing additional social support-focused psychoeducation, skills training, a personalized social support plan, and several sessions focused on reducing PTSD barriers to engaging in the community and with their social networks, including ways to reduce accommodation from loved ones for PTSD-driven avoidance. Quantitative analyses of data collected from MOVE!+UP participants found that increases in social support predicted improved diet quality and increased physical activity in the intervention (Hoerster et al., 2018).

The final version of MOVE!+UP appears to hold promise as an intervention. Veterans in the final cohort not only lost a significant amount of weight (14lbs on average and 71% lost more than 5% of their starting weight) but participants also reported a significant improvement in PTSD symptoms (Hoerster et al., 2021). Social support may have been one of the factors that supported improvements in both health behaviors and PTSD symptoms. Therefore, the current qualitative study seeks to further explore veterans' perceptions of social support, within and outside of MOVE!+UP, while participating in the uncontrolled pilot of the intervention. This study will yield insights about how social support can best be targeted within behavioral weight management interventions in general, as well as for populations that face additional barriers to successful weight management.

Method

The methods for the pilot of MOVE!+UP, from which data for the present study are drawn, are described in greater detail in (Hoerster et al., 2021).

Participants

Forty-four veterans were enrolled in a pilot of MOVE!+UP across five cohorts. All participants (N=37) who completed the one-hour semi-structured interview regarding their experience in MOVE!+UP were included in this analysis. Participant demographics are presented in Table 1. All participants were patients of a large VA medical center, had experienced at least 1 traumatic experience based on assessment with the Life Events Checklist (Gray et al., 2004); had a diagnosis of PTSD based on a score of at least 33 on the PTSD Checklist (PCL-5; Bovin et al., 2016; Weathers et al., 2013) consistent with standard assessment practice in VA; met criteria for overweight or obesity (BMI \geq 25), and had the endorsement of a medical provider confirming that they could safely engage in the intervention. Participants had an average PCL score for cohorts 1-4 of 56.6 and 59.1 for cohort 5 and 80% of participants were concurrently engaged in PTSD psychotherapy when they initiated the program.

Procedure

Participants were recruited from a large VA medical center by provider referrals and flyers posted around the hospital. The study was approved by the VA Puget Sound Health Care System, Seattle Division Institutional Review Board and all participants completed written consent forms in-person after receiving a thorough verbal description of the study.

Veterans were enrolled in one of five consecutive cohorts of MOVE!+UP. For cohort 1-3, the intervention consisted of 4 weekly in-person sessions followed by 6 biweekly individual brief phone coaching sessions. For cohort 4, in-person sessions were expanded to 6 in-person and 8 individual brief phone coaching sessions. For cohorts 1-4 all sessions were led by a veteran peer support specialist and participants were encouraged to participate in MOVE! simultaneously. The peer support specialist received training and supervision before and during each cohort. Training included reviewing facilitator and participant manuals, engaging in role plays with staff acting as Veterans, completing a one-hour online MOVE! training, and receiving weekly feedback in one-hour supervision meetings based on audio recordings of the sessions and structured fidelity ratings. Training specific to the needs of peer support specialists was guided by the VA peer support implementation toolkit (Chinman et al., 2012). In general, peer specialists are required to complete the VA general competency test prior to providing services. More detail on training is provided in the paper describing the pilot trial (Hoerster et al., 2021).

For cohort 5, MOVE!+UP consisted of 16 weekly in-person 2-hour sessions led by both the peer support specialist and a psychologist and included 2 individual consultations with a dietician to standardize and ensure dietician engagement, due to the mental health focus of MOVE!+UP and its providers. Across all cohorts, MOVE!+UP consisted of psychoeducation about weight management strategies, cognitive behavioral PTSD management strategies, health behaviors, and social support with one focal topic covered each week. Some examples of topics from the standard MOVE! include setting SMART goals, healthy eating, and physical activity strategies. Participants also kept food and activity diaries, and had a weekly weigh-in. While many of these intervention components are included in standard MOVE!, the primary distinction between MOVE! and MOVE!+UP is

that the interrelationship of PTSD and health is emphasized in all aspects of the program. For example, MOVE!+UP includes a session dedicated almost entirely to sleep. Community engagement and its role in recovery from PTSD are emphasized. Skills for coping with PTSD such as thought challenging exercises are incorporated into several sessions. MOVE!+UP also incorporates an increased emphasis on the mental health aspects of mindful eating and body image.

Participants also engaged in a 30-40-minute group walk to and from a nearby park as part of all in-person MOVE!+UP sessions. Some standard VA MOVE! programs provide an exercise program, which has been found to increase retention (Spring et al., 2014). The objectives of the walk are to facilitate exercise--as in the standard MOVE!--but also to address PTSD-specific barriers. Specifically, walks serve as a form of in vivo exposure for addressing hypervigilance-based activity barriers (Rutter et al., 2013) and enhance community engagement. Veterans are asked to contemplate what they've learned in that day's session and to pay attention to their mental and physical health experiences during the group walk. They then return to the group meeting for a final 20 minutes, where they share reflections from the walk to consolidate learning, followed by setting weekly activity and diet goals.

Measures

Veterans' self-reported demographic variables are listed in Table 1. To determine race and ethnicity, participants were asked whether they identified as of Hispanic, Latino or Spanish origin or not and whether they identified as White, Black/African-American, American Indian/Alaskan Native, Asian/Pacific Islander and/or Other.

All veterans included in this analysis completed at least one in-person, semi-structured interview that lasted approximately one hour. Interviews were conducted when the cohort concluded its in-person sessions (at 4 weeks for cohorts 1-3; 6 weeks for cohort 4, and 16 weeks for cohort 5). Participants were asked a variety of questions related to their experience in MOVE!+UP, and to provide feedback about the intervention and how they applied MOVE!+UP education, skills, and support in their daily lives. Participants in cohorts 1-4 were invited to participate in a brief second interview at 16 weeks because they continued receiving coaching calls through 16 weeks after the in-person sessions ended. Cohort 5 participants were interviewed once since phone coaching was an optional and concurrent part of the 16-week in-person intervention they received. This resulted in a total of 62 interviews, and transcripts from each of those interviews were included in this analysis.

The interview guide was iteratively refined over time based on input from participants and study staff to ensure high-quality data, and to best elicit responses relevant to the particular cohort. The final interview guide used in interviewing cohort 5 is included as online supplementary material.

Data Analysis

All interviews were transcribed verbatim. We conducted template analysis (King, 1998) utilizing ATLAS.ti 7 (Atlas.ti, 2017). This method of thematic analysis is well suited to provide insights into a wide range of participant experience because it does not

prescribe using an a-priori hierarchical coding structure, encourages analysts to develop both descriptive and interpretive themes that reflect the richest salient data (Brooks et al., 2015). A coding template that summarizes broad categories important to the research question is developed and initial codes are applied to some of the data, codes are updated and emergent codes added as needed moving from general to more specific. These new codes are then used to re-analyze the earlier interviews iteratively and once all transcripts are coded the final template allows for the final development of themes.

For this study, portions of interviews were identified and extracted related to social support and other social factors that were discussed in relation to a-priori categories including weight management, health behaviors, and mental health. The quotes were examined and sub-categories identified related to the study's focus and past research findings. Quotes were initially coded in terms of overall valence-- positive (good, beneficial, favorable) or negative (bad, problematic, or harmful), categorized as being related to experiences inside or outside the group, and representative of barriers to receiving social support. From the quotes in each of these categories, we then identified the specific common messages that are summarized and are described in the results section. Example quotes are included throughout the results and were taken from many different participant interviews as is consistent with Ranney et al. (2015).

Results

Veterans' quotes about social factors were generally related to one of four categories. Veterans shared experiences and observations that were: 1. positive both within the intervention group and outside; 2. negative or created barriers to health behavior change; 3. descriptive of barriers to accessing, building, and benefiting from social support; and 4. related to PTSD symptoms.

Category 1: Positive Social Factors

Within MOVE!+ UP—*“Building that camaraderie that was lost when we all left the military. It’s so much easier to run in formation than to run alone, it’s sort of an aspect of the military”* (Participant A). Veterans in general found the intervention's group format to be positive and other veterans to be supportive. Many expressed feeling less alone knowing others were struggling with PTSD, eating behavior, and being physically active. They especially appreciated the cohesiveness that resulted from a shared veteran identity with each other and the peer support counselor. *“You just feel like they understand. You have that bond of being in the service together. Where somebody who hasn’t been in the service doesn’t have the idea. We can talk and go straight to the thing, we can talk about whatever it is and they understand. The lingo. Everything”* (Participant B).

Participants described benefiting both from receiving and giving support and advice to other group members. Some participants (although not all) also appreciated the inclusion of both female and male veterans despite concerns related to negative past experiences. One female participant shared, *“Having a mixed group of men and women, I think that was even nicer. You could see both sides, a female’s perspective and a male’s perspective, because a lot of times, I’m not comfortable with men”* (Participant C).

“I needed accountability and I needed to get healthy” (Participant D). Participants found having the group hold them accountable for behavior change and having the intervention as a weekly reminder to be very important to their success. Participants also appreciated being able to celebrate each other’s successes and accomplishments. *“Encouragement. And acknowledged when you’d lose weight, a few pounds. They were giving you good, ‘Atta’ boys’. Lifting you up. Lifting the people up in there”* (Participant E).

Outside of MOVE!+UP—*“So you can get social support if you get out there and get it. I go to the senior center three days a week. They help me to exercise, they help me stretch. They got people there that can support me”* (Participant F). Participants described receiving support from others outside the group from diverse places and relationships such as spouses, children, extended family, coworkers, church members, neighbors, senior centers, community centers, and gyms. *“My friend from church, he’d either call me or I’d call him to ask if we were going out to the golf course, and he’d ask if I wanted to do that. So, I had some kind of support from that. And my wife too”* (Participant G).

Support varied in what form it was offered, including instrumental (tangible support offered in physical ways such as cooking healthy meals or sending healthy recipes), companionship, or general encouragement. Although participants described valuing any type of support, they especially appreciated when others held them accountable for making behavior changes, discussed their health goals, and engaged in healthy behaviors with them. *“The neighbors keep teasing me with ‘what are you eating today’? ‘You didn’t go to McDonald’s’? So I have them double checking me to make sure”* (Participant H). Participants also described being motivated to make changes and manage their weight because of others and wanting to either live longer, be good role models, or be more involved in the lives of those they care about. *“My little girl. I want to be able to go out there and play with her. I want to be around to walk her down the aisle. So I’m doing everything I can to lose the weight”* (Participant H).

Many veterans were inspired by MOVE!+UP to actively work on building more social support, increasing their social networks, interacting with others more, and becoming more involved in community organizations and activities. *“I’m trying to get out there with more people. Take myself out to a movie instead of just holing up in my apartment. Do some volunteer work. Go out and see people. Go out and do a weekly game”* (Participant I). Some participants even shared resources with loved ones and encouraged others to engage in more healthy behaviors, which in turn increased the support participants received from others because they were working together on a shared goal. *“I’ve been working harder with my other half to share with her and kind of overlap or dovetail some of her fitness goals with mine. A lot of times we’ll go together or a few times a week, we’ll go together and walk to go pick up the little one...”* (Participant J).

Category 2: Negative Social Factors

Within MOVE!+UP—Some veterans found the group to be unsupportive in several ways. One of the most common themes was others’ apparent lack of dedication to the group, poor attendance, and disruptive in-group behavior. *“[Some] people came in and they*

wouldn't even talk, they just sat there. Well, if you're not going to participate, don't waste everybody's time" (Participant H). Some veterans also viewed group members as having varying levels of motivation. Some described how others who did not make as many positive changes or seem to put in as much work impacted their own motivation and experience in the group.

For cohorts 1-4, the intervention was shorter, and many veterans did not think there was enough time to get to know the others and bond as much as they wanted. *"I think it could go like 6 weeks or something like that. Because you get to know more people and people could get more out of it. I think and they'd talk more about it"* (Participant K).

Outside MOVE!+UP—Participants described a variety of ways that others outside the group interfered with their ability to make positive health behavior changes. *"Yeah. I have a lot of people and friends and acquaintances in my life, who, because of my age, tend to be overweight. And they don't like being reminded that they're overweight. It's hard to get a little bit of support from my peers"* (Participant I). Some participants' loved ones also struggled with similar issues related to weight and mental health symptoms that made it hard for them to leave the house or make positive changes. Other loved ones were simply unwilling to make any changes, which made it harder for veterans to meet their goals when spending time around others who ate unhealthy food or were sedentary. Several participants also described depending heavily on only one or two others outside of the group for support. Then, when they were unavailable or unforeseen barriers occurred, participants did not stick to their positive diet changes, increases in physical activity, or weight loss progress.

Many veterans noted that even if loved ones wanted to be supportive and help, their actions could still end up as barriers. *"Having family and friends supporting you is vital to success. If they're pushing food on you, you're never going to succeed. It's just like an alcoholic. If you have somebody sitting there saying 'here, have a glass of wine, drink up', you're not going to do well"* (Participant L). Many veterans described others showing love and care through buying or making unhealthy foods in large portions and encouraging unhealthy behaviors like avoiding exercise and having unhealthy treats. *"He'll go and bring me three or four bags of popcorn, just because. He thinks he's doing a loving thing, and he's not"* (Participant M).

Category 3: Barriers to accessing, building, or benefiting from social support

Some veterans described reluctance to share their difficulties and weight management goals with others or ask for support. For some, even if they had social connections, those in their networks did not know the veteran needed support or was working on making changes. Others simply had very few people in their lives and some described having no one to support them. *"At this point in time, I can't find anybody to. I'm a loner. I'm kind of secluded..."* (Participant G).

Other participants described a variety of barriers originating from themselves. Many described strong negative and extreme beliefs about relationships, with some describing discomfort being around others, being vulnerable and sharing personal information, or being embarrassed they were struggling and needed help rather than only providing support to

others. *“Because what if you tried the community and it didn’t work? You want to be somewhere where you can feel accepted and safe. That’s the most important. Because I’ve done my community. And I felt judged...I don’t feel like I could be out there”* (Participant N). Others described themselves as “curmudgeons,” “difficult to be around,” “not social,” “not a gym person,” someone who does not like their neighbors or neighborhood, and someone who does not “do groups” or “the community.”

Category 4: PTSD and social factors

PTSD symptoms often interfered with not only veterans’ ability and willingness to engage in positive health behaviors but also to be social or benefit from social support. Veterans also described how PTSD symptoms and behaviors used to avoid symptoms led to increases in isolation and withdrawal. *“I couldn’t leave my apartment, I wasn’t sleeping well. Anytime I tried to do something social, there were all sorts of anxiety and panic attacks”* (Participant P). *“We’re very social creatures and part of PTSD is pulling away from other people, and that goes hand in hand with the propensity for people with PTSD to gain weight”* (Participant A).

Hypervigilance and difficulty with trust were especially problematic for participants’ engagement in the group and spending time with others outside of the group. Some participants also expressed concern about discussing with others how PTSD symptoms interfered with weight loss because this could lead to increases in intrusive thoughts and symptoms. *“I would continue with this program with the veterans with PTSD. Often we’re loners, we don’t want to see other people. We’re afraid that we might catch one of the triggers that’ll send us off some place”* (Participant G). Symptoms can often make it difficult to be around other people and out in public in general, which reduces opportunities to be active, eat well, and be supported. *“Being able to go out into the world and exercise is important. Part of that avoidance with PTSD is trying to limit your exposure to the outside world”* (Participant A).

Loved ones’ behavior can also inadvertently negatively impact and be impacted by PTSD symptoms. On days when veterans were having more symptoms or struggling more, loved ones would suggest engaging in unhealthy behaviors like resting more, not exercising, having unhealthy food, or eating larger portions. *“My husband and I have both been working together on the PTSD, and we haven’t had much left over for the partner, because we’re so involved in my crap, and then he does his...sometimes we go to the store, one of us alone, and we’ll buy the other’s favorite sugar, dessert and stuff like that”* (Participant M). In addition, if loved ones also had PTSD or other mental health conditions, they were often less helpful and supportive on days their symptoms were worse. *“I have a lot of different challenges with my marriage in that my wife has the same issues I do. She has PTSD... Any noise, and she’ll just go crazy, she can’t be around anybody smoking a cigarette...she’s really hard to get out of the house”* (Participant O).

Several participants described how being more social and receiving social support not only helped them with weight management but also by reducing PTSD symptoms. Many appreciated the message of the importance of social support from MOVE!+UP. As one veteran said, *“They gave me opportunities and learning about it myself, about how I have*

to be part of a community. Part of something else besides being alone. Gaining friendship, and giving yourself some type of camaraderie like we had in the service. That's something we miss a lot, that veterans lose and they don't know it was lost ... and that helps with your PTSD" (Participant F).

Discussion

Veterans' descriptions of the connection between social factors and health behaviors while participating in a group-based weight loss intervention for veterans with PTSD identified several important takeaways, with implications for future research and practice focused on improving weight management. Our prior quantitative analyses showed that veterans participating in MOVE+UP! with improved levels of social support, positively changed their diets and increased physical activity more than those without positive changes in social support (Hoerster et al., 2018). Building on these findings, the present qualitative analyses provide a more nuanced understanding of how social support can influence weight management behaviors, weight loss, and psychological outcomes, and the interrelationships among these domains. Specifically, many participants in this study described how a lack of social support—or unhelpful interactions with others—were barriers to health behavior change and successful weight management. The findings of this study suggest that behavioral weight management programs like VA's standard weight management program, MOVE!, might be improved by enhancing elements to improve positive social support to capitalize on those already included such as a group format.

Past studies have found group-based weight management interventions to be more effective than those in an individual format (Jovanovi et al., 2009; Paul-Ebhohimhen & Avenell, 2009) and Renjilian and colleagues (2001) found that individuals had better outcomes in groups, even when they expressed a preference for individual over group treatment before beginning the intervention. However, although some past studies have found that the level of group cohesion is not associated with effectiveness (Taylor et al., 2019), findings from a prior multi-site trial suggest that simply providing treatment in groups is not enough for social influences to impact weight loss, and that factors that contribute to group cohesion and positive social support are important to understand and target (Wing et al., 2014).

Indeed, the present study's findings corroborate the complexity of the benefits and potential pitfalls of group-based treatment. Many participants in the current study expressed appreciation for the group setting generally, but also noticed a negative impact on their own motivation if other group members had poor attendance, did not appear dedicated to the group, did not speak during group meetings, or failed to make significant behavioral changes. Participants appreciated having a shared veteran identity and challenges related to PTSD and weight management. Although comments were mixed, many participants shared appreciating having a mixed gendered group with a diversity of perspectives rather than just a shared gender identity. This was surprising given female veteran's commonly reported wariness of men because of past trauma histories and documented requests from female veteran's for women-only treatment in VA clinics (Kimerling et al., 2015; Monteith et al., 2020; Wilson, 2018). As a result, including variables related to group composition, especially gender, would be beneficial in future studies. Taken together, findings suggest

that group-based treatment alone is not sufficient for improving weight management and that MOVE! and other treatments may benefit from explicitly targeting social support using approaches included in MOVE!+UP, to facilitate positive social support between group members and in outside-group social support.

The present study's findings suggest there are a variety of ways to explicitly enhance social support in the context of weight management. Group management of interpersonal dynamics should be a key focus of group-based interventions, including setting clear expectations, encouraging consistent attendance and participation, and addressing issues as they arise throughout the program. Within MOVE!+UP, since this was a commonly expressed concern in cohorts 1-4, for cohort 5, participants were encouraged to make a clear commitment to the group and making changes, both during the enrollment and informed consent process, as well as within the program. Additionally, other participants expressed concern in earlier cohorts about not having enough time to get to know the other participants and bond. This was one reason that for cohort 5 the number of in-person group sessions was increased from 4 or 6 to 16.

Many participants in the present study discussed feeling motivated to lose weight and to improve their health based on their values, such as wanting to be around and able to engage in activities with loved ones, being a good role model, and a good parent, spouse, or friend. Having participants specifically think about their social networks and why they want to make changes could reduce dropout rates and increase compliance. Other studies that incorporate values into interventions targeting weight-related behaviors have had mixed results, with findings that values-based interventions can increase weight loss (Forman et al., 2016) and improve diabetes management (Gregg et al., 2007) although Lillis et al. (2017) found that their values-based intervention increased values-driven behavior but this did not directly lead to more weight loss. However, these studies did not specifically focus on social values related to loved ones, so more research is needed to establish if incorporating a social values-based emphasis or specific exercises can improve health outcomes in weight loss interventions.

Participants in the present study discussed appreciation for and the importance of all kinds of support from others but reported most often—and finding the most helpful—when others participated in positive health behaviors and discussed strategies with them. Other studies have also found that active support from loved ones is especially important, such as engaging in healthy eating and physical activity, making changes in their own lifestyles, and losing weight with the participant (Gorin et al., 2005; Hoerster et al., 2015; Kumanyika et al., 2009). Especially relevant to this population, veterans are more likely to meet daily physical activity recommendations if they have others with whom they can exercise (Hoerster et al., 2015) and eat healthy diets (Hoerster et al., 2016). Therefore, encouraging participants in weight loss interventions to request and elicit more active and instrumental support—and possibly inviting loved ones to participate in some or all of the program—may lead to enhanced behavioral, weight, and health outcomes.

Similar to other studies (Faw, 2014; Swinburn et al., 2011; Zwickert & Rieger, 2014) participants conversely described ways that social factors and interactions can be unhelpful

and a barrier to health behavior change. Several other studies have also documented that, despite good intentions, loved ones and friends can undermine weight loss by serving large portions, denying the individual has a weight problem, buying unhealthy food, planning events that center around food, providing unhelpful or unwanted advice, being self-conscious themselves about their weight, or eating unhealthy food or avoiding physical activity themselves (Faw, 2014; Zwickert & Rieger, 2014). As a result, participants in weight loss interventions may find discussing strategies to manage these challenges helpful.

For the population in this study, PTSD symptoms can create a two-fold barrier to successful weight management. Participants described PTSD symptoms not only interfering with engaging in positive health behaviors (physical activity and healthy eating) but also with eliciting and benefiting from social support to help make these changes needed to lose weight. Participants' observations are consistent with past findings such as how veterans with PTSD, compared to those without a mental health diagnosis, report more overall barriers to successful weight management such as overwhelming emotional experiences, readily available unhealthy food, and frequent hunger (Klingaman et al., 2016). Physical health problems and chronic pain also more frequently interfere with being physically active among people with PTSD (Buis et al., 2011). Finally, PTSD symptoms may influence veterans' relationships in such a way as to prompt social supports to engage in or suggest unhealthy behaviors with the veterans, as a form of PTSD symptom accommodation, which can serve to maintain unhelpful behaviors and PTSD symptoms (e.g., Campbell et al., 2017). The present study suggests that health behavior interventions targeting people with PTSD would likely benefit from enhanced social support targeting to optimize outcomes.

The results of this study corroborate prior work suggesting that social support, mental health symptoms, and weight management are all interconnected. Specifically, positive social support has the potential to not only directly impact weight management (Kiernan et al., 2012; Verheijden et al., 2005; Zwickert & Rieger, 2014) but potentially also indirectly by improving mental health symptoms (Dai et al., 2016; Han et al., 2014; Sippel et al., 2019). This is likely especially true for PTSD, which is often described as a disorder of isolation because of individuals' challenges with hypervigilance, trust, and avoidance. In addition, higher levels of social support are associated with higher levels of engagement and improved outcomes in PTSD specific treatment (Bourassa et al., 2020; Campbell et al., 2020; Price et al., 2013; Shnaider et al., 2017; Thrasher et al., 2010). As a result, individuals with PTSD may need specially tailored interventions to assist them in overcoming additional barriers to weight loss, which could have synergistic benefits to physical and mental health. Indeed, although MOVE!+UP was designed at the outset to capitalize on and enhance social support, the feedback described in this paper was incorporated into the final MOVE!+UP intervention structure and content, in order to improve its targeting of social support and improve mental and physical health outcomes. MOVE!+UP is now being tested in a randomized controlled trial (NCT04563741). Preliminary findings from the pilot study of MOVE!+UP suggest the final MOVE!+UP holds promise for improving both PTSD and weight outcomes for veterans with PTSD classified as overweight or obese (Hoerster et al., 2021), perhaps by harnessing a shared sense of identity of PTSD to increase group comfort and more effectively utilize the group setting and content.

The findings in this study may extend to those with other mental health conditions, given people with other psychiatric conditions also experience social support deficits (Lim et al., 2018; Santini et al., 2015; Wang et al., 2018) and behavioral weight management barriers (Littman et al., 2015; Maciejewski et al., 2018; Rush et al., 2016). While a growing body of work suggests that weight management programs tailored to the needs of those with psychiatric conditions can be beneficial (Ma et al., 2019; Naslund et al., 2017), the present study's findings suggest that outcomes of such programs could be further enhanced with a more targeted and nuanced approach to social support enhancement.

Implications for how social support should be considered as behavioral weight management interventions expand into telemedicine modalities. Previously, VA's MOVE! has been primarily offered in an in-person group format, but with the goal to improve access and utilization; MOVE! is now being offered with a variety of other modalities that may provide fewer opportunities to capitalize on social support (Hoerster et al., 2020). This includes delivering the standard MOVE! program in groups via video conferencing. TeleMOVE! is an individual remote education and monitoring program completed by veterans at home using a telehealth unit and scale, and was found to be as effective as standard MOVE! (Rutledge et al., 2017). MOVE! is also exploring use of more convenient, asynchronous, self-directed approaches to supporting weight management. Future studies will need to determine if the change in the format reduces effectiveness since findings from this study suggest it might, at least for those in need of social support enhancement.

Lastly the present study makes it clear that measurement of social support should be nuanced and measure forms of both positive support but also support that increases barriers to successful weight management. Findings from this study suggest that not all support from others is helpful even when loved ones have good intentions but still encourage engagement in less healthy behaviors or deter engagement in healthy eating and physical activity.

Limitations

Although the current study provides important insights, several limitations should be taken into account. The MOVE!+UP pilot design did not include a control condition so the analysis only included interviews from participants engaged in the intervention. Also, each cohort experienced different versions of the intervention as it was improved and changed in response to results from the previous cohort. Relatedly, interview questions varied across cohorts and during interviews to best capture the information most relevant to their cohort. As such, participants were asked in slightly different ways about the role of social support across cohorts. These variations may have led to differences in responses with less being said about social support in some interviews. The questions used in the interviews were also open ended to maximize the information collected and allow the participants to prioritize what was important but meant that responses were not uniform across participants and particular points or opinions cannot be compared or counted in a meaningful way. Lastly, the study only included Veterans from one VA medical center, which could limit the transferability of the results.

Conclusions and Future Directions

This qualitative study provides insights for how behavioral weight loss interventions should incorporate social support components to enhance engagement and effectiveness. This study's recommendations should be further considered and tested in the design of future weight loss interventions to enhance behavioral weight loss outcomes in the VA and beyond.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- Atlas.ti* (Version 7). (2017). Scientific Software Development,.
- Baron KG, Reid KJ, & Zee PC (2013). Exercise to improve sleep in insomnia: Exploration of the bidirectional effects. *Journal of Clinical Sleep Medicine*, 9(8), 819–824. 10.5664/jcsm.2930 [PubMed: 23946713]
- Black DR, Gleser LJ, & Kooyers KJ (1990). A meta-analytic evaluation of couples weight-loss programs. *Health Psychology*, 9(3), 330–347. 10.1037/0278-6133.9.3.330 [PubMed: 2140323]
- Bourassa KJ, Smolenski DJ, Edwards-Stewart A, Campbell SB, Reger GM, & Norr AM (2020). The impact of prolonged exposure therapy on social support and PTSD symptoms. *Journal of Affective Disorders*, 260, 410–417. 10.1016/j.jad.2019.09.036 [PubMed: 31539674]
- Bovin MJ, Marx BP, Weathers FW, Gallagher MW, Rodriguez P, Schnurr PP, & Keane TM (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition (PCL-5) in veterans. *Psychological Assessment*, 28(11), 1379–1391. 10.1037/pas0000254 [PubMed: 26653052]
- Breland JY, Phibbs CS, Hoggatt KJ, Washington DL, Lee J, Haskell S, Uchendu US, Saechao FS, Zephyrin LC, & Frayne SM (2017). The obesity epidemic in the veterans health administration: prevalence among key populations of women and men veterans. *Journal of General Internal Medicine*, 32, 11–17. 10.1007/s11606-016-3962-1
- Brooks J, McCluskey S, Turley E, & King N (2015). The utility of template analysis in qualitative psychology research. *Qualitative Research in Psychology*, 12(2), 202–222. 10.1080/14780887.2014.955224 [PubMed: 27499705]
- Buis LR, Kotagal LV, Porcari CE, Rauch SAM, Krein SL, & Richardson CR (2011). Physical activity in postdeployment Operation Iraqi Freedom/Operation Enduring Freedom veterans using Department of Veterans Affairs services. *Journal of Rehabilitation Research and Development*, 48(8), 901–912. 10.1682/JRRD.2010.08.0144 [PubMed: 22068369]
- Campbell SB, Erbes C, Grubbs K, & Fortney J (2020). Social support moderates the association between posttraumatic stress disorder treatment duration and treatment outcomes in telemedicine-based treatment among rural veterans. *Journal of Traumatic Stress*, 33(4), 391–400. 10.1002/jts.22542 [PubMed: 32521100]
- Campbell SB, Renshaw KD, Kashdan TB, Curby TW, & Carter SP (2017). A daily diary study of posttraumatic stress symptoms and romantic partner accommodation. *Behavior Therapy*, 48(2), 222–234. 10.1016/j.beth.2016.04.006 [PubMed: 28270332]

- Chinman M, Salzer M, & O'Brien-Mazza D (2012). National survey on implementation of peer specialists in the VA: Implications for training and facilitation. *Psychiatric Rehabilitation Journal*, 35(6), 470–473. 10.1037/h0094582 [PubMed: 23276242]
- Christakis NA, & Fowler JH (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine*, 357(4), 370–379. 10.1056/NEJMsa066082 [PubMed: 17652652]
- Dai W, Chen L, Tan H, Wang J, Lai Z, Kaminga AC, Li Y, & Liu A (2016). Association between social support and recovery from post-traumatic stress disorder after flood: A 13-14 year follow-up study in Hunan, China chronic disease epidemiology. *BMC Public Health*, 16(1), 1–9. 10.1186/s12889-016-2871-x [PubMed: 26728978]
- Dedert EA, Calhoun PS, Watkins LL, Sherwood A, & Beckham JC (2010). Posttraumatic stress disorder, cardiovascular, and metabolic disease: A review of the evidence. *Annals of Behavioral Medicine*, 39(1), 61–78. 10.1007/s12160-010-9165-9 [PubMed: 20174903]
- Dorflinger LM, & Masheb RM (2018). PTSD is associated with emotional eating among veterans seeking treatment for overweight/obesity. *Eating Behaviors*, 31(January), 8–11. 10.1016/j.eatbeh.2018.07.005 [PubMed: 30048898]
- Faw MH (2014). Young adults' strategies for managing social support during weight-loss attempts. *Qualitative Health Research*, 24(2), 267–278. 10.1177/1049732313520079 [PubMed: 24482423]
- Forman EM, Butryn ML, Manasse SM, Crosby RD, Goldstein SP, Wyckoff EP, & Thomas JG (2016). Acceptance-based versus standard behavioral treatment for obesity: Results from the mind your health randomized controlled trial. *Obesity*, 24(10), 2050–2056. 10.1002/oby.21601 [PubMed: 27670400]
- Gorin A, Sherwood N, Jeffery R, Phelan S, Tate D, & Wing R (2005). Involving support partners in obesity treatment. *Journal of Consulting and Clinical Psychology*, 73(2), 341–343. 10.1037/0022-006X.73.2.341 [PubMed: 15796642]
- Gray MJ, Litz BT, Hsu JL, & Lombardo TW (2004). Psychometric properties of the life events checklist. *Assessment*, 11(4), 330–341. 10.1177/1073191104269954 [PubMed: 15486169]
- Gregg JA, Callaghan GM, Hayes SC, & Glenn-Lawson JL (2007). Improving diabetes self-management through acceptance, mindfulness, and values: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 75(2), 336–343. 10.1037/0022-006X.75.2.336 [PubMed: 17469891]
- Hall KS, Hoerster KD, & Yancy WS (2015). Post-traumatic stress disorder, physical activity, and eating behaviors. *Epidemiologic Reviews*, 37(1), 103–115. 10.1093/epirev/mxu011 [PubMed: 25595169]
- Han SC, Castro F, Lee LO, Charney ME, Marx BP, Brailey K, Proctor SP, & Vasterling JJ (2014). Military unit support, postdeployment social support, and PTSD symptoms among active duty and National Guard soldiers deployed to Iraq. *Journal of Anxiety Disorders*, 28(5), 446–453. 10.1016/j.janxdis.2014.04.004 [PubMed: 24846492]
- Hoerster KD, Gray KE, Simpson T, Unützer J, Saelens B, Reiber G, & Nelson KM (2018). Predictors of diet quality and physical activity improvements in a weight loss program for overweight veterans with PTSD. In Poster Presented at the 39th Annual Meeting of the Society of Behavioral Medicine, New Orleans. *Annals of Behavioral Medicine*, 52, S79.
- Hoerster KD, Gray K, & Raffa SD (2020). Weight management and healthy lifestyles. *JAMA Internal Medicine*, 180(10), 1403–1404.
- Hoerster KD, Lai Z, Goodrich DE, Damschroder LJ, Littman AJ, Klingaman EA, Nelson KM, & Kilbourne AM (2014). Weight loss after participation in a national VA weight management program among veterans with or without PTSD. *Psychiatric Services*, 65(11), 1385–1388. 10.1176/appi.ps.201300404 [PubMed: 25123784]
- Hoerster KD, Millstein RA, Hall KS, Gray KE, Reiber GE, Nelson KM, & Saelens BE (2015). Individual and contextual correlates of physical activity among a clinical sample of United States veterans. *Social Science and Medicine*, 142, 100–108. 10.1016/j.socscimed.2015.07.034 [PubMed: 26298646]
- Hoerster KD, Tanksley L, Sulayman N, Bondzie J, Brier M, Damschroder L, Coggeshall S, Houseknecht D, Hunter-Merrill R, Monty G, Saelens BE, Sayre G, Simpson T, Wong E, & Nelson

- K (2021). Testing a tailored weight management program for veterans with PTSD: The MOVE! + UP randomized controlled trial. *Contemporary Clinical Trials*, 107. 10.1016/j.cct.2021.106487
- Hoerster KD, Wilson S, Nelson KM, Reiber GE, & Masheb RM (2016). Diet quality is associated with mental health, social support, and neighborhood factors among veterans. *Eating Behaviors*, 22, 168–173. 10.1016/j.eatbeh.2016.10.003
- Jovanovi Ž, Crn evi -Orli Ž, Štimac D, Koki S, Perši V, Ruži T, & Goll-Bari S (2009). Effects of obesity reduction on cardiovascular risk factors: Comparison of individual and group treatment - Substudy of the Croatian healthy weight loss programme. *Collegium Antropologicum*, 33(3), 751–757. [PubMed: 19860100]
- Kahwati LC, Lance TX, Jones KR, & Kinsinger LS (2011). RE-AIM evaluation of the Veterans Health Administration's MOVE! weight management program. *Translational Behavioral Medicine*, 1(4), 551–560. 10.1007/s13142-011-0077-4 [PubMed: 24073079]
- Kiernan M, Moore SD, Schoffman DE, Lee K, King AC, Taylor CB, Kiernan NE, & Perri MG (2012). Social support for healthy behaviors: Scale psychometrics and prediction of weight loss among women in a behavioral program. *Obesity*, 20(4), 756–764. 10.1038/oby.2011.293 [PubMed: 21996661]
- Kimerling R, Pavao J, Greene L, Karpenko J, Rodriguez A, Saweikis M, & Washington DL (2015). Access to mental health care among women veterans. *Medical Care*, 53(Supplement 4Suppl 1), S97–S104. 10.1097/MLR.0000000000000272 [PubMed: 25767985]
- King N (1998). Template analysis. In Symon G & Cassell C (Eds.), *Qualitative methods and analysis in organizational research: A practical guide* (pp. 118–134). Sage Publications Ltd.
- Kinsinger LS, Jones KR, Kahwati L, Harvey R, Burdick M, Zele V, & Yevich SJ (2009). Design and dissemination of the move! weight-management program for veterans. *Preventing Chronic Disease*, 6(3).
- Klingaman EA, Hoerster KD, Aakre JM, Viverito KM, Medoff DR, & Goldberg RW (2016). Veterans with PTSD report more weight loss barriers than veterans with no mental health disorders. *General Hospital Psychiatry*, 39(2016), 1–7. 10.1016/j.genhosppsych.2015.11.003 [PubMed: 26719103]
- Koepsell TD, Littman AJ, & Forsberg CW (2012). Obesity, overweight, and their life course trajectories in veterans and non-veterans. *Obesity*, 20(2), 434–439. 10.1038/oby.2011.2 [PubMed: 21293452]
- Kumanyika SK, Wadden TA, Shults J, Fassbender JE, Brown SD, Bowman MA, Brake V, West W, Frazier J, Whitt-Glover MC, Kallan MJ, Desnouee E, & Wu X (2009). Trial of family and friend support for weight loss in African American adults. *Archives of Internal Medicine*, 169(19), 1795–1804. 10.1001/archinternmed.2009.337 [PubMed: 19858438]
- Lillis J, Thomas JG, Niemeier HM, & Wing RR (2017). Exploring process variables through which acceptance-based behavioral interventions may improve weight loss maintenance. *Journal of Contextual Behavioral Science*, 6(4), 398–403. 10.1016/j.jcbs.2017.07.005 [PubMed: 29230381]
- Lim MH, Gleeson JFM, Alvarez-Jimenez M, & Penn DL (2018). Loneliness in psychosis: a systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 53(3), 221–238. 10.1007/s00127-018-1482-5 [PubMed: 29327166]
- Littman AJ, Damschroder LJ, Verchinina L, Lai Z, Kim HM, Hoerster KD, Klingaman EA, Goldberg RW, Owen RR, & Goodrich DE (2015). National evaluation of obesity screening and treatment among veterans with and without mental health disorders. *General Hospital Psychiatry*, 37(1), 7–13. 10.1016/j.genhosppsych.2014.11.005 [PubMed: 25500194]
- Ma J, Rosas LG, Lv N, Xiao L, Snowden MB, Venditti EM, Lewis MA, Goldhaber-Fiebert JD, & Lavori PW (2019). Effect of integrated behavioral weight loss treatment and problem-solving therapy on body mass index and depressive symptoms among patients with obesity and depression. *JAMA*, 321(9), 869. 10.1001/jama.2019.0557 [PubMed: 30835308]
- Maciejewski ML, Shepherd-Banigan M, Raffa SD, & Weidenbacher HJ (2018). Systematic review of behavioral weight management program MOVE! for veterans. *American Journal of Preventive Medicine*, 54(5), 704–714. 10.1016/j.amepre.2018.01.029 [PubMed: 29550164]
- Masheb RM, Chan SH, Raffa SD, Ackermann R, Damschroder LJ, Estabrooks PA, Evans-Hudnall G, Evans NC, Histon T, Littman AJ, Moin T, Nelson KM, Pagoto S, Pronk NP, Tate DF, & Goldstein MG (2017). State of the art conference on weight management in VA: Policy and

- research recommendations for advancing behavioral interventions. *Journal of General Internal Medicine*, 32, 74–78. 10.1007/s11606-016-3965-y [PubMed: 28271431]
- Monteith LL, Bahraini NH, Gerber HR, Dorsey Holliman B, Schneider AL, Holliday R, & Matarazzo BB (2020). Military sexual trauma survivors' perceptions of veterans health administration care: A qualitative examination. *Psychological Services*, 17(2), 178–186. 10.1037/ser0000290 [PubMed: 30265071]
- MOVE! Weight Management Program. (2020). <https://www.move.va.gov/vetworkbook.asp>
- Naslund JA, Whiteman KL, McHugo GJ, Aschbrenner KA, Marsch LA, & Bartels SJ (2017). Lifestyle interventions for weight loss among overweight and obese adults with serious mental illness: A systematic review and meta-analysis. *General Hospital Psychiatry*, 47(3), 83–102. 10.1016/j.genhosppsych.2017.04.003 [PubMed: 28807143]
- Paul-Ebhohimhen V, & Avenell A (2009). A systematic review of the effectiveness of group versus individual treatments for adult obesity. *Obesity Facts*, 2(1), 17–24. 10.1159/000186144 [PubMed: 20054200]
- Price M, Gros DF, Strachan M, Ruggiero KJ, & Acierno R (2013). The role of social support in exposure therapy for Operation Iraqi Freedom/Operation Enduring Freedom veterans: A preliminary investigation. *Psychological Trauma: Theory, Research, Practice, and Policy*, 5(1), 93–100. 10.1037/a0026244 [PubMed: 23869250]
- Ranney ML, Meisel ZF, Choo EK, Garro AC, Sasson C, & Morrow Guthrie K (2015). Interview-based qualitative research in emergency care part II: Data collection, analysis and results reporting. *Academic Emergency Medicine*, 22(9), 1103–1112. 10.1111/acem.12735 [PubMed: 26284572]
- Renjilian DA, Perri MG, Nezu AM, McKelvey WF, Shermer RL, & Anton SD (2001). Individual versus group therapy for obesity: Effects of matching participants to their treatment preferences. *Journal of Consulting and Clinical Psychology*, 69(4), 717–721. 10.1037/0022-006X.69.4.717 [PubMed: 11550739]
- Rush T, LeardMann CA, & Crum-Cianflone NF (2016). Obesity and associated adverse health outcomes among US military members and veterans: Findings from the millennium cohort study. *Obesity*, 24(7), 1582–1589. 10.1002/oby.21513 [PubMed: 27345964]
- Rutledge T, Skoyen JA, Wiese JA, Ober KM, & Woods GN (2017). A comparison of MOVE! versus TeleMOVE programs for weight loss in Veterans with obesity. *Obesity Research and Clinical Practice*, 11(3), 344–351. 10.1016/j.orcp.2016.11.005 [PubMed: 27931766]
- Rutter LA, Weatherill RP, Krill SC, Orazem R, & Taft CT (2013). Posttraumatic stress disorder symptoms, depressive symptoms, exercise, and health in college students. *Psychological Trauma: Theory, Research, Practice, and Policy*, 5(1), 56–61. 10.1037/a0021996
- Santini ZI, Koyanagi A, Tyrovolas S, Mason C, & Haro JM (2015). The association between social relationships and depression: A systematic review. *Journal of Affective Disorders*, 175, 53–65. 10.1016/j.jad.2014.12.049 [PubMed: 25594512]
- Shnaider P, Sijercic I, Wanklyn SG, Suvak MK, & Monson CM (2017). The role of social support in cognitive-behavioral conjoint therapy for posttraumatic stress disorder. *Behavior Therapy*, 48(3), 285–294. 10.1016/j.beth.2016.05.003 [PubMed: 28390493]
- Simon N, Roberts NP, Lewis CE, van Gelderen MJ, & Bisson JI (2019). Associations between perceived social support, posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD): implications for treatment. *European Journal of Psychotraumatology*, 10(1). 10.1080/20008198.2019.1573129
- Sippel LM, Watkins LE, Pietrzak RH, Hoff R, & Harpaz-Rotem I (2019). Heterogeneity of posttraumatic stress symptomatology and social connectedness in treatment-seeking military veterans: a longitudinal examination. *European Journal of Psychotraumatology*, 10(1). 10.1080/20008198.2019.1646091
- Spring B, Sohn MW, Locatelli SM, Hadi S, Kahwati L, & Weaver FM (2014). Individual, facility, and program factors affecting retention in a national weight management program. *BMC Public Health*, 14(1), 1–11. 10.1186/1471-2458-14-363 [PubMed: 24383435]
- Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie ML, & Gortmaker SL (2011). The global obesity pandemic: Shaped by global drivers and local environments. *The Lancet*, 378(9793), 804–814. 10.1016/S0140-6736(11)60813-1

- Talbot LS, Maguen S, Epel ES, Metzler TJ, & Neylan TC (2013). Posttraumatic stress disorder is associated with emotional eating. *Journal of Traumatic Stress, 26*(4), 521–525. 10.1002/jts.21824 [PubMed: 23893425]
- Taylor SS, Olsen MK, McVay MA, Grubber J, Gierisch JM, Yancy WS, & Voils CI (2019). The role of group cohesion in a group-based behavioral weight loss intervention. *Journal of Behavioral Medicine, 42*(1), 162–168. 10.1007/s10865-018-9953-4 [PubMed: 30076501]
- Teachman J, & Tedrow L (2013). Veteran status and body weight: A longitudinal fixed effects approach. *Population Research and Policy Review, 32*(2), 199–220. [PubMed: 25580045]
- Thrasher S, Power M, Morant N, Marks I, & Dalgleish T (2010). Social support moderates outcome in a randomized controlled trial of exposure therapy and (or) cognitive restructuring for chronic posttraumatic stress disorder. *The Canadian Journal of Psychiatry, 55*(3), 187–190. 10.1177/070674371005500311 [PubMed: 20370970]
- Trickey D, Siddaway AP, Meiser-Stedman R, Serpell L, & Field AP (2012). A meta-analysis of risk factors for post-traumatic stress disorder in children and adolescents. *Clinical Psychology Review, 32*(2), 122–138. 10.1016/j.cpr.2011.12.001 [PubMed: 22245560]
- Verheijden MW, Bakx JC, van Weel C, Koelen MA, & van Staveren WA (2005). Role of social support in lifestyle-focused weight management interventions. *European Journal of Clinical Nutrition, 59*. 10.1038/sj.ejcn.1602194
- Wang J, Mann F, Lloyd-Evans B, Ma R, & Johnson S (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry, 18*(1), 1–16. 10.1186/s12888-018-1736-5 [PubMed: 29304757]
- Weathers FW, Litz BT, Keane TM, Palmieri PA, Marx BP, & Schnurr PP (2013). The PTSD checklist for DSM-5 (PCL-5). Retrieved from the National Center for PTSD Website: [Http://Www.Ptsd.va.Gov](http://www.ptsd.va.gov).
- Wilson LC (2018). The prevalence of military sexual trauma: A meta-analysis. *Trauma, Violence, and Abuse, 19*(5), 584–597. 10.1177/1524838016683459
- Wing RR, Leahey T, Jeffery R, Johnson KC, Hill JO, Coday M, & Espeland MA (2014). Do weight loss and adherence cluster within behavioral treatment groups? *Obesity, 22*(3), 638–644. 10.1002/oby.20526 [PubMed: 23804576]
- Zwicker K, & Rieger E (2014). A qualitative investigation of obese women's experiences of effective and ineffective social support for weight management. *Clinical Obesity, 4*(5), 277–286. 10.1111/cob.12072 [PubMed: 25825860]

Impact Statement:

Veterans with PTSD participating in a weight management program were interviewed about their experience related to social support. Participants' comments suggested that they found many forms of social support beneficial, but not all forms of support from others were helpful with their weight loss goals, especially when others encouraged them to make unhealthy choices. Other barriers mentioned were a lack of social relationships in general and PTSD symptoms making it harder to accept social support. Results of this study suggest that weight loss programs should assist participants with increasing the positive social support they receive, within and outside of the treatment, and reducing barriers created by others, particularly among those with psychiatric conditions such as PTSD.

Table 1.

Baseline Characteristics among MOVE!+UP Participants who Completed at least 1 Qualitative Interview (N=37)

Variable	Average/# of Participants
Age; Mean (SD)	55 (12)
Gender (Male); %	70%
Race; %	
White	62%
Black	16%
Native	11%
Asian	3%
Other	8%
Ethnicity (Hispanic); %	8%
Income; %	
<\$20K	23%
\$20-40k	29%
\$40-80k	34%
>\$80k	14%
Employment Status (Employed); %	12.5%
Married or living with a significant other; %	51.4%
Weight (lbs); Mean (SD)	243 (55)
BMI; Mean (SD)	36 (6)