

# The role of social support in obesity online health communities.

## A literature review

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### Abstract

In the treatment of obesity, social support is considered key to successful weight loss and behavioural change, and online health communities to complement obesity treatment programmes have been shown to increase obesity treatment effectiveness. This study reviews the latest literature regarding how social support provided through an online health community can help people tackle obesity, identifying the different effects of social support on online health community members, specifically, the promotion of behavioural change and increased self-efficacy. This study also reveals how the recent literature points to both a direct and indirect relationship between social support in online health communities for obesity treatment and actual weight loss. This review is likely to provide useful insights to both healthcare professionals and social platform developers.

### Highlights

- Literature is reviewed from the last 10 years on social support in obesity online health communities.
- Most research to date has focused on more general effects of social support.
- 21 studies report on the effects of social support for members of obesity online health communities.
- Social support improves aspects related to weight loss, behavioural change, and participation in online health communities.
- The effects of social support vary depending on whether support is given or received.
- Research gaps exist regarding the effects of different types of social support.

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### Introduction

Digital social networks have reached a new peak in popularity and maturity (Zhang & Huang, 2021). In terms of health communication, digital social networks are by now present in almost all healthcare areas, e.g., training for professionals and patients, health-related decision making, health promotion, knowledge transfer, and direct health service provision (Suggs, 2006).

Digital social networks like Meta and Reddit foster the

development of online communities, defined as being composed of individuals with similar interests or common goals (Yuqing et al., 2007). Online health communities (OHCs), which are platforms where individuals with a similar health condition give and receive mutual support (Hether et al., 2014), cover a wide range of health-related concerns, including cancer (Setoyama et al., 2011), Type 1 and 2 diabetes (Herrero et al., 2019; Zhang et al., 2013), AIDS (Fullwood et al., 2019), as well as obesity and excess weight (Centola & van de Rijt, 2015).

## Online Health Communities: Advantages and Characteristics

OHCs offer several advantages over in-person support groups, including anonymity, a safe space where people face fewer prejudices, convenience of use, and social support (Hwang et al., 2010; Yan, 2018). Although in-person groups also potentially offer a safe space and social support, OHCs are particularly enhanced by their anonymity and convenience of use.

In relation to anonymity, because interaction happens through a device, OHCs foster the invisibility of their members (Ballantine & Stephenson, 2011; Zhang et al., 2013), who feel more at liberty to discuss sensitive topics openly and honestly (Hwang et al., 2014). The digital environment also means that OHC members can conceal their identity fully or partially to ensure that they cannot be identified offline (DeAndrea et al., 2012; van Dijck, 2013). OHC members who pursue a common goal do not feel judged by their failures (Hwang et al., 2010; Yan, 2018), feel they can be themselves, feel accepted for who they are (Lewis et al., 2011; Reading et al., 2019), and so there is a lesser tendency to form prejudices based on physical appearances (Chung et al., 2013). This is especially important for people with stigmatized conditions, such as excess weight (Fernández Ramírez & Baleriola Escudero, 2012; Major et al., 2014), as feelings of shame regarding their condition mean that they often fail to act to improve their health (e.g., by seeking medical advice; Bandura, 2004; Lewis et al., 2011).

As for convenience, OHCs are atemporal in that members can raise and respond to issues as suits them (Fullwood et al., 2019; Setoyama et al., 2011). OHCs are also dynamic and typically have a large membership, so questions are responded to almost immediately. Additionally, archived topics and content in OHCs can be accessed by members at any time. Access to an OHC does not require a physical space or travel, as is necessary for in-person encounters (Setoyama et al., 2011; Taimien, 2016), which is particularly important for people who otherwise would be unable to participate (e.g., because they live in remote locations or have reduced mobility).

OHCs act as a common resource for sharing information and seeking emotional support for people who perceive that the support provided by their offline social circle is insufficient (Chung et al., 2013; Reifegerste et al., 2017; Setoyama et al., 2011). OHCs are especially valuable for people with stigmatized conditions, as is the case of obesity (Fernández Ramírez & Baleriola Escudero, 2012).

## Online Health Communities for Weight Loss

OHCs focused on weight loss are beneficial for patients with obesity (Chung, 2013; Kotevko & Hunt, 2016; Reading et al., 2019; Reifegerste et al., 2017), primarily because they focus on improving emotional wellbeing, rather than on achieving objectives fixed by prescribed treatments, such as losing a certain number of kilos or reducing waist circumference (Reifegerste et al., 2017). Improved emotional wellbeing increases the probability of behavioural change, and, consequently, of weight loss (Major et al., 2014).

While improved emotional wellbeing is undoubtedly a fundamental first step to behavioural change and weight loss (Cunha et al., 2017; Hwang et al., 2010; Reifegerste et al., 2017). Funk et al. (2010) reported no evidence of a direct relationship between OHC participation and weight loss. However, the same authors also observed that members who interacted with the OHC at least once a month during 26 of the 28 months of that study lost more weight than less interactive OHC members, and, furthermore, maintained their weight loss over a longer period (Funk et al., 2010).

## Social Support in Online Health Communities

Albrecht and Adelman (1987, p. 19) defined social support as verbal or non-verbal communication that reduces uncertainty regarding a situation, the self, the other, or a relationship; they also suggested that social support increased a person's perceived control over their own vital experience.

Weight-loss OHCs can be used to create broad social support networks (Cunha et al., 2017), since they minimize social, spatial, and temporal barriers between members. When OHC members support and encourage each other, they help change, increase, and maintain healthy behaviours, self-esteem, and perceptions of self-efficacy (Bandura, 2004), and this ultimately leads to weight loss (Yan, 2018).

Previous research suggests that most overweight treatments overly focus on weight loss to the detriment of considering how patients can internalize behavioural guidelines for a healthy lifestyle. Effective obesity treatment should therefore not be limited exclusively to weight loss, but should help the patient learn and assimilate healthy behaviours (Reifegerste et al., 2017). In obesity OHCs, combining social support with weight loss techniques has been documented as beneficial (Yan, 2018), as this approach helps members achieve better health results and cope emotionally with their condition (Hwang et al., 2010; Nosek et al., 2019). Emo-

tional coping relies on a perception of self-efficacy, i.e., a belief in one's ability to take control over the self and external factors (Bandura, 1997). Li et al. (2014) observed that the social support received by individuals at the beginning of participation in an OHC increased their sensation of being able to control their weight. Nonetheless, there is as yet no conclusive evidence that social support is an independent factor in weight loss.

### Social Support Classification

According to Pearson (1986), social support has quantitative and qualitative dimensions, which Hwang et al. (2014) differentiated in terms of structural social support (also known as perceived social support) and functional social support (corresponding to Pearson's quantitative and qualitative dimensions, respectively). Structural social support refers to the perceived availability of social support and is reflected in terms of channel and frequency, i.e., how and how often social support is received, respectively. Functional social support refers to the type and function of social support received, i.e., the kind of support and how it is transmitted, respectively. Hwang et al. (2010) classified social support in obesity OHCs as emotional, informational, instrumental, and appraisal.

**Emotional Social Support.** This type of social support is defined as empathy, trust, and intimacy with other members of the OHC, i.e., "behaviour that fosters feelings of comfort and leads an individual to believe that he or she is admired, respected, and loved, and that others are available to provide caring and security." (Jacobson, 1986, p. 252). An example is a member thanking the community for support during their weight loss process.

**Informational Social Support** (also known as cognitive social support). This type of social support is information that allows users to better understand their situation and adapt (Jacobson, 1986). It takes the form of advice, recommendations, referrals to experts, assessments of situations, and information provision to other OHC members. Examples are members sharing tips or weight-loss recipes. Zhang et al. (2013) identified two main ways to provide this kind of support: proactively, without any OHC member asking for it, and reactively, answering questions posed by other OHC members.

**Instrumental Social Support** (also known as material support). This support is offered through goods or services

that help users solve practical problems (Jacobson, 1986); it thus has a tangible dimension. In an overweight context, this kind of support helps individual not only acknowledge their excess weight, but also to lose weight. In weight-loss OHCs, an example is exchanging or selling diet products.

**Appraisal Social Support** (also known as esteem social support). This kind of support is given through feedback, encouragement, and constructive criticism to OHC members (Hwang et al. 2010). Although it is similar to emotional social support, it differs in that it focuses on the individual rather than the community (Cutrona & Suhr, 1992). An example is a member expressing admiration of a weight loss testimonial.

### Active and Passive Social Support

Another perspective on social support is whether it is genuinely received or simply perceived. According to Yan (2020), received social support requires an act of support, while perceived social support is based on perceptions of support being available with no action needed. Similarly, Ballantine and Stephenson (2011) note that, in the OHC setting, social support can be active, e.g., direct interaction between members encouraging each other to continue with a diet, or passive, e.g., new weight-loss information shared with the community, with the reader thus passively receiving social support. Furthermore, the mere act of interacting in an obesity OHC could represent social support in itself, as the individual becomes aware that others are living with a similar condition (Ballantine & Stephenson, 2011).

### Social Support Classification in Current Research

In relation to the emotional, informational, instrumental, and appraisal social support classification, the focus in obesity OHCs has been largely on emotional and informational social support (Ballantine & Stephenson, 2011; Fullwood et al., 2019; Hether et al., 2014). Appraisal social support has received less attention (Pappa et al., 2017), even though it may be equally as effective as informational and emotional social support. As for instrumental social support, it is not clearly operationalized as a unique category. This is because all support that results in weight loss could be classified as such, according to Hwang et al. (2010), who additionally noted that if instrumental social support is all the support

**Table 1.** Literature search strategy

Database	Boolean search
Web of Science*	(TS=(social support)) AND TS=(“online community”) OR TS=(“online health community”) AND TS=(obesity) PY=(2011-2021)
Scopus	TITLE-ABS-KEY (obesity AND “social support” AND “online” AND “community” OR “online health community”) AND PUBYEAR > 2010

\* TS and PY refer to term and year of publication, respectively.

that leads to weight loss, then all interactions that ultimately lead to weight loss could be classified as instrumental.

### Scope and Methodology

We carried out a systematic literature review of research from 2011 to 2021 into the role played by social support in obesity OHCs, with a view to identifying what social support benefits have been reported in the literature and whether weight loss was one of those benefits.

Recent years have witnessed the publication of several literature reviews on the benefits of OHCs for their members (Kingod et al., 2017; Newman et al., 2019), the psychological factors associated with interaction in OHCs (Kamalpour et al., 2018; Lleras de Frutos et al., 2020), and the role of OHCs in generally promoting healthy habits (Welch et al., 2016). Two other literature reviews (Ufholz, 2020; Waring et al., 2018) adopted a general approach to OHCs, i.e., there was no specific focus on the role played by social support in OHCs in general, or in obesity OHCs in particular.

Based on our objective of contributing to the existing literature, we aimed to determine the feasibility of using obesity OHCs as a complementary treatment for obesity. To maximize the benefits of social support for OHC members, we needed to determine what link, if any, existed between social support in obesity OHCs and weight loss. Such information has important implications, not only for public health policy decision making, but also for the design and management of new platforms to host obesity OHCs that maximize social support benefits for their members.

### Aims and Research Questions

This review aimed to identify key findings from studies published in the last ten years that applied social support theory to online weight-loss communities aimed at treating obesity (obesity OHCs).

As mentioned above, past literature reviews (Ufholz, 2020; Waring et al., 2018) have not specifically addressed the effects of social support on OHC members. In addition, as noted by Schaefer et al. (1981), it is important to bear in mind that different types of social support can produce different outcomes. Therefore, our first research question is:

RQ 1. What effects, if any, does social support has on obesity OHC members?

Several studies focus on whether or not social support is obtained through obesity OHCs, with some reporting that social support in obesity OHCs may ultimately lead to weight loss (Song et al., 2018; Turner-McGrievy & Tate, 2013; Yan, 2017). However, it is not clear that weight loss can be directly attributed to either participation in, or social support received from, obesity OHCs (Cunha et al., 2017; Pappa et al., 2017). Therefore, our second research question is:

RQ 2. What impact, if any, does social support (in any of its forms) in obesity OHCs has on weight-loss outcomes?

### Literature Search Strategy

Our systematic literature review (Table 1) was conducted by searching two key academic databases, namely, the Web of Science (WOS) and Scopus, using the keywords “social support”, “obesity”, and “online communities”, and using Boolean operators to avoid possible bias in the results. A criterion of the search was that the aforementioned terms had to appear in the title, the abstract, or the keywords. Note that we

deliberately included “obesity” and excluded “weight loss” in the Boolean search, to avoid including research into weight-loss communities whose focus was not the treatment of obesity, and so not within the scope of this review (e.g., pro-anorexia or pro-bulimia communities).

## Inclusion Criteria

Table 2 summarizes inclusion and exclusion criteria defined before the search.

## Study Selection

Intercoder reliability was ensured by the involvement of two different researchers in the inclusion process and the literature review. The two researchers retrieved a total of 82 articles (41 WOS and 41 Scopus) for initial review (Figure 1). This was a significantly lower number than yielded when the same strategy was used to search for other terms (Table 3): “social support” and “online community”, and “social support”, “online community”, and “weight loss” (as opposed to “obesity”). However, a quick scan of the abstracts retrieved from WOS for these alternative searches revealed

that they did not meet the basic criteria of being online-based or community-based studies.

Of the 82 retrieved articles, 27 studies appeared in both databases, so duplicates were excluded, leaving 55 articles whose titles and abstracts were reviewed (by both researchers independently) to select articles that specifically mentioned the use of social support in obesity OHCs. Any discrepancies were resolved by agreement.

A further 30 articles were discarded, leaving 25 for inclusion in the review. Table 5 summarizes details of included articles and excluded articles, along with reasons for exclusion, as follows: not based on an online community (n=10); not an OHC (n=10); not about social support (n=4); not targeted at obese people (n=3); not based online (n=1); social support not linked with obesity (n=1); did not meet any criteria (n=1).

The 25 remaining articles that complied with the established criteria were read in full to verify that they were valid for the qualitative analysis phase. A further eight articles were excluded after reading. Five were articles that did not meet our criteria: two referred to clinical trials underway and so reporting no results (Evans et al., 2019; Jane et al., 2015), two did not cover social support (Chomutare et al.,

**Table 2.** *Inclusion and exclusion criteria*

Inclusion criteria	Exclusion criteria
Articles published in English.	Documents published in languages other than English.
Articles that are accessible.	Records that, despite inclusion in the databases, cannot be accessed (e.g., articles in press and under review).
Journal article or conference paper.	Records other than journal articles or conference papers.
Peer-reviewed article.	Non-peer-reviewed records.
Published article.	Research pending publication.
Focus: effects of social support for obesity treatment.	Focus: effects of social support for weight loss but not obesity-related.
OHC composed of members who are obese or overweight.	Digital media used as a one-way channel (e.g., online noticeboards and social media when used only to deliver messages). Offline communities.
OHC targeting members who are obese or overweight, and who are referred to as patients (Farmer et al., 2009).	Obesity OHCs that target members who cannot be considered patients (e.g., carers, relatives, or health professionals).

**Table 3.** *Alternative search strategy results* (back to text)

Keywords	Total	Scopus	Web of Science
Social support, online community	939	475	464
Social support, online community, weight loss (as opposed to obesity)	110,897	15	110,882

**Figure 1.** *Selection flowchart (based on PRISMA)* (back to text)



2016; Naparstek et al., 2017), and one did not refer to obesity OHCs (Shigaki et al., 2014). The other three articles were excluded because they were systematic reviews or did not report data or results that could help respond to the research questions (Ufholz, 2020; Waring et al., 2018; Willmott et al., 2019).

Finally, a manual review of the references regarding social support in obesity OHCs located four further articles for inclusion (Chancellor et al., 2018; Jane et al., 2018; Song et al., 2018; Wang & Willis, 2018). This left a total of 21 studies for the qualitative review.

## Analytical Framework

Analysis of the articles was based on the research questions and objectives of this review, i.e., the types and effects of social support and the relationship between social support and weight loss.

## Results

Table 5 summarizes details of the studies included in this systematic review.

### Overview of Selected Studies

The 21 studies included in the analysis used quantitative and qualitative methodologies in diverse approaches to the study of social support in obesity OHCs. Despite the fact that there is extensive literature on different types of social support, 10 of the analysed studies did not specify the type of social support researched. Interestingly, this group included all four studies based on clinical trials (Holtz et al., 2014; Jane et al., 2018; B.H. Marcus et al., 2015; Nosek et al., 2019); the fact that social support type was not specified may be because the authors used social support as yet another variable, without focusing on types.

For all the studies, irrespective of the methodology used, we noted that: (a) people find obesity OHCs a convenient way to give and receive social support (Holtz et al., 2014; B.H. Marcus et al., 2015; Nosek et al., 2019; Yan, 2018); and (b) the effects of social support on obesity OHC members, which were diverse, were almost invariably beneficial.

Research that specified the type of social support studied mainly focused on informational social support and emo-

tional social support (Dickins et al., 2011; Kim, Faw et al., 2017; Kim, Ray et al., 2017; Reading et al., 2019; Song et al., 2018; Taiminen, 2016; Yan, 2018). Just two of the studies mentioned appraisal social support (Pappa et al., 2017; S.R. Marcus, 2016); both those studies used content analysis as a methodology, as, given its nature, appraisal social support is easier to observe by analysing comments rather than using a methodology like surveying. Those nine studies reported different benefits for each. It was also observed that the effects of social support may be influenced by other circumstances, such as the patient's psychological profile (Chancellor et al., 2018; Yan, 2018) or demographic characteristics (Johnson & Wardle, 2011; B.H. Marcus et al., 2015). However, this issue was not explored in the reviewed literature.

Finally, 12 of the 21 analysed studies reported a direct or indirect relationship between social support in obesity OHCs and weight loss. The studies that did not observe this effect reported that weight loss was linked to other factors, such as self-efficacy (B.H. Marcus et al., 2015), or indicated that weight loss was not a variable in their research (Chancellor et al., 2018; S.R. Marcus, 2016; Nosek et al., 2019).

### Effects of Social Support on Obesity OHC Members

The reviewed literature described social support for obesity OHC members in terms of four types of effects: (a) promotion of healthy behaviours; (b) increased self-efficacy; (c) improved psychological wellbeing; and (4) enhanced adherence and participation in the OHC. Most studies took into account member perceptions regarding social support that positively affected mental health and behavioural change. Indeed, it is noteworthy that few studies reported negative effects of social support. Yan (2018) noted, however, that even though the benefits of social support have been thoroughly studied, some studies observed no effect, and the reporting of adverse effects was very rare (mainly related to the overall weight-loss effectiveness of the OHC for a specific type of participant).

#### *Promotion of Healthy Behaviours*

In the reviewed studies, one of the main effects of social support on obesity OHC members was to bring about behavioural change. Social support fostered a sense of responsibility among OHC members (Chancellor et al., 2018; Reading



et al. 2019), who were observed to be more motivated to monitor their progress and keep on track with their objectives (Reading et al., 2019).

Reading et al. (2019) noted that the level of trust was high, because social support was provided by individuals with whom OHC members could identify. Similarly, in a study that focused on promoting physical activity amongst Latino women with obesity, B.H. Marcus et al. (2015) observed that the OHC offered increased social support (and hence improved physical activity), compensating for the little social support perceived to be received from offline circles.

One example of a change in habits was journal-keeping to record food intake. Such food diaries have been found to be an influential factor in perceptions of weight-loss self-efficacy (Yan, 2018), with individuals who perceived a greater degree of social support, increasing their food-logging practices (Kim, Faw et al., 2017; Yan, 2018). Noteworthy is the fact that increased use of self-monitoring techniques (such as weigh-ins and diary keeping) appeared to be linked more to perceived social support than to self-efficacy (Kim, Faw et al., 2017). This would suggest that receiving social support can be a motivational factor for certain activities related to weight monitoring, while also improving a sense of belonging to the community (Kim, Faw et al., 2017).

Yan (2018), in a study of users of a popular health tracking application, observed a positive and significant impact on people's sense of self-efficacy, as, irrespective of whether the user felt they had a high or low level of self-efficacy, logging their food intake helped them increase their self-efficacy level, and therefore, achieve better outcomes. However, for users with an intermediate self-efficacy level, the difference in habits was barely statistically significant.

Some authors noted, however, that monitoring weight loss using health devices or tracking applications was not enough to initiate a change in behaviours (Kim, Faw et al., 2017) or to enhance access to information (Holtz et al., 2014). Nonetheless, participation in OHCs fosters interactivity between members (whether other patients or healthcare professionals) and so enhances social support.

The OHC's own norms of conduct also mediated the effects of social support on members and vice versa; thus, for instance, the perception of a high level of social support from others increased the likelihood that members would adhere to the norms of the OHC (Kim, Ray et al., 2017).

Finally, the type of social support received also affected

the type of behaviour adopted. For example, when experts provided informational social support, such as physical activity guidelines and health information (Kim, Ray et al., 2017), OHC members were more inclined to learn new behaviours that they could implement in their daily life.

Chancellor et al. (2018) compared an obesity OHC and an online community promoting eating disorders in terms of the effects of comments and demonstrations of support, observing that although both communities had the same goal of losing weight, the obesity OHC promoted weight loss through healthy behaviours and lifestyles, while the eating disorders community perpetuated unhealthy habits. This indicates how members may feel pressured to adopt certain behaviours, whether positive or negative (Chancellor et al., 2018; Kim, Ray et al., 2017).

### *Increased Self-Efficacy*

As has been tentatively noted, social support may play a role in enhancing self-efficacy and, consequently, in achieving weight-loss goals. A safer and more efficient way of learning than trial and error, for instance, is learning from the experiences of other OHC members, as this results in enhanced self-efficacy to lose weight (Wang & Willis, 2018). That particular example refers to what is known as self-efficacious content, i.e., content intended to increase the motivation of both the creator and the user. Receiving this type of content has been shown to be helpful in overcoming barriers and setbacks in personal attempts to lose weight (Reading et al., 2019).

Even merely interacting with other OHC members can increase self-efficacy (Nosek et al., 2019; Yan, 2018), because OHCs, in addition to offering weight-loss advice and strategies, enable connection between people with the same condition and the same difficulties. Connection, in fact, is a key determinant for how much members interact, even more than the total number of peers available in the OHC (Yan, 2020). When individuals are at the beginning of their weight loss process or have a low level of self-efficacy, their need to belong to a community is greater, and they are, thus, more proactive (Yan, 2018). This greater interaction, in both providing and receiving social support, gives them access to more of the OHC's resources, which increases their self-efficacy and the likelihood that they will achieve weight loss.

Yan (2018) also highlighted, however, that self-efficacy could be undermined because of an interaction that, in other circumstances, might have increased self-efficacy. An

example is members receiving social support without having asked for it. Being provided with more social support than needed could have negative outcomes, because, for a person with a high level of self-confidence, to be perceived as someone needing help may seem patronizing and leave them feeling inadequate (Yan, 2018).

### *Improved Psychological Wellbeing*

In addition to influencing behavioural change and self-efficacy levels, social support also influenced mental and psychological wellbeing in persons with obesity (Kim, Ray et al., 2017). In a clinical trial conducted by Jane et al. (2018), using an obesity OHC to complement a supervised weight-loss programme was reported to improve the psychological wellbeing of patients, quality of life, health, and social relationship parameters showing a significant improvement after 24 weeks of treatment. However, the same authors concluded that the improved psychological wellbeing during the trial could not be considered as mediating in weight loss.

Note that, in the analysed studies, there was no consensus regarding what can be considered as psychological wellbeing. In the case of Jane et al. (2018), for instance, patients self-reported their perceptions of quality of life, health, and social relationships. Other studies (Dickins et al., 2011; Holtz et al., 2014; Marcus, 2016; Nosek et al., 2019) focused more on feelings of belonging to a group and of less social stigma related to their obesity, with both those factors helping to improve psychological wellbeing – despite the absence of a definition of what was considered as such.

As noted elsewhere, the nature of OHCs as a safe space leads members to feel confident about expressing their challenges with weight loss and to also feel supported (Reading et al., 2019). In a weight-loss clinical trial of army veterans, Holtz et al. (2014) observed that women who perceived that they received insufficient social support from their offline social circles tended to use the OHC more, to engage more with others in a motivational way, and to feel they were part of a team. Likewise, Nosek et al. (2019), in a pilot test of Second Life as an OHC platform for women with obesity and impaired mobility, noted that 77% of the women mentioned that receiving feedback, establishing relationships, and interacting with people in the same situation were the most valuable features of the OHC.

However, it seems that two gaps exist in the reviewed literature regarding the impact of social support in improving psychological wellbeing. First, there is no exploration of

whether improved psychological wellbeing results from or is the cause of weight loss. Second, while belonging to an OHC provides support that can lead to greater weight loss (Poncela-Casanovas et al., 2015; Pappa et al., 2017), Yan (2020) noted that members who focused more on the social features of an OHC often lost less weight than their peers. This is less an issue in OHCs that focus more on the actual community of overweight people (otherwise known as the ‘fatosphere’). In these OHCs, the effects on psychological wellbeing could be classified as follows: (a) having a space in which to connect with other individuals with an alternative dialogue about weight; (b) reducing perceptions of stigma associated with obesity; and (c) having positive perceptions of the self and feeling a sense of solidarity and empowerment (Dickins et al., 2011; S.R. Marcus, 2016).

### *Enhanced Adherence and Participation*

Another important effect of social support is adherence and level of participation in obesity OHCs. Most of the reviewed studies concurred that there was a connection between social support and participation (Kim, Faw et al., 2017; Kim, Ray et al., 2017; Reifegerste et al., 2017; Tierney & Moisey, 2014), and that the perception of receiving social support increased with adherence as an OHC member (Pappa et al., 2017; Song et al., 2018).

In maintaining social interactions and participating in obesity OHCs, and more specifically, in the online weight loss competitions frequently organized in this kind of OHC, both the type of social support and its source proved to be critical factors (Song et al., 2018). This finding is noteworthy: the greater the adherence over time in an OHC to change behaviours, the greater the likelihood of adopting a healthy lifestyle and the more effective the weight-loss treatment (Yan, 2020). Members that interacted more with other members received more social support and this, consequently, increased their chances of maintaining their adherence and participation (Kim, Ray et al., 2017). Taiminem (2016) also noted that participation in OHCs, either hosted in social media or in an online forum, increased adherence to the prescribed treatment.

Users who perceived greater social support from other OHC members had a higher probability of interacting and actively participating than members who merely sought information (Kim, Ray et al., 2017). Cunha et al. (2017) observed that receiving social support increased the probability of revisiting the OHC by 66% (a statistically

significant result at 0.1%). Moreover, as Reading et al. (2019) observed, receiving social support from people living similar experiences is related to a more positive experience of treatment.

Displays of social support in obesity OHCs, such as upvoting comments or posts, gave the user a greater sense of belonging and increased their perceptions of support (Pappa et al., 2017). Although the relationship was not causal, it was observed that there was a positive association between such displays and weight loss (Pappa et al., 2017).

Certain kinds of content or communications were less likely to lead to interaction (Kim, Ray et al., 2017; Wang & Willis, 2018); content that reflected a personal experience, for instance, had a higher interaction rate than shared general health information. However, this did not mean that the social support was less; health information reflects informational social support, which invites a lower level of interaction than a personal testimonial or an implicit or explicit request for encouragement (Kim, Ray et al., 2017; Wang & Willis, 2018).

Finally, participation plays a key role in perceptions of social support. Reifergeste et al. (2017) observed that, over and above passive participation, e.g., merely reading comments posted by other members, active participation in the OHC is fundamental for the individual to be able to perceive social support.

**Matching Social Support.** According to optimal matching theory, certain types of social support are more beneficial than others because they directly address stress (Yan, 2018). As mentioned above, in some cases social support is unwanted; more particularly, it can stop being desired or effective if it does not match with what the receiving individual needs (Yan, 2018). Within OHCs, according to Reifergeste et al. (2017), active participation increased the chance of receiving necessary and desired social support. In their study of social support in health-related activities for its effect on both the receiver and sender and for the health outcomes achieved, Yan (2018) found that, providing, but not necessarily receiving, social support was positively associated with weight loss. Receiving unsolicited social support could have a negative effect on weight loss, according to Yan (2018), in the following two circumstances: when the social support sought is not the social support received, and when the OHC member has a high level of self-efficacy. According to Yan (2018), social support is more effective if the OHC member specifically seeks, and receives in return, emotional social support. If instead of emotional support, however, the OHC

member receives informational social support, then effectiveness is less, since the sought and received social support fail to match.

As for high levels of self-efficacy, OHC members with this characteristic are not only capable of monitoring their own weight loss, but also tend to altruistically help and guide the rest of the OHC. Receiving social support has a negative effect on these members, since according to Yan (2018), it generates a sense of inadequacy and makes them feel incompetent. In contrast, their provision of social support to the rest of the OHC augments their self-esteem and, consequently, their self-efficacy and weight-loss achievements. Yan (2018) linked this phenomenon to helper theory, whereby the helper benefits from helping others, i.e., for the member to perceive that they are receiving social support from the OHC, they feel that they first have to offer help, which, in turn, increases their self-efficacy (they perceive that their help is useful, they feel appreciated by the OHC, and they develop and enhance relationships with other OHC members).

### Effects of Social Support on Weight Loss

Weight loss is closely linked to the objectives that individuals set for themselves in obesity OHCs, whether in terms of losing kilos or acquiring healthy habits. Different objectives would suggest different behaviours, different kinds of social support needed and provided, and, ultimately, differences in weight loss outcomes (Chancellor et al., 2018; Yan, 2020). For actual weight loss, discrepancies are evident regarding the kind of social support that is most effective.

Kim, Ray et al. (2017) and Kim, Faw et al. (2017) observed that there was no significant relationship between receiving social support – in their case in the form of encouragement – and weight loss, as social support did not translate into increased physical activity or a changed diet. Nonetheless, they noted that social support did play a crucial role in behavioural change – which logically has to precede weight loss, i.e., to see weight loss, it is first necessary to change behaviour. According to the same authors, the two behavioural changes that had the greatest impact on weight loss were keeping a food log and participating in the OHC, both of which were influenced and fostered by social support. Yan (2020), in contrast, observed that both receiving and giving social support were effective for weight loss, although receiving support was more effective (to a statistically significant degree). Cunha et al. (2017) observed that OHC members that received social support from their very first comment

achieved weight loss of 26%; note, however, that results were self-reported in that study, so patients may have overestimated their weight loss. The same authors also noted that, since weight loss outcomes could be posted for other members to see, it may be that those who received more social support updated weight loss more frequently, compared to others who may also have lost weight but did not post about it. Both Yan (2020) and Cunha et al. (2017) reported a relationship between social support and weight loss, while Kim et al. (2017) indicated that social support directs behaviours to healthier habits, such as self-monitoring.

OHC members that participated more and interacted more with content that provided social support (in any of its forms) had more success in losing weight (Pappa et al., 2017). However, this finding should not be overgeneralized, as there is no certainty that the relationship was causal. Wang and Willis (2018) argue, for instance, that it is actually losing weight that leads members to participate and interact more, and therefore receive social support, and not the other way around.

Regarding their clinical trial, Jane et al. (2018) reported greater weight loss after 24 weeks among participants following a weight-loss treatment and supported by an OHC than participants who had only received an informational dossier, even though both groups had followed the same nutritional and physical activity guidelines.

Finally, noteworthy are specific circumstances when there was neither a direct nor indirect relationship between social support and weight loss. One example is when members treat the obesity OHC – where the main objective is to lose weight – as a safe space in which to socialize without fear of being stigmatized. Thus, for members who focus more on the social aspects of the OHC, there was translation into actual weight loss (Yan, 2020).

## Discussion and Conclusion

This literature review, which analysed social support in obesity OHCs in terms of types, effects and the relationship with weight loss, aimed to understand social support mechanisms with a focus on maximizing benefits for OHC members. We expect this information on the long- and short-term benefits of OHCs for patients to be useful for healthcare professionals that treat obesity, and especially obesity in patients whose circumstances are such that they receive little or no social support.

## Effects of Social Support on Obesity OHC Members

The review revealed that social support in obesity OHCs is linked to positive effects, specifically, behavioural change, increased self-efficacy, improved psychological wellbeing, and enhanced adherence and participation. While Yan (2018) commented on possible negative outcomes, these were rare and only occurred in very specific scenarios.

Most studies concurred that social support, combined with self-efficacy, increased the probability of behavioural change, and consequently, of weight loss. Social support was found to be strongly linked to participation in a feedback loop, as an enhanced perception of social support was both the cause and consequence of higher participation. Participation was also considered to be a factor that directly or indirectly influenced weight loss.

Generally speaking, improved psychological wellbeing was only indirectly or briefly discussed. Future studies of social support need to address this issue, especially considering the stigmatization experienced by people with obesity (Dickins et al., 2011; S.R. Marcus, 2016; Puhl & Heuer, 2010), as an indicator of a poorer quality of life (Castro et al., 2018). As noted by Nosek et al. (2018), OHCs constitute a safe space for these individuals to implement obesity treatment.

Another noteworthy finding was that social support was ultimately more beneficial than self-efficacy in acquiring healthy habits, such as keeping a food log. Finally, differences were observed in self-efficacy levels and behavioural change, when support was received as opposed to given in obesity OHCs.

## Impact of Social Support on Weight Loss in Obesity OHC Members

The review revealed a relationship between weight loss and participation in obesity OHCs, with social support playing a key role. While Funk et al. (2010) disputed the existence of a direct relationships, Yan (2018, 2020), Kim, Faw et al. (2017), and Kim, Ray et al. (2017) observed that there was both a direct and indirect relationship between social support and weight loss.

## Study Limitations

The main limitation of this review is the small number of included articles ( $n=21$ ), which reflects the limited efforts to address a specifically narrow topic: social support transmitted through OHCs that specifically focus on obesity. While both the benefits of social support and the fact that OHCs can successfully provide social support are well established facts, specific research into how OHC members receiving obesity and excess weight treatment are affected is not sufficiently nuanced. Evidence of this (as described in Scope & Methodology) is the alternative search strategy based on social support and online community as keywords, which retrieved close to 1,000 references. This would suggest that a knowledge gap exists that is reflected in the small number of articles that have addressed social support specifically transmitted through obesity OHCs.

Another limitation of this review is that only half of the reviewed articles specified the kind of social support they researched; of those that did, most focused on informational social support and emotional social support. This would further suggest that research into social support in obesity OHCs in the last decade has not been extensive enough and has not been sufficiently nuanced in terms of types of social support studied.

Finally, another limitation is that no distinction was made in terms of the platforms that hosted the OHCs. In the reviewed studies, as pointed out by Ellison and Boyd (2013), many digital social networking platforms exist, each with their own architecture, design, and rules.

## Future Research

The OHCs studied in the reviewed literature were hosted in digital environments, but used different platforms: the studies by Kim, Ray et al. (2017) and Kim, Faw et al. (2017) were based on commercial mobile health applications, with features for monitoring and logging actions, and for interacting with other members and healthcare professionals; the studies by Reifeigerste et al. (2017), Chancellor et al. (2018), and Pappa et al. (2017) were based on more conventional OHCs organised around forums and threads, while the patients in the study by Jane et al. (2018) had access to a private group on Facebook; and the study conducted by Nosek et al. (2019), the OHC met in Second Life, an online virtual world. This variety in platforms would suggest that the effects of social support may not be directly comparable. The changing na-

ture and differing types of digital environments poses difficulties for research into social support in OHCs (and, as mentioned above, represents a limitation of this review).

Many of the reviewed studies focused on women and, except in the research by Holtz et al. (2014), gender was unknown in the other studies (patients were anonymous), or the effects of social support were not compared for women and men. Gender differences are a potentially interesting future line of research into social support in obesity OHCs, especially if other characteristics, such as physical and psychological factors, are also considered.

The psychological profile of patients, and their goals, undoubtedly impacts how social support affects them. Yet only two of the analysed studies specifically referred to this dimension: Yan (2018), who explored the adequacy of social support sought and received, and Cunha et al. (2017), who tentatively noted that individuals differ in how they give and receive social support, depending on personality, sense of humour, and writing style. Further research is needed to explore how psychological factors affect social support mechanisms in obesity OHCs.

The time frame of the studies in this review varied greatly, making it difficult to establish an average typical time-frame for the analysed data. Future research should consider taking this variable into account, to facilitate the comparability of studies and their findings.

Finally, a gap is detected regarding the link between psychological wellbeing derived from social support and actual weight loss. Of the studies that addressed weight loss, some noted that less weight was lost in patients who focused more on OHC social features (thereby receiving greater social support and a psychological boost), whereas other studies observed the opposite. Exploring the links between lack of motivation to lose weight due to an increase in psychological wellbeing and motivation to lose weight is, therefore, another potential line of future research.

## Conclusion

This review of the literature of the last 10 years on social support in obesity OHCs aimed to assess the evidence surrounding this kind of OHC. The detailed review suggests that further research is necessary to better understand how the effects of social support in obesity OHCs could be maximized, taking into account patient sociodemographic characteristics, attitudes, motivations, and expectations.

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**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
1	The Association Between Weight Loss And Engagement With A Web-Based Food And Exercise Diary In A Commercial Weight Loss Programme: A Retrospective Analysis.	Johnson et al.	2011	International Journal Of Behavioral Nutrition And Physical Activity 8.	Included.
2	The Role Of The Fatosphere In Fat Adults' Responses To Obesity Stigma: A Model Of Empowerment Without A Focus On Weight Loss	Dickins et al.	2011	Qualitative Health Research 21 (12), pp.1679-1691.	Included.
3	Sharing Data For Public Health Research By Members Of An International Online Diabetes Social Network.	Weitzman et al.	2011	Plos One 6 (4).	Excluded. Not an obesity OHC.
4	Dog Walking Is Associated With A Favorable Risk Profile Independent Of A Moderate To High Volume Of Physical Activity.	Lentino et al.	2012	Journal Of Physical Activity & Health 9 (3), pp.414-420.	Excluded. Does not meet the topic criteria (obesity, social support, online community).
5	Teammates And Social Influence Affect Weight Loss Outcomes In A Team-Based Weight Loss Competition.	Leahey et al.	2012	Obesity 20 (7), pp.1413-1418.	Excluded. Not based on an OHC.
6	Online Narratives And Peer Support For Colorectal Cancer Screening: A Pilot Randomized Trial.	Hwang et al.	2013	American Journal Of Preventive Medicine 45(1), pp. 98-107.	Excluded Does not study social support in relation to obesity.
7	Process Evaluation Of The Living Green, Healthy And Thrifty (Light) Web-Based Child Obesity Management Program: Combining Health Promotion With Ecology And Economy.	Jogova et al.	2013	Bmc Public Health 13.	Excluded. Does not study an obesity OHC.
8	Gamified Physical Activation Of Young Men - A Multidisciplinary Population-Based Randomized Controlled Trial (MOPO Study).	Ahola et al.	2013	Bmc Public Health 13.	Excluded. Does not study an obesity OHC.
9	The A-Framework: The Role Of Access, Attributes, And Affordance In The Adoption Of Distance Education Technology For Lifestyle Change.	Tierney & Moisey	2014	International Journal Of Distance Education Technologies, 12(3), pp. 22-40.	Included.

**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
10	Friend Or Foe? An Exploratory Study Of Australian Parents' Use Of Asynchronous Discussion Boards In Childhood Obesity.	Appleton et al.	2014	Collegian 21 (2), pp.151-158.	Excluded- Targets are not obese or overweight.
11	Comparison Of Veteran Experiences Of Low-Cost, Home-Based Diet And Exercise Interventions.	Holtz et al.	2014	Journal Of Rehabilitation Research And Development 51 (1), pp.149-160	Included.
12	Successful Weight Loss: How Information Technology Is Used To Lose.	Shigaki et al.	2014	Telemedicine And E-Health 20 (2), pp.144-151.	Excluded after reading. Not an OHC.
13	Dog Walking Is Associated With A Favorable Risk Profile Independent Of A Moderate To High Volume Of Physical Activity.	Morgan et al.	2014	International Journal Of Behavioral Nutrition And Physical Activity 11.	Excluded. Not based online.
14	Using Interactive Internet Technology To Promote Physical Activity In Latinas: Rationale, Design, And Baseline Findings Of Pasos Hacia La Salud.	B.H. Marcus et al.	2015	Contemporary Clinical Trials 44, pp. 149-158.	Included.
15	Increasing Water Intake Of Children And Parents In The Family Setting: A Randomized, Controlled Intervention Using Installation Theory.	Lahlou et al.	2015	Annals Of Nutrition And Metabolism 66, pp. 26-30	Excluded. Not an obesity OHC.
16	Social Embeddedness In An Online Weight Management Programme Is Linked To Greater Weight Loss.	Poncela-Casasnovas et al.	2015	Journal Of The Royal Society Interface 12 (104)	Included.
17	Using New Technologies To Promote Weight Management: A Randomised Controlled Trial Study Protocol.	Jane et al.	2015	BMC Public Health 15	Excluded after reading. Study protocol, no results.
18	Using Mixed Methods To Develop And Evaluate An Online Weight Management Intervention.	Bradbury et al.	2015	British Journal Of Health Psychology 20 (1), pp.45-55	Excluded. Not an online community.
19	How Do Online Communities Matter? Comparison Between Active And Non-Active Participants In An Online Behavioral Weight Loss Program.	Taiminen.	2016	Computers In Human Behavior 63, pp. 787-795.	Included.

**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
20	Cancer Screening, Prevention, And Treatment In People With Mental Illness.	Weinstein et al.	2016	CA: A Cancer Journal For Clinicians 66(2), pp. 133-151.	Excluded. Not an obesity OHC.
21	Comparison Of Veteran Experiences Of Low-Cost, Home-Based Diet And Exercise Interventions.	Holtz et al.	2014	Studies In Health Technology And Informatics 225, pp. 597-601.	Excluded after reading. Not related to social support.
22	Successful Weight Loss: How Information Technology Is Used To Lose.	Shigaki et al.	2014	HEALTHINF 2016 - 9th International Conference On Health Informatics, Proceedings; Part Of 9th International Joint Conference On Biomedical Engineering Systems And Technologies, BIOSTEC 2016, pp. 377-382.	Excluded. Not an obesity OHC Targets are not obese or overweight.
23	Thinspiration Vs. Thicksperation: Comparing Pro-Anorexic And Fat Acceptance Image Posts On A Photo-Sharing Site.	S.R. Marcus.	2016	Cyberpsychology-Journal Of Psychosocial Research On Cyberspace 10 (2).	Included.
24	A Survey Of Social Support For Exercise And Its Relationship To Health Behaviours And Health Status Among Endurance Nordic Skiers.	Anderson et al.	2016	BMJ Open 6 (6).	Excluded. Not an OHC.
25	A 2-Year Young Adult Obesity Prevention Trial In The US: Process Evaluation Results.	Laska et al.	2016	Health Promotion International 31 (4), pp.793-800.	Excluded. Does not study social support.
26	Guideline-Concordant Weight loss Programs In An Urban Area Are Uncommon And Difficult To Identify Through The Internet.	Bloom et al.	2016	Obesity 24 (3), pp.583-588.	Excluded. Does not study social support. Targets are not obese or overweight.
27	Prevalence And Pricing Of Chain Gyms In New York City.	Zagnit et al.	2016	International Journal Of Health Promotion And Education 54 (1), pp.50-57.	Excluded. Not an OHC.
28	Feasibility And Acceptability Of Facebook For Health Promotion Among People With Serious Mental Illness.	Naslund et al.	2016	Digital Health 2.	Excluded. Not an obesity OHC.

**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
29	A Warm Welcome Matters! The Link Between Social Feedback And Weight Loss In /R/Loseit.	Cunha et al.	2017	26th International World Wide Web Conference 2017, WWW 2017 Companion, pp. 1063-1072.	Included.
30	Perspectives On Learning To Cook And Public Support For Cooking Education Policies In The United States: A Mixed Methods Study.	Wolfson et al.	2017	Appetite 108, pp. 226-237.	Excluded. Does not study social support. Not an obesity OHC.
31	Online Social Support For Obese Adults: Exploring The Role Of Forum Activity.	Reifegerste et al.	2017	International Journal Of Medical Informatics 101, pp.1-8.	Included.
32	Online Support For Vulnerable Consumers: A Safe Place?	Parkinson et al.	2017	Journal Of Services Marketing 31 (4-5), Pp.412-422.	Excluded.
33	Factors Associated With Weight Change In Online Weight Management Communities: A Case Study In The Loseit Reddit Community.	Pappa et al.	2017	Journal Of Medical Internet Research 19 (1).	Excluded. Not an obesity OHC.
34	Internet-Delivered Obesity Treatment Improves Symptoms Of And Risk For Depression.	Naparstek et al.	2017	Obesity 25 (4), pp.671-675.	Included. Does not study social support.
35	Complementary Support From Facilitators And Peers For Promoting Mhealth Engagement And Weight Loss	Kim, Ray, et al.	2017a	Journal Of Health Communication 22 (11), pp.905-912.	Included.
36	Mobile But Connected: Harnessing The Power Of Self-Efficacy And Group Support For Weight Loss Success Through Mhealth Intervention	Kim, Faw, et al.	2017b	Journal Of Health Communication 22 (5), pp.395-402.	Included.
37	Weight Loss Support Seeking On Twitter: The Impact Of Weight On Follow Back Rates And Interactions	May et al.	2017	Translational Behavioral Medicine 7 (1).	Excluded. Not an OHC.
38	Clinic Versus Online Social Network-Delivered Lifestyle Interventions: Protocol For The Get Social Noninferiority Randomized Controlled Trial	Wang et al.	2017	JMIR Research Protocols 6 (12)	Excluded. Systematic review.

**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
39	Social Media And Obesity In Adults: A Review Of Recent Research And Future Directions	Waring et al.	2018	Current Diabetes Reports 18(6),34	Excluded. Not an obesity OHC.
40	My Quest, An Intervention Using Text Messaging To Improve Dietary And Physical Activity Behaviors And Promote Weight Loss In Low-Income Women	Griffin et al.	2018	Journal Of Nutrition Education And Behavior 50(1), pp. 11-18. E1.	Excluded after reading. Not related to social support.
41	Good Intentions, Bad Outcomes: The Effects Of Mismatches Between Social Support And Health Outcomes In An Online Weight Loss Community	Yan	2018	Production And Operations Management 27(1), pp. 9-27.	Excluded. Not an obesity OHC Targets are not obese or overweight.
42	Design Of A Novel Digital Intervention To Promote Healthy Weight Management Among Postpartum African American Women	Evans et al.	2019	Contemporary Clinical Trials Communications;16,10046.	Included.
43	A Pilot Test Of The Gowoman Weight Management Intervention For Women With Mobility Impairments In The Online Virtual World Of Second Life®	Nosek et al.	2019	Disability And Rehabilitation 41(22), pp. 2718-2729.	Excluded. Not an OHC.
44	Barriers And Facilitators Of Midwives' Physical Activity Behaviour In Hospital And Community Contexts In Scotland	Holly et al.	2019	Journal Of Advanced Nursing 75(10), pp. 2211-2222.	Excluded. Does not study social support.
45	Patient Needs, Perceptions, And Attitudinal Drivers Associated With Obesity: A Qualitative Online Bulletin Board Study	Cook et al.	2019	Advances In Therapy 36(4), pp. 842-857.	Excluded. Does not study social support. Targets are not obese or overweight.
46	Weight Management In Young Adults: Systematic Review Of Electronic Health Intervention Components And Outcomes	Willmott et al.	2019	Journal Of Medical Internet Research, 21(2), E10265.	Excluded. Not an OHC.
47	Social Experiences Of Adults Using Online Support Forums To Lose Weight: A Qualitative Content Analysis	Reading et al.	2019	Health Education & Behavior 46 (2_Suppl), pp.129-133.	Excluded. Not an obesity OHC.
48	Personalized Web-Based Weight Loss Behavior Change Program With And Without Dietitian Online Coaching For Adults With Overweight And Obesity: Randomized Controlled Trial.	Beleigoli et al.	2020	Journal Of Medical Internet Research 22(11), E17494	Excluded. Not an OHC.

**Table 4.** Retrieved studies selected for initial review (back to text)

#	Title	Authors	Year	Journal	Included/Excluded
49	Translation Of Two Healthy Eating And Active Living Support Programs For Parents Of 2-6 Year Old Children: A Parallel Partially Randomised Preference Trial Protocol (The 'Time For Healthy Habits' Trial).	Hammersley et al.	2020	BMC Public Health 20(1),636.	Excluded. Not an obesity OHC.
50	Peer Support Groups For Weight Loss.	Ufholz.	2020	Current Cardiovascular Risk Reports 14 (10).	Excluded after reading. Not related to social support.
51	The Kindness Of Commenters: An Empirical Study Of The Effectiveness Of Perceived And Received Support For Weight loss Outcomes.	Yan.	2020	Production And Operations Management 29 (6), pp.1448-1466.	Excluded. Not an obesity OHC Targets are not obese or overweight.
52	Understanding Weight Loss Via Online Discussions: Content Analysis Of Reddit Posts Using Topic Modeling And Word Clustering Techniques.	Liu & Yin.	2020	Journal Of Medical Internet Research 22 (6).	Included.
53	How Minority Parents Could Help Children Develop Healthy Eating Behaviors: Parent And Child Perspectives.	Callender et al.	2020	Nutrients 12 (12)	Excluded. Not an OHC.
54	A Whole Family-Based Physical Activity Promotion Intervention: Findings From The Families Reporting Every Step To Health (FRESH) Pilot Randomised Controlled Trial	Guagliano et al.	2020	International Journal Of Behavioral Nutrition And Physical Activity 17 (1).	Excluded. Does not study social support.
55	Positive And Negative Emotions Predict Weight Loss Intentions And Behaviors Beyond Theory Of Planned Behavior Constructs.	Richards et al.	2021	Eating And Weight Disorders-Studies On Anorexia Bulimia And Obesity 26 (3), pp.829-838.	Excluded. Does not study social support. Targets are not obese or overweight.
56	Norms Matter: Contrasting Social Support Around Behavior Change In Online Weight Loss Communities.	Chancellor et al.	2018	Conference on Human Factors in Computing Systems - Proceedings, 2018-April, 1-14.	Included manually.
57	Psychological Effects Of Belonging To A Facebook Weight Management Group In Overweight And Obese Adults: Results Of A Randomised Controlled Trial.	Jane et al.	2018	Health and Social Care in the Community, 26(5), 714-724.	Included manually.
58	Factor Driving Continued Use Of Online Health Promotion Competitions: Evidence From A Weight Loss Online Community.	Song et al.	2018	Online Information Review 42(6): 802-820.	Included manually.
59	Supporting Self-Efficacy Through Interactive Discussion In Online Communities Of Weight Loss.	Wang and Willis.	2018	Journal of Health Psychology 23(10): 1309-1320.	Included manually.

**Table 5.** Retrieved studies selected for initial review (back to text)

#	Study	Methodology	Social support type	Weight loss linked to social support	Social support effects
1	Chancellor et al. (2018)	Content analysis	Not specified	No	Behavioural change
2	Cunha et al. (2017)	Causal inference from user-generated observational data	Not specified	Yes	Increased OHC participation, greater weight loss
3	Dickins et al. (2011)	Grounded theory	Emotional	No	Increased self-esteem and reduced perceived stigma
4	Holtz et al. (2014)	Randomized crossover trial	Not specified	Yes	Increased treatment adherence
5	Jane et al. (2018)	Randomized clinical trial	Not specified	Yes	Psychological benefits and greater weight loss
6	Johnson & Wardle (2011)	Retrospective weight change analysis	Not specified	Yes	Weight loss
7	Kim, Faw et al. (2017)	Online survey	Informational	Yes	Behavioural change
8	Kim, Ray et al. (2017)	Online survey + causal-comparative research	Emotional Informational	Yes	Behavioural change
9	S.R. Marcus (2016)	Content analysis	Informational Emotional Appraisal	No	Increased self-esteem and reduced perceived stigma
10	B.H. Marcus et al. (2015)	Randomized controlled trial	Not specified	No	Increased physical activity
11	Nosek et al. (2018)	Clinical trial	Not specified	No	Increased physical activity
12	Pappa et al. (2017)	Content analysis	Informational Emotional Appraisal	Yes	Increased motivation and treatment adherence
13	Poncela-Casasnovas et al. (2015)	Quantitative retrospective study	Not specified	No	Weight loss
14	Reading et al. (2019)	Content analysis from web-administered survey	Informational Emotional	No	Useful weight-loss information and increased motivation
15	Reifegerste et al. (2017)	Online survey	Informational Emotional	No	Increased participation



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#	Study	Methodology	Social support type	Weight loss linked to social support	Social support effects
16	Cox proportional hazards model + text mining	Cox proportional hazards model + text mining	Informational Emotional Instrumental	Yes	Increased engagement/ participation
17	Online survey	Online survey	Not specified	Yes	Behavioural change
18	Mixed: survey and semi-structured interviews	Mixed: survey and semi-structured interviews	Not specified	No	Increased OHC use
19	Content analysis	Content analysis	Informational Emotional Other (not specified)	Yes	Increased OHC participation
20	Causal-comparative research	Causal-comparative research	Not specified	Yes	Increased self-efficacy (only with matched social support)
21	Correlational research	Correlational research	Not specified	Yes	Behavioural change

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