

**Exploring the Effectiveness of Online Support Interventions for Emerging Adults: A
Systematic Literature Review**

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Abstract

Background: The use of online social support in treating mental health concerns is increasing. Social support refers to the range of interactions that occur inside social networks and have a favourable impact on one's mental and overall well-being. Especially for emerging adults these resources indicate a strong potential as 26% of emerging adults report having mental health problems and this age group shows high engagement in seeking mental health information and support online. However, there has been a gap in the literature in systematic reviews that assess the overall effectiveness of online support interventions for emerging adults covering a wide range of mental health outcomes.

Objective: This review aimed to systematically explore the effectiveness of online social support on mental health outcomes for emerging adults.

Method: A systematic literature review was conducted. Relevant studies were searched using Scopus, Web of Science, PubMed and PsycINFO. In total, 660 records were screened by title and abstract. Studies were included if they (1) studied the effectiveness of online social support intervention, (2) the interventions discussed mental health outcomes and (3) the sample's age range was 15 to 35 years old.

Results: After applying the eligibility criteria, 8 articles were included in the current systematic review. The studies evaluated a range of mental health problems including depression (n=7), anxiety (n=4), general psychological problems (n=3), schizophrenia (n=1), and substance use (n=1). Half of the studies used online forums, bullet/message boards, discussion boards or support groups; the other studies integrated a collection of different digital interactive features. Several study designs were used in the included studies including randomised controlled trials (n=6), one randomised trial and one pre-post study. Studies focusing on depression, anxiety, and psychological distress symptoms show mixed effectiveness, whereas interventions targeting more complex disorders like substance use and schizophrenia were ineffective.

Conclusion: Interventions including online social support have the potential to improve emerging adults' mental health, especially in the areas of anxiety and depression. However, for more severe and complex mental health conditions, their efficacy varies and is less apparent. Further studies need to concentrate on enhancing user engagement, evaluating the efficacy of multi-component support systems, and performing further research on the effectiveness of online social support.

Keywords: mental health; social support; online interventions; emerging adults; young people; systematic literature review

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The Role of Social Support

In recent years, using online social support to address mental health problems has become increasingly prevalent. The term "social support" refers to a broad variety of interactions and multifaceted effects that occur within social networks (Sarason et al., 1994). According to Taylor (2007), social support can be defined more precisely as the sense of being liked, appreciated, and a part of a supportive social network that is strongly correlated with several aspects of mental health and well-being. Moreover, social support may be obtained from various sources, such as friends, family, coworkers, medical experts, and even online communities (Morrison & Bennett, 2009). Research has revealed that social support can have direct and indirect effects on individuals' health. Directly, it increases the perceived capacity to experience good life events and subjective mental health qualities such as satisfaction, fulfilment, and self-confidence (Taylor, 2011). Moreover, social support develops one's abilities and self-assurance and encourages behaviours that promote health (Taylor, 2011). Additionally, Schwarzer, et al. (2004) found that it increases a sense of control over life and strengthens useful coping techniques. Indirectly, it can affect health as stated in the buffering model (Morrison & Bennett, 2009). The buffering model contends that over time, social support protects people from the negative effects of stress, such as physical or mental issues (Dour, et al., 2013; Morrison & Bennett, 2009). Thus, social support has been found to function as an alleviating variable in the relationship between stressful life events and mental well-being (Taylor et al., 2007).

Being diagnosed as mentally ill and coping with the negative impact on one's quality of life and self-efficacy are among the most stressful life events (Dour, et al., 2013; Naslund, et al., 2016). From a clinical standpoint, there are many challenges to overcome to reach people who suffer from serious mental illness. These include social isolation, a reluctance to seek treatment, and difficult social situations like upsetting family dynamics or traumatic life experiences (Naslund, et al., 2016). Here, research highlights that young individuals are disproportionately affected by mental health issues, with about 26% of young people aged 16 to 24 experiencing a mental health condition at some point in their lives (Australian Institute of Health and Welfare, 2024). This prevalence highlights the crucial need for interventions customized for this population. Furthermore, young individuals are particularly engaged in searching for health-related information on the Internet. Horgan and Sweeney (2010)

discovered that a significant proportion of students aged 18 to 24 had previously used the Internet to access mental health information and that most of them indicated a willingness to use online platforms for mental health support. Given their high internet engagement and significant mental health challenges, online social support networks may offer novel approaches for supporting and engaging this population (Naslund, et al., 2016). Thus, examining how social interactions can be efficiently provided through online platforms is crucial.

Online Social Support

The use of new technologies, like the Internet and social media, for social support in helping individuals deal with health-related issues has drawn more attention from research in the past 20 years from a variety of disciplines (Wright, 2003). According to Wright et al. (2003), people with health-related concerns have had new opportunities to communicate with a network of people dealing with similar problems due to the rapid growth of Internet access and computer-mediated communication. Östberg, & Lennartsson (2007) further explain that online support groups offer different types of social support, including emotional support, instrumental support and informational support which can buffer individuals against distress and improve mental health outcomes. They describe that emotional support involves empathy and trust, instrumental support gives practical assistance and informational support includes advice and information. These supports are critical to well-being as instrumental support helps with practical tasks; informational support facilitates problem-solving and emotional support enhances a sense of belonging and value (Östberg, & Lennartsson, 2007).

In recent years, a range of studies highlighted the significance and influence of online social support and pointed to some important features and advantages of these support communities. For instance, a study in 2013 by the Australian group GROW, which investigates the impact of a mutual help group on psychological well-being and mental health, showed that 81% reported an improved network of friends and personal support; 85% felt an improved sense of personal value; 77% experienced an improved sense of belonging and connection with the community; 67% said that the mutual help group had directly contributed to their recovery from mental illness (Finn et al., 2007). Moreover, Hanley et al., (2019) found, that support communities are more easily available to people who might find it challenging to attend in-person meetings physically, geographically, or temporally. Online platforms provide a degree of anonymity that may be helpful, especially for people who are often reluctant to use mental health services, such as young individuals (Hanley et al., 2019). The Internet's relative anonymity allows young people to share personal stories and discuss

information about subjects frequently stigmatized in daily life (Hanley et al., 2019). In addition, King and Moreggi (2007) argue that online groups provide a range of communication options, most notably text and video, and may foster creativity via the use of multimedia technologies. Typically, text-based support entails for example chat rooms or discussion boards, which may be more convenient for people wanting more flexible involvement and prefer anonymity (Tanis, 2008). Alternatively, video-based support replicates the dynamics of in-person interactions by using platforms such as video conferencing, where visual and verbal communication may generate a sense of proximity and involvement (Banbury et al., 2018). According to the comparative study by Renfrew et al. (2020), there does not seem to be a significant difference in the effectiveness of the two formats for mental health outcomes. This implies that participant preference may be a more significant factor in determining the best kind of support, in order to improve even more the support experience (King & Moreggi, 2007). These findings underscore the potential benefits of online support communities, making it crucial to examine their effectiveness for young individuals' mental health.

Mental Health & Online Social Support

Various online interventions have been tested for managing different mental health disorders. For instance, there is evidence that taking part in online support groups significantly lowers the symptoms of depression. Notably, research like those by Houston et al. (2002) and a meta-analysis by Pfeiffer et al. (2011) have shown that frequent involvement in these groups has been linked to a reduction in depressive symptoms. For instance, the study by Houston et al. (2002) showed those who participated in online support groups for depression usually had severe depressive symptoms, were socially isolated, and considered the group as helpful. The study also found that heavy participation in Internet groups was more effective than regular engagement in the reduction of depression (Houston et al., 2002). Also, the study findings by Pfeiffer et al. (2011) indicate that compared to participants who got usual treatment, those who received peer support interventions showed a substantial reduction in depression symptoms. Additionally, the quantitative study by Griffiths et al. (2012), investigated the effectiveness of an Internet-based self-help group (ISG) in lowering depression symptoms both when utilized independently and in conjunction with an automated online psychotherapy training program. In line with the beforementioned studies, the decrease in depressive symptoms was considerably larger in both the ISG alone and the combination with the automated training program.

Furthermore, online support groups offer a private setting for people with other mental illnesses, like schizophrenia. In the study by Baumel et al. (2016), people suffering from a schizophrenia-spectrum disorder were recruited to test an online emotional support program. The results of this study point out that the participants gave positive evaluations of their experiences, emphasizing the platform's helpfulness and value. Patients believed having interaction opportunities and emotional releases was beneficial. Also, a small body of research conducted on online support groups found a significant advantage for people with autism spectrum disorder. One study found that the autism community provides significant social support to its members both on Twitter and blogs (Saha, & Agarwal, 2016). Social support facilitated by community members can help caregivers deal with challenges and be effective in reducing psychological stress and enhancing the quality of life for individuals diagnosed with an autism spectrum disorder (Saha, & Agarwal, 2016). However, the body of research on online support groups on how effective these networks are for different aspects of mental health is still in its early stages.

Overview of the Study

The literature on online support groups, in summary, provides an insight into their beneficial effects on mental health outcomes. They serve as an essential support system and are important in providing additional help for people suffering from mental health problems (Dour et al., 2013). Online support groups can be particularly beneficial for young individuals seeking help and information about mental health issues (Horgan and Sweeney, 2010). This is especially relevant as young people experience some of the highest rates of mental health problems and frequently use the Internet to connect with others (Horgan and Sweeney, 2010; Patel et al., 2007). The current literature review will concentrate on text-based social support groups as they are more widely available, allow also passive engagement and provide anonymity, which is especially useful for sensitive topics where members might feel uncomfortable disclosing their identity in person (Tanis, 2008). All of this might be important for inclusion.

Although some literature reviews explored the effectiveness of online support for specific mental health disorders, there seems to be a notable gap in comprehensive reviews that cover a wide range of mental health conditions and assess the overall effectiveness of online support for emerging adults. Online and social network interventions for depression in youth were the subject of a recent systematic study (Rice et al., 2014). Nevertheless, additional mental health issues impacting this age group were not examined in this investigation. In addition, a systematic review has examined the efficacy of peer support

networks relating to health issues on the Internet and the influence of online support groups on symptoms of depression (Eysenbach et al., 2004). However, this review did not focus on young individuals or address different mental health disorders. Therefore, undertaking thorough evaluations is essential for combining the current body of research, figuring out which mental disorders were studied about online support interventions for young individuals and comparing for which mental health outcomes online support groups were found to be effective.

As a result, the current systematic literature review aims to explore the effectiveness of online social support interventions on mental health outcomes for emerging adults. The literature review addresses the following research questions:

1. What mental health outcomes have been the focus of studies on online social support interventions?
2. What is the effectiveness of online social support interventions on the mental health outcomes of emerging adults?

Methods

Research Design

In the current study, a systematic literature review method was used following existing guidelines of PRISMA by Page et al. (2021) to answer the research question of the current thesis. In general, a systematic literature review method is a thorough and systematic procedure of gathering any relevant studies on a subject, evaluating them critically, and combining the information to address particular research objectives (Lamé, 2019). Furthermore, this approach seeks to provide an analytical critique in addition to summarizing previous research on the subject (Okoli & Schabram, 2010). Moreover, an SLR could ensure that relevant research is included in the evaluation by using explicit and transparent inclusion and exclusion criteria. Furthermore, conclusions generated from the included studies may be further distinguished and assessed for validity and reliability by a systematic evaluation of their methodological quality (Tod et al., 2021).

Search Strategy

A thorough search was carried out using PubMed, PsycINFO, Scopus and Web of Science to search for relevant studies. These databases were chosen because, PubMed covers biomedicine, including psychiatry; PsycINFO concentrates on behavioural science and mental health; Scopus and Web of Science databases contain research from all fields. Thus, the fields of psychology, psychiatry, and technological research were included in the search. The

articles that were available in both German and English and published after 2008 were filtered in the databases. Additionally, all constructs' keywords were gathered and combined into several search strings to define the search. As a result, a range of search queries were evaluated in the four databases indicated above by constantly changing the search query and the included keywords. The goal of this process was to determine the best search query to locate all relevant articles. The last day of the search was April 16, 2024. Table 1 contains the chosen keywords for the final search query.

Table 1

Final search query keywords

Variable	Keywords
Online	(online OR digital OR Internet OR "Internet-based" OR "web-based" OR mobile)
Social Support	("support interventions" OR "social network" OR "social interventions" OR "support programs" OR "peer support" OR "peer interventions" OR "peer to peer")
Mental Health Disorders	("mental disorder" OR "psych* disorder")
Young Adults	(teenager OR child* OR adolescents OR students OR "young adults" OR College OR University)

As the four databases differed in how they applied the Boolean operators, the final search query had to be adjusted to be used in the different databases (see Appendix A).

Eligibility Criteria

To provide a focused review that addresses the research question, inclusion and exclusion criteria must be defined to screen the data. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement provided the basis for this screening procedure, enabling a methodical and thorough assessment of the studies (Page et al., 2021). A PRISMA checklist is available in Appendix B.

For instance, the review entails articles that (1) describe empirical quantitative work which is translated to or originally appeared in English or German and published after 2008. (2) The sample's age range was 15 to 35 years old. Studies related to students were included if

the sample age was not indicated in the publication. Articles that (3) discussed or investigated a social interaction including digital text-based platforms such as social media forums, chat rooms and other online communities designed for peer support as defined by Eysenbach, et al. (2004) were included. Studies involving video-based interactions were excluded.

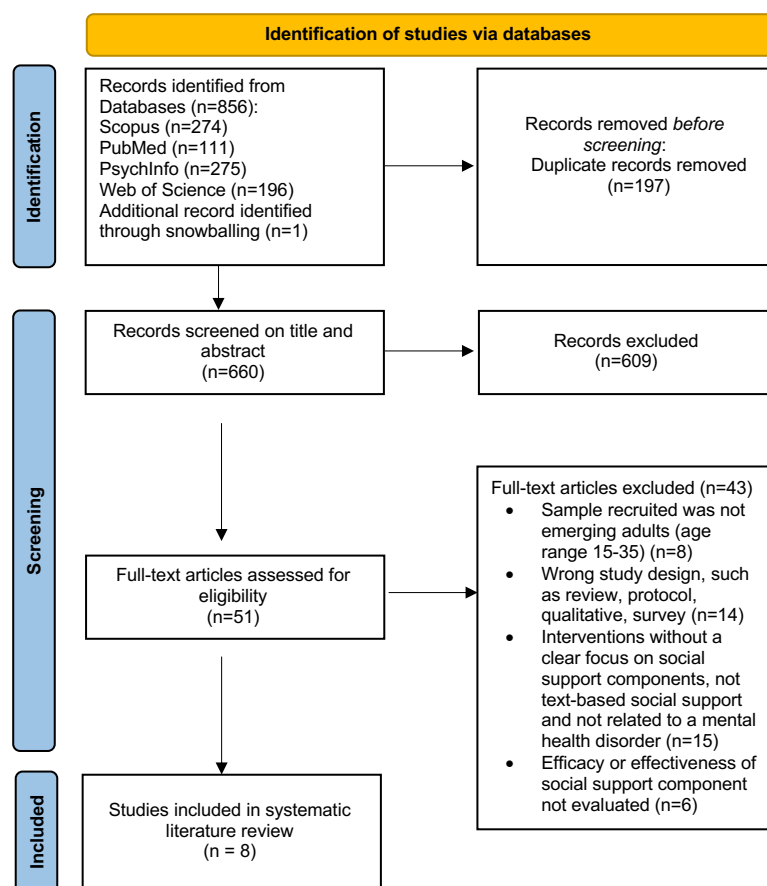
Furthermore, (4) this review included studies targeting any form of digital online support focusing on mental health problems. Here, articles assessing participants without mental health issues (e.g., physical health issues or non-clinical distress) were excluded as the populations differ from clinical populations and the circumstances can vary a lot, making it difficult to draw generalizable conclusions. Moreover, research was included that (5) evaluates the effectiveness of an online support intervention. Research on component interventions (such as online cognitive behavioural therapy combined with a support group) that did not allow for the separation of the intervention's peer support component's effectiveness was excluded. Moreover, in-person meetings, offline support groups, and research not conducted on Internet platforms were excluded from this research.

Study Selection

Covidence was used to eliminate duplicate articles and facilitate the research selection process (<https://covidence.org>). It is a program for screening literature transparently and methodically. In the first stage, the 661 articles found were screened on the title and in the second stage on the abstract by one author (AS). This first screening process yielded a total of 50 relevant articles. Step 3 involved reviewing the entire document to assess the eligibility of the remaining studies, and the inclusion and exclusion criteria were used to decide the studies' eligibility. Here, 43 studies in total were eliminated because they did not meet the requirements for inclusion. Studies that were not included in the databases used or that were published in less accessible formats were found by gathering research in a second round utilizing snowball sampling by looking at the reference list of included studies (Greenhalgh & Peacock, 2005; Wohlin, 2014). However, this approach did not identify any relevant research. Lastly, one coder included eight publications for coding. Figure 1 provides a thorough summary of the selection procedure.

Figure 1.

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart of the selection process for the systematic literature review.



Data Extraction and Synthesis

The following criteria were coded by one researcher to answer the first research question: (1) participant characteristics: sample size, age, and sex; (2) intervention design: intervention description (3) social support interaction: delivery methods (description of the intervention, format - forums, chat rooms, etc., type of peer support), whether or not it was moderated and by whom (e.g., health professionals, peer expert or someone else); and (4) study design: randomized controlled trial (RCT)/randomized trial/pre-post, whether or not it employed an intention-to-treat (ITT) analysis, dropout (n,%), types of measurements/questionnaires, duration/length of follow-up. For the second research question, the following criteria were coded: (5) primary outcomes for the different mental health disorders: statistical significance and Hedge's g effect size for post-intervention changes between the intervention and control groups.

The collected data was visualized in a table, entailing all study details and the study's primary outcomes relevant to answering the research questions. Here, the group-by-time

interaction as well as the between-group findings were provided for the randomized controlled trials and the randomized trial. Results within groups were given for pre-post designs. Between groups, Hedge's g correlations and confidence intervals for small sample sizes were calculated in studies that reported mean scores and standard deviations (Borenstein, 2009).

Quality Assessment

One reviewer rigorously evaluated each of the studies that were selected for this systematic literature review using an appropriate critical appraisal tool. In this review, the Joanna Briggs Institute (JBI) critical appraisal tools were applied (Joanna Briggs Institute, 2020). The JBI critical appraisal is a thorough series of questions used when conducting systematic literature reviews for quantitative research as it helps evaluate the methodological quality, validity, and bias risk of the included studies. The current review employed checklists designed for quasi-experimental studies and randomised controlled trials. Articles were classified as being of “high” quality if they scored between 100% and 80%; they were classified as being of “moderate” quality if they scored between 80% and 60%; and they were classified as being of “poor” quality if they scored less than 60%.

Appendix C summarizes the evaluation of each article together with the item ratings.

Results

Characteristics of the Included Studies

Table 3 provides a detailed description of the eight included studies. One study applied a pre-post design (Horgan & Sweeney, 2013), six studies were randomized controlled trials and one research was a randomized trial (Freeman et al., 2008). A no-intervention control group was used in half of the RCTs. The other RCTs had alternative interventions, such as expressive writing, school-based health education as usual or primary or tertiary community mental health services (Alvaarez-Jimenez et al., 2021; Birrell et al., 2023; Morris et al., 2015). All studies had sample sizes between 39 and 283 (median = 161).

Table 3.*Characteristics and findings of the included studies*

Study Country	Intervention Description	Social support format Moderation status Moderator	Study design ITT	Participants Number of participants	Age (Mean, SD) Sex (%)	Completer (N) Dropouts (n, %)	Outcome measures Measurement points	Results on the post- intervention effectiveness of online social support	Hedges g (between groups at post- intervention) and 95% confidence intervals (CI)
Ahmad et al. (2020)	I: “P-MVC” - 12 video-based modules	Discussion forums	RCT	Undergraduate students	M = 24.8 SD = 6.5	ISupport: N = 37 I: N = 34 C: N = 38	PHQ-9 (Depression), BAI (Anxiety), PSS (Perceived Stress)	There were statistically significant reductions in depression and perceived stress for F-MVC compared with C.	Depression: g = -0.65 CI: -1.12,-0.19
Canada	ISupport: “F.MVC” - 12 video-based modules, anonymous peer-to-peer discussion forums C = no intervention	Moderated Unknown	Yes	N = 113 (ISupport: N = 39, I: N = 35, C: N = 39)	F = 75.3% M = 24.8%	ISupport Dropout: N = 2 (5.1%), I Dropout: N = 1 (2.9%), C Dropout: N = 1 (2.6%)	Baseline (T1), 4 weeks (T2), Post intervention (8 weeks)	There were no statistically significant reductions in anxiety for F-MVC compared with C.	Anxiety: g = -0.33 CI: -0.79,0.13 Perceived Stress: g = -0.77 CI: -1.24,-0.30
Alvarez-Jimenez et al. (2021)	ISupport: “Horyzons” - Vocational support, online content and “café” (discussion threads and interaction with “peer-workers”)	peer-to-peer online social networking, interactive online therapy, expert support	RCT	Young people (16-27 years)	M = 20.91 SD = 2.88	ISupport: N = 63 C: N = 63	PSP (Schizophrenia - Social functioning), CDSS (Depression)	Social functioning: PSP scores at 18 month follow up found no significant group-by-time interaction effect.	Social functioning: g = 0.03 CI: -0.32,0.37
Australia	C: primary or tertiary community mental health services (TAU)	Moderated Clinicians	Yes	N = 170 (ISupport: N = 86, C: N = 84)	F = 47.1% M = 52.9%	ISupport Dropout: N = 23 (26.8%) C: N = 21 (25%)	Baseline Follow-Up (6 months) Follow-Up (12 months) Follow-Up (18 months)	Depression: There was no effectiveness of Horyzons found on other secondary outcome variables such as depression.	Depression: g = -0.09 CI: -0.45,0.25
Birrell et al. (2023)	ISupport: “Mind your Mate program” (40-minute web-based classroom lesson and companion	skill-building modules for peer support, self-care modules, and	RCT	Secondary school students and	M = 15.3 SD = 0.41	ISupport: N = 68 C: N = 69	GAD-7 (Anxiety), PHQ-9 (Depression), K-10 (Psychological distress), Patterns of Alcohol	Depression: Students in the intervention group experienced small to moderate reductions in depressive symptoms over the	Depression: g = 0.11 CI: -0.22,0.45 Anxiety:
Australia			Yes						

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	smartphone mobile app)	help-seeking tools		university students	F = 43.4%	ISupport Dropout: N = 20 (22.7%) C Dropout: N = 9 (11.5%)	Index, National drug Strategy Household Survey	12 months compared with students in the control group	g = 0.15 CI: -0.18, 0.49
	C = school-based health education as usual	Moderated Teacher		N = 166 (ISupport: N = 88, C: N = 78)			Baseline Follow-Up (6 months) Follow-Up (12 months)	Anxiety/ Psychological Distress/ Substance Use: No differences were observed between the intervention and control group in relation to all the outcomes	Psychological Stress: g = 0.19 CI: -0.08, 0.47 Substance Use: N/A
Ellis et al. (2011)	I: "MoodGYM" -3 x weekly 1-hour sessions of online CBT, 5 modules plus therapist guidance)	Message boards - Forums with blogs and mood chart	RCT Yes	Undergraduate psychology students	M = 19.67 SD = 1.66	N = 39 No dropout	DASS (Depression), DASS (Anxiety)	Depression: Online peer support was not effective compared to the control condition.	Depression: g = -0.63 CI: -1.41, 0.16
Australia	ISupport: "Mood Garden" - 3 x weekly 1-hour sessions of online peer-based support and information/ therapist guidance	Public Moderated Volunteers who experienced mood disorders		N = 39 (I: N = 13; ISupport: N = 13; C: N = 13)	F = 77%		Baseline Post intervention (3 weeks)	Anxiety: Online peer support was effective compared to the control condition with a significant difference between the online support intervention and the control group.	Anxiety: g = -0.91 CI: -1.72, 0.10
Freeman et al. (2008)	C: No intervention I: Website containing information about common student problems	Electronic bulletin board	RT No	Undergraduate and graduate students	M = 21 SD = not reported	I: N = 82 ISupport: N = 51	CORE-OM (subjective well-being, problems/symptoms, life functioning, risk to self or others)	A non-significant reduction from pre- to post-intervention. Adding online peer support did not increase the effectiveness of the intervention.	Psychological Problems: g = -0.22 CI: -0.57, 0.13
England	ISupport: identical Website with the addition of an online mutual support group which used an electronic bulletin board	Unknown		N = 283 (I: N = 141, ISupport: N = 142)	F = 70% M = 30%	I Dropout: N = 59 (42%) ISupport Dropout: N = 91 (64%)	Baseline Post intervention (10 weeks)		

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Horgan & Sweeney (2013)	ISupport: Website provided a forum to allow participants to offer peer support to each other. It also provides Information on depression and links to other supports	Forum Moderated Researcher	Pre-post No	University students N = 118	M = 20.6 SD = 1.8 F = 35.6% M = 64.4%	N = 16 Dropout = 102 (86%)	CES-D (Depression) Baseline Post intervention (6 weeks)	While a difference from pre- to post-intervention can be noted it was not statistically significant	N/A
Morris et al. (2015)	ISupport: "Panoply" - 25 minutes per week; posting stressful thoughts and situation, receiving crowdsourced reappraisal support or reappraising posts of others	Web-based, peer-to-peer cognitive reappraisal platform in the form of posts Unknown Unknown	RCT No	Young people (18–35 years) N = 217 (ISupport: N = 108, C: N = 109)	M = 23.7 SD = 5.3 F = 71.7	ISupport: N = 84 C: N = 82 ISupport Dropout: N = 24 (22.2%) C Dropout: N = 27 (24.8%)	CES-D (Depression) Baseline Post intervention (3 weeks)	A significant improvement from pre to post for depression was found.	Depression: g = -0.05 CI: -0.35,0.25
Yoe et al. (2023)	ISupport: "Acceset"- a stand-alone digital peer support platform C = no intervention	discussions, emotion stamps, motivation graphics, interchange format, stickers Moderated Certified Counselors	RCT Yes	Emerging Adults (19-25 years) N = 100 (ISupport: N = 50, C: N = 50)	M = 19.44 SD = 1.28 F = 53%	N/A	GDA-7 (Anxiety), PHQ-9 (Depression) Baseline Post intervention (3 weeks) Follow-Up (6 weeks) Second Follow-Up (9 weeks)	Seekers in the intervention groups had statistically significant improvement in psychological well-being with lower symptoms of anxiety and depression compared to C. Furthermore, the effect of the intervention was sustained beyond the period of intervention (but not at the second follow-up assessment)	N/A

Note. I = intervention, ISupport = Social Support Intervention, C = Control Group, RCT = Randomized Controlled Trial, RT = Randomized Trial, F-MVC = full Web-based Mindfulness Virtual Community intervention, P-MVC = partial Web-based Mindfulness Virtual Community intervention
Measures: DASS = Depression Anxiety Stress Scale, CES-D = Center for Epidemiologic Studies Depression Scale, K-10 = Kessler Psychological Distress Scale, PHQ-9 = Patient Health Questionnaire- 9 item, BAI = Beck Anxiety Inventory, PSS = Perceived Stress Scale, GAD-7 = Generalized Anxiety Disorder Scale, Patterns of Alcohol, PSP = Personal and Social Performance Scale, CDSS = Calgary Depression Scale for Schizophrenia, CORE-OM = Clinical Outcomes in Routine Evaluation—Outcome Measure

Participants

University students (undergraduate and graduate students) made up the majority of the samples ($n = 6$). The other three studies included emerging adults ranging from 15-35 years. The total participants ranged in mean age from 15 to 24 years old. Half of the studies ($n = 4$) had most of the participants being female with over 70%. In the remaining studies, the deviation between female and male participants was more balanced or male participants predominate. The majority of research ($n = 7$) recruited participants from schools or universities. One of these studies also collected participants from Internet websites and social media channels, such as Facebook, and Twitter (Morris et al., 2015). The study by Alvaarez-Jimenez et al. (2021) recruited young people with first-episode psychosis who were receiving care at the Early Psychosis Prevention and Intervention Centre (EPPIC). Furthermore, a number of studies were conducted in Australia ($n = 3$), whereas the remaining studies were from England, Canada, and Singapore.

Interventions

Half of the studies used Internet forums, bullet/message boards, discussion boards or support groups; the other studies integrate a collection of different digital interactive features, such as reappraisal, virtual chat rooms, emotional stamps, motivation graphics etc. (see Table 3). The social support platforms included in the studies were developed for research purposes and are not accessible to the general public. Six of the included studies used social support interventions that were moderated by either health professionals, teachers, or trained peers who experienced similar disorders (see Table 3). All studies had baseline measurements and one or two post-intervention-/follow-up measurements. Thereby the longest follow-up period was from 1 to 18 months after the beginning of the intervention, with an average duration of 9.5 months (SD 5.19) (see Table 3).

Study Quality

Quality scores for the eight articles are given in Appendix C. Overall, the included articles fulfilled the criteria for methodological quality as determined by the JBI critical appraisal tools, with an average score of 74.2% across all articles, indicating a moderate level of quality. 37.5 % ($n = 3$) showed a high quality, 50% ($n = 4$) showed a moderate quality and 12.5% ($n = 1$) showed a low quality. The majority of the assessed studies demonstrated high adherence to the ITT principle, demonstrating a commitment to methodological rigour. Among the eight included studies, five reported using an ITT design, two reported completer analyses, and one did not specify the statistical analysis of the research in detail.

Mental Health Outcomes Studied

In answering the first research question concerning the mental health outcomes targeted by studies on online support interventions, the included studies have examined a variety of mental health disorders with a diverse collection of outcome measures to assess the effectiveness of social support interventions.

Depression

The most common mental health condition that has been studied in the included studies is depression (see Table 3). These studies include six randomized controlled trials (RCTs) and one pre-post study that assessed online support interventions. A range of social support formats, including message boards, forums, and multi-component support, were assessed for their efficacy in alleviating depressive symptoms. The Patient Health Questionnaire (PHQ-9) and the Center for Epidemiologic Studies Depression Scale (CES-D) were two of the primary instruments employed in these investigations. Studies such as those carried out by Ahmad et al. (2020), Birrell et al. (2023), and Yoe et al. (2023) employed the PHQ-9 to measure depression levels both before and after the intervention, resulting in important information about the interventions' effectiveness. Horgan & Sweeney (2013) and Morris et al. (2015) used the CES-D to measure the depression levels.

Anxiety

Another focus of the reviewed studies was anxiety. Four randomized controlled trials (RCTs) examined the impact of online social support interventions on anxiety symptoms. In these RCTs, a number of anxiety evaluations were utilized, which show a more heterogeneous collection of questionnaires, including the Beck Anxiety Inventory (BAI) by Ahmad et al. (2020), the Generalized Anxiety Disorder Scale (GAD-7) by Birrell et al. (2023) and Yoe et al. (2023), and the Depression Anxiety Stress Scale (DASS) by Ellis et al. (2011). The formats used within the included studies on anxiety symptoms included forums, a multi-component intervention, and discussion forums.

Psychological Problems and Psychological Distress

In total, two studies measured psychological distress outcomes within their research on social support interventions. The study by Freeman et al. (2008) focused on psychological problems more in general, including aspects such as subjective well-being, problems/symptoms, life functioning, and risk to self or others (see Table 3). Thereby, two of the studies were RCTs and one study was an RT design. One of the RCTs exploring the impact of a social support intervention on psychological distress examined a moderated discussion forum (Ahmad et al., 2020), whereas the other RCT utilized a multi-component

social support platform, including moderated skill-building modules for peer support, self-care modules, and help-seeking tools (Birrell et al., 2023). Both studies used different measurements to measure the effectiveness of the individual's psychological distress. Ahmad et al. (2020) used the Perceived Stress Scale (PSS), while Birrell et al. (2023) used the Kessler Psychological Distress Scale (K10). Although the measurements were different, both studies measured at the time points, at baseline first follow-up during the intervention (4 weeks/6 weeks) and post-intervention (8 weeks/12 weeks) (see Table 3). Thirdly, the study by Freeman et al. (2008) on psychological problems was an RCT comparing an electronic bulletin board with online information to online information alone. In doing this, the Clinical Outcomes in Routine Evaluation—Outcome Measure (CORE-OM) was used at baseline measurement and post-intervention measurement.

Substance Use

Substance usage was especially studied in the study by Birrell et al. (2023), which employed the National Drug Strategy Household Survey and the Patterns of Alcohol Index as measurements to evaluate the effectiveness of the online support intervention on alcohol use and other drugs. This study included an RCT studying a multi-component social support platform including skill-building modules for peer support, self-care modules, and help-seeking tools to provide the patient with social support.

Schizophrenia

The efficacy of an innovative online social therapy for specialized first-episode psychosis services was evaluated in the Horyzons project, an RCT by Alvarez-Jimenez et al. (2021). This intervention incorporates several moderated components of social support for the patients such as peer-to-peer online social networking options, interactive online therapy, and expert support. This study used the Personal and Social Performance Scale (PSP) as a measure to evaluate the social functioning of patients with schizophrenia and the Calgary Depression Scale for Schizophrenia (CDSS) for the depressive levels in these patients.

Intervention Effectiveness

The second research question, which examined the effectiveness of online social support interventions on emerging adults' mental health outcomes, produced a variety of findings across different mental health conditions. RCTs focusing on depression symptoms show mixed effectiveness. Compared to control groups, three of these RCTs showed a substantial reduction in depression symptoms from pre- to post-measurement, particularly in interventions that offered multifaceted, interactive social support platforms (see Table 3). The RCT by Yoe et al. (2023) even found that the intervention's beneficial effects on depressed

symptoms persisted until the first follow-up period, which was six weeks later. Comparing the other three RCTs to their control groups, only small to moderate symptom reductions were seen. The pre-post research by Horgan & Sweeney (2013) that used a moderated online forum intended for college students found a decrease in symptoms associated with depression. Nevertheless, this effectiveness failed to reach statistical significance (Horgan & Sweeney, 2013).

Also, the findings of the studies examining anxiety symptoms were inconsistent. Two of the studies, conducted by Ellis et al. (2011) and Yeo et al. (2023), reported a statistically significant reduction in anxiety symptoms when compared with control groups. Ahmad et al. (2020) and Birrell et al. (2023) studies, on the other hand, found no significant differences between the control groups and the online social support interventions. Remarkably, the outcomes varied even for comparable intervention formats. Ellis's et al. (2011) study using a forum revealed favourable outcomes ($g = -0.91$), whilst Ahmad et al (2020) with a similar design failed to demonstrate any noteworthy advantages ($g = -0.33$). Comparably, out of the two studies that included multiple social support features (Birrell et al, 2023; Yoe et al. 2023), the intervention of Yoe et al. (2023) showed effectiveness in lowering symptoms of anxiety, while the intervention studied by Birrell et al. (2023) did not ($g = 0.15$).

Regarding general psychological distress, the study by Freeman et al. (2008) indicated no decrease in symptoms between the pre- and post-intervention periods. After the intervention, there was no proof that the electronic support group had any further impact on the psychological well-being of the participants ($g = -0.22$). In relation to this, Birrell et al. (2023) found no difference between the intervention and control groups on psychological distress ($g = 0.19$). However, the RCT by Ahmad et al. (2020) studying psychological distress, observed a statistically significant reduction in the perceived stress for the intervention group compared to the control group ($g = -0.77$).

In schizophrenia, the intervention by Alvaarez-Jimenez et al. (2021) significantly improved educational and occupational results, but there were no noticeable improvements in the social functioning variable ($g = 0.03$). In particular, compared to the control group, participants in the intervention group had noticeably greater probabilities of obtaining work or enrolling in school, indicating a positive impact on a crucial aspect of social rehabilitation. The intervention group also showed a tendency toward fewer hospitalizations and ER visits, which may indicate that it can lessen the need for acute care. According to these findings, online social support intervention may not have a major effect on social functioning scores,

but it may be able to help young individuals recovering from first-episode psychosis achieve better career outcomes and use healthcare less frequently.

The study by Birrell et al. (2023) also examined the effectiveness of social support intervention on substance use, including alcohol and drug use. When compared to the control group, the intervention had no significant effects on alcohol or other drug usage. Despite the intervention's goal of lowering drug use initiation, for 12 months, both groups had comparable usage patterns.

Discussion

Main Findings

This systematic literature review aimed to fill the gap in the present state of research concerning the effectiveness of online social support interventions on mental health outcomes for emerging adults. Eight studies could be identified including six RCTs, one RT and one pre-post intervention. Overall, the included studies were of moderate quality, with an average score of 74.2%. In the following, the two research questions of this systematic literature review will be answered, while different aspects influencing the effectiveness of online social support interventions will be discussed.

Targeted Mental Health Outcomes

Concerning the first research question, several mental health outcomes were targeted by the selected studies, including depression, anxiety, psychological problems, psychological distress, substance use (alcohol and drug use) and schizophrenia. Thus, online social support interventions are being investigated for a wide range of disorders, as indicated by the variety of mental health conditions studied, which range from common problems like depression and anxiety to more complex conditions like schizophrenia. Thereby, in the evaluated studies, depression and anxiety were the mental health outcomes that were studied the most frequently, with depression being the subject of seven studies and anxiety being studied in four studies. This is in line with the most common mental health outcomes faced by emerging adults studied in the literature. Research has indicated that a considerable proportion of emerging adults encounter mental health problems, with anxiety, mood, and drug use disorders being particularly common (Gustavson et al., 2018). According to the study by Gustavson et al. (2018), the 12-month prevalence of anxiety disorders in young women was 26.7%, depressive disorders were 7.2%, and alcohol use disorder was 4.4%. The Australian Institute of Health and Welfare (2024), which discovered that anxiety and depression ranked first and second in terms of overall burden among those aged 15 to 24, supports the high prevalence of these conditions among young people.

Effectiveness of Online Social Support Interventions

While answering the second research question, there are mixed findings about the effectiveness of online social support interventions across different mental health outcomes for young individuals.

Participation and Engagement

Results from the studies included in this review on the impact of online support treatments on depressive symptoms in emerging adults have been inconsistent, which can be attributed to the level of participant engagement (Houston et al., 2002). Several studies included in this review found some evidence supporting the effectiveness of social support on depressive symptoms for young individuals. For instance, participants in an eight-week web-based intervention with a peer-to-peer discussion forum had substantial reductions in depression (Ahmad et al., 2020). The outcomes align with those of the Internet Support Groups (ISG) investigation by Houston et al. (2002) which also focused on people suffering from depression. Similar to Ahmad et al. (2020), the study by Houston et al. (2002) used a discussion forum allowing for real-time interaction and support and discovered that regular members of these groups showed higher improvements in their depression ratings than did less frequent users. This is consistent with the low dropout rate of Ahmad et al.'s (2020) study, which showed that after eight weeks, just 5.1% of the intervention group withdrew. This is also in line with the study by Callear et al. (2013), which examined the effect of adherence to an Internet-based depression prevention program found that participants in the high adherence intervention group reported larger intervention effects. Thus, it can be stated that participating actively in online social support interventions can have a positive impact on young individuals' mental health (Callear et al., 2013; Houston et al., 2002).

In contrast, the study by Horgan & Sweeney (2013) found no significant effectiveness of online social support interventions on depression, which may be explained by the high dropout rate of 86% in their study. A high dropout rate, as well as low active participation in the intervention, is also evident in the study by Freeman et al. (2008), which may result in a non-significant reduction of psychological problems. Due to the high attrition rates, the study's statistical power and effectiveness were probably impaired, which again emphasizes that active participation is a potential factor contributing to the effectiveness of these interventions (Houston et al., 2002). The study by Gan et al. (2021) further supported this notion, that maintaining participants' engagement over an extended time is essential to attaining notable changes in mental health.

Multi-Component Social Support Formats

Significant findings indicating the effectiveness of online social support interventions on depression and anxiety were reported by the two studies of Yeo et al. (2023) and Morris et al. (2015). Both studies integrated multiple features to provide the participants with social support and found significant reductions in depressive symptoms when utilizing these online social support platforms. Yeo et al. (2023) additionally reported that the participants' anxiety symptoms were significantly reduced by the intervention. These findings are also in line with the thorough investigation carried out by Griffiths et al. (2012) reporting a significant reduction in depressive symptoms at 6- and 12-month follow-up. The results of this RCT study demonstrated a significant reduction in depressed symptoms through moderated forums and interactive discussions (Griffiths et al., 2012). All three studies employ a multi-component social support strategy consistently, which highlights the potential efficacy of interactive, multi-component online support networks in alleviating depression. The Social Support Theory mentioned earlier could provide a theoretical explanation for this, stating that there are different types of support, such as emotional, informational and instrumental support, which can buffer individuals against distress and improve mental health outcomes (Östberg, & Lennartsson, 2007). Multi-component formats can provide more diverse types of support, which in turn can lead to an enhanced effectiveness of these interventions.

Impact on Complex Conditions

On the other hand, several studies in this review found that online support had limited or no effect. An analysis of the included studies' results suggests that relying solely on online social support interventions alone in treating complex mental health issues might be frequently insufficient. For example, the Alvarez-Jimenez et al. (2021) study, which concentrated on young individuals experiencing their first psychotic episode, discovered that although improvements were observed in terms of academic and professional accomplishments, the intervention did not significantly improve social functioning or lessen depressive symptoms. Previous research, such as that done by Granholm et al. (2014), has demonstrated that improvements in social functioning frequently call for sustained involvement and specialized social skills training, which may not be adequately provided by online interventions alone. Thus, the nature of social functioning in schizophrenia, which is frequently more difficult to change may call for more extensive interventions (Granholm et al., 2014).

Moreover, online support programs developed primarily for less severe conditions like mild to moderate depression may be less successful in treating psychosis due to its complexity

and intensity, which frequently involve symptoms like delusions and significant cognitive disturbances (Penn et al., 2005). Therefore, given that studies examining mild to moderate depression indicated a beneficial effect of online social support interventions (see Table 3), the lack of effectiveness on depression in this study highlights the fundamental limits of online interventions when applied to more severe mental health issues.

Furthermore, the study conducted by Birrell et al. (2023), showed that young individuals' use of alcohol and drugs, as well as depressive and anxiety symptoms, were not significantly decreased by online social support interventions throughout 12 months. These results align with earlier research investigating treatment options for substance abuse. For instance, a meta-analysis conducted by Riper et al. (2014) discovered that although online therapies for alcohol abuse showed little to moderate benefits these results were only temporary. This conclusion fits with the findings of the study by Alvarez-Jimenez et al. (2021) and shows that the intervention does not fully address the multitude of complex interactions between biological, psychological, and social variables impacting substance use behaviours (Belfiore et al., 2024). Thus, in the study by Birrell et al. (2023), there might not been enough online social support available to address the complex nature of substance use behaviours, highlighting the significance of integrated treatment methods for young individuals suffering from substance abuse (Belfiore et al., 2024).

This implies that although online resources might offer beneficial assistance, their efficacy may differ based on the complexity of particular mental health issues. This suggests that conventional in-person mental health programs might offer more comprehensive care for individuals with more severe and complex disorders (Corrigan, 2006).

Limitations

While some of the predicted results of the current study are met, there are several limitations to this systematic literature review. Firstly, the research designs and outcome measures of the included studies differed greatly (see Table 3). This methodological and statistical heterogeneity, investigated by the Ryan & Cochrane Consumers and Communication Review Group (2016), produces challenges in combining and comparing data from the different studies creating mixed effectiveness in the outcomes. For example, whilst some research utilized pre-post studies or non-randomized trials, others used randomized controlled trials (RCTs). A variety of scales were used to assess similar mental health outcomes. Here for example, the reduction in depressive symptoms across the different studies was measured using different tools including the Patient Health Questionnaire (PHQ-9), the Calgary Depression Scale for Schizophrenia (CDSS), Depression Anxiety Stress Scale

(DASS), Generalized Anxiety Disorder Scale (GAD-7), Center for Epidemiologic Studies Depression Scale (CES-D), and the Perceived Stress Scale (PSS) (see Table 3). In addition, the variability in intervention designs including different social support formats, lengths of the interventions and participant engagement levels, further complicated the synthesis of results. These inconsistencies make it more difficult to get clear findings and affects the generalizability of the conclusions drawn (Ryan & Cochrane Consumers and Communication Review Group, 2016).

Another noteworthy limitation of this review is the age range of the participants population in the included studies. When looking at the study by Morris et al. (2015), for example, participants ranging in age from 18 to 35. Because of this wide age range, it is difficult to draw conclusions regarding the effectiveness of online support interventions and to make direct comparisons. People who are 35 years old may use and perceive digital media in different ways or have different mental health problems than people who are 18 years old (Thayer & Ray, 2006). Age-related differences in digital usage and knowledge, online interaction preferences, and life experiences can all have an impact on how people use online support (Thayer & Ray, 2006). These variances may result in disparities in the efficacy of these interventions for various age groups, making it challenging to generalize results across such a diverse age range.

Thirdly, the included studies in the literature review may point towards selection biases. In this systematic literature review, search phrases like "online support interventions" and "digital peer support" were used for the search terms to obtain wide coverage and avoid focusing on specific delivery approaches. This might have resulted in a selection bias of the included studies as the majority of the included interventions were mostly web-based, which means that research using alternative digital support channels like text messaging or mobile applications may have been missed (Drucker et al., 2016). However, the use of keywords like "SMS," "text-messaging," and "mobile apps" in a follow-up search would have indicated that many treatments utilizing these media are frequently unguided self-help tools rather than moderated, structured support interventions. Next, the outcomes of the included studies focus on psychopathology rather than well-being, which could indicate another selection bias. This might reflect a broader bias within the research field. In general, many studies have shown that only about half of all studies are ever published (Drucker et al., 2016). Studies with statistically significant results are more likely to be published and are typically released a year earlier (Dwan et al., 2013). In the selection process of this systematic literature review, there were no studies found that focused on well-being related mental health outcomes.

Therefore, the exclusion of unpublished, statistically non-significant data may have biased this systematic review (Dwan et al., 2013).

Next, most of the time, consumers, researchers, or health professionals moderated the discussion groups. However, nothing was known about the moderators' backgrounds, expertise, and involvement in the discussion group. Furthermore, although the kind of moderation may affect the participants' outcomes, the included studies lacked in-depth information on the use of theory-driven moderation. Since moderation is an essential component in online communities and can directly affect the interaction quality (Chen et al., 2011), more information on the kind of moderation and moderators should be included in future research. This might provide insight into the appropriate degree of moderation for online social support interventions.

Lastly, a potential data extraction and interpretation bias of the literature review must be addressed (Mathes et al., 2017). The results might be influenced by subjective judgment as all data extraction and analysis were done by a single researcher (Mathes et al., 2017). This could result in biases in the interpretation and synthesis of the data, which could skew the results. Individual interpretations and personal biases may have influenced the overall outcomes of the review by influencing the data points that were highlighted or minimized. The inclusion of a peer review phase or the involvement of several researchers in these procedures may assist reduce bias and improve the accuracy of the results (Mathes et al., 2017).

Future Research Recommendations and Implications

Based on the findings and limitations of the current literature review, recommendations for future research and implications can be made to improve knowledge of and efficacy of online social support interventions. Firstly, the studies included in the current literature review varied significantly in their methodologies and intervention formats. The high heterogeneity in social support formats led to inconsistent results, making it difficult to compare the interventions' effectiveness (Ryan & Cochrane Consumers and Communication Review Group, 2016). Thus, to evaluate which formats are most helpful for particular mental health outcomes, more high-quality and comparative studies evaluating various forms of online social support treatments (e.g., forums, video chats, mixed media) are required. Although the literature indicates that there is no significant difference between text-based and video-based support (Renfrew et al., 2020), more studies should concentrate on specific comparisons to determine the circumstances and demographics for which each format works best.

Next, the findings of the review suggest a correlation between participation and engagement of users on the effectiveness of online social support interventions. This shows that while developing new online social support interventions an important emphasis needs to be made on how to engage the user more and how to make them use the intervention more actively (Houston et al., 2002). However, there is still a lack of knowledge on how these online social support interventions can be designed to enhance participants' engagement and reduce dropout rates. Future studies should explore strategies to actively involve the users. This can entail looking at the effects of different moderation styles, the role of interactive features and the significance of personalized content in sustaining user interest over time.

In addition, the review shows a tendency for more complex and multicomponent interventions that incorporate different types of social support to be more effective. This indicates that continued investment in and development of multi-component online formats that incorporate various forms of support and interactive features is recommended. These platforms should aim to address different dimensions of mental health by combining informational support, instrumental support and emotional support as explained by Östberg, & Lennartsson (2007).

Lastly, due to the mixed results in the effectiveness of online social support interventions, more studies should be conducted employing both qualitative and quantitative research methods to gain a comprehensive understanding of the mechanisms behind the effectiveness of online social support interventions. When combined with quantitative data, qualitative insights can offer important context by explaining why and how specific interventions succeed or fail in particular situations.

Conclusion

Research suggests that online social support could be a powerful tool to improve mental health problems among young individuals. This systematic review offers a thorough overview of the effectiveness of online social support interventions on emerging adults' mental health. The results gathered from eight studies indicate that the effectiveness of interventions aimed at reducing depression or anxiety symptoms varied. While some studies revealed significant decreases in symptoms, especially those that included multicomponent interactive social support platforms, others found no significant change from the control groups. Similarly, while significant reductions were occasionally shown after the intervention for general psychological issues, this was not always the case in all the studies on psychological problems and distress. Lastly, online social support interventions did not significantly reduce first-episode psychosis symptoms or alcohol and drug usage. These

inconsistent findings might indicate that the effectiveness of these online social support interventions might be dependent on factors such as participant engagement, social support formats used, and the complex nature of the mental health conditions being addressed. To conclude, future research should concentrate on exploring more in-depth which role online social support might play in improving young individuals' mental health, how to improve user engagement and future research is needed in investigating the effectiveness of different social support formats.

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Appendix A

Table A2

Search strategies for each of the included databases

Database	Search String
PubMed 111 results	("online"[Title/Abstract] OR virtual[Title/Abstract] OR "social media"[Title/Abstract] OR forum[Title/Abstract] OR chat[Title/Abstract] OR "digital"[Title/Abstract] OR internet[Title/Abstract] OR "internet-based"[Title/Abstract] OR "web-based"[Title/Abstract] OR "mobile"[Title/Abstract])) AND ("support Interventions"[Title/Abstract] OR "social network"[Title/Abstract] OR "support group"[Title/Abstract] OR "social groups"[Title/Abstract] OR "social interventions"[Title/Abstract] OR "support networks"[Title/Abstract] OR "support programs"[Title/Abstract] OR "peer support"[Title/Abstract] OR "peer interventions"[Title/Abstract] OR "peer to peer"[Title/Abstract]) AND ("mental disorder"[Title/Abstract] OR "psych* disorder"[Title/Abstract]) AND ("survey"[Title/Abstract] OR "quantitative analysis"[Title/Abstract] OR "statistical analysis"[Title/Abstract] OR "experiment"[Title/Abstract] OR "randomized controlled trial"[Title/Abstract] OR "longitudinal study"[Title/Abstract] OR "cross-sectional study"[Title/Abstract]) AND (teenager[Title/Abstract] OR children[Title/Abstract] OR adolescents[Title/Abstract] OR students[Title/Abstract] OR "young adults"[Title/Abstract] OR College[Title/Abstract] OR University[Title/Abstract])
Scopus 273 results	TITLE-ABS-KEY(((online OR virtual OR "social media" OR forum OR chat OR digital OR internet OR "internet-based" OR "web-based" OR mobile) W/5 ("support Interventions" OR "social network" OR "support group" OR "social groups" OR "social interventions" OR "support networks" OR "support programs" OR "peer support" OR "peer interventions" OR "peer to peer")) AND ("mental disorder" OR "psych* disorder") AND ("survey" OR "quantitative analysis" OR "statistical analysis" OR "experiment" OR "randomized controlled trial" OR "longitudinal study") AND (teenager OR child* OR adolescents OR students OR "young adults" OR College OR University))
PsycInfo 275 results	TI ((online OR OR digital OR internet OR "internet-based" OR "web-based" OR mobile) AND ("support Interventions" OR "social network" OR "social interventions" OR "support programs" OR "peer support" OR "peer interventions" OR "peer to peer") AND ("mental disorder" OR "psych* disorder") AND ("survey" OR "quantitative analysis" OR "statistical analysis" OR "experiment" OR "randomized controlled trial" OR "longitudinal study") AND (teenager OR child* OR adolescents OR students OR "young adults" OR College OR University)) OR AB ((online OR virtual OR "social media" OR forum OR chat OR digital OR internet OR "internet-based" OR "web-based" OR mobile) AND ("support Interventions" OR "social network" OR "support group" OR "social groups" OR "social interventions" OR "support networks" OR "support programs" OR "peer support" OR "peer interventions" OR "peer to peer") AND ("mental disorder" OR "psych* disorder") AND ("survey" OR "quantitative analysis" OR "statistical analysis" OR "experiment" OR "randomized controlled trial" OR "longitudinal study") AND (teenager OR child* OR adolescents OR students OR "young adults" OR College OR University)) OR KW ((online OR virtual OR "social media" OR forum OR chat OR digital OR internet OR "internet-based" OR "web-based" OR mobile) AND ("support Interventions" OR "social network" OR "support group" OR "social groups" OR "social interventions" OR "support networks" OR "support programs" OR "peer support" OR "peer interventions" OR "peer to peer") AND ("mental disorder" OR

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“psych* disorder”) AND ("survey" OR "quantitative analysis" OR "statistical analysis" OR "experiment" OR "randomized controlled trial" OR "longitudinal study") AND (teenager OR child* OR adolescents OR students OR “young adults” OR College OR University))
TS= ((online OR virtual OR "social media" OR digital OR internet OR "internet-based" OR “web-based” OR mobile) AND ("support Interventions" OR "social network" OR "support group" OR “social interventions” OR "support networks" OR "peer support" OR “peer interventions”) AND (“mental disorder” OR “psych* disorder”) AND ("survey" OR "quantitative analysis" OR "statistical analysis" OR "experiment" OR "randomized controlled trial" OR "longitudinal study") AND (teenager OR child* OR adolescents OR students OR “young adults” OR College OR University))

Appendix B

PRISMA Checklist 2020

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4-5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	4-5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6-9
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	5-6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	5-6
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	7
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	8-9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	8-9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	9
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	9
Synthesis	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and	9

Section and Topic	Item #	Checklist item	Location where item is reported
methods		comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	9
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	9
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	9
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	9
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	9
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	9
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	8
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/A
Study characteristics	17	Cite each included study and present its characteristics.	9-12
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	13
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	10-12
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	9-12
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	9-12
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	13
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	13
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	13
DISCUSSION			

Section and Topic	Item #	Checklist item	Location where item is reported
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	17-20
	23b	Discuss any limitations of the evidence included in the review.	20-22
	23c	Discuss any limitations of the review processes used.	20-22
	23d	Discuss implications of the results for practice, policy, and future research.	22-23
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	N/A
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	N/A
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	N/A

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Table C4

Study	Checklist used	Item number of the selected checklist													Total Score (%) rating
		1	2	3	4	5	6	7	8	9	10	11	12	13	
Ahmad et al. (2020)	Randomised controlled trials*	Y	Y	Y	U	NA	U	Y	Y	Y	Y	Y	Y	Y	10/13 (76.9%) moderate
Alvaarez-Jimenez et al. (2021)	Randomised controlled trials*	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y	Y	Y	11/13 (84.6%) high
Birrell et al. (2023)	Randomised controlled trials*	Y	U	Y	N	NA	U	Y	Y	Y	Y	Y	Y	Y	9/13 (69.2%) moderate
Ellis et al. (2011)	Randomised controlled trials*	Y	U	Y	U	NA	U	N	Y	Y	Y	Y	Y	Y	8/13 (62.5%) moderate
Freeman et al. (2008)	Quasi-Experimental Studies**	Y	Y	Y	Y	Y	Y	Y	N	Y					8/9 (88.9%) high
Horgan et al. (2013)	Quasi-Experimental Studies**	Y	N	Y	Y	Y	Y	Y	N	U					6/9 (50%) low
Morris et al. (2015)	Randomised controlled trials*	Y	Y	Y	U	NA	U	Y	Y	Y	Y	Y	Y	Y	10/13 (76.9%) moderate
Yoe et al. (2023)	Randomised controlled trials*	Y	Y	Y	U	NA	Y	Y	Y	Y	Y	Y	Y	Y	11/13 (84.6%) high

Note. All checklists used were designed by the Joanna Briggs Institute. *Randomised controlled trials (12 items), **Quasi-Experimental studies (9 items). Y = Yes, N = No, U = Unclear, N.a = Not applicable

Randomized Control Trial Checklist items:

1. Was true randomization used for assignment of participants to treatment groups?
2. Was allocation to treatment groups concealed?
3. Were treatment groups similar at the baseline?
4. Were participants blind to treatment assignment?
5. Were those delivering treatment blind to treatment assignment?
6. Were outcomes assessors blind to treatment assignment?
7. Were treatment groups treated identically other than the intervention of interest?
8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
9. Were participants analyzed in the groups to which they were randomized?
10. Were outcomes measured in the same way for treatment groups?
11. Were outcomes measured in a reliable way?
12. Was appropriate statistical analysis used?
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?

Quasi-Experimental Studies Checklist items:

1. Is it clear in the study what is the “cause” and what is the “effect” (i.e. there is no confusion about which variable comes first)?
2. Was there a control group?
3. Were participants included in any comparisons similar?
4. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
5. Were there multiple measurements of the outcome, both pre and post the intervention/exposure?
6. Were the outcomes of participants included in any comparisons measured in the same way?
7. Were outcomes measured in a reliable way?
8. Was follow-up complete and if not, were differences between groups in terms of their follow-up adequately described and analyzed?
9. Was appropriate statistical analysis used?