How Effective Are Interactive Social Media Interventions for Changing Health and Health Behaviors? A Cochrane Review Summary with Commentary

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Key Points

• Social media has an increasingly important role in health promotion, including as an intervention mechanism.
• This Cochrane Review was designed to examine whether interactive social media interventions improve health behaviors and outcomes in comparison with noninteractive interventions or no interventions.
• Findings of the systematic review indicate that interactive social media interventions may positively affect physical activity, weight loss, and well-being. However, the Cochrane Review authors caution that the quality of the evidence was low due to heterogeneity among studies, uncertain risk of bias, and studies’ failure to examine harms.
• The original commentary elaborates upon the conclusions of the Cochrane Review’s authors that future studies should more closely examine mediating variables such as social support and engagement, variables that may explain how social media interventions improve health outcomes.
• The original commentary also suggests that future studies of social media as a strategy for recruitment in social media interventions may provide insights as to whether such methods improve adherence.

Background


* This brief is one in a series prepared by RTI Press in agreement with the Cochrane Library/Wiley. These briefs summarize and add original commentary to research presented in Cochrane Reviews. This summary is based on a Cochrane Review previously published in the Cochrane Database of Systematic Reviews 2021, Issue 5, Art. No. CD012932, DOI: https://doi.org/10.1002/14651858.CD012932.pub2 (see https://www.cochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and Cochrane Database of Systematic Reviews should be consulted for the most recent version of the review.
Social media has increasingly become an important vehicle for individuals to form and maintain relationships as well as to acquire knowledge. The Pew Research Center reported that in 2021, a majority of US adults used social media. In the survey, 81% of US adults indicated that they ever used YouTube, and 69% indicated that they ever used Facebook. Among young adults aged 18 to 29 years, Instagram, Snapchat, and TikTok were especially strong. Increasingly, social media has a role in health promotion, in such activities as providing health information, offering support, and providing mental health services.

This Cochrane Review examines the evidence for the effectiveness of interactive social media interventions on change in health behaviors, both physical and mental health, and adverse effects. The authors of the review define interactive social media as “activities, practices, or behaviors among communities of people who have gathered online to interactively share information, knowledge, and opinions...in which adults are able to communicate directly with each other” (p. 1). In this paper, we summarize the methods, key findings, and discussion points from the Cochrane Review, and then provide our own commentary on the review.

Using the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) system to rate the quality of the evidence, Petkovic and colleagues rate the overall certainty of the evidence as low, mainly due to unclear or high risk of bias as well as considerable heterogeneity in outcome measurement. We conducted a dual assessment of the quality of the systematic review using AMSTAR2 (A MeaSurement Tool to Assess systematic Reviews) and concluded that the Cochrane Review was a high-quality review. Where the review reports conflicting results in summary results, main text, and tables, we focus on results reported in the main text; but we report the number of well-being studies as they appear in the summary of findings.

Methods

The Cochrane Review includes studies of the general population with participants at least 18 years of age, although the authors do include studies of mixed-age populations if the studies provide disaggregated data for participants older than 18 years or if most participants were at least 18 years old. The authors limit inclusion to studies of social media interventions that were designed for two-way communication between the user and peers, initiated by either peers or organizations. These interactive social media interventions were eligible for inclusion if they were on commonly used platforms such as Facebook or Twitter, rather than web-based chat rooms. The review includes any comparison such as a noninteractive social media control, a less-interactive social media control, or usual care. The review groups studies with a noninteractive social media control or no control in one group and those with a less interactive social media intervention in a second group. Eligible study designs include randomized control trials (RCTs) and cluster RCTs, controlled before-and-after (CBAs), and interrupted time series studies (ITSs). The authors required social media interventions to focus on changing one or more health-related behaviors or health outcomes. In addition to evaluating the primary outcome categories of health behaviors, bodily functions (i.e., physical health), psychological health, well-being, and adverse events, the authors analyzed a variety of secondary behaviors such as social support, attitudes, and adherence to social media interventions.

Search Methodology

The Cochrane Review authors searched for studies of relevant social media interventions in a variety of databases and websites. They searched for both published and unpublished studies in any language from 2001 through June 1, 2020.

Main Results

The review includes 88 studies, the majority of which were RCTs (84); 3 were CBAs, and 1 was an ITS. Most studies were conducted in the United States (n = 49). The remaining studies were conducted in Australia (n = 14), China (n = 10), other Asian countries (n = 4), Europe (n = 6), Canada (n = 3), and South America (n = 2). Across all 88 studies, the review includes 871,378 participants; the authors do not provide a summary of sex distribution or average age. They include 41 studies that targeted general populations of healthy adults, 46 studies of those who had a health condition or were at-risk for a health condition (e.g., diabetes, overweight/obese adults, smokers, low-income mothers), and 1 study limited to young adults. The authors report only RCT results in the main summary of findings, which are the only results that we include. The authors report the effects of social media interventions by grouping similar outcomes. In this summary, we report top-line results for primary outcomes when there are comparisons of 2 or more studies. The authors also report secondary outcomes; we include several of these: change in knowledge, attitudes, self-efficacy, and social support as well as adherence.

Comparison 1: Interactive Social Media Compared with Noninteractive Social Media

Health Behaviors

The review includes 54 RCTs that examined a variety of health behaviors: physical activity, dietary behavior, breastfeeding, tobacco use, condom use, prevention activities (i.e., screening, medication use, vaccination uptake), self-care, and others. We present here only outcomes that are reported in more
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than 1 study. In a meta-analysis of 29 studies (n = 6,250), the review finds a small effect of interactive social media interventions on increases in physical activity in comparison with noninteractive social media (standardized mean difference [SMD]: 0.29; 95% confidence interval [CI]: 0.13 to 0.45). The authors also find that a reduction in tobacco use was likely linked to participation in an interactive social media intervention, but the results (risk ratio [RR]: 0.98; 95% CI: 0.74 to 1.29; 4 studies) were deemed uncertain. That is, the evidence had moderate certainty because high risk of bias of eligible studies. Although the overall meta-analysis of 8 studies assessing uptake of prevention activities was deemed uncertain (SMD: 0.11; 95% CI: -0.07 to 0.30), when the studies were disaggregated by outcome type (i.e., examining individual outcomes), the effect of interactive social media interventions was positive for uptake of screening tests (RR: 1.64; 95% CI: 1.21 to 2.24). The review finds little to no effect of interactive social media interventions on dietary quality (SMD: 0.11; 95% CI: -0.25 to 0.47; 8 studies), condom use (SMD 0.22; 95% CI: -0.33 to 0.76; 2 studies), and self-care (SMD: 0.06; 95% CI: -0.55 to 0.67; 2 studies).

Physical Health Outcomes (Body Function Outcome)
The review comprises 29 RCTs assessing physical health outcomes, including weight loss, gestational weight gain, body mass index (BMI), and blood glucose. The review found that in 16 studies, interactive social-media interventions had a positive effect on weight loss (mean difference [MD]: -1.33 kg; 95% CI: -2.0 to -0.67). Similarly, in the 4 studies examining BMI, interactive social media interventions had a positive effect on reductions of BMI (MD: 0.51; 95% CI: -0.92 to -0.10). The review also finds a significant effect of interactive social media interventions on lowering blood glucose levels (MD: -1.74; 95% CI: -2.79 to -0.68; 4 studies). The review finds effects for other body function outcomes (e.g., reducing insomnia, improving premenstrual syndrome, reducing flu-like symptoms), but these effects were only reported in single studies.

Well-Being
The review includes 16 RCTs that assessed well-being, quality of life, and fatigue, finding that interactive social media interventions improved this global construct as compared with those in the control conditions (SMD: 0.46; 95% CI: 0.14 to 0.79). Restricting the analysis to the 12 studies that assessed changes in quality of life, the authors report a positive effect for the interactive social media interventions (SMD: 0.50; 95% CI: 0.16 to 0.83).

Psychological Outcomes
The review includes 12 RCTs assessing depression and distress. The authors report pooled estimates suggesting little to no effect of interactive social media interventions on depression or distress scores (SMD: -0.15; 95% CI: -0.38 to 0.08).

Adverse Events
The review indicates that no studies reported any adverse events related to the social media components of the intervention, including privacy issues or online harassment. The authors report that five studies examined possible adverse effects of the intervention related to the physical activity program that was the focus of the social media intervention, including musculoskeletal injuries, pulmonary events, cardiac events, and blisters. The authors indicate one additional study with adverse events but do not further elaborate about either the study or the adverse events.

Differences by Population
For outcomes that were reported in at least 10 studies, the review examines differences in specific groups for outcome types such as health screening, and physical activity. In particular, the authors examine differences in outcomes in RCTs involving a general population and in RCTs that targeted a population with or at-risk of a condition. The review does not detect any differences between the social media and non-social media intervention groups in daily steps, the measure of physical activity, in either the general population or at-risk group. The authors report greater weight loss in both the general population and targeted at-risk groups as a function of interactive social media. They do not report any group differences in quality of life or depression scores between the interactive social media group and non-social media groups.

Secondary Outcomes
The review considers several secondary outcomes, including change in knowledge, change in attitudes, change in self-efficacy, and change in social support, among others. The authors report a positive change in knowledge scores in the 9 RCTs in which it was assessed but caution that, due to heterogeneity, the results are uncertain (SMD: 0.90; 95% CI: 0.22 to 1.58). The specific outcomes included knowledge of medical conditions, nutrition and weight, exercise, and parental competence, with only nutrition and weight knowledge assessed in more than 1 study. Three RCTs assessed changes in attitudes (i.e., condom use, exercise, and medication), in which the overall effect was negative, but the authors indicate the results were uncertain because of both heterogeneity and a small effect (SMD: -0.11; 95% CI: -0.48 to 0.26). The authors report a small positive effect in the change in self-efficacy scores in 14 RCTs that examined exercise.
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The review reports no overall difference between the two social media interventions (SMD: -0.39; 95% CI: -2.99 to 2.20), but the authors indicate that the results are uncertain.

**Psychological Outcomes**

The review includes three psychological outcome RCTs, each measuring one outcome: self-worth, depression, and anxiety. The authors did not perform a meta-analysis. With one study per outcome, we are not reporting the findings.

**Subgroup Differences by Population**

The review does not report any subgroup differences by population.

**Adverse Events**

None of the studies comparing any interactive social media intervention with an active but less interactive social media control reported on adverse events.

**Secondary Outcomes**

Few studies comparing a social media intervention with an active comparator examined secondary outcomes. The authors report a small negative effect in 2 RCTs examining changes in exercise self-efficacy but indicate that the results are uncertain (SMD: -0.05; 95% CI: -0.52 to 0.42). Only 1 study examined changes in physical activity social support; there was a small effect that favored the active comparator, but the authors caution that the results are uncertain. Among the 12 RCTs with an active comparator, half reported adherence, of which only 2 of the 6 were considered good.

**Cochrane Review Authors’ Conclusions**

The review concludes that interactive social media interventions may have a positive effect on physical activity, weight loss, and well-being. However, the authors caution that the quality of evidence is low because of considerable heterogeneity and unclear risks of bias. The review recommends that practitioners should evaluate the effectiveness of any interactive social media intervention that they implement and examine harms associated with social media. The authors discuss the limitations of the research in terms of variability in outcomes across studies, suggesting that future studies designed to change health behavior or health outcomes consider using standardized outcomes to facilitate combining data. They also suggest that future studies examine what aspects of the intervention lead to positive findings when interactive social media is combined with other co-interventions. Although the review authors had planned to examine whether adherence affected the effectiveness of the interventions, it was inconsistently reported in the studies.
limiting the ability to analyze its effect. The review authors also speculate that the substantial heterogeneity in study outcomes may have been due to differences in adherence.

**Original Commentary**

Although the authors of the Cochrane Review conclude that interactive social media interventions show some promise for improving physical activity, weight loss, and well-being, they also indicate that the literature has a variety of limitations. In addition to the diversity of outcomes, which often resulted in only a few studies that measured the same outcome (e.g., steps for physical activity), the studies varied in delivery format (e.g., text message, Facebook page, or app) and features of the intervention. More than half of the studies included social media as a part of a multicomponent intervention. The review authors examine multicomponent and social media–only interventions separately, but the multicomponent interventions differed in the nature of the additional component. Given the diversity of interventions, the authors were not able to determine what drove changes in the outcomes. The review authors acknowledge that multicomponent interventions are complex. Yet, it is not clear how single-component social media interventions lead to positive change either.

When there were at least 10 studies for a given outcome, the review authors performed subgroup analyses to examine intervention differences in general populations as compared with populations with a health condition or at-risk of a condition. However, due to insufficient numbers of studies, the authors could not do these for all relevant subgroups. One possibility for future research is to examine subgroups based on health, financial, or social mobility issues to assess whether social media interventions improve outcomes for groups with limited access to resources or settings that can promote health-seeking behaviors.

Understanding what elements of social media interventions lead to changes in outcomes such as physical activity, weight loss, and well-being is critical for future research studies. The many secondary outcomes examined across the included studies could potentially provide hypotheses about the mechanism of change. One secondary outcome included in this study—social support—may be a good candidate for further exploration. Literature has shown that social support may directly impact health behavior in outcomes such as physical activity and weight loss, suggesting its potential role as a mediating variable. In addition, other research has shown the link between social support, social media use, and psychological outcomes. Specifically, Lin and colleagues found that social support mediated the link between active social media use and loneliness, with greater active social media use increasing perceived social support, which is associated with a lower level of loneliness. Although the studies cited above are not social media interventions, the findings suggest that active social media use may lead to greater social support, which could explain some of the changes identified in the Cochrane review trials. Unfortunately, the Cochrane Review authors found only a few studies that included social support outcomes, and the authors conclude that social support did not differ as a function of the social media interventions. Only one study in the Cochrane Review reported social support effects that were greater in the social media group than in the non-social media group, and it was for support from family. Using social support as an intervening variable in an analysis may help uncover whether it is an explanatory construct.

The Cochrane Review authors also consider adherence to the intervention as a secondary variable. Graham and colleagues, who define adherence as a description of what was actually delivered and received, readily acknowledge that measuring and reporting adherence in complex intervention is often poorly done, in part, because there is no standardized approach to its measurement, and its operationalization varies across trials. In the current Cochrane Review, fewer than half of the trials measured adherence, and the Cochrane Review authors rate only 20% of the RCTs as good. This finding suggests that the failure to find effects in some outcomes may have been due to less than satisfactory adherence. Better attention to adherence in intervention studies may yield greater understanding of how social media interventions affect health outcomes.

Although it may be premature to hail social media as a vehicle to improve health outcomes, there is evidence that social media can be used in research capacities aside from intervention purposes. One such area is research regarding outreach and recruitment. Given the broad user base of social media platforms like Facebook and Instagram, the use of targeted advertisements on these platforms has become an increasingly popular method of recruiting participants for public health research studies. Many studies have found that using targeting tools on these platforms to reach more narrow audiences can be a cost-effective and time-efficient way to recruit hard-to-reach populations, especially when compared with more traditional recruitment methods. Additionally, the COVID-19 pandemic disrupted many in-person activities and made traditional methods like in-person research recruitment within health-care settings near impossible for an extended period of time.

The studies included in the Cochrane Review did not discuss the role of the recruitment method used by the RCTs in terms of adherence. That is, they did not examine whether adherence to a social media intervention is greater when participants are recruited using social media outreach methods. Using data provided in the review, we find that only 31 of the 82
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RCTs that provided recruitment data reported social media as a strategy used for recruitment (it could have been one of several strategies used); 9 of these studies (29%) were graded as having good adherence in comparison to 6 (19%) that were graded as having low adherence. Of the 51 RCTs that did not use social media recruitment methods, only 7 (18%) were rated as having good adherence. Social media-based recruitment and retention is likely to selectively include participants with greater comfort and engagement with social media. Whether this factor translates to greater adherence, and therefore greater improvement in health and behavioral outcomes, is an area for further research, as studies increasingly rely on social media to recruit participants. The ad hoc statistics that we present suggest that future studies of social media interventions may consider systematically varying recruitment methods to examine the effect of social media recruitment on adherence.

Recently, researchers at RTI experimented with recruitment on Facebook, Instagram, and Pinterest ads to recruit new and expectant parents in North Carolina to sign up for expanded newborn screening. The authors found social media recruitment to be an efficient use of funds when in-person recruitment was not available; however, ad performance and effectiveness depended on several variables. These variables, including ad competition on the platforms, platform ratings of the ad, and tracking capabilities, are often out of the advertiser’s control. Given the evolving nature of social media platforms, research about leveraging social media in research capacities is perpetually needed. RTI authors have discussed this need in a recent podcast.

Conclusions
Interactive social media interventions to improve health behaviors and outcomes show some promise. Whereas the Cochrane Review suggests such interventions may benefit physical activity, weight loss, and well-being, the evidence is insufficient for making strong conclusions. Future research that adopts common outcome measures and that examines mediating variables may lead to a greater understanding of the mechanisms involved in social media interventions. Other ways of using social media in research, such as study recruitment, also show utility.

References
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