
Review

Digital Mental Health Interventions for Young People Aged 16-25 Years: Scoping Review

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Abstract

Background: Digital mental health interventions for young people offer a promising avenue for promoting mental well-being and addressing mental health issues in this population.

Objective: This scoping review aims to explore the range of digital mental health interventions available for young people aged 16-25 years, with a particular focus on digital tool types, modalities, delivery formats, target populations, and study retention rates.

Methods: The scoping review was conducted in 6 databases (PubMed, Web of Science, Scopus, MEDLINE, Cochrane Library, and PsychInfo). Studies were included if they were published from 2019 to 2024 in English, reported on a population of young people aged 16-25 years, and included validated mental health or well-being outcome measures. All types of digital interventions from promotion and prevention to treatment of mental health were included.

Results: After screening 13,306 articles, 145 articles were included in the final review. The findings reveal a diverse landscape of studies, equally focusing on the prevention and promotion of mental health and the treatment of mental ill health, most commonly using cognitive behavioral therapy (63/145, 43.4%). The most common digital tools were apps (51/135, 37.8%), web-based resources (45/135, 33.3%), and websites (19/135, 14.1%). The results highlight the over emphasis on convenience sampling (140/145, 96.6%), with participants mainly recruited from universities or colleges, and a lack of representation from marginalized groups, including lesbian, gay, bisexual, transgender, and queer youth; those from socioeconomically deprived backgrounds; and those who are neurodivergent. Moreover, the focus on anxiety and depression leaves other mental health conditions underrepresented. Retention rates ranged from 16% to 100% and averaged 66% across all studies.

Conclusions: There is a need for more research on mental health promotion and prevention measures among those aged younger than 25 years as young people are at increased risk of mental health issues. This includes exploring different intervention approaches and modalities beyond cognitive behavioral therapy and ensuring inclusivity in study populations. Standardizing intervention durations and incorporating long-term follow-up data could provide valuable insights into the efficacy and effectiveness of digital interventions. Future studies should aim for greater inclusivity, ensuring representation from marginalized groups to address the diverse mental health needs of young people effectively. By adopting these approaches, digital mental health interventions can become more accessible, engaging, and impactful for young people worldwide.

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KEYWORDS

digital mental health; youth; mHealth; mobile health; digital intervention; mental health promotion; mental health treatment; well-being; scoping review; PRISMA

Introduction

Background

In recent years, heightened attention has been directed toward mental health in young people, primarily prompted by the widespread prevalence and profound impact of various mental health conditions. The aggregate estimated prevalence of mental disorders reported for individuals aged 5 to 24 years indicates that more than 1 in 10 children and youth around the world, which equates to 293 million individuals, live with at least one diagnosable mental disorder [1]. The majority of mental disorders appear by the age of 14 years but often remain undiagnosed and untreated in adulthood [2]. The pooled incidence of mental health conditions in children and adolescents has been reported to be 13.4% globally [3], and a recent systematic review found that the incidence rates were higher in Europe at 15.5% [2]. Over the entire life course, 25% of all years lived with disability attributable to mental disorders were recorded before the age of 25 years [1]. The gravity of this matter is striking when looking at various rates of mental ill health around the world [4]. The prevalence of mental disorders varies considerably in different countries, for example, 20% in North America, 12% in Europe and Asia, and 8% in Africa [4]. Differences in gender and age are also present as males are more likely to receive a diagnosis of attention-deficit/hyperactivity disorder compared to females, while females are more likely to be diagnosed with depression compared to males, and adolescents are more susceptible than children to affective disorders and behavior disorders [5]. It is worrying that only 58% of young adults aged 18-25 years with severe mental disorders are accessing treatment [6]. Anxiety, mood disorders, such as depression, and behavioral disorders are among the most prominent contributors [7]. Since 2020, state interventions in the context of the COVID-19 pandemic, such as enforced isolation and school closure, have most certainly increased the burden on young people's well-being and increased the likelihood of acquiring mental ill health or experiencing worse mental ill health [8]. Lower health-related quality of life and higher anxiety levels are now more common than before COVID-19, particularly among people with a poor socioeconomic position, a migration background, or limited living space [9]. Despite these statistics, the global median of government health spending on mental health is less than 2%, and demand for face-to-face therapy continues to surpass capacity [10,11].

These trends highlight the urgent need for comprehensive strategies to address the complex interplay of mental health challenges using scalable solutions, as reflected in the health policies and strategy reports at both European [12] and global [13,14] levels. The evolution of mental health services to incorporate digital interventions stands out as a promising avenue for effecting positive change on a global scale. One such scalable response has focused on the use of information and

communication technology to boost capacity to support and improve young people's mental health [15].

Digital Mental Health Interventions

Digital mental health interventions (DMHIs) refer to the digital delivery of well-established psychological treatments by leveraging the use of technology, including digital devices such as computers and smartphones [16]. DMHIs can include text, video, or audio-based technology, and the most commonly used DMHI is internet-delivered cognitive behavioral therapy (CBT) [17]. Internet-delivered CBT has demonstrated high usability and acceptability [18] as well as effectiveness at reducing the symptoms of depression [19] and anxiety [20] among young people.

There are several barriers and facilitators for the use of DMHIs. From the perspective of young people, perceived facilitators include anonymity, accessibility, and prompt feedback [21]. The reported advantages of digital technologies include greater reach to geographically isolated populations, flexible access, increased convenience, fewer visits to specialist clinics, greater privacy and anonymity, enhanced treatment fidelity, rapid scalability, and low-cost delivery [22].

Barriers include lack of personalization to individual needs, fear of misdiagnosis, and issues with the effectiveness of DMHIs [23]. Previous studies have reported low adherence and high dropout rates among adolescents and young adults [24]. Human interaction has been highlighted as an important factor influencing engagement, as low adherence rates have been reported in online interventions without therapeutic guidance [25,26]. Therefore, guided interventions usually have higher engagement rates than unguided interventions [27]. In this context, blended interventions refer to the integration of digital interventions with face-to-face mental health care [28,29], and they have previously been found to be effective in improving students' mental health [30]. Nonetheless, a previous report has highlighted heterogeneity across meta-analyses in the level of detail regarding the nature of interventions, the target populations, and the type of support delivered, making it challenging to draw strong conclusions with regard to the circumstances under which human support is most effective [31].

Our Review

Many reviews have been undertaken to evaluate the wide range of digital mental health supports that are accessible, but there is a dearth of up-to-date reviews, with many published in 2021 or earlier, thus failing to consider the change in the digital world since COVID-19 [20,32-35]. Most prior systematic and scoping reviews focused on specific topics only, such as technologies (eg, apps only [36,37]), specific aspects of mental health (eg, depression and anxiety only [20,32,33,35,38] and mental health promotion only [8]), study populations (eg, university students for convenience [38,39]), and research techniques (eg, randomized controlled trials [RCTs] alone [37]). Previous

reviews [20,32,33,37-40] primarily focused on determining effectiveness rather than on assessing the implementation features of existing approaches, such as delivery formats, modalities, and retention rates, across the spectrum of interventions from promotion and prevention to early intervention and treatment, which is the focus of this review. Given that previous studies often focused on a single population type, this scoping review explored the inclusion of marginalized populations in the digital mental health support context. UNICEF defines disadvantaged, vulnerable, or marginalized adolescents as “individuals aged 10-19, who are excluded from social, economic, or educational opportunities enjoyed by other adolescents in their community due to numerous factors beyond their control” [41]. These factors include those operating at the social level (eg, economic inequality, violence, stigma, racism, and migration), family level (eg, neglect and abuse), and individual level (eg, disability and ethnicity). Examples of disadvantaged, vulnerable, or marginalized young people include immigrants, refugees, orphans, and those who belong to stigmatized indigenous, ethnic, or religious groups. They also include individuals who identify as belonging to “sexual minorities” (eg, gay, lesbian, bisexual, and queer) or “gender minorities” (eg, transgender and gender diverse), which will be referred to as lesbian, gay, bisexual, transgender, and queer (LGBTQ+) in the context of this review.

The purpose of this study is to report on a scoping review that was undertaken to investigate research findings on the range of DMHIs and supports available for a broad range of young people aged 16-25 years, with a particular focus on digital tools,

modalities, delivery formats, target populations, and retention rates.

Specific research questions are as follows:

- What are the characteristics of the studies that have been carried out involving DMHIs for young people?
- What are the characteristics of DMHIs offered to young people and to what degree are young people receiving human support in combination with digital support?
- Who are the main target populations of DMHIs for young people?
- What are the retention rates across studies involving DMHIs with young people?

Methods

Protocol

A review protocol for this study has been registered with Open Science Framework (OSF) [42]. The search process was guided by the main stages outlined in the Arksey and O'Malley framework [43]. A search of the literature was initially conducted on December 16, 2022, and updated on June 7, 2024, in the following databases: PubMed, Web of Science, Scopus, MEDLINE, Cochrane Library, and PsychInfo. The search combined terms related to 4 key concepts, including mental health, technology, young people, and interventions. The search strategy can be found in [Table 1](#), and examples of search results can be found in [Multimedia Appendix 1](#). Reporting was guided by the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) checklist ([Multimedia Appendix 2](#)).

Table 1. Search terms used to identify studies across 6 key databases.

Topic	Terms (combined together with AND statements)
Mental health	well-being OR wellbeing OR stress OR mental disorder OR mental illness OR mental health
Young people	youth* OR young* OR child* OR adolescen* OR student* OR teen*
Interventions	intervention OR promot* OR prevent* OR program* OR polic* OR implementation OR evaluation OR therap*
Technology	digital* OR mHealth OR eHealth OR web-based OR internet-based OR mobile phone OR text message OR text-based OR SMS OR app OR artificial intelligence OR tele* OR computeri*

Criteria

Articles published in English only were considered for inclusion. The selection criteria are presented in [Textbox 1](#). In the registered protocol on OSF, the original criteria stated that articles reporting on a study population of those aged 12-25 years would be included; however, this was later refined to 16-25 years. Given that there is no universal agreement on the definition of the age group of youth, populations between 16 and 25 years were selected to capture the out-of-school population of young people in the United Kingdom and Ireland as per education policies, and these ages fall within the range

for young people reported by the World Health Organization [44]. Grey literature was not included in the search strategy. Initially, the protocol on OSF stated that the search would include articles from the last 5 years, from 2017 to 2022. However, the search was updated in 2024 and thus included articles published from 2019 onwards. The search was restricted to studies published in the last 5 years (2019-2024) to ensure the review included the most relevant up to date literature, considering the rapid adoption and assessment of digital mental health technologies throughout the sector in recent years, particularly during the COVID-19 pandemic [45] and beyond.

Textbox 1. Selection criteria.**Inclusion criteria**

- Population: Young people aged 16-25 years. If the sample population included people aged >25 years or <16 years, the mean age was assessed, and studies with a mean age >16 years and <25 years were included.
- Intervention: Studies that focused on mental well-being, mental health, and mental health conditions, covering all interventions for mental health promotion and prevention, as well as treatment. The focus was on the digital intervention developed or evaluated in the study. Studies with an element of human support were still included if the main intervention component was a digital tool and human support was an adjunct to the digital intervention offered to participants. All types of digital tools were covered, including but not limited to websites, games, computer-assisted programs, chatbots, digital devices, virtual reality, and mobile text messaging.
- Comparator: Not applicable.
- Outcome: Validated pre- and postmental health/well-being outcome measures. Primary or secondary outcome related to mental health.
- Type of publication: Pilot or feasibility studies, randomized controlled trials, nonrandomized controlled trials, other types of randomized trials, longitudinal studies, and mixed methods studies. Studies published in the last 5 years (January 1, 2019, until June 7, 2024).

Exclusion criteria

- Population: Young people aged <16 years or >25 years.
- Intervention: Telemental health, telepsychiatry, teletherapy, or telepsychology, including the digital delivery of one-on-one therapy or counseling services, which are traditionally administered in person. In the context of this review, emphasis was placed on delivery or evaluation of a predefined digital mental health intervention program (such as an internet-delivered cognitive behavioral therapy course or other modality) and not on video, phone, or text-based individual counseling or therapy.
- Comparator: Not applicable.
- Outcome: Primary or secondary outcome not related to mental health.
- Type of publication: Qualitative studies, cross-sectional studies, and student theses.

Study Selection and Data Extraction

All records were imported to Covidence [46]. Duplicates automatically detected by Covidence were removed prior to screening. Title and abstract screening were conducted by 4 independent reviewers (CP, TW, CK, and AMC). During the screening, articles were sorted by title in alphabetical order to compare the title, author name, and abstract with consecutive articles to manually delete duplicates. Three reviewers (CP, TW, and CK) completed the full-text review. For both title and abstract screening and full-text review, 2 independent reviewers screened all articles. Any conflicts were discussed and resolved between these 2 reviewers to reach consensus.

One author (CP) created the data extraction template, which was later refined with 2 additional authors (TW and CK). The data extraction template included the main study characteristics (year, aim, study design, and location), participant details for experimental and control groups (age, gender identity, inclusion of marginalized young people, number of participants, where participants were recruited, method of recruitment [eg, convenience sampling], and participant type [eg, general population]), intervention details (target area, delivery [ie, digital only or blended digital and human support], blended intervention details, type of digital tool, primary and secondary outcome measures, scales used, follow-up, psychological modality used in interventions, duration, incentives, promotion/prevention or intervention, intervention name, and features), and retention details (number of those who started and completed the study). One author (CP) extracted data from all articles included in the scoping review. A second author (CK) completed data extraction for one-third of the articles, and the first author (CP) completed

a consensus template for these studies and discussed any discrepancies with the second author.

Data Analysis

Data were analyzed in R using R version 4.3.2 (R Project for Statistical Computing).

Characteristics of the Included Studies

Summaries were computed for each study, including the country of publication, research method, and year of publication. Summary statistics were calculated for the length of studies in weeks and the follow-up length for studies that included a follow-up. Studies were labeled as including a follow-up if outcome measures were collected on any date after the poststudy outcomes were obtained. If studies only recorded pre- and poststudy measures, they were marked as not recording follow-up data. Summary statistics were included for participant numbers in both the experimental and control groups, where reported. Text analysis, using the tm package [47], was performed to explore the most common primary and secondary outcomes, and to measure the most frequent outcomes for validated mental health scales. Summaries were computed for studies that included incentives versus those that did not and for the types of incentives used.

Characteristics of Interventions

To explore the characteristics of interventions, the interventions with similar or the same names were checked across studies to identify which studies reported on different aspects of the same digital intervention. A new dataset was created containing the target area for the intervention, the type of digital tool, the features of each intervention, if the intervention was digital only

or had an element of human support (blended interventions) and the type of human support (relevant for blended interventions only), and the features of each intervention, with duplicate information removed. Summaries were computed for each of those categories. For intervention features, a list of features was derived based on the intervention description in each article. For example, many articles mentioned that the intervention specifically included psychoeducational content or explained information on mental health and how to manage symptoms, which was also recorded as psychoeducation or education. Some studies referred back to a previous article, which detailed intervention features. Blended interventions were classified as those that had any degree of human support alongside the digital intervention and were categorized according to the author descriptions in the articles. A donut plot was created for the delivery of interventions (digital only or blended) across the different types of digital tools, using the *webr* package [48]. Given the high degree of overlap within blended interventions, a Venn diagram was used to illustrate the peer, clinician, and research team support offered, and an upset plot (using *UpSet R* package [49] and *ComplexUpset* [50]) was used for data visualization of the type of blended support offered.

Target Populations

Summaries were computed for target populations across studies. The primary study populations included (1) the general population, (2) those experiencing mental ill health symptoms, and (3) those having a mental health diagnosis. The general population included young people in a general sense with no specific mental health recruitment criteria. The second population most commonly had mild-to-moderate symptoms that were self-reported, but in some cases, they were based on mental health scales, which were administered to determine if participants were experiencing problems with their mental health. The third population had moderate-to-severe symptoms determined either by the participants self-reporting that they had a mental health diagnosis or by researcher-administered mental health scales, where participants received a clinically significant score indicative of a mental health diagnosis (eg, a score of 10 or higher on the Patient Health Questionnaire-9 [PHQ-9] indicated moderate-to-severe depression). Summaries were reported for the sampling approach used, and the recruitment source for participants was visualized using the *UpSet R* package [49] and *ComplexUpset* [50]. For participant age across experimental and control groups, the mean of means was calculated from the mean ages reported across all studies

that provided this information. To explore gender inclusivity, the gender proportions in each study were explored for those identifying as male, female, and LGBTQ+. Combined boxplots and violin plots were created to visualize the gender identity breakdown, using the *ggplot2* package [51]. An upset plot was created to visualize the representation of marginalized groups in study populations across articles, using the *UpSet R* package [49] and *ComplexUpset* [50]. Across the 3 main participant types, a donut plot (*webr* package [48]) was created to illustrate the breakdown of digital-only interventions versus blended human and digital support interventions. Venn diagrams were created to visualize the different psychological treatment modalities, and a grouped bar chart was created to display the proportions of the main intervention features.

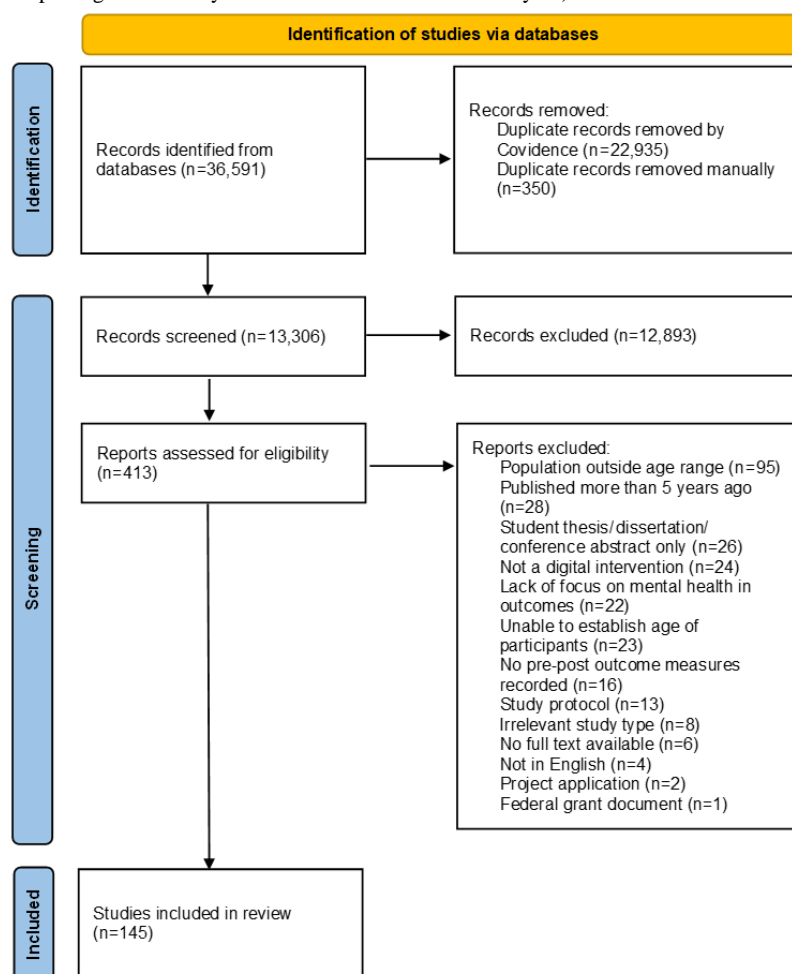
Retention Rate

There was no way to report on actual engagement with the content within interventions, as studies report this differently or not at all in most cases. Thus, the retention rate was calculated as the number of people that started the study and were allocated to receive the digital intervention divided by the number of people that completed the study, and this was converted to a percentage. For studies that included a follow-up, the number of people that completed the study was taken as the number that completed the final follow-up assessment. For studies that did not include a follow-up, the number of people that completed the study was taken as the number of people that completed the poststudy outcome assessment. Summary statistics were calculated for the retention rate overall and for different categories, including study type, delivery method, type of digital tool, study population, and incentives. Summary statistics of studies with a high retention rate ($\geq 90\%$) were also calculated in terms of the number of participants recruited, the length of the study, the follow-up measures and when they were recorded, and whether incentives were used.

Results

Included Studies

A total of 36,591 records were identified across the 6 databases that were searched; however, 23,285 articles were removed as they were identified as duplicates (Figure 1). Through abstract and full-text screening, 12,893 articles were removed, and the reasons for removal are outlined in Figure 1. Eventually, 145 articles were included in the final review (Figure 1).

Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart.

Characteristics of the Included Studies

Table 2 provides an overview of the country of origin, research methodology, and year of publication for each study. Of the 145 studies, 80 (55.2%) reported on digital tools for primary prevention or mental health promotion and the remaining 65 (44.8%) reported on digital tools for early intervention or treatment of mental ill health symptoms.

The interventions ranged from one-off single sessions with a digital tool to sessions lasting up to 26 weeks (6 months) (Multimedia Appendix 3). The most common study length was

4 weeks (Multimedia Appendix 3), and the mean study length was 6 weeks. Other prescribed intervention durations were 1-2 weeks, 1-9 weeks, 3-6 weeks, and 3-12 weeks. Two articles did not detail the study length. Less than half of the articles (63/145, 43.4%) recorded participant follow-up outside of the conventional pre-post study data. A total of 48 of these 63 studies recorded only 1 follow-up anywhere from 2 weeks after the intervention period to 52 weeks. The most common follow-up period was 12 weeks, and the mean follow-up period was 19 weeks. Ten studies followed up with participants at 2 time points (eg, at 4 and 12 weeks), and 2 studies followed up with participants at 3 time points (eg, at 8, 12, and 24 weeks).

Table 2. Study characteristics.

Characteristic	Value (N=145), n (%)	References
Country of publication		
United States of America	43 (29.7)	[52-93]
Australia	16 (11.0)	[94-109]
United Kingdom	14 (9.7)	[110-123]
China	11 (7.6)	[124-134]
Canada	11 (7.6)	[135-144]
Netherlands	7 (4.8)	[145-151]
New Zealand	6 (4.1)	[152-157]
Germany	4 (2.8)	[158-161]
Finland	3 (2.1)	[162-164]
Sweden	3 (2.1)	[19,165,166]
Austria	2 (1.4)	[167,168]
India	2 (1.4)	[169,170]
Iran	2 (1.4)	[30,171]
Italy	2 (1.4)	[172,173]
Singapore	2 (1.4)	[174,175]
Switzerland	2 (1.4)	[176,177]
Brazil	1 (0.7)	[178]
Colombia	1 (0.7)	[179]
Czech Republic	1 (0.7)	[180]
Denmark	1 (0.7)	[181]
France	1 (0.7)	[182]
Indonesia	1 (0.7)	[183]
Ireland	1 (0.7)	[184]
Japan	1 (0.7)	[185]
Latvia	1 (0.7)	[186]
Lithuania	1 (0.7)	[187]
Malaysia	1 (0.7)	[188]
Poland	1 (0.7)	[189]
Portugal	1 (0.7)	[190]
South Korea	1 (0.7)	[191]
Tunisia	1 (0.7)	[192]
United States and Canada	1 (0.7)	[193]
Research method		
Randomized controlled trial	81 (55.9)	[19,52,53,55,56,58,62-64,67,68,71,75,77,81-87,89,92-95,101,104-107,109,110,117,118,121,123-127,129,131-134,136,138-141,144,145,149,153,155,157-159,161,164,166-169,171,172,174,176-179,181,184,185,187,189,191-194]
Pilot trial	19 (13.1)	[61,65,69,73,78-80,90,96-98,100,103,108,113,115,148,156,190]
Feasibility study	16 (11.0)	[57,59,72,91,102,111,114,119,122,130,152,165,175,180,183,186]
Longitudinal study	5 (3.4)	[76,99,112,150,151]
Open trial	3 (2.1)	[54,74,154]
Quasiexperimental study	3 (2.1)	[30,163,188]

Characteristic	Value (N=145), n (%)	References
Pre-post study	2 (1.4)	[162,170]
Other study types ^a	16 (11.0)	[4,60,66,70,88,116,120,128,135,142,143,146,147,160,173,182]
Year of publication		
2019	15 (10.3)	[19,30,71,72,74,106,109,118,119,132,140,155,168,171,193]
2020	27 (18.6)	[63,67,69,70,76-78,96-100,108,111,117,120-122,139,153,162,164,166,179,180,184,191]
2021	23 (15.9)	[65,66,73,79-82,107,112,113,123,134,141,142,148,154,156,161,163,169,170,172,173]
2022	29 (20.0)	[62,68,83-85,87,88,101,114,115,124,126,130,131,133,138,143,144,149,151,157,165,174,175,182,186,187,192,194]
2023	33 (22.8)	[52,54,57,58,60,61,75,86,89-91,93-95,102,104,105,110,116,125,129,137,146,147,150,152,158,160,177,178,181,189,190]
2024 ^b	18 (12.4)	[53,55,56,59,64,92,103,127,128,135,136,159,167,176,183,185,188]

^aOther study types included: 3-staged participatory, co-design approach; evaluation study; feasibility and acceptability study; implementation-effectiveness study; microrandomized trial; mixed methods study; nonrandomized controlled trial; proof-of-concept study; quantitative study; randomized trial; randomized dismantling trial; randomized factorial trial; repeated measures within-subjects study; secondary data analysis; type 1 effectiveness-implementation randomized controlled trial; and uncontrolled trial.

^bUntil June 7, 2024.

Participant Numbers

The number of participants recruited to the experimental groups varied greatly across all studies, ranging from 8 to 2222 (mean 167, SD 303). A total of 88 (60.7%) studies included at least one control group, and the number of participants recruited in these cohorts ranged from 12 to 2355 (mean 148, SD 281).

Outcome Measures

The most common primary outcomes assessed across studies were depression (72/145, 49.7%), anxiety (62/145, 42.8%), stress (38/145, 26.2%), well-being (25/145, 17.2%), and mindfulness (11/145, 7.6%). The top secondary outcomes were anxiety (30/145, 20.7%), depression (22/145, 15.2%), well-being (12/145, 8.3%), self-efficacy (10/145, 6.9%), and attributes of mindfulness (11/145, 7.6%). The most frequently used validated mental health scales across studies to assess outcomes are shown in Table 3.

Table 3. Most frequently used mental health scales across studies.

Scale	Short name or scale variations used	Studies (N=145), n (%)
Patient Health Questionnaire	PHQ-9, PHQ-8, PHQ-4, and PHQ-2	35 (24.1)
Generalized Anxiety Disorder	GAD-7, GAD-2, and GAD-Q	24 (16.6)
Depression Anxiety Stress Scale	DASS-21	17 (11.7)
Perceived Stress Scale	PSS-10 and PSS-4	16 (11.0)
Warwick Edinburgh Mental Wellbeing Scale	WEMWBS and SWEMWBS	10 (6.9)

Incentives

Over half of the studies (80/145, 55.2%) reimbursed participants for taking part in the study or gave some type of incentive for taking part. Reimbursement typically included monetary incentives, such as a voucher or money for completing the baseline, postintervention, and follow-up measures (47/145, 32.4%); some form of course credit for those who were studying (11/145, 7.6%); a voucher, money/gift card, or course credit (11/145, 7.6%); entry into a prize draw (4/145, 2.8%); and a voucher or money and entry into a prize draw (4/145, 2.8%). Other incentives included annual app subscriptions (1/145, 0.7%), a service and data plan and phone for the intervention duration (1/145, 0.7%), and a gift card for each questionnaire completed along with free app membership (1/145, 0.7%).

Characteristics of Interventions

Ten interventions were used across more than one study, including *Calm* [71,120], *EMiCompass* [148,158], *Grow It!* [150,151], *imi* [75,85], *LifeBuoy* [94,101], *Mindfulness Virtual Community* [139,141], *Spark* [55,93], *Step-by-Step* [128,130], *Tita* [162,164], and *Whitu* [156,157]. Thus, this section of the results reports on all unique interventions (n=135) after excluding duplicate interventions.

Target Area

Most interventions were targeted at general mental well-being, depression, anxiety, or stress, or combinations of these 4 areas relating to mental health (Table 4).

Table 4. Target area for digital mental health interventions across all studies.

Target area ^a	Value (N=135), n (%)
General mental well-being	52 (38.5)
Depression	19 (14.1)
Anxiety and depression	8 (5.9)
Stress	6 (4.4)
Distress	5 (3.7)
Anxiety	4 (3.0)
LGBTQ+ ^b specific	3 (2.2)
Help-seeking	3 (2.2)
Loneliness	3 (2.2)
Anxiety, depression, and general well-being	2 (1.5)
Anxiety, depression, and stress	2 (1.5)
Anxiety, depression, and suicidal ideation	2 (1.5)
Anxiety and stress	2 (1.5)
Resilience	2 (1.5)

^aOther target areas not listed in the table: anxiety, depression, and low mood; anxiety, depression, and repeated negative thinking; anxiety, depression, social anxiety, and insomnia; childhood adversity and low self-esteem; distress and adjustment; general well-being; general well-being and substance use; mental health diagnostic and severity spectrum and stages of treatment; mental health literacy; parents have a mental illness or substance use disorder; perfectionism; psychological flexibility; posttraumatic stress disorder and complex posttraumatic stress disorder; reward responsiveness; self-efficacy; self-harm; social anxiety; social connection; stress and general well-being; suicidal ideation; suicidal ideation and insomnia; suicidal ideation, low mood, and self-harm; suicide prevention.

^bLGBTQ+: lesbian, gay, bisexual, transgender, and queer.

Types of Interventions

The most common type of digital tool was an app (51/135, 37.8%), followed by a web-based resource (45/135, 33.3%), a website (19/135, 14.1%), a chatbot (6/135, 4.4%), a virtual reality system (2/135, 1.5%), an app with a game (2/135, 1.5%), and an app with a chatbot (2/135, 1.5%). Other types included an app with a game, an app with text messaging, an app with virtual reality, an app with a wearable, email, a game, metaverse, text messaging, a website with social media, a website with text messaging, and a wearable.

Features of Interventions

Table 5 presents the features across all 135 unique digital interventions. In some cases, there were different variations of the same intervention suites, including IntelliCare (Pocket Helper, Purple Chill, and Slumber Time or IntelliCare for College Students) [72,78], MOST+ and MoST-MH [82,97], and Silvercloud (Space for Resilience/Space from COVID-19 or Space from Depression).

Table 5. Intervention features across all 135 unique digital interventions.

Feature	Value (N=135), n (%)
Psychoeducation or education	97 (71.9)
Mindfulness, breathing, or relaxation exercises	70 (51.9)
Videos	58 (43.0)
Mood logging or check-in	53 (39.3)
Audio	37 (27.4)
Photos	32 (23.7)
Messaging system or texts	29 (21.5)
Writing exercises, diaries, or journaling	26 (19.3)
Goal setting	26 (19.3)
Interactive tasks	25 (18.5)
Push notifications or reminders	25 (18.5)
Signposting to external resources	24 (17.8)
Gamification or rewards	21 (15.6)
Self-help information or monitoring	19 (14.1)
Homework exercises	18 (13.3)
Personalization or customization	18 (13.3)
Email prompts	16 (11.9)
Coping strategies	14 (10.4)
Personal or peer stories or testimonials	14 (10.4)
Ecological momentary assessment or experience sampling method	12 (8.9)
Gratitude	11 (8.1)
Feedback to users	11 (8.1)
Peer forum or interactions	10 (7.4)
Self-help plan or relapse plan	9 (6.7)
Quiz	8 (5.9)
Video conferencing	6 (4.4)
Virtual reality	4 (3.0)
General health tracking	2 (1.5)
Dot probe	2 (1.5)
Keyword triggers	2 (1.5)

Intervention Approach

Just over half of the interventions (70/135, 51.9%) used a digital-only approach, and the rest (65/135, 48.1%) used a blended approach, where participants had some degree of human support (peer, clinical, or research team support) alongside a digital intervention (Figure 2).

Of the 65 studies that used some degree of human support, the blended approach between digital and human support varied among studies and overlapped in many cases (Figure 3). The approaches were as follows: some sessions were delivered in person or via telehealth communication (18/65, 27.7%);

participants were able to speak to a professional or someone from the research team if needed (16/65, 24.6%); weekly check-ins were held with participants (12/65, 18.5%); the mental health of participants was monitored, and they were directed to professional help if needed (11/65, 16.9%); participants had peer group support (11/65, 16.9%); participants were already attending a mental health service, and the digital tool was a part of the intervention (9/65, 13.8%); the digital tool was delivered in person (3/65, 4.6%); group sessions were delivered as part of the intervention (2/65, 3.1%); coaching from a professional or a member of the research team (2/65, 3.1%); and participants received the digital intervention while on a waiting list for face-to-face services (2/65, 3.1%).

Figure 2. Delivery of interventions across different types of digital tools (N=135).

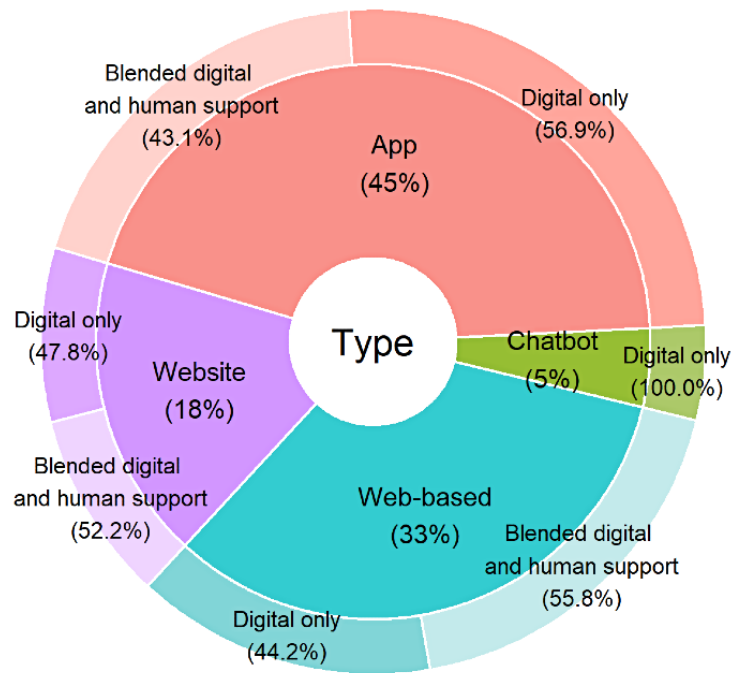
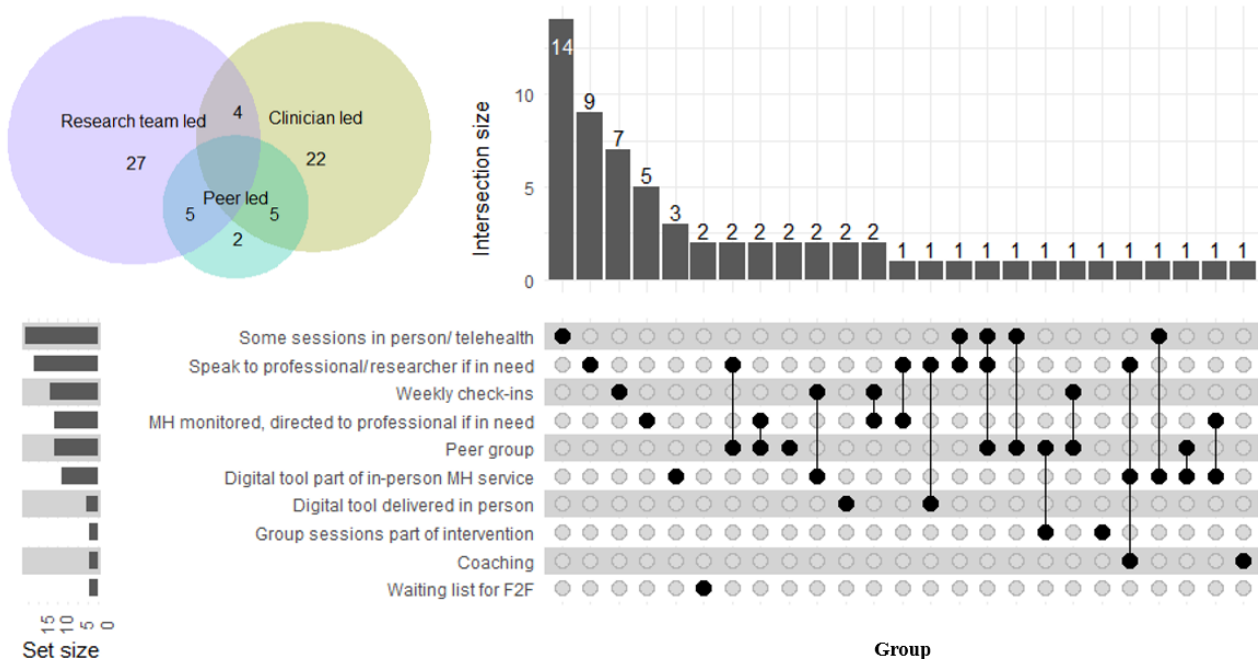


Figure 3. Types of blended interventions used across studies (N=65). Venn diagram showing overlap between peer, clinician, and research team support. Upset plot showing the degree of overlap between specific types of blended support. F2F: face-to-face; MH: mental health.



Target Populations

Recruited Populations

Less than half of the studies (63/145, 43.4%) recruited participants from the general population with no specific focus on recruiting young people experiencing mental ill health, 26.2% (38/145) recruited participants experiencing mental ill health symptoms, and 18.6% (27/145) recruited participants who had a mental health diagnosis or who met the clinical or diagnostic

criteria for a mental health diagnosis. Moreover, a small number of studies (6/145, 4.1%) included a mix of participants who were not experiencing mental health symptoms and those with a mental health diagnosis, 3.4% (5/145) recruited participants with a specific physical health diagnosis, 2.8% (4/145) recruited only an LGBTQ+ population, and 1.4% (2/145) recruited only a homeless population. Further details on the mental health conditions of those who had a mental health diagnosis or met the diagnostic criteria can be found in [Table 6](#).

Table 6. Participant information for studies that recruited individuals who had a mental health diagnosis or met the diagnostic criteria (27 studies).

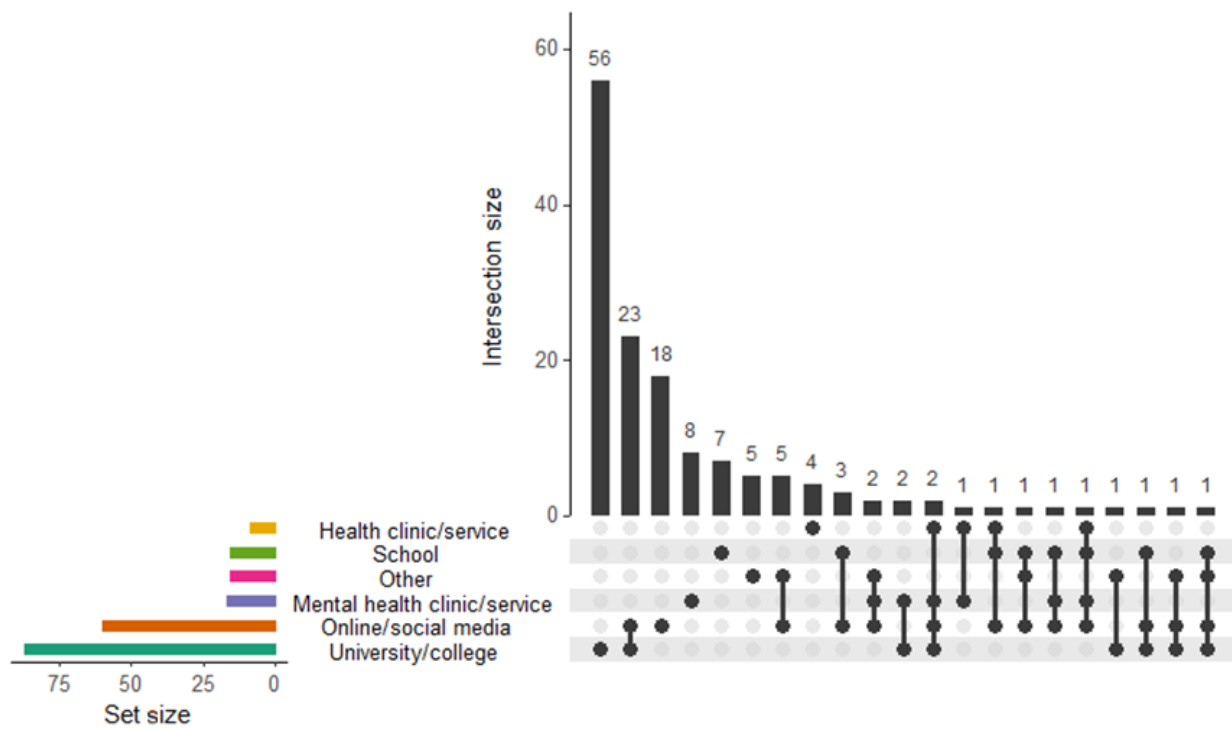
Mental health condition and details	Sample size (n) of those who started the study, mean (SD)	Percentage (%) of those who completed the study, mean (SD)	References
Depression (n=7) Depression (n=3), major depressive disorder (n=3), and young people with or at an elevated risk of depression (n=1)	43 (23)	81 (19)	[57,87,113,122,126,130,135]
Anxiety (n=5) Generalized anxiety disorder (n=3), anxiety (n=1), and social anxiety (n=1)	105 (94)	64 (24)	[52,68,132,144,169]
Depression or anxiety (n=5) Anxiety or depression (n=4) and clinical levels of depression or anxiety in the Patient Health Questionnaire-8 or Generalized Anxiety Disorder-7 (n=1)	49 (43)	78 (22)	[69,95,119,121,133]
Depression or anxiety with other co-morbidities (n=5) Major depressive disorder, reactive attachment disorder, panic disorder, attention-deficit/hyperactivity disorder, intermittent explosive disorder, borderline personality disorder, and parent-child relational problem (n=1) Depression or distress (n=1) Depression/major depressive episode and co-morbidities with generalized anxiety disorder, social anxiety disorder, panic disorder, and agoraphobia (n=1) Anxiety, depression, social anxiety, or insomnia (n=1) Depression, bipolar disorder, anxiety disorder, and psychosis (n=1)	28 (14)	82 (15)	[148] [100] [19] [76] [158]
Other (n=5) Psychotic disorder, schizophrenia, schizoaffective disorder, and schizophreniform disorder (n=1) Posttraumatic stress disorder and complex posttraumatic stress disorder (n=1) Social phobia (n=1) Psychosis and borderline personality disorder (n=1) Specific details not reported; inclusion criteria stated that only participants with a current mental health diagnosis documented in their electronic medical record or those who received mental health services within 3 months according to a self-report or a report by a parent or clinician could participate (n=1)	42 (26)	75 (19)	[108] [187] [96] [103] [82]

Sampling and Recruitment Strategies

Almost all of the studies (140/145, 96.6%) used a convenience sampling approach, while the remaining studies used a convenience sampling approach with snowballing (1/145, 0.7%), cluster randomization of schools (1/145, 0.7%), geographically

representative sampling (1/145, 0.7%), sampling representative of the depressive population (1/145, 0.7%), and random sampling (1/145, 0.7%). Participants were predominately from educational institutions, as universities were the most popular source for recruitment (87/145, 60.0%), followed by online or social media (60/145, 41.4%) (Figure 4).

Figure 4. Participant recruitment sources across all studies (N=145).



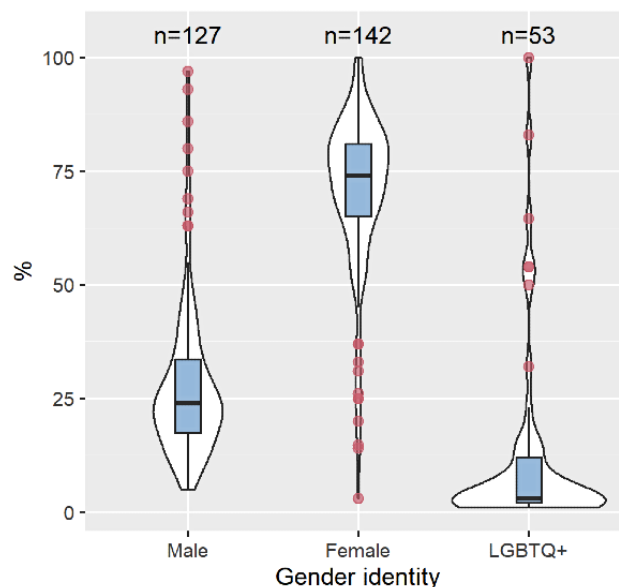
Age and Gender Identity

The overall mean age of participants in the experimental groups from all studies that reported this variable (n=133) was 20.8 years. A total of 12 studies did not mention the specific ages of their populations, however the age range of the experimental groups was 16-25 years. The overall mean age of participants in the control groups from all studies that reported this variable (n=82) was 20.8 years. A total of 6 studies only reported the age range.

Females were largely overrepresented within the study groups, making up 71% of study populations on average across 142

studies, while males on average made up 28% of study populations across 127 studies (Figure 5). Three studies included an entirely female population [70,166,171]. Gender was not reported equally across studies, as 15 studies did not include or report the gender breakdown of male participants and 3 did not include or report the gender breakdown of female participants. Only 53 (36.6%) studies included individuals identified as LGBTQ+ (Figure 5), with the highest representation from transgender and nonbinary individuals. In these studies, LGBTQ+ participants represented 1% to 100% of the study population (mean 13%, SD 22%). As mentioned in Table 4, 3 interventions were specifically targeted at improving the mental health of those who identified as LGBTQ+.

Figure 5. Gender split in experimental groups across all studies (N=145). LGBTQ+: lesbian, gay, bisexual, transgender, and queer.

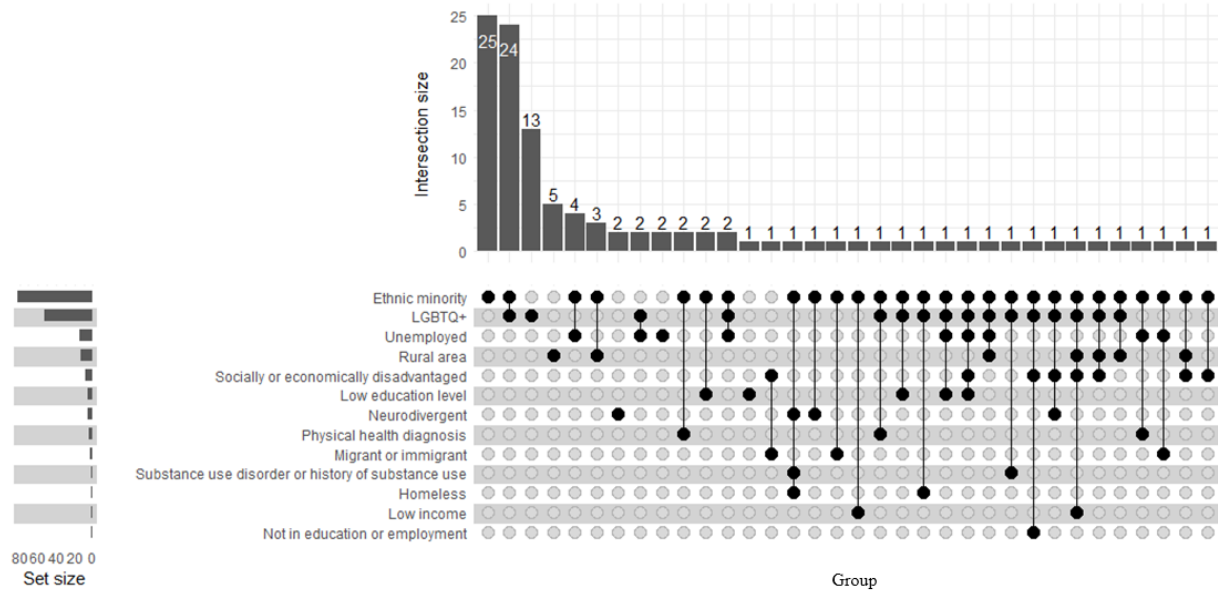


Marginalized Groups

Three-quarters (108/145, 74.5%) of all studies included marginalized groups in their study populations (Figure 6). Minority ethnic groups were most frequently represented, with 82 (56.6%) studies including participants from a variety of ethnic groups (Figure 6). LGBTQ+ young people were the second most represented group (53/145, 36.6%) (Figure 6). Only a very small proportion of studies had other groups,

including those who were unemployed (15/145, 10.3%), were living in a rural area (13/145, 9.0%), were socially or economically disadvantaged (8/145, 5.5%), had a low education level (6/145, 4.1%), were neurodivergent (5/145, 3.4%), were living with a physical health condition (4/145, 2.8%), were migrants or immigrants (3/145, 2.1%), had a low income (2/145, 1.4%), were homeless (2/145, 1.4%), had current or previous substance use issues (2/145, 1.4%), and were not educated or employed (1/145, 0.7%).

Figure 6. Marginalized groups represented across all studies (N=145). LGBTQ+: lesbian, gay, bisexual, transgender, and queer.

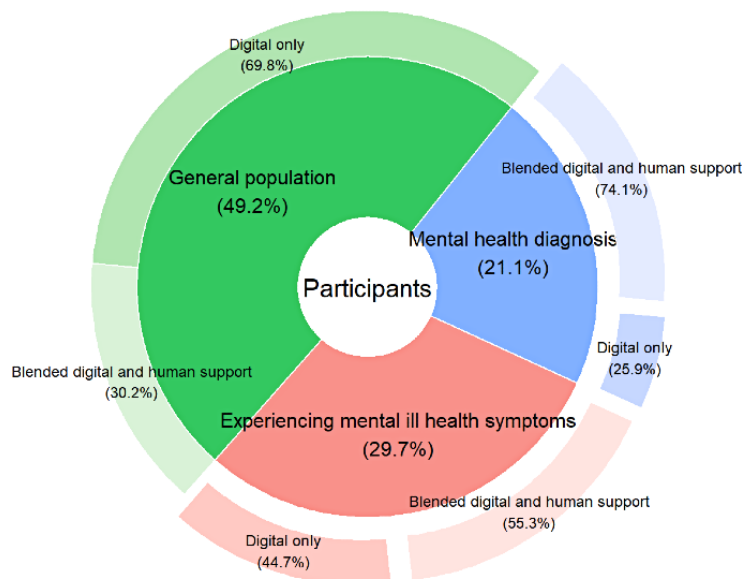


Intervention Approach Across Main Populations

Most studies using interventions targeted at the general population (n=63) adopted a digital-only approach (70%), whereas studies that recruited people experiencing mental ill health symptoms (n=38) had a higher percentage of blended support (54%) and those that recruited people with a mental health diagnosis (n=27) had the highest proportion of blended

human and digital support (74%) (Figure 7). The type of blended approach varied across study populations, with researcher team support being the most common approach in the general population (12/19, 63.2%). In study populations of those with mental ill health symptoms, research team (9/21, 42.9%) and clinician support (9/21, 42.9%) were equally used. For those with a mental health diagnosis, clinician support was the most common (14/20, 70.0%).

Figure 7. Breakdown of digital-only support versus blended human and digital support.

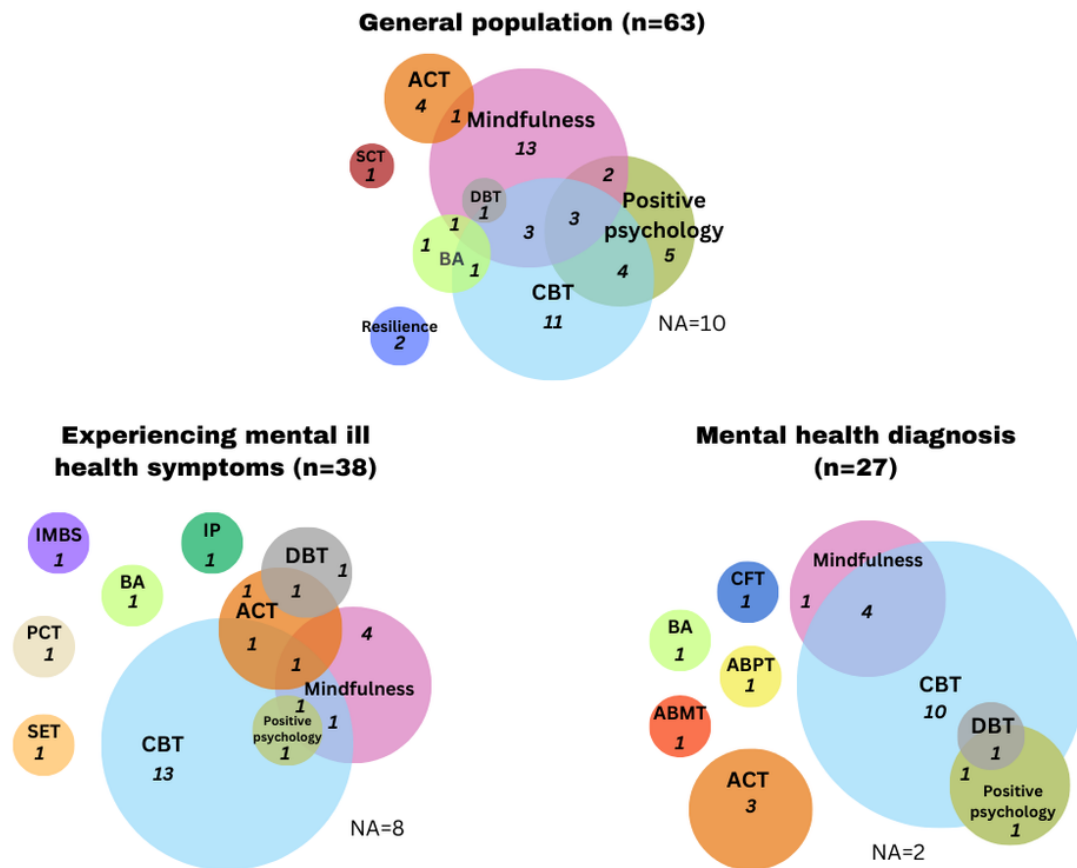


Modalities

Many of the interventions reported in the studies used multiple treatment modalities, and these differed depending on the population group (Figure 8). The most common modality was CBT, which was used in interventions across 63 (43.4%) studies, with 39 (26.9%) using CBT alone and 24 (16.6%) using CBT in combination with another modality. The second most common

treatment modality was mindfulness, which was used in interventions across 40 (27.6%) studies, with 21 (14.5%) using mindfulness alone and 19 (13.1%) using mindfulness in combination with another treatment modality. The third most popular type was positive psychology, which was used in 21 (14.5%) studies, with 7 (4.8%) using positive psychology as the sole modality and 14 (9.7%) using it in combination with another treatment modality.

Figure 8. Treatment modalities used in digital mental health interventions across main participant groups. ABMT: attention bias modification training; ABPT: affect-based psychodynamic therapy; ACT: acceptance and commitment therapy; BA: behavioral activation; CBT: cognitive behavioral therapy; CFT: compassion-focused therapy; DBT: dialectical behavior therapy; IMBS: information-motivation-behavioral skills; IP: interpersonal psychotherapy; NA: not applicable; PCT: perceptual control theory; SCT: social cognitive theory; SET: self-efficacy training.



Intervention Features

In studies that recruited participants from the general population (n=63), the most common features used in digital interventions were psychoeducation or education (44/63, 70%), mindfulness or breathing exercises (37/63, 59%), and mood logging (20/63, 32%) (Figure 9).

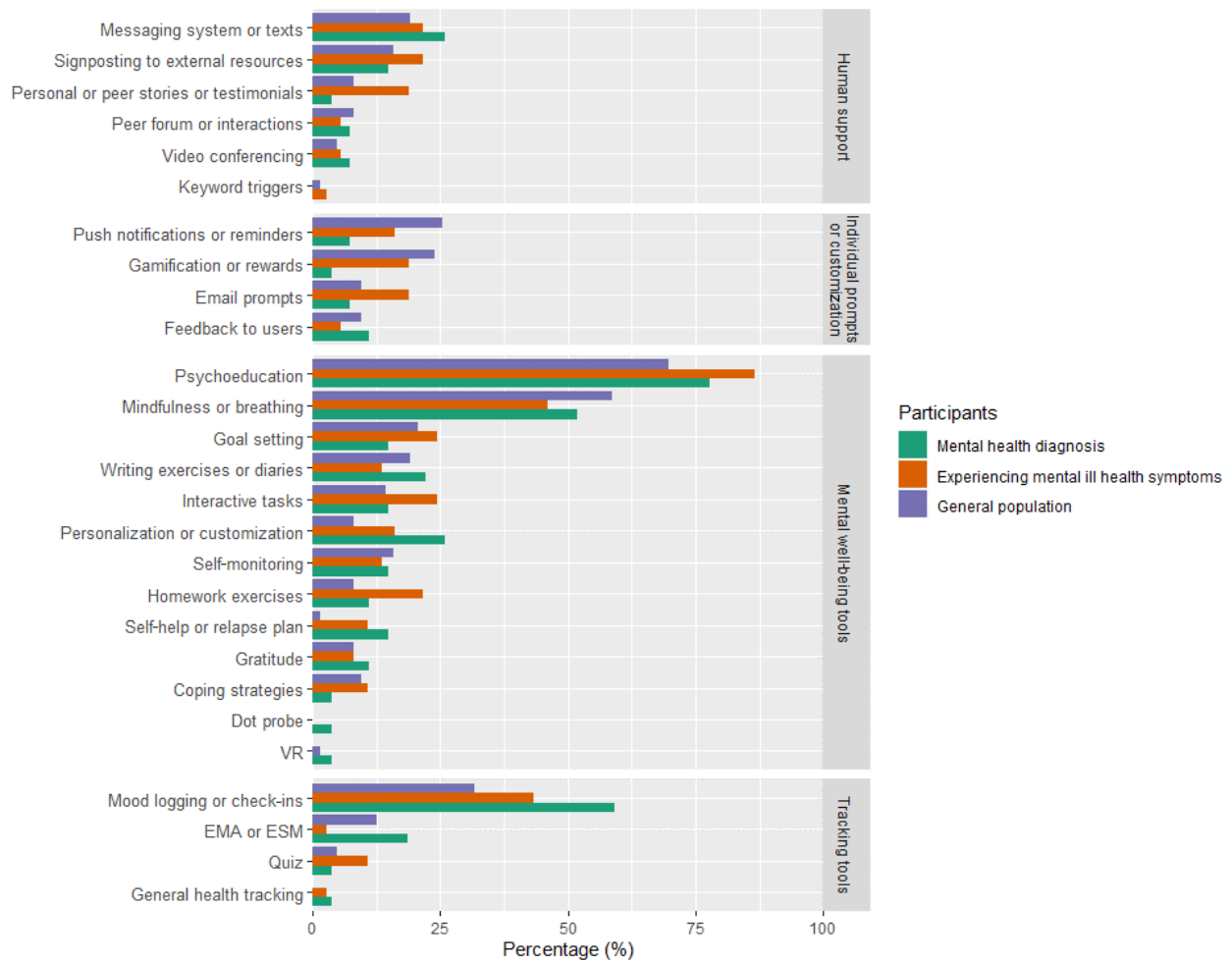
In studies that recruited people experiencing mental ill health symptoms (n=38), the top features in digital interventions were the same, including psychoeducation or education (32/38, 86%), mindfulness or breathing exercises (17/38, 45%), and mood logging (16/38, 43%) (Figure 9).

In studies that recruited people with a mental health diagnosis or those who met diagnostic criteria (n=27), the most common features in digital interventions were psychoeducation or

education (21/27, 78%); mood logging, check-in, or self-monitoring of symptoms (16/27, 59%); and mindfulness or breathing exercises (5/27, 25%) (Figure 9).

Personalization or customization was a more common feature in interventions for people experiencing mental ill health symptoms (6/38, 16%) or those with a mental health diagnosis (7/27, 26%) compared to the general population (5/63, 8%) (Figure 9). Self-help plans or relapse plans were used more commonly in people experiencing mental ill health symptoms (4/38, 10%) or those with a mental health diagnosis (4/27, 15%) compared to the general population (1/63, 1%) (Figure 9). Gamification or reward incentives were used more often in interventions for the general population (15/63, 24%) and for people experiencing mental ill health symptoms (7/37, 19%) compared to interventions for those with a mental health diagnosis (1/27, 4%) (Figure 9).

Figure 9. Intervention features across most common populations. EMA: ecological momentary assessment; ESM: experience sampling method; VR: virtual reality.



Retention

Retention rates ranged from 16% to 100%, with a mean retention rate of 66% (SD 23%) across all studies. [Table 7](#) highlights the

retention rate across study type, delivery, type of digital tool, study population, and incentive versus no incentive.

Table 7. Retention rates across study characteristics.

Characteristic	Participants (n) who started the study		Participants (%) who completed the study	
	Range	Mean (SD)	Range	Mean (SD)
Study type				
Randomized controlled trial (n=81)	8-2222	177 (305)	16-100	70 (22)
Pilot study (n=19)	8-630	69 (140)	24-100	79 (22)
Feasibility study (n=16)	10-692	77 (167)	19-100	66 (24)
Delivery				
Digital only (n=77)	8-2327	189 (370)	19-100	69 (23)
Digital intervention with human support (n=68)	8-2222	165 (319)	16-100	71 (23)
Type of digital tool				
App (n=58)	10-2222	121 (294)	33-100	76 (18)
Web-based (n=43)	10-810	176 (207)	19-100	64 (24)
Website (n=23)	12-1982	258 (436)	16-100	57 (25)
Study population				
General population (n=63)	10-2327	263 (444)	19-100	68 (23)
Experiencing mental ill health symptoms (n=38)	8-1982	166 (328)	16-100	64 (22)
Mental health diagnosis (n=27)	11-280	53 (56)	32-100	76 (22)
Incentive				
No incentive given (n=65)	8-2222	193 (382)	16-100	65 (24)
Any incentive given (n=80)	8-2327	166 (318)	24-100	73 (21)

Studies With High Retention Rates

A total of 36 studies had very high retention rates of 90%-100% [57,61,66,67,69,73,75,77-79,82,84,85,88,95,100,103,107,114,124-126,131-133,135,141,155,160,163,167,172,175,176,185,190]. These studies recruited between 8 and 222 participants (mean 60, SD 52). The approach ranged from a single, one-off session to a 24-week trial period, with an average length of 6 weeks. Only 10 of these 36 studies recorded any follow-up measures, anywhere from 2 weeks after the study up to 12 weeks, with an average follow-up duration of 8.5 weeks. Approximately two-thirds (22/36, 61%) of these studies gave participants some form of reimbursement, such as financial incentives or course credits for students, for completing the study.

Discussion

Principal Findings

This study sought to investigate the literature on DMHIs for young people aged 16-25 years in order to assess (1) the characteristics of studies, (2) the characteristics of DMHIs offered to young people and the level of human support in combination with digital mental health, (3) the target populations of DMHIs for young people, and (4) the retention rates across studies involving DMHIs for young people.

Studies were spread out globally, mostly originating from the United States of America (43/145, 29.7%), Australia (16/145, 11.0%), and the United Kingdom (14/145, 9.7%). There was a range of study types (mostly RCTs: 81/145, 55.9%), and the majority of studies had a control group (88/145, 60.7%). Just

under half of the studies (65/145, 44.8%) focused on treatment, and the rest (80/145, 55.2%) focused on mental health promotion or prevention of mental health problems. The mean prescribed length of using an intervention was 6 weeks, and 43.4% (63/145) of studies recorded follow-up data after the intervention period, most commonly at 12 weeks. Participant numbers varied greatly across studies from 8 to 2222, with a mean of 167 but with a large SD of 303. Over half of the studies (80/145, 55.2%) provided reimbursements for study participation, and these were mostly in the form of financial incentives.

Interventions mostly targeted general mental well-being, depression, anxiety, or stress. Apps (51/135, 37.8%), web-based resources (45/135, 33.3%), and websites (19/135, 14.1%) were the most popular digital tools. Psychoeducational content (97/135, 71.9%) and mindfulness or breathing exercises (70/135, 51.9%) were most common across digital interventions. Moreover, 48.1% (65/135) of interventions involved a blended approach combining human support with a digital intervention, while 51.9% (70/135) involved a digital-only approach.

The largest group of participants across studies included young people from the general population without reported mental health issues (63/145, 43.4%). The next most common group included those experiencing mental ill health symptoms (38/145, 26.2%), followed by those with a mental health diagnosis or meeting diagnostic criteria (27/145, 18.6%). Among those diagnosed, most had anxiety or depression; 5 studies included participants with depression or anxiety along with other co-morbid mental health conditions and 5 studies included participants with other mental health conditions. Convenience

sampling was prevalent (140/145, 96.6%), with universities and colleges being the primary recruitment location. Three-quarters of the studies (108/145, 74.5%) included young people from marginalized groups. Digital-only approaches were common for the general population, while blended human-digital support was more often used for those with mental ill health symptoms or a mental health diagnosis. CBT, positive psychology, and mindfulness were the most popular approaches in interventions for the general population, whereas digital interventions for mental health symptoms or diagnosis often used CBT or other specific therapeutic modalities. Gamification or reward incentives were more prevalent in interventions for the general population (15/63, 24%) and populations experiencing mental health symptoms (7/37, 19%) and less prevalent in interventions for individuals with mental health diagnoses (1/27, 4%). The mean age of participants was 20.8 years across all studies. Females were largely overrepresented (71% of study populations), while males typically constituted 30% of study populations. Only 36.6% (53/145) of studies included LGBTQ+ participants, including transgender and nonbinary individuals. In these studies, LGBTQ+ representation averaged 13%.

The average retention rate across all studies was 66% (SD 23%). Retention rates were higher than the mean for pilot studies (mean 79%), apps (mean 76%), studies that recruited participants with a mental health diagnosis (mean 76%), and studies that offered any type of incentive (mean 73%).

Limitations

In this review, some information was missing during data extraction as indicated in the results. For example, 12 studies reported age ranges instead of average age, but most data were largely reported. As a scoping review methodology was employed, a risk of bias assessment or an assessment of the efficacy or effectiveness of DMHIs was not conducted. As a quality assessment was not conducted, the interpretation of findings regarding retention rates might be affected. In particular, 44% of studies were not RCTs, which are considered the gold standard in research for evaluating effectiveness. Therefore, the finding that retention rates for pilot studies were higher (79% on average) than those for RCTs (70% on average) should be interpreted with caution. Given the heterogeneity of DMHIs included in this study, a systematic review and meta-analysis was not feasible, and thus, it was not possible to assess effectiveness. However, future work could focus on specific areas, for example, apps for specific cohorts of young people, to assess effectiveness. Despite these limitations, this scoping review provides extensive insights into the current landscape of DMHIs for young people, ranging from mental health promotion and primary prevention to more targeted treatment interventions, and indicates useful areas for future research.

Comparison With Prior Work

While roughly half of the studies included in this review focused on the treatment of common mental health problems, future work could direct more resources toward promotion and prevention measures to halt the escalation of mental ill health. The period between 18 and 25 years of age represents a transitional phase marked by increased exposure to risk factors

like instability, employment search, identity exploration, and heightened self-focus, elevating the risk of mental health conditions [195]. Thus, for young people, it is important to focus on mental health promotion and prevention strategies, which include universal, whole population approaches irrespective of current mental health status; selective approaches for specific risk factors; indicated approaches that focus on early subclinical symptoms; and tertiary approaches that target specific mental health conditions [196]. A recent meta-analysis found that the use of digital mental health promotion tools among youth aged between 11 and 18 years resulted in small significant improvements in general well-being and small-to-medium significant improvements in anxiety [8]. The current literature indicates that universal approaches used within psychological or psychoeducational interventions may improve symptoms of anxiety but may not prevent depressive or anxiety disorders [197]. Further research into digital mental health promotion for young people would be beneficial to strengthen these findings, given the heterogeneity of studies in this area.

Psychoeducational content and mindfulness or breathing exercises were most commonly used across interventions for all populations, and throughout the studies, there was a major focus on CBT and mindfulness-based approaches. Although CBT is considered the gold standard for treatment, as a previous systematic review and meta-analysis found that digitally delivered CBT interventions had greater effect sizes compared to other modalities [198], future interventions could use a broader spectrum of therapeutic models. Acceptance and commitment therapy, which is another type of third-wave cognitive treatment, was used in a small proportion of studies, and it has been previously demonstrated to be effective in enhancing and sustaining mental health outcomes across various demographics; however, evidence of the clinical significance of these effects is lacking [199]. Given the scarcity of research, a future direction could be to run large-scale trials to determine the effectiveness of other therapeutic modalities outside of CBT or combined approaches, particularly in the digital mental health context. In addition to these therapeutic modalities, there is limited research on theoretical models informing DMHIs, particularly for young people. A commentary paper provided a conceptual overview of how established behavior theories and models, such as Health Belief Model, Theory of Planned Behavior, Transtheoretical Model, and Social Cognitive Theory, can inform the development of a digital intervention for individuals with mental ill health [200]. Naslund et al [200] suggested that individual characteristics should inform intervention design and shape the content, while theory should inform strategies to support behavior change, which can be modified in real-time based on user feedback, and that theory can also guide outcomes to inform behavior mechanisms and intervention modifications. In 2020, the World Health Organization published a framework for planning, developing, and implementing youth-centered DMHIs, which mentions developing a theory-driven approach but does not provide explicit details on how to approach this using psychological theory [201]. Further research is needed on how these theoretical approaches can be adapted for digital delivery and their appropriateness for young people.

One of the most prominent results was the exclusion of more marginalized groups outside of ethnic minorities. However, there may be underreporting of the inclusion of marginalized groups as studies may not always capture this information when collecting participant demographic information. Based on the data used in this review, there was a lack of gender diversity and lack of representation from certain populations, including young people who were unemployed, were living in a rural area, were socially or economically disadvantaged, had a low education level, were neurodivergent, were living with a physical health condition, were migrants or immigrants, had a low income, were homeless, were experiencing current or previous substance use issues, and were not educated or employed. These groups are often excluded from digital mental health studies, as convenience sampling is most often used, with participants most commonly being recruited through universities or colleges. In particular, LGBTQ+ young people often experience victimization and have poorer mental health and higher rates of self-harm and suicidal ideation compared to their cisgender and heterosexual peers [202,203]. Looking more broadly across the whole population in a UK mental health service, a recent study highlighted that certain vulnerable groups, including ethnic minorities, individuals with disabilities, those born outside of the UK, and those with lower academic attainment, were underrepresented in psychological therapies at the national level [204]. Other previous work also identified that more research is needed on preventative DMHIs in young people having poor or underserved backgrounds [205]. It is clear that future work in this area should aim to be more inclusive, with representation from marginalized and vulnerable young people.

In addition, there was a lack of inclusion of a range of mental health conditions outside of anxiety and depression, given that only 5 studies focused solely on study populations of people with diagnoses that did not include anxiety or depression. Previous systematic reviews on digital interventions for young people with anxiety and depression have found small to medium effect sizes when comparing digital interventions, most commonly using CBT modalities, with interventions used in a control group [32,33]. In addition, studies targeting those with mental health diagnoses were relatively underpowered, with sample sizes falling short of the previously reported median of 106 participants in efficacy and effectiveness trials [206].

The average prescribed length of using an intervention was 6 weeks, but there were large variations from a single one-off session to a use period of 6 months, and only 43.4% (63/145) of studies recorded follow-up data after the intervention period at different time points. Compared to traditional therapy, there are no consistent prescribed lengths for DMHIs. Depending on the type of DMHI being delivered, future work could explore intervention lengths akin to that prescribed by psychological therapy services. For example, in the UK, the National Health

Service provides “NHS Talking Therapies,” formerly known as Improving Access to Psychological Therapies, which follows a stepped care model. Within this model, individuals experiencing mild-to-moderate mental ill health symptoms (step 2) would receive low-intensity treatment, which could be up to 6 sessions with a mental health professional. There was also a lack of long-term follow-up data in over half of the studies, which would make it difficult to track sustained changes in mental health over time. Future work should look at standardizing the length of treatment within DMHIs and including long-term follow-up data to help determine the efficacy or effectiveness of digital tools compared to traditional face-to-face mental health support.

The average retention rate across all studies was 66%, which falls slightly short of the weighted average of 69% reported for the retention of internet-based mental health interventions [207]. In comparison to other studies in this field, 74.8% of young people aged 11-18 years completed mental health promotion interventions with a digital component [8] and 80% of children and young people used digital health interventions or completed follow-up measures [21]. The average rate identified in this study is also comparable with that in other studies on youth mental health interventions generally that did not involve a digital component. For example, a study that examined interventions for young people at risk of psychosis reported a pooled retention rate of 66% [208]. For long-term clinical studies, a rate of 80% or higher is considered acceptable or high completion [209], so there is still room for improvement. Sustaining engagement with DMHIs in real-world settings outside of RCTs is even more challenging, as highlighted by Fleming et al [210], and only 0.5% to 28.7% of users from the general population completed or continually used self-help interventions for anxiety and depression. Some previous strategies have been identified to recruit young people and keep them engaged in longitudinal health research, such as recruitment through social media, including financial incentives for taking part, joining with peer groups, and incorporating data collection that is user friendly and flexible, and young people also emphasized the importance of social connection with both peers and the research team [211]. Another study that examined barriers and facilitators to engagement with digital health interventions among those aged 2-25 years found that children and young people preferred digital health interventions with features such as videos, limited text, personalization, ability to connect with others, and options to receive text message reminders [21]. An important area for future work will be to identify or incorporate better strategies to improve engagement and completion, particularly for marginalized populations. The main recommendations for the field based on key findings in this review can be found in Table 8, which include general recommendations for future research, as well as relevant findings for clinicians, technology developers, and policy makers.

Table 8. Recommendations for future work based on key findings in this review.

Recommendation	Key findings
General recommendations for future research	
Expand research in underrepresented regions: More research is needed in low- and middle-income countries to ensure digital mental health interventions are accessible and culturally relevant across diverse global populations.	The majority of studies were conducted in high-income countries, particularly the United States, Australia, and the United Kingdom.
Enhance study design and follow-up assessments: Future research should incorporate multiple follow-up assessments to evaluate the sustained impact of interventions beyond the intervention period.	Over half of the studies were randomized controlled trials, but few studies included long-term follow-ups.
Improve diversity and inclusion in participant recruitment: Efforts should be made to recruit participants from more diverse backgrounds, including ethnic minorities, low-income populations, neurodivergent individuals, and those living in rural areas. Additional demographic information should be recorded to confirm inclusion.	Most studies relied on convenience sampling from universities and online platforms, limiting representation.
Address gender imbalance in study samples: Aim for a more balanced gender distribution to understand the effectiveness of digital interventions across all genders.	Females were largely overrepresented in study populations (71% on average), and LGBTQ+ ^a young people were only included in 37% of studies overall.
Recommendations for clinicians	
Increase focus on blended human-digital approaches: Blended approaches, particularly for individuals with mental health diagnoses, could be prioritized to improve engagement and outcomes.	While 52% of interventions were fully digital, nearly half (48%) included some form of human support.
Standardize and validate outcome measures: Greater consistency in validated measures is needed to assess intervention effectiveness reliably.	Studies used a variety of mental health scales, making it difficult to compare results.
Tailor digital interventions to specific mental health needs: More targeted interventions should be developed to support individuals with severe or complex mental health conditions outside of anxiety and depression.	While general mental well-being was the most common target along with anxiety, depression, and stress, specific conditions, such as posttraumatic stress disorder and psychosis, were underrepresented.
Recommendations for technology developers	
Encourage multicomponent interventions: Combining multiple elements, such as interactive tasks, gamification, and peer support, may enhance engagement.	The most common intervention features were psychoeducation, mindfulness, and mood tracking.
Leverage emerging technologies for mental health: Future research could explore the potential of advanced technologies to enhance engagement and personalization.	Apps and web-based resources were the dominant modalities, with minimal use of virtual reality, chatbots, or artificial intelligence-driven interventions.
Recommendations for policy makers	
Increase accessibility and affordability: Future interventions could focus on cost-effective solutions that remain accessible without financial incentives.	Over half of the studies provided financial incentives, which may not be sustainable in real-world implementation.
Promote implementation in real-world settings: Future research should explore how digital tools can be integrated into health care systems, schools, and workplaces for broader reach and long-term sustainability.	Many interventions were tested in research environments but lacked real-world application.

^aLGBTQ+: lesbian, gay, bisexual, transgender, and queer.

Conclusions

This scoping review has provided a comprehensive overview of DMHIs for young people aged 16-25 years. It has highlighted the global spread of studies, focusing on the treatment, prevention, and promotion of mental health. The scoping review sheds light on the need for greater inclusivity in research, given the high proportion of females who are often recruited from universities through convenience sampling. The review also

highlights a lack of representation from marginalized groups and emphasizes the importance of long-term follow-up data to assess the efficacy and effectiveness of these interventions. Additionally, the review highlights challenges in sustaining engagement and completion, particularly outside of controlled trials, and suggests the importance of incorporating better engagement strategies, especially for marginalized populations. Overall, this review calls for a more inclusive and comprehensive approach to DMHIs for young people.

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Data Availability

The dataset containing data extracted from the studies included in this review can be found in [Multimedia Appendix 4](#).

Conflicts of Interest

None declared.

Multimedia Appendix 1

Total number of results returned after searching 6 databases.

[\[DOCX File , 490 KB-Multimedia Appendix 1\]](#)

Multimedia Appendix 2

PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) checklist.

[\[PDF File \(Adobe PDF File\), 84 KB-Multimedia Appendix 2\]](#)

Multimedia Appendix 3

Intervention duration across studies. The red line indicates the mean study duration.

[\[PNG File , 5 KB-Multimedia Appendix 3\]](#)

Multimedia Appendix 4

Data extracted from all 145 studies.

[\[XLSX File \(Microsoft Excel File\), 120 KB-Multimedia Appendix 4\]](#)

References

1. Kieling C, Buchweitz C, Caye A, Silvani J, Ameis SH, Brunoni AR, et al. Worldwide prevalence and disability from mental disorders across childhood and adolescence: evidence from the global burden of disease study. *JAMA Psychiatry*. Apr 01, 2024;81(4):347-356. [doi: [10.1001/jamapsychiatry.2023.5051](https://doi.org/10.1001/jamapsychiatry.2023.5051)] [Medline: [38294785](https://pubmed.ncbi.nlm.nih.gov/38294785/)]
2. Sacco R, Camilleri N, Eberhardt J, Umla-Runge K, Newbury-Birch D. A systematic review and meta-analysis on the prevalence of mental disorders among children and adolescents in Europe. *Eur Child Adolesc Psychiatry*. Sep 2024;33(9):2877-2894. [FREE Full text] [doi: [10.1007/s00787-022-02131-2](https://doi.org/10.1007/s00787-022-02131-2)] [Medline: [36581685](https://pubmed.ncbi.nlm.nih.gov/36581685/)]
3. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *J Child Psychol Psychiatry*. Mar 2015;56(3):345-365. [doi: [10.1111/jcpp.12381](https://doi.org/10.1111/jcpp.12381)] [Medline: [25649325](https://pubmed.ncbi.nlm.nih.gov/25649325/)]
4. Wang S, Li Q, Lu J, Ran H, Che Y, Fang D, et al. Treatment rates for mental disorders among children and adolescents: a systematic review and meta-analysis. *JAMA Netw Open*. Oct 02, 2023;6(10):e2338174. [FREE Full text] [doi: [10.1001/jamanetworkopen.2023.38174](https://doi.org/10.1001/jamanetworkopen.2023.38174)] [Medline: [37851443](https://pubmed.ncbi.nlm.nih.gov/37851443/)]
5. Park JH, Bang YR, Kim CK. Sex and age differences in psychiatric disorders among children and adolescents: high-risk students study. *Psychiatry Investig*. Jul 2014;11(3):251-257. [FREE Full text] [doi: [10.4306/pi.2014.11.3.251](https://doi.org/10.4306/pi.2014.11.3.251)] [Medline: [25110497](https://pubmed.ncbi.nlm.nih.gov/25110497/)]
6. Key substance use and mental health indicators in the United States: Results from the 2021 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration. 2022. URL: <https://www.samhsa.gov/data/sites/default/files/reports/rpt39443/2021NSDUHFFRRev010323.pdf> [accessed 2025-04-26]
7. Merikangas KR, He J, Burstein M, Swanson SA, Avenevoli S, Cui L, et al. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication--Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. Oct 2010;49(10):980-989. [FREE Full text] [doi: [10.1016/j.jaac.2010.05.017](https://doi.org/10.1016/j.jaac.2010.05.017)] [Medline: [20855043](https://pubmed.ncbi.nlm.nih.gov/20855043/)]
8. Wright M, Reitegger F, Cela H, Papst A, Gasteiger-Klicpera B. Interventions with digital tools for mental health promotion among 11-18 year olds: a systematic review and meta-analysis. *J Youth Adolesc*. Apr 2023;52(4):754-779. [FREE Full text] [doi: [10.1007/s10964-023-01735-4](https://doi.org/10.1007/s10964-023-01735-4)] [Medline: [36754917](https://pubmed.ncbi.nlm.nih.gov/36754917/)]
9. Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *Eur Child Adolesc Psychiatry*. Jun 2022;31(6):879-889. [FREE Full text] [doi: [10.1007/s00787-021-01726-5](https://doi.org/10.1007/s00787-021-01726-5)] [Medline: [33492480](https://pubmed.ncbi.nlm.nih.gov/33492480/)]

10. Fonagy P, Pugh K, O'Herlihy A. The Children and Young People's Improving Access to Psychological Therapies (CYP IAPT) Programme in England. In: Skuse D, Bruce H, Dowdney L, editors. *Child Psychology and Psychiatry: Frameworks for Clinical Training and Practice*. Hoboken, NJ. John Wiley & Sons; 2017:429-435.
11. World Mental Health Report: Transforming mental health for all. World Health Organization. URL: <https://www.who.int/teams/mental-health-and-substance-use/world-mental-health-report> [accessed 2025-04-26]
12. WHO European framework for action on mental health 2021–2025. World Health Organization. URL: <https://www.who.int/europe/publications/i/item/9789289057813> [accessed 2025-04-26]
13. The State of the World's Children 2021 On My Mind: Promoting, protecting and caring for children's mental health. UNICEF. URL: <https://www.unicef.org/reports/state-worlds-children-2021> [accessed 2025-04-26]
14. Comprehensive Mental Health Action Plan 2013-2030. World Health Organization. URL: <https://www.who.int/publications/i/item/9789240031029> [accessed 2025-04-26]
15. Hollis C, Falconer CJ, Martin JL, Whittington C, Stockton S, Glazebrook C, et al. Annual Research Review: Digital health interventions for children and young people with mental health problems - a systematic and meta-review. *J Child Psychol Psychiatry*. Apr 2017;58(4):474-503. [FREE Full text] [doi: [10.1111/jcpp.12663](https://doi.org/10.1111/jcpp.12663)] [Medline: [27943285](https://pubmed.ncbi.nlm.nih.gov/27943285/)]
16. Gan DZQ, McGillivray L, Han J, Christensen H, Torok M. Effect of engagement with digital interventions on mental health outcomes: a systematic review and meta-analysis. *Front Digit Health*. 2021;3:764079. [FREE Full text] [doi: [10.3389/fdgth.2021.764079](https://doi.org/10.3389/fdgth.2021.764079)] [Medline: [34806079](https://pubmed.ncbi.nlm.nih.gov/34806079/)]
17. Balcombe L, De Leo D. Evaluation of the use of digital mental health platforms and interventions: scoping review. *Int J Environ Res Public Health*. Dec 26, 2022;20(1):362. [FREE Full text] [doi: [10.3390/ijerph20010362](https://doi.org/10.3390/ijerph20010362)] [Medline: [36612685](https://pubmed.ncbi.nlm.nih.gov/36612685/)]
18. Palacios JE, Richards D, Palmer R, Coudray C, Hofmann SG, Palmieri PA, et al. Supported internet-delivered cognitive behavioral therapy programs for depression, anxiety, and stress in university students: open, non-randomised trial of acceptability, effectiveness, and satisfaction. *JMIR Ment Health*. Dec 14, 2018;5(4):e11467. [FREE Full text] [doi: [10.2196/11467](https://doi.org/10.2196/11467)] [Medline: [30552076](https://pubmed.ncbi.nlm.nih.gov/30552076/)]
19. Topooco N, Byléhn S, Dahlström Nysäter E, Holmlund J, Lindegaard J, Johansson S, et al. Evaluating the efficacy of internet-delivered cognitive behavioral therapy blended with synchronous chat sessions to treat adolescent depression: randomized controlled trial. *J Med Internet Res*. Nov 01, 2019;21(11):e13393. [FREE Full text] [doi: [10.2196/13393](https://doi.org/10.2196/13393)] [Medline: [31682572](https://pubmed.ncbi.nlm.nih.gov/31682572/)]
20. Christ C, Schouten MJ, Blankers M, van Schaik DJ, Beekman AT, Wisman MA, et al. Internet and computer-based cognitive behavioral therapy for anxiety and depression in adolescents and young adults: systematic review and meta-analysis. *J Med Internet Res*. Sep 25, 2020;22(9):e17831. [FREE Full text] [doi: [10.2196/17831](https://doi.org/10.2196/17831)] [Medline: [32673212](https://pubmed.ncbi.nlm.nih.gov/32673212/)]
21. Liverpool S, Mota CP, Sales CMD, Čuš A, Carletto S, Hancheva C, et al. Engaging children and young people in digital mental health interventions: systematic review of modes of delivery, facilitators, and barriers. *J Med Internet Res*. Jun 23, 2020;22(6):e16317. [FREE Full text] [doi: [10.2196/16317](https://doi.org/10.2196/16317)] [Medline: [32442160](https://pubmed.ncbi.nlm.nih.gov/32442160/)]
22. MacDonell KW, Prinz RJ. A review of technology-based youth and family-focused interventions. *Clin Child Fam Psychol Rev*. Jun 2017;20(2):185-200. [FREE Full text] [doi: [10.1007/s10567-016-0218-x](https://doi.org/10.1007/s10567-016-0218-x)] [Medline: [27787701](https://pubmed.ncbi.nlm.nih.gov/27787701/)]
23. Dederichs M, Weber J, Pischke CR, Angerer P, Apolinário-Hagen J. Exploring medical students' views on digital mental health interventions: A qualitative study. *Internet Interv*. Sep 2021;25:100398. [FREE Full text] [doi: [10.1016/j.invent.2021.100398](https://doi.org/10.1016/j.invent.2021.100398)] [Medline: [34026567](https://pubmed.ncbi.nlm.nih.gov/34026567/)]
24. Lehtimäki S, Martic J, Wahl B, Foster KT, Schwalbe N. Evidence on digital mental health interventions for adolescents and young people: systematic overview. *JMIR Ment Health*. Apr 29, 2021;8(4):e25847. [FREE Full text] [doi: [10.2196/25847](https://doi.org/10.2196/25847)] [Medline: [33913817](https://pubmed.ncbi.nlm.nih.gov/33913817/)]
25. Kelders SM, Kok RN, Ossebaard HC, Van Gemert-Pijnen JEW. Persuasive system design does matter: a systematic review of adherence to web-based interventions. *J Med Internet Res*. Nov 14, 2012;14(6):e152. [FREE Full text] [doi: [10.2196/jmir.2104](https://doi.org/10.2196/jmir.2104)] [Medline: [23151820](https://pubmed.ncbi.nlm.nih.gov/23151820/)]
26. Kloek C, Bossen D, de Bakker DH, Veenhof C, Dekker J. Blended interventions to change behavior in patients with chronic somatic disorders: systematic review. *J Med Internet Res*. Dec 21, 2017;19(12):e418. [FREE Full text] [doi: [10.2196/jmir.8108](https://doi.org/10.2196/jmir.8108)] [Medline: [29269338](https://pubmed.ncbi.nlm.nih.gov/29269338/)]
27. Borghouts J, Eikley E, Mark G, De Leon C, Schueller SM, Schneider M, et al. Barriers to and facilitators of user engagement with digital mental health interventions: systematic review. *J Med Internet Res*. Mar 24, 2021;23(3):e24387. [FREE Full text] [doi: [10.2196/24387](https://doi.org/10.2196/24387)] [Medline: [33759801](https://pubmed.ncbi.nlm.nih.gov/33759801/)]
28. Erbe D, Eichert H, Ripper H, Ebert DD. Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: systematic review. *J Med Internet Res*. Sep 15, 2017;19(9):e306. [FREE Full text] [doi: [10.2196/jmir.6588](https://doi.org/10.2196/jmir.6588)] [Medline: [28916506](https://pubmed.ncbi.nlm.nih.gov/28916506/)]
29. Valentine L, McEnery C, Bell I, O'Sullivan S, Pryor I, Gleeson J, et al. Blended digital and face-to-face care for first-episode psychosis treatment in young people: qualitative study. *JMIR Ment Health*. Jul 28, 2020;7(7):e18990. [FREE Full text] [doi: [10.2196/18990](https://doi.org/10.2196/18990)] [Medline: [32720904](https://pubmed.ncbi.nlm.nih.gov/32720904/)]
30. Borjalilu S, Mazaheri MA, Talebpour A. Effectiveness of mindfulness-based stress management in the mental health of Iranian university students: a comparison of blended therapy, face-to-face sessions, and mHealth app (Aramgar). *Iran J Psychiatry Behav Sci*. May 12, 2019;13(2):e84726. [doi: [10.5812/ijpbs.84726](https://doi.org/10.5812/ijpbs.84726)]

31. Werntz A, Amado S, Jasman M, Ervin A, Rhodes JE. Providing human support for the use of digital mental health interventions: systematic meta-review. *J Med Internet Res*. Feb 06, 2023;25:e42864. [FREE Full text] [doi: [10.2196/42864](https://doi.org/10.2196/42864)] [Medline: [36745497](https://pubmed.ncbi.nlm.nih.gov/36745497/)]
32. Grist R, Croker A, Denne M, Stallard P. Technology delivered interventions for depression and anxiety in children and adolescents: a systematic review and meta-analysis. *Clin Child Fam Psychol Rev*. Jun 2019;22(2):147-171. [FREE Full text] [doi: [10.1007/s10567-018-0271-8](https://doi.org/10.1007/s10567-018-0271-8)] [Medline: [30229343](https://pubmed.ncbi.nlm.nih.gov/30229343/)]
33. Garrido S, Millington C, Cheers D, Boydell K, Schubert E, Meade T, et al. What works and what doesn't work? a systematic review of digital mental health interventions for depression and anxiety in young people. *Front Psychiatry*. 2019;10:759. [FREE Full text] [doi: [10.3389/fpsy.2019.00759](https://doi.org/10.3389/fpsy.2019.00759)] [Medline: [31798468](https://pubmed.ncbi.nlm.nih.gov/31798468/)]
34. Wies B, Landers C, Ienca M. Digital mental health for young people: a scoping review of ethical promises and challenges. *Front Digit Health*. 2021;3:697072. [FREE Full text] [doi: [10.3389/fdgh.2021.697072](https://doi.org/10.3389/fdgh.2021.697072)] [Medline: [34713173](https://pubmed.ncbi.nlm.nih.gov/34713173/)]
35. Dewa LH, Lawrance E, Roberts L, Brooks-Hall E, Ashrafian H, Fontana G, et al. Quality social connection as an active ingredient in digital interventions for young people with depression and anxiety: systematic scoping review and meta-analysis. *J Med Internet Res*. Dec 17, 2021;23(12):e26584. [FREE Full text] [doi: [10.2196/26584](https://doi.org/10.2196/26584)] [Medline: [34927592](https://pubmed.ncbi.nlm.nih.gov/34927592/)]
36. Bear HA, Ayala Nunes L, DeJesus J, Liverpool S, Moltrecht B, Neelakantan L, et al. Determination of markers of successful implementation of mental health apps for young people: systematic review. *J Med Internet Res*. Nov 09, 2022;24(11):e40347. [FREE Full text] [doi: [10.2196/40347](https://doi.org/10.2196/40347)] [Medline: [36350704](https://pubmed.ncbi.nlm.nih.gov/36350704/)]
37. Leech T, Dorstyn D, Taylor A, Li W. Mental health apps for adolescents and young adults: A systematic review of randomised controlled trials. *Children and Youth Services Review*. Aug 2021;127:106073. [FREE Full text] [doi: [10.1016/j.childyouth.2021.106073](https://doi.org/10.1016/j.childyouth.2021.106073)]
38. Riboldi I, Cavaleri D, Calabrese A, Capogrosso CA, Piacenti S, Bartoli F, et al. Digital mental health interventions for anxiety and depressive symptoms in university students during the COVID-19 pandemic: A systematic review of randomized controlled trials. *Rev Psiquiatr Salud Ment*. 2023;16:47-58. [FREE Full text] [doi: [10.1016/j.rpsm.2022.04.005](https://doi.org/10.1016/j.rpsm.2022.04.005)] [Medline: [35755491](https://pubmed.ncbi.nlm.nih.gov/35755491/)]
39. Ferrari M, Allan S, Arnold C, Eleftheriadis D, Alvarez-Jimenez M, Gumley A, et al. Digital interventions for psychological well-being in university students: systematic review and meta-analysis. *J Med Internet Res*. Sep 28, 2022;24(9):e39686. [FREE Full text] [doi: [10.2196/39686](https://doi.org/10.2196/39686)] [Medline: [36169988](https://pubmed.ncbi.nlm.nih.gov/36169988/)]
40. Wright S. *New Adventures in Independent Practice: Leveraging Technology to Treat Underserved, Rural Populations in Skilled Nursing Facilities*. In: Maheu M, Drude K, Wright S, editors. *Career Paths in Telemental Health*. Cham. Springer; 2017:95-104.
41. Auerswald CL, Piatt AA, Mirzazadeh A. *Research with Disadvantaged, Vulnerable and/or Marginalized Adolescents*. United Nations. 2017. URL: <https://www.un-ilibrary.org/content/papers/26642166/23> [accessed 2025-04-26]
42. Scoping review. OSF. URL: https://osf.io/xvkas/?view_only=c64021ca70a44b4992e18495f2df4072 [accessed 2025-04-28]
43. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. Feb 2005;8(1):19-32. [doi: [10.1080/1364557032000119616](https://doi.org/10.1080/1364557032000119616)]
44. Adolescent health in the South-East Asia Region. World Health Organization. URL: <https://www.who.int/southeastasia/health-topics/adolescent-health> [accessed 2025-04-26]
45. Li J. Digital technologies for mental health improvements in the COVID-19 pandemic: a scoping review. *BMC Public Health*. Mar 01, 2023;23(1):413. [FREE Full text] [doi: [10.1186/s12889-023-15302-w](https://doi.org/10.1186/s12889-023-15302-w)] [Medline: [36859184](https://pubmed.ncbi.nlm.nih.gov/36859184/)]
46. Covidence. URL: <https://www.covidence.org/> [accessed 2025-04-26]
47. Feinerer I, Hornik K, Meyer D. Text mining infrastructure in R. *Journal of Statistical Software*. 2008;25(5):1-54. [doi: [10.18637/jss.v025.i05](https://doi.org/10.18637/jss.v025.i05)]
48. Moon KW. *webr: Data and Functions for Web-Based Analysis*. GitHub. URL: <https://github.com/cardiomoon/webr> [accessed 2025-04-26]
49. Conway J, Lex A, Gehlenborg N. UpSetR: an R package for the visualization of intersecting sets and their properties. *Bioinformatics*. Sep 15, 2017;33(18):2938-2940. [FREE Full text] [doi: [10.1093/bioinformatics/btx364](https://doi.org/10.1093/bioinformatics/btx364)] [Medline: [28645171](https://pubmed.ncbi.nlm.nih.gov/28645171/)]
50. ComplexUpset. Zenodo. URL: <https://zenodo.org/records/7314197> [accessed 2025-04-26]
51. Wickham H. *ggplot2: Elegant Graphics for Data Analysis*. Cham, Switzerland. Springer; 2016.
52. Papini S, Jacquart J, Zaizar ED, Telch MJ, Smits JA. Targeting anxiety sensitivity with evidence-based psychoeducation: a randomized waitlist-controlled trial of a brief standalone digital intervention. *Cognitive and Behavioral Practice*. Nov 2023;30(4):678-691. [doi: [10.1016/j.cbpra.2022.04.001](https://doi.org/10.1016/j.cbpra.2022.04.001)]
53. Eltahawy L, Essig T, Myszkowski N, Trub L. Can robots do therapy?: Examining the efficacy of a CBT bot in comparison with other behavioral intervention technologies in alleviating mental health symptoms. *Computers in Human Behavior: Artificial Humans*. Jan 2024;2(1):100035. [doi: [10.1016/j.chbah.2023.100035](https://doi.org/10.1016/j.chbah.2023.100035)]
54. Wolitzky-Taylor K, LeBeau R, Arnaudova I, Barnes-Horowitz N, Gong-Guy E, Fears S, et al. A novel and integrated digitally supported system of care for depression and anxiety: findings from an open trial. *JMIR Ment Health*. Jul 24, 2023;10:e46200. [FREE Full text] [doi: [10.2196/46200](https://doi.org/10.2196/46200)] [Medline: [37486735](https://pubmed.ncbi.nlm.nih.gov/37486735/)]

55. Peake E, Miller I, Flannery J, Chen L, Lake J, Padmanabhan A. Preliminary efficacy of a digital intervention for adolescent depression: randomized controlled trial. *J Med Internet Res*. Feb 07, 2024;26:e48467. [FREE Full text] [doi: [10.2196/48467](https://doi.org/10.2196/48467)] [Medline: [38324367](https://pubmed.ncbi.nlm.nih.gov/38324367/)]
56. Abramovitch A, Uwadiae A, Robinson A. A randomized clinical trial of a gamified app for the treatment of perfectionism. *Br J Clin Psychol*. Mar 2024;63(1):73-91. [doi: [10.1111/bjc.12444](https://doi.org/10.1111/bjc.12444)] [Medline: [37864496](https://pubmed.ncbi.nlm.nih.gov/37864496/)]
57. Miller I, Peake E, Strauss G, Vierra E, Koepsell X, Shalchi B, et al. Self-guided digital intervention for depression in adolescents: feasibility and preliminary efficacy study. *JMIR Form Res*. Nov 22, 2023;7:e43260. [FREE Full text] [doi: [10.2196/43260](https://doi.org/10.2196/43260)] [Medline: [37991839](https://pubmed.ncbi.nlm.nih.gov/37991839/)]
58. Chang C, Palermo E, Deswert S, Brown A, Nuske HJ. Money can't buy happiness: A randomized controlled trial of a digital mental health app with versus without financial incentives. *Digit Health*. 2023;9:20552076231170693. [FREE Full text] [doi: [10.1177/20552076231170693](https://doi.org/10.1177/20552076231170693)] [Medline: [37361441](https://pubmed.ncbi.nlm.nih.gov/37361441/)]
59. Kwok G, Sharma A, Mandato I, Devine KA. Feasibility and acceptability of a meditation mobile app intervention for adolescent and young adult survivors of childhood cancer. *Int J Environ Res Public Health*. May 02, 2024;21(5):584. [FREE Full text] [doi: [10.3390/ijerph21050584](https://doi.org/10.3390/ijerph21050584)] [Medline: [38791797](https://pubmed.ncbi.nlm.nih.gov/38791797/)]
60. Thomas EBK, Sagorac Gruichich T, Maronge JM, Hoel S, Victory A, Stowe ZN, et al. Mobile acceptance and commitment therapy with distressed first-generation college students: microrandomized trial. *JMIR Ment Health*. May 15, 2023;10:e43065. [FREE Full text] [doi: [10.2196/43065](https://doi.org/10.2196/43065)] [Medline: [37184896](https://pubmed.ncbi.nlm.nih.gov/37184896/)]
61. Giovanelli A, Sanchez Karver T, Roundfield KD, Woodruff S, Wierzba C, Wolny J, et al. The Appa Health App for youth mental health: development and usability study. *JMIR Form Res*. Oct 04, 2023;7:e49998. [FREE Full text] [doi: [10.2196/49998](https://doi.org/10.2196/49998)] [Medline: [37792468](https://pubmed.ncbi.nlm.nih.gov/37792468/)]
62. Hanano M, Rith-Najarian L, Boyd M, Chavira D. Measuring adherence within a self-guided online intervention for depression and anxiety: secondary analyses of a randomized controlled trial. *JMIR Ment Health*. Mar 28, 2022;9(3):e30754. [FREE Full text] [doi: [10.2196/30754](https://doi.org/10.2196/30754)] [Medline: [35343901](https://pubmed.ncbi.nlm.nih.gov/35343901/)]
63. Pachankis JE, Williams SL, Behari K, Job S, McConocha EM, Chaudoir SR. Brief online interventions for LGBTQ young adult mental and behavioral health: A randomized controlled trial in a high-stigma, low-resource context. *J Consult Clin Psychol*. May 2020;88(5):429-444. [FREE Full text] [doi: [10.1037/ccp0000497](https://doi.org/10.1037/ccp0000497)] [Medline: [32271053](https://pubmed.ncbi.nlm.nih.gov/32271053/)]
64. Chow GM, Bird MD, Cox C, Cooper BT, Gabana NT. A brief web-based depression literacy, efficacy, and stigma intervention among college students. *Advances in Mental Health*. May 19, 2023;22(1):4-24. [doi: [10.1080/18387357.2023.2213357](https://doi.org/10.1080/18387357.2023.2213357)]
65. Gladstone TRG, Rintell LS, Buchholz KR, Myers TL. Adaptation of an evidence-based online depression prevention intervention for college students: intervention development and pilot study results. *Social Sciences*. Oct 16, 2021;10(10):398. [doi: [10.3390/socsci10100398](https://doi.org/10.3390/socsci10100398)]
66. Sturgill R, Martinasek M, Schmidt T, Goyal R. A novel artificial intelligence-powered emotional intelligence and mindfulness app (Ajivar) for the college student population during the COVID-19 pandemic: quantitative questionnaire study. *JMIR Form Res*. Jan 05, 2021;5(1):e25372. [FREE Full text] [doi: [10.2196/25372](https://doi.org/10.2196/25372)] [Medline: [33320822](https://pubmed.ncbi.nlm.nih.gov/33320822/)]
67. Bruehlman-Senecal E, Hook CJ, Pfeifer JH, FitzGerald C, Davis B, Delucchi KL, et al. Smartphone app to address loneliness among college students: pilot randomized controlled trial. *JMIR Ment Health*. Oct 20, 2020;7(10):e21496. [FREE Full text] [doi: [10.2196/21496](https://doi.org/10.2196/21496)] [Medline: [33079071](https://pubmed.ncbi.nlm.nih.gov/33079071/)]
68. Bautista CL, Ralston AL, Brock RL, Hope DA. Peer coach support in internet-based cognitive behavioral therapy for college students with social anxiety disorder: efficacy and acceptability. *Cogent Psychology*. Feb 26, 2022;9(1):2040160. [doi: [10.1080/23311908.2022.2040160](https://doi.org/10.1080/23311908.2022.2040160)]
69. Haeger JA, Davis CH, Levin ME. Utilizing ACT daily as a self-guided app for clients waiting for services at a college counseling center: A pilot study. *J Am Coll Health*. Apr 2022;70(3):742-749. [doi: [10.1080/07448481.2020.1763366](https://doi.org/10.1080/07448481.2020.1763366)] [Medline: [32529933](https://pubmed.ncbi.nlm.nih.gov/32529933/)]
70. Levin ME, Krafft J, Hicks ET, Pierce B, Twohig MP. A randomized dismantling trial of the open and engaged components of acceptance and commitment therapy in an online intervention for distressed college students. *Behav Res Ther*. Mar 2020;126:103557. [doi: [10.1016/j.brat.2020.103557](https://doi.org/10.1016/j.brat.2020.103557)] [Medline: [32014692](https://pubmed.ncbi.nlm.nih.gov/32014692/)]
71. Huberty J, Green J, Glissmann C, Larkey L, Puzia M, Lee C. Efficacy of the mindfulness meditation mobile app "Calm" to reduce stress among college students: randomized controlled trial. *JMIR Mhealth Uhealth*. Jun 25, 2019;7(6):e14273. [FREE Full text] [doi: [10.2196/14273](https://doi.org/10.2196/14273)] [Medline: [31237569](https://pubmed.ncbi.nlm.nih.gov/31237569/)]
72. Schueller SM, Glover AC, Rufa AK, Dowdle CL, Gross GD, Karnik NS, et al. A mobile phone-based intervention to improve mental health among homeless young adults: pilot feasibility trial. *JMIR Mhealth Uhealth*. Jul 02, 2019;7(7):e12347. [FREE Full text] [doi: [10.2196/12347](https://doi.org/10.2196/12347)] [Medline: [31267980](https://pubmed.ncbi.nlm.nih.gov/31267980/)]
73. Moffitt-Carney KM, Duncan AB. Evaluation of a mindfulness-based mobile application with college students: A pilot study. *J Am Coll Health*. Sep 12, 2021;69(2):208-214. [doi: [10.1080/07448481.2019.1661420](https://doi.org/10.1080/07448481.2019.1661420)] [Medline: [31513476](https://pubmed.ncbi.nlm.nih.gov/31513476/)]
74. Lattie EG, Kashima K, Duffecy JL. An open trial of internet-based cognitive behavioral therapy for first year medical students. *Internet Interv*. Dec 2019;18:100279. [FREE Full text] [doi: [10.1016/j.invent.2019.100279](https://doi.org/10.1016/j.invent.2019.100279)] [Medline: [31534911](https://pubmed.ncbi.nlm.nih.gov/31534911/)]
75. Choi SK, Bruehlman-Senecal E, Green A, Lavra J, Bauermeister J. Patterns of engagement in digital mental health intervention for LGBTQ+ youth: a latent profile analysis. *Front Digit Health*. Nov 23, 2023;5:1254929. [FREE Full text] [doi: [10.3389/fdgh.2023.1254929](https://doi.org/10.3389/fdgh.2023.1254929)] [Medline: [38075522](https://pubmed.ncbi.nlm.nih.gov/38075522/)]

76. Attridge MD, Morfitt RC, Roseborough DJ, Jones ER. Internet-based cognitive-behavioral therapy for college students with anxiety, depression, social anxiety, or insomnia: four single-group longitudinal studies of archival commercial data and replication of employee user study. *JMIR Form Res*. Jul 23, 2020;4(7):e17712. [[FREE Full text](#)] [doi: [10.2196/17712](https://doi.org/10.2196/17712)] [Medline: [32706662](https://pubmed.ncbi.nlm.nih.gov/32706662/)]
77. Chavez LJ, Kelleher K, Slesnick N, Holowacz E, Luthy E, Moore L, et al. Virtual reality meditation among youth experiencing homelessness: pilot randomized controlled trial of feasibility. *JMIR Ment Health*. Sep 24, 2020;7(9):e18244. [[FREE Full text](#)] [doi: [10.2196/18244](https://doi.org/10.2196/18244)] [Medline: [32969834](https://pubmed.ncbi.nlm.nih.gov/32969834/)]
78. Lattie E, Cohen KA, Winquist N, Mohr DC. Examining an app-based mental health self-care program, IntelliCare for college students: single-arm pilot study. *JMIR Ment Health*. Oct 10, 2020;7(10):e21075. [[FREE Full text](#)] [doi: [10.2196/21075](https://doi.org/10.2196/21075)] [Medline: [33037874](https://pubmed.ncbi.nlm.nih.gov/33037874/)]
79. Charvet L, George A, Cho H, Krupp LB, Dennis-Tiwary TA. Mobile attention bias modification training is a digital health solution for managing distress in multiple sclerosis: a pilot study in pediatric onset. *Front Neurol*. Jul 28, 2021;12:719090. [[FREE Full text](#)] [doi: [10.3389/fneur.2021.719090](https://doi.org/10.3389/fneur.2021.719090)] [Medline: [34393986](https://pubmed.ncbi.nlm.nih.gov/34393986/)]
80. Ruehlman L, Karoly P. A pilot test of Internet-delivered brief interactive training sessions for depression: Evaluating dropout, uptake, adherence, and outcome. *J Am Coll Health*. Oct 2023;71(7):2131-2139. [doi: [10.1080/07448481.2021.1961781](https://doi.org/10.1080/07448481.2021.1961781)] [Medline: [34469262](https://pubmed.ncbi.nlm.nih.gov/34469262/)]
81. Craig Rushing S, Kelley A, Bull S, Stephens D, Wrobel J, Silvasstar J, et al. Efficacy of an mHealth intervention (BRAVE) to promote mental wellness for American Indian and Alaska Native teenagers and young adults: randomized controlled trial. *JMIR Ment Health*. Sep 15, 2021;8(9):e26158. [[FREE Full text](#)] [doi: [10.2196/26158](https://doi.org/10.2196/26158)] [Medline: [34524092](https://pubmed.ncbi.nlm.nih.gov/34524092/)]
82. Suffoletto B, Goldstein T, Gotkiewicz D, Gotkiewicz E, George B, Brent D. Acceptability, engagement, and effects of a mobile digital intervention to support mental health for young adults transitioning to college: pilot randomized controlled trial. *JMIR Form Res*. Oct 14, 2021;5(10):e32271. [[FREE Full text](#)] [doi: [10.2196/32271](https://doi.org/10.2196/32271)] [Medline: [34647893](https://pubmed.ncbi.nlm.nih.gov/34647893/)]
83. Rackoff GN, Fitzsimmons-Craft EE, Taylor CB, Eisenberg D, Wilfley DE, Newman MG. A randomized controlled trial of internet-based self-help for stress during the COVID-19 pandemic. *J Adolesc Health*. Aug 2022;71(2):157-163. [[FREE Full text](#)] [doi: [10.1016/j.jadohealth.2022.01.227](https://doi.org/10.1016/j.jadohealth.2022.01.227)] [Medline: [35351353](https://pubmed.ncbi.nlm.nih.gov/35351353/)]
84. Grenawalt TA, Tansey TN, Phillips BN, Strauser DR, Rosenthal DA, Wagner S. Effectiveness of internet-based behavioral activation on quality of life among young adult survivors of childhood brain tumor: a randomized controlled trial. *Disabil Rehabil*. Jul 2023;45(15):2480-2487. [doi: [10.1080/09638288.2022.2094478](https://doi.org/10.1080/09638288.2022.2094478)] [Medline: [35798680](https://pubmed.ncbi.nlm.nih.gov/35798680/)]
85. Bauermeister J, Choi SK, Bruhlman-Senecal E, Golinkoff J, Taboada A, Lavra J, et al. An identity-affirming web application to help sexual and gender minority youth cope with minority stress: pilot randomized controlled trial. *J Med Internet Res*. Aug 01, 2022;24(8):e39094. [[FREE Full text](#)] [doi: [10.2196/39094](https://doi.org/10.2196/39094)] [Medline: [35916700](https://pubmed.ncbi.nlm.nih.gov/35916700/)]
86. Klimczak KS, Twohig MP, Peacock GG, Levin ME. Using peer-support coaching to improve adherence to online ACT self-help for college mental health: A randomized controlled trial. *Behav Res Ther*. Jan 2023;160:104228. [doi: [10.1016/j.brat.2022.104228](https://doi.org/10.1016/j.brat.2022.104228)] [Medline: [36455430](https://pubmed.ncbi.nlm.nih.gov/36455430/)]
87. Six SG, Byrne KA, Aly H, Harris MW. The effect of mental health app customization on depressive symptoms in college students: randomized controlled trial. *JMIR Ment Health*. Aug 09, 2022;9(8):e39516. [[FREE Full text](#)] [doi: [10.2196/39516](https://doi.org/10.2196/39516)] [Medline: [35943788](https://pubmed.ncbi.nlm.nih.gov/35943788/)]
88. Kleiman EM, Bentley KH, Wacha-Montes A, Taylor ME, Lozy O, Conti K, et al. A pilot implementation-effectiveness trial of a single-session telehealth workshop and smartphone-based cognitive behavioral intervention for managing emotions among college students. *Behav Ther*. Sep 2022;53(5):1024-1036. [doi: [10.1016/j.beth.2022.04.008](https://doi.org/10.1016/j.beth.2022.04.008)] [Medline: [35987533](https://pubmed.ncbi.nlm.nih.gov/35987533/)]
89. Pachankis JE, Soulliard ZA, Layland EK, Behari K, Seager van Dyk I, Eisenstadt BE, et al. Guided LGBTQ-affirmative internet cognitive-behavioral therapy for sexual minority youth's mental health: A randomized controlled trial of a minority stress treatment approach. *Behav Res Ther*. Oct 2023;169:104403. [doi: [10.1016/j.brat.2023.104403](https://doi.org/10.1016/j.brat.2023.104403)] [Medline: [37716019](https://pubmed.ncbi.nlm.nih.gov/37716019/)]
90. Crosby Ms Msw ES, Witte Ph DK. A pilot study of sleep scholar: A single-session, internet-based insomnia intervention for college students with a history of suicide ideation. *J Am Coll Health*. Oct 2023;71(7):1984-1998. [doi: [10.1080/07448481.2021.1953028](https://doi.org/10.1080/07448481.2021.1953028)] [Medline: [34283711](https://pubmed.ncbi.nlm.nih.gov/34283711/)]
91. Lai B, Young R, Craig M, Chaviano K, Swanson-Kimani E, Wozow C, et al. Improving social isolation and loneliness among adolescents with physical disabilities through group-based virtual reality gaming: feasibility pre-post trial study. *JMIR Form Res*. Dec 06, 2023;7:e47630. [[FREE Full text](#)] [doi: [10.2196/47630](https://doi.org/10.2196/47630)] [Medline: [38055309](https://pubmed.ncbi.nlm.nih.gov/38055309/)]
92. Rith-Najarian LR, Gong-Guy E, Flournoy JC, Chavira DA. Randomized controlled trial of a web-based program for preventing anxiety and depression in university students. *J Consult Clin Psychol*. Jan 2024;92(1):1-15. [doi: [10.1037/ccp0000843](https://doi.org/10.1037/ccp0000843)] [Medline: [37768633](https://pubmed.ncbi.nlm.nih.gov/37768633/)]
93. Kulikov VN, Crosthwaite PC, Hall SA, Flannery JE, Strauss GS, Vierra EM, et al. A CBT-based mobile intervention as an adjunct treatment for adolescents with symptoms of depression: a virtual randomized controlled feasibility trial. *Front Digit Health*. 2023;5:1062471. [[FREE Full text](#)] [doi: [10.3389/fdgth.2023.1062471](https://doi.org/10.3389/fdgth.2023.1062471)] [Medline: [37323125](https://pubmed.ncbi.nlm.nih.gov/37323125/)]
94. McGillivray L, Keng-Meng Hui N, Wong QJJ, Han J, Qian J, Torok M. The effectiveness of a smartphone intervention targeting suicidal ideation in young adults: randomized controlled trial examining the influence of loneliness. *JMIR Ment Health*. Mar 30, 2023;10:e44862. [[FREE Full text](#)] [doi: [10.2196/44862](https://doi.org/10.2196/44862)] [Medline: [36995752](https://pubmed.ncbi.nlm.nih.gov/36995752/)]

95. Bell I, Arnold C, Gilbertson T, D'Alfonso S, Castagnini E, Chen N, et al. A personalized, transdiagnostic smartphone intervention (Mello) targeting repetitive negative thinking in young people with depression and anxiety: pilot randomized controlled trial. *J Med Internet Res*. Dec 13, 2023;25:e47860. [FREE Full text] [doi: [10.2196/47860](https://doi.org/10.2196/47860)] [Medline: [38090786](https://pubmed.ncbi.nlm.nih.gov/38090786/)]
96. Rice S, O'Bree B, Wilson M, McEnery C, Lim MH, Hamilton M, et al. Leveraging the social network for treatment of social anxiety: Pilot study of a youth-specific digital intervention with a focus on engagement of young men. *Internet Interv*. Apr 2020;20:100323. [FREE Full text] [doi: [10.1016/j.invent.2020.100323](https://doi.org/10.1016/j.invent.2020.100323)] [Medline: [32435600](https://pubmed.ncbi.nlm.nih.gov/32435600/)]
97. Alvarez-Jimenez M, Rice S, D'Alfonso S, Leicester S, Bendall S, Pryor I, et al. A novel multimodal digital service (Moderated Online Social Therapy+) for help-seeking young people experiencing mental ill-health: pilot evaluation within a national youth e-mental health service. *J Med Internet Res*. Aug 13, 2020;22(8):e17155. [FREE Full text] [doi: [10.2196/17155](https://doi.org/10.2196/17155)] [Medline: [32788151](https://pubmed.ncbi.nlm.nih.gov/32788151/)]
98. Deady M, Glozier N, Collins D, Einboden R, Lavender I, Wray A, et al. The utility of a mental health app in apprentice workers: a pilot study. *Front Public Health*. Sep 4, 2020;8:389. [FREE Full text] [doi: [10.3389/fpubh.2020.00389](https://doi.org/10.3389/fpubh.2020.00389)] [Medline: [33014953](https://pubmed.ncbi.nlm.nih.gov/33014953/)]
99. Kahl BL, Miller HM, Cairns K, Giniunas H, Nicholas M. Evaluation of ReachOut.com, an unstructured digital youth mental health intervention: prospective cohort study. *JMIR Ment Health*. Oct 15, 2020;7(10):e21280. [FREE Full text] [doi: [10.2196/21280](https://doi.org/10.2196/21280)] [Medline: [33055066](https://pubmed.ncbi.nlm.nih.gov/33055066/)]
100. Tighe J, Shand F, McKay K, Mcalister T, Mackinnon A, Christensen H. Usage and acceptability of the iBobbly app: pilot trial for suicide prevention in Aboriginal and Torres Strait Islander youth. *JMIR Ment Health*. Dec 01, 2020;7(12):e14296. [FREE Full text] [doi: [10.2196/14296](https://doi.org/10.2196/14296)] [Medline: [33258782](https://pubmed.ncbi.nlm.nih.gov/33258782/)]
101. Torok M, Han J, McGillivray L, Wong Q, Werner-Seidler A, O'Dea B, et al. The effect of a therapeutic smartphone application on suicidal ideation in young adults: Findings from a randomized controlled trial in Australia. *PLoS Med*. May 2022;19(5):e1003978. [FREE Full text] [doi: [10.1371/journal.pmed.1003978](https://doi.org/10.1371/journal.pmed.1003978)] [Medline: [35639672](https://pubmed.ncbi.nlm.nih.gov/35639672/)]
102. Wrightson-Hester A, Anderson G, Dunstan J, McEvoy PM, Sutton CJ, Myers B, et al. An artificial therapist (Manage Your Life Online) to support the mental health of youth: co-design and case series. *JMIR Hum Factors*. Jul 21, 2023;10:e46849. [FREE Full text] [doi: [10.2196/46849](https://doi.org/10.2196/46849)] [Medline: [37477969](https://pubmed.ncbi.nlm.nih.gov/37477969/)]
103. O'Sullivan S, McEnery C, Cagliarini D, Hinton JDX, Valentine L, Nicholas J, et al. A novel blended transdiagnostic intervention (eOxygen) for youth psychosis and borderline personality disorder: uncontrolled single-group pilot study. *JMIR Ment Health*. Apr 01, 2024;11:e49217. [FREE Full text] [doi: [10.2196/49217](https://doi.org/10.2196/49217)] [Medline: [38557432](https://pubmed.ncbi.nlm.nih.gov/38557432/)]
104. Ditton E, Knott B, Hodyl N, Horton G, Oldmeadow C, Walker FR, et al. Evaluation of an app-delivered psychological flexibility skill training intervention for medical student burnout and well-being: randomized controlled trial. *JMIR Ment Health*. Feb 06, 2023;10:e42566. [FREE Full text] [doi: [10.2196/42566](https://doi.org/10.2196/42566)] [Medline: [36745486](https://pubmed.ncbi.nlm.nih.gov/36745486/)]
105. Finlay-Jones AL, Parkinson A, Sirois F, Perry Y, Boyes M, Rees CS. Web-based self-compassion training to improve the well-being of youth with chronic medical conditions: randomized controlled trial. *J Med Internet Res*. Sep 13, 2023;25:e44016. [FREE Full text] [doi: [10.2196/44016](https://doi.org/10.2196/44016)] [Medline: [37703081](https://pubmed.ncbi.nlm.nih.gov/37703081/)]
106. Hides L, Dingle G, Quinn C, Stoyanov SR, Zelenko O, Tjondronegoro D, et al. Efficacy and outcomes of a music-based emotion regulation mobile app in distressed young people: randomized controlled trial. *JMIR Mhealth Uhealth*. Jan 16, 2019;7(1):e11482. [FREE Full text] [doi: [10.2196/11482](https://doi.org/10.2196/11482)] [Medline: [30664457](https://pubmed.ncbi.nlm.nih.gov/30664457/)]
107. Maybery D, Reupert A, Bartholomew C, Cuff R, Duncan Z, McAuliffe C, et al. An online intervention for 18-25-year-old youth whose parents have a mental illness and/or substance use disorder: A pilot randomized controlled trial. *Early Interv Psychiatry*. Nov 2022;16(11):1249-1258. [FREE Full text] [doi: [10.1111/eip.13274](https://doi.org/10.1111/eip.13274)] [Medline: [35118795](https://pubmed.ncbi.nlm.nih.gov/35118795/)]
108. Lim MH, Gleeson JFM, Rodebaugh TL, Eres R, Long KM, Casey K, et al. A pilot digital intervention targeting loneliness in young people with psychosis. *Soc Psychiatry Psychiatr Epidemiol*. Jul 2020;55(7):877-889. [doi: [10.1007/s00127-019-01681-2](https://doi.org/10.1007/s00127-019-01681-2)] [Medline: [30874828](https://pubmed.ncbi.nlm.nih.gov/30874828/)]
109. Sanci L, Kauer S, Thuraisingam S, Davidson S, Duncan A, Chondros P, et al. Effectiveness of a mental health service navigation website (link) for young adults: randomized controlled trial. *JMIR Ment Health*. Oct 17, 2019;6(10):e13189. [FREE Full text] [doi: [10.2196/13189](https://doi.org/10.2196/13189)] [Medline: [31625945](https://pubmed.ncbi.nlm.nih.gov/31625945/)]
110. Syed Sherif RJ, Vuorre M, Riga E, Przybylski AK, Adams H, Harmer CJ, et al. A co-produced online cultural experience compared to a typical museum website for mental health in people aged 16-24: A proof-of-principle randomised controlled trial. *Aust N Z J Psychiatry*. May 2023;57(5):745-757. [FREE Full text] [doi: [10.1177/00048674221115648](https://doi.org/10.1177/00048674221115648)] [Medline: [36081341](https://pubmed.ncbi.nlm.nih.gov/36081341/)]
111. Di Simplicio M, Appiah-Kusi E, Wilkinson P, Watson P, Meiser-Stedman C, Kavanagh DJ, et al. Imaginator: a proof-of-concept feasibility trial of a brief imagery-based psychological intervention for young people who self-harm. *Suicide Life Threat Behav*. Jun 2020;50(3):724-740. [FREE Full text] [doi: [10.1111/sltb.12620](https://doi.org/10.1111/sltb.12620)] [Medline: [32057131](https://pubmed.ncbi.nlm.nih.gov/32057131/)]
112. Linton MA, Jelbert S, Kidger J, Morris R, Biddle L, Hood B. Investigating the use of electronic well-being diaries completed within a psychoeducation program for university students: longitudinal text analysis study. *J Med Internet Res*. Apr 22, 2021;23(4):e25279. [FREE Full text] [doi: [10.2196/25279](https://doi.org/10.2196/25279)] [Medline: [33885373](https://pubmed.ncbi.nlm.nih.gov/33885373/)]
113. Midgley N, Guerrero-Tates B, Mortimer R, Edbrooke-Childs J, Mechler J, Lindqvist K, et al. The Depression: Online Therapy Study (D:OTS)-A pilot study of an internet-based psychodynamic treatment for adolescents with low mood in the

- UK, in the context of the COVID-19 pandemic. *Int J Environ Res Public Health*. Dec 09, 2021;18(24):12993. [FREE Full text] [doi: [10.3390/ijerph182412993](https://doi.org/10.3390/ijerph182412993)] [Medline: [34948601](https://pubmed.ncbi.nlm.nih.gov/34948601/)]
114. King N, Linden B, Cunningham S, Rivera D, Rose J, Wagner N, et al. The feasibility and effectiveness of a novel online mental health literacy course in supporting university student mental health: a pilot study. *BMC Psychiatry*. Jul 30, 2022;22(1):515. [FREE Full text] [doi: [10.1186/s12888-022-04139-z](https://doi.org/10.1186/s12888-022-04139-z)] [Medline: [35907852](https://pubmed.ncbi.nlm.nih.gov/35907852/)]
115. Stevens M, Cartagena Fariás J, Mindel C, D'Amico F, Evans-Lacko S. Pilot evaluation to assess the effectiveness of youth peer community support via the Kooth online mental wellbeing website. *BMC Public Health*. Oct 12, 2022;22(1):1903. [FREE Full text] [doi: [10.1186/s12889-022-14223-4](https://doi.org/10.1186/s12889-022-14223-4)] [Medline: [36224546](https://pubmed.ncbi.nlm.nih.gov/36224546/)]
116. Brown M, Lord E, John A. Adaptation of ACTivate Your Wellbeing, a digital health and well-being program for young persons: co-design approach. *JMIR Form Res*. Apr 13, 2023;7:e39913. [FREE Full text] [doi: [10.2196/39913](https://doi.org/10.2196/39913)] [Medline: [37052994](https://pubmed.ncbi.nlm.nih.gov/37052994/)]
117. Kingston J, Becker L, Woeginger J, Ellett L. A randomised trial comparing a brief online delivery of mindfulness-plus-values versus values only for symptoms of depression: Does baseline severity matter? *J Affect Disord*. Nov 01, 2020;276:936-944. [doi: [10.1016/j.jad.2020.07.087](https://doi.org/10.1016/j.jad.2020.07.087)] [Medline: [32745830](https://pubmed.ncbi.nlm.nih.gov/32745830/)]
118. Cook L, Mostazir M, Watkins E. Reducing stress and preventing depression (respond): randomized controlled trial of web-based rumination-focused cognitive behavioral therapy for high-ruminating university students. *J Med Internet Res*. May 13, 2019;21(5):e11349. [FREE Full text] [doi: [10.2196/11349](https://doi.org/10.2196/11349)] [Medline: [31094331](https://pubmed.ncbi.nlm.nih.gov/31094331/)]
119. Brogna E, Millings A, Barkham M. Counseling with guided use of a mobile well-being app for students experiencing anxiety or depression: clinical outcomes of a feasibility trial embedded in a student counseling service. *JMIR Mhealth Uhealth*. Aug 15, 2019;7(8):e14318. [FREE Full text] [doi: [10.2196/14318](https://doi.org/10.2196/14318)] [Medline: [31418424](https://pubmed.ncbi.nlm.nih.gov/31418424/)]
120. Clarke J, Draper S. Intermittent mindfulness practice can be beneficial, and daily practice can be harmful. An in depth, mixed methods study of the "Calm" app's (mostly positive) effects. *Internet Interv*. Mar 2020;19:100293. [FREE Full text] [doi: [10.1016/j.invent.2019.100293](https://doi.org/10.1016/j.invent.2019.100293)] [Medline: [31890639](https://pubmed.ncbi.nlm.nih.gov/31890639/)]
121. Ponzio S, Morelli D, Kawadler JM, Hemmings NR, Bird G, Plans D. Efficacy of the digital therapeutic mobile app BioBase to reduce stress and improve mental well-being among university students: randomized controlled trial. *JMIR Mhealth Uhealth*. Apr 06, 2020;8(4):e17767. [FREE Full text] [doi: [10.2196/17767](https://doi.org/10.2196/17767)] [Medline: [31926063](https://pubmed.ncbi.nlm.nih.gov/31926063/)]
122. Bevan Jones R, Thapar A, Rice F, Mars B, Agha SS, Smith D, et al. A digital intervention for adolescent depression (MoodHwb): mixed methods feasibility evaluation. *JMIR Ment Health*. Jul 17, 2020;7(7):e14536. [FREE Full text] [doi: [10.2196/14536](https://doi.org/10.2196/14536)] [Medline: [32384053](https://pubmed.ncbi.nlm.nih.gov/32384053/)]
123. Perkins AM, Bowers G, Cassidy J, Meiser-Stedman R, Pass L. An enhanced psychological mindset intervention to promote adolescent wellbeing within educational settings: A feasibility randomized controlled trial. *J Clin Psychol*. Apr 2021;77(4):946-967. [doi: [10.1002/jclp.23104](https://doi.org/10.1002/jclp.23104)] [Medline: [33450060](https://pubmed.ncbi.nlm.nih.gov/33450060/)]
124. Dai Z, Jing S, Wang H, Xiao W, Huang Y, Chen X, et al. Mindfulness-based online intervention on mental health among undergraduate nursing students during coronavirus disease 2019 pandemic in Beijing, China: A randomized controlled trial. *Front Psychiatry*. 2022;13:949477. [FREE Full text] [doi: [10.3389/fpsy.2022.949477](https://doi.org/10.3389/fpsy.2022.949477)] [Medline: [36465283](https://pubmed.ncbi.nlm.nih.gov/36465283/)]
125. Han M, Wang Y, Zhang Y, Wang Y, Ou J, Ren D, et al. A multicomponent digital intervention to promote help-seeking for mental health problems and suicide in sexual and gender diverse young adults: A randomized controlled trial. *PLoS Med*. Mar 2023;20(3):e1004197. [FREE Full text] [doi: [10.1371/journal.pmed.1004197](https://doi.org/10.1371/journal.pmed.1004197)] [Medline: [36877740](https://pubmed.ncbi.nlm.nih.gov/36877740/)]
126. Zhao C, Wampold BE, Ren Z, Zhang L, Jiang G. The efficacy and optimal matching of an Internet-based acceptance and commitment therapy intervention for depressive symptoms among university students: A randomized controlled trial in China. *J Clin Psychol*. Jul 2022;78(7):1354-1375. [doi: [10.1002/jclp.23329](https://doi.org/10.1002/jclp.23329)] [Medline: [35191525](https://pubmed.ncbi.nlm.nih.gov/35191525/)]
127. Gao Y, Shi L, Fu N, Yang N, Weeks-Gariepy T, Mao Y. Mobile-delivered mindfulness intervention on anxiety level among college athletes: randomized controlled trial. *J Med Internet Res*. Mar 08, 2024;26:e40406. [FREE Full text] [doi: [10.2196/40406](https://doi.org/10.2196/40406)] [Medline: [38457201](https://pubmed.ncbi.nlm.nih.gov/38457201/)]
128. Li G, Sit HF, Chen W, Wu K, Sou EKL, Wong M, et al. A WHO digital intervention to address depression among young Chinese adults: a type 1 effectiveness-implementation randomized controlled trial. *Transl Psychiatry*. Feb 20, 2024;14(1):102. [doi: [10.1038/s41398-024-02812-3](https://doi.org/10.1038/s41398-024-02812-3)] [Medline: [38378687](https://pubmed.ncbi.nlm.nih.gov/38378687/)]
129. Zhou X, Edirippulige S, Jones A, Bai X, Smith AC, Bambling M. The feasibility, acceptability and efficacy of an app-based intervention (the Coping Camp) in reducing stress among Chinese school adolescents: A cluster randomised controlled trial. *PLoS One*. 2023;18(11):e0294119. [FREE Full text] [doi: [10.1371/journal.pone.0294119](https://doi.org/10.1371/journal.pone.0294119)] [Medline: [38011111](https://pubmed.ncbi.nlm.nih.gov/38011111/)]
130. Sit HF, Hong IW, Burchert S, Sou EKL, Wong M, Chen W, et al. A feasibility study of the who digital mental health intervention step-by-step to address depression among Chinese young adults. *Front Psychiatry*. 2021;12:812667. [FREE Full text] [doi: [10.3389/fpsy.2021.812667](https://doi.org/10.3389/fpsy.2021.812667)] [Medline: [35069297](https://pubmed.ncbi.nlm.nih.gov/35069297/)]
131. He Y, Yang L, Zhu X, Wu B, Zhang S, Qian C, et al. Mental health chatbot for young adults with depressive symptoms during the COVID-19 pandemic: single-blind, three-arm randomized controlled trial. *J Med Internet Res*. Nov 21, 2022;24(11):e40719. [FREE Full text] [doi: [10.2196/40719](https://doi.org/10.2196/40719)] [Medline: [36355633](https://pubmed.ncbi.nlm.nih.gov/36355633/)]
132. Teng M, Hou Y, Chang S, Cheng H. Home-delivered attention bias modification training via smartphone to improve attention control in sub-clinical generalized anxiety disorder: A randomized, controlled multi-session experiment. *J Affect Disord*. Mar 01, 2019;246:444-451. [doi: [10.1016/j.jad.2018.12.118](https://doi.org/10.1016/j.jad.2018.12.118)] [Medline: [30599367](https://pubmed.ncbi.nlm.nih.gov/30599367/)]

133. Sun S, Lin D, Goldberg S, Shen Z, Chen P, Qiao S, et al. A mindfulness-based mobile health (mHealth) intervention among psychologically distressed university students in quarantine during the COVID-19 pandemic: A randomized controlled trial. *J Couns Psychol*. Mar 2022;69(2):157-171. [FREE Full text] [doi: [10.1037/cou0000568](https://doi.org/10.1037/cou0000568)] [Medline: [34264696](https://pubmed.ncbi.nlm.nih.gov/34264696/)]
134. Liu K, Duan Y, Wang Y. The effectiveness of a web-based positive psychology intervention in enhancing college students' mental well-being. *Social Behavior and Personality*. Aug 04, 2021;49(8):1-13. [doi: [10.2224/sbp.10459](https://doi.org/10.2224/sbp.10459)]
135. Walters C, Gratzler D, Dang K, Laposa J, Knyahnytska Y, Ortiz A, et al. The use of text messaging as an adjunct to internet-based cognitive behavioral therapy for major depressive disorder in youth: secondary analysis. *JMIR Form Res*. May 31, 2024;8:e40275. [FREE Full text] [doi: [10.2196/40275](https://doi.org/10.2196/40275)] [Medline: [38820586](https://pubmed.ncbi.nlm.nih.gov/38820586/)]
136. Vereschagin M, Wang AY, Richardson CG, Xie H, Munthali RJ, Hudec KL, et al. Effectiveness of the minder mobile mental health and substance use intervention for university students: randomized controlled trial. *J Med Internet Res*. Mar 27, 2024;26:e54287. [FREE Full text] [doi: [10.2196/54287](https://doi.org/10.2196/54287)] [Medline: [38536225](https://pubmed.ncbi.nlm.nih.gov/38536225/)]
137. Wang Y, Farb NAS. Web-based training for post-secondary student well-being during the pandemic: a randomized trial. *Anxiety Stress Coping*. Jan 2023;36(1):1-17. [doi: [10.1080/10615806.2022.2079637](https://doi.org/10.1080/10615806.2022.2079637)] [Medline: [35615957](https://pubmed.ncbi.nlm.nih.gov/35615957/)]
138. Fiodorova A, Farb N. Brief daily self-care reflection for undergraduate well-being: a randomized control trial of an online intervention. *Anxiety Stress Coping*. Mar 27, 2022;35(2):158-170. [doi: [10.1080/10615806.2021.1949000](https://doi.org/10.1080/10615806.2021.1949000)] [Medline: [34313502](https://pubmed.ncbi.nlm.nih.gov/34313502/)]
139. El Morr C, Ritvo P, Ahmad F, Moineddin R, Team MVC. Effectiveness of an 8-week web-based mindfulness virtual community intervention for university students on symptoms of stress, anxiety, and depression: randomized controlled trial. *JMIR Ment Health*. Jul 17, 2020;7(7):e18595. [FREE Full text] [doi: [10.2196/18595](https://doi.org/10.2196/18595)] [Medline: [32554380](https://pubmed.ncbi.nlm.nih.gov/32554380/)]
140. Walsh KM, Saab BJ, Farb NA. Effects of a mindfulness meditation app on subjective well-being: active randomized controlled trial and experience sampling study. *JMIR Ment Health*. Jan 08, 2019;6(1):e10844. [FREE Full text] [doi: [10.2196/10844](https://doi.org/10.2196/10844)] [Medline: [30622094](https://pubmed.ncbi.nlm.nih.gov/30622094/)]
141. Ritvo P, Ahmad F, El Morr C, Pirbaglou M, Moineddin R, Team MVC. A mindfulness-based intervention for student depression, anxiety, and stress: randomized controlled trial. *JMIR Ment Health*. Jan 11, 2021;8(1):e23491. [FREE Full text] [doi: [10.2196/23491](https://doi.org/10.2196/23491)] [Medline: [33264098](https://pubmed.ncbi.nlm.nih.gov/33264098/)]
142. MacIsaac A, Mushquash AR, Mohammed S, Grassia E, Smith S, Wekerle C. Adverse childhood experiences and building resilience with the JoyPop app: evaluation study. *JMIR Mhealth Uhealth*. Jan 04, 2021;9(1):e25087. [FREE Full text] [doi: [10.2196/25087](https://doi.org/10.2196/25087)] [Medline: [33393908](https://pubmed.ncbi.nlm.nih.gov/33393908/)]
143. Peynenburg V, Hadjistavropoulos H, Thiessen D, Titov N, Dear B. Internet-delivered cognitive behavioral therapy for postsecondary students: randomized factorial trial for examining motivational interviewing and booster lessons. *J Med Internet Res*. Sep 07, 2022;24(9):e40637. [FREE Full text] [doi: [10.2196/40637](https://doi.org/10.2196/40637)] [Medline: [36069785](https://pubmed.ncbi.nlm.nih.gov/36069785/)]
144. O'Connor KA, Bagnell A, Rosychuk RJ, Chen AA, Lingley-Pottie P, Radomski AD, et al. A randomized controlled trial evaluating the effect of an internet-based cognitive-behavioral program on anxiety symptoms in a community-based sample of adolescents. *J Anxiety Disord*. Dec 2022;92:102637. [doi: [10.1016/j.janxdis.2022.102637](https://doi.org/10.1016/j.janxdis.2022.102637)] [Medline: [36179438](https://pubmed.ncbi.nlm.nih.gov/36179438/)]
145. Reininghaus U, Daemen M, Postma MR, Schick A, Hoes-van der Meulen I, Volbragt N, et al. Transdiagnostic Ecological momentary intervention for improving self-esteem in youth exposed to childhood adversity: The SELFIE randomized clinical trial. *JAMA Psychiatry*. Mar 01, 2024;81(3):227-239. [FREE Full text] [doi: [10.1001/jamapsychiatry.2023.4590](https://doi.org/10.1001/jamapsychiatry.2023.4590)] [Medline: [38019495](https://pubmed.ncbi.nlm.nih.gov/38019495/)]
146. Amanvermez Y, Karyotaki E, Cuijpers P, Ciharova M, Donker M, Hurks P, et al. A guided, internet-based stress management intervention for university students with high levels of stress: feasibility and acceptability study. *JMIR Form Res*. Nov 10, 2023;7:e45725. [FREE Full text] [doi: [10.2196/45725](https://doi.org/10.2196/45725)] [Medline: [37948106](https://pubmed.ncbi.nlm.nih.gov/37948106/)]
147. van Doorn M, Monsanto A, Wang CL, Verfaillie SCJ, van Amelsvoort TAMJ, Popma A, et al. The effects of a digital, transdiagnostic, clinically and peer-moderated treatment platform for young people with emerging mental health complaints: repeated measures within-subjects study. *JMIR Mhealth Uhealth*. Dec 13, 2023;11:e50636. [FREE Full text] [doi: [10.2196/50636](https://doi.org/10.2196/50636)] [Medline: [38090802](https://pubmed.ncbi.nlm.nih.gov/38090802/)]
148. Rauschenberg C, Boecking B, Paetzold I, Schruers K, Schick A, van Amelsvoort T, et al. A compassion-focused ecological momentary intervention for enhancing resilience in help-seeking youth: uncontrolled pilot study. *JMIR Ment Health*. Aug 05, 2021;8(8):e25650. [FREE Full text] [doi: [10.2196/25650](https://doi.org/10.2196/25650)] [Medline: [34383687](https://pubmed.ncbi.nlm.nih.gov/34383687/)]
149. Karyotaki E, Klein AM, Ciharova M, Bolinski F, Krijnen L, de Koning L, et al. Guided internet-based transdiagnostic individually tailored Cognitive Behavioral Therapy for symptoms of depression and/or anxiety in college students: A randomized controlled trial. *Behav Res Ther*. Mar 2022;150:104028. [FREE Full text] [doi: [10.1016/j.brat.2021.104028](https://doi.org/10.1016/j.brat.2021.104028)] [Medline: [35066365](https://pubmed.ncbi.nlm.nih.gov/35066365/)]
150. Dietvorst E, Legerstee JS, Vreeker A, Koval S, Mens MM, Keijsers L, et al. The Grow It! app-longitudinal changes in adolescent well-being during the COVID-19 pandemic: a proof-of-concept study. *Eur Child Adolesc Psychiatry*. Jun 2023;32(6):1097-1107. [FREE Full text] [doi: [10.1007/s00787-022-01982-z](https://doi.org/10.1007/s00787-022-01982-z)] [Medline: [35524826](https://pubmed.ncbi.nlm.nih.gov/35524826/)]
151. Mens MMJ, Keijsers L, Dietvorst E, Koval S, Legerstee JS, Hillegers MHJ. Promoting daily well-being in adolescents using mHealth. *J Youth Adolesc*. Nov 2022;51(11):2173-2189. [FREE Full text] [doi: [10.1007/s10964-022-01656-8](https://doi.org/10.1007/s10964-022-01656-8)] [Medline: [35867325](https://pubmed.ncbi.nlm.nih.gov/35867325/)]

152. Thabrew H, Kumar H, Steadman E. Acceptability and feasibility of "Village," a digital communication app for young people experiencing low mood, thoughts of self-harm, and suicidal ideation to obtain support from family and friends: mixed methods pilot open trial. *JMIR Form Res*. Mar 13, 2023;7:e41273. [[FREE Full text](#)] [doi: [10.2196/41273](https://doi.org/10.2196/41273)] [Medline: [36912882](https://pubmed.ncbi.nlm.nih.gov/36912882/)]
153. Flett JAM, Conner TS, Riordan BC, Patterson T, Hayne H. App-based mindfulness meditation for psychological distress and adjustment to college in incoming university students: a pragmatic, randomised, waitlist-controlled trial. *Psychol Health*. Sep 2020;35(9):1049-1074. [doi: [10.1080/08870446.2019.1711089](https://doi.org/10.1080/08870446.2019.1711089)] [Medline: [32046499](https://pubmed.ncbi.nlm.nih.gov/32046499/)]
154. Williams R, Hopkins S, Frampton C, Holt-Quick C, Merry SN, Stasiak K. 21-day stress detox: open trial of a universal well-being chatbot for young adults. *Social Sciences*. Oct 30, 2021;10(11):416. [doi: [10.3390/socsci10110416](https://doi.org/10.3390/socsci10110416)]
155. Flett JAM, Hayne H, Riordan BC, Thompson LM, Conner TS. Mobile mindfulness meditation: a randomised controlled trial of the effect of two popular apps on mental health. *Mindfulness*. Oct 31, 2018;10(5):863-876. [doi: [10.1007/s12671-018-1050-9](https://doi.org/10.1007/s12671-018-1050-9)]
156. Serlachius A, Boggiss A, Lim D, Schache K, Wallace-Boyd K, Brenton-Peters J, et al. Pilot study of a well-being app to support New Zealand young people during the COVID-19 pandemic. *Internet Interv*. Dec 2021;26:100464. [[FREE Full text](#)] [doi: [10.1016/j.invent.2021.100464](https://doi.org/10.1016/j.invent.2021.100464)] [Medline: [34631433](https://pubmed.ncbi.nlm.nih.gov/34631433/)]
157. Thabrew H, Boggiss AL, Lim D, Schache K, Morunga E, Cao N, et al. Well-being app to support young people during the COVID-19 pandemic: randomised controlled trial. *BMJ Open*. May 19, 2022;12(5):e058144. [[FREE Full text](#)] [doi: [10.1136/bmjopen-2021-058144](https://doi.org/10.1136/bmjopen-2021-058144)] [Medline: [35589362](https://pubmed.ncbi.nlm.nih.gov/35589362/)]
158. Paetzold I, Schick A, Rauschenberg C, Hirjak D, Banaschewski T, Meyer-Lindenberg A, et al. Exploring putative therapeutic mechanisms of change in a hybrid compassion-focused, ecological momentary intervention: Findings from the EMCompass trial. *Behav Res Ther*. Sep 2023;168:104367. [doi: [10.1016/j.brat.2023.104367](https://doi.org/10.1016/j.brat.2023.104367)] [Medline: [37467549](https://pubmed.ncbi.nlm.nih.gov/37467549/)]
159. Karing C. Long-term effects of combined mindfulness intervention and app intervention compared to single interventions during the COVID-19 pandemic: a randomized controlled trial. *Front Psychol*. 2024;15:1355757. [[FREE Full text](#)] [doi: [10.3389/fpsyg.2024.1355757](https://doi.org/10.3389/fpsyg.2024.1355757)] [Medline: [38566946](https://pubmed.ncbi.nlm.nih.gov/38566946/)]
160. Atik E, Stricker J, Schückes M, Pittig A. Efficacy of a brief blended cognitive behavioral therapy program for the treatment of depression and anxiety in university students: uncontrolled intervention study. *JMIR Ment Health*. Aug 25, 2023;10:e44742. [[FREE Full text](#)] [doi: [10.2196/44742](https://doi.org/10.2196/44742)] [Medline: [37624631](https://pubmed.ncbi.nlm.nih.gov/37624631/)]
161. Bruhns A, Lüdtke T, Moritz S, Bücken L. A mobile-based intervention to increase self-esteem in students with depressive symptoms: randomized controlled trial. *JMIR Mhealth Uhealth*. Jul 12, 2021;9(7):e26498. [[FREE Full text](#)] [doi: [10.2196/26498](https://doi.org/10.2196/26498)] [Medline: [34255711](https://pubmed.ncbi.nlm.nih.gov/34255711/)]
162. Lahtinen O, Salmivalli C. The relationship between mindfulness meditation and well-being during 8 weeks of ecological momentary assessment. *Mindfulness*. Nov 18, 2019;11(1):255-263. [doi: [10.1007/s12671-019-01248-x](https://doi.org/10.1007/s12671-019-01248-x)]
163. Kurki M, Gilbert S, Mishina K, Lempinen L, Luntamo T, Hinkka-Yli-Salomäki S, et al. Digital mental health literacy program for the first-year medical students' wellbeing: a one group quasi-experimental study. *BMC Med Educ*. Nov 06, 2021;21(1):563. [[FREE Full text](#)] [doi: [10.1186/s12909-021-02990-4](https://doi.org/10.1186/s12909-021-02990-4)] [Medline: [34742258](https://pubmed.ncbi.nlm.nih.gov/34742258/)]
164. Lahtinen O, Salmivalli C. An effectiveness study of a digital mindfulness-based program for upper secondary education students. *Mindfulness*. Aug 01, 2020;11(11):2494-2505. [doi: [10.1007/s12671-020-01462-y](https://doi.org/10.1007/s12671-020-01462-y)]
165. Lindegaard T, Wasteson E, Demetry Y, Andersson G, Richards D, Shahnavaz S. Investigating the potential of a novel internet-based cognitive behavioural intervention for Dari and Farsi speaking refugee youth: A feasibility study. *Internet Interv*. Apr 2022;28:100533. [[FREE Full text](#)] [doi: [10.1016/j.invent.2022.100533](https://doi.org/10.1016/j.invent.2022.100533)] [Medline: [35433279](https://pubmed.ncbi.nlm.nih.gov/35433279/)]
166. Hasselberg A, Ronnlund M. Cultivating self-kindness and attention to the present moment in the young: A pilot-study of a two-week internet-delivered mindfulness and self-compassion program. Oxfordshire, United Kingdom. Taylor & Francis; 2020.
167. Weiss EM, Staggl S, Holzner B, Rumpold G, Dresen V, Canazei M. Preventive effect of a 7-week app-based passive psychoeducational stress management program on students. *Behav Sci (Basel)*. Feb 25, 2024;14(3):180. [[FREE Full text](#)] [doi: [10.3390/bs14030180](https://doi.org/10.3390/bs14030180)] [Medline: [38540483](https://pubmed.ncbi.nlm.nih.gov/38540483/)]
168. Tagalidou N, Baier J, Laireiter A. The effects of three positive psychology interventions using online diaries: A randomized-placebo controlled trial. *Internet Interv*. Sep 2019;17:100242. [[FREE Full text](#)] [doi: [10.1016/j.invent.2019.100242](https://doi.org/10.1016/j.invent.2019.100242)] [Medline: [30923680](https://pubmed.ncbi.nlm.nih.gov/30923680/)]
169. Newman MG, Kanuri N, Rackoff GN, Jacobson NC, Bell MJ, Taylor CB. A randomized controlled feasibility trial of internet-delivered guided self-help for generalized anxiety disorder (GAD) among university students in India. *Psychotherapy (Chic)*. Dec 2021;58(4):591-601. [[FREE Full text](#)] [doi: [10.1037/pst0000383](https://doi.org/10.1037/pst0000383)] [Medline: [34881930](https://pubmed.ncbi.nlm.nih.gov/34881930/)]
170. Singh K, Bandyopadhyay S. Enhancing college students well-being: The psycho-spiritual well-being intervention. *Journal of Human Behavior in the Social Environment*. Jan 04, 2021;31(7):867-888. [doi: [10.1080/10911359.2020.1823294](https://doi.org/10.1080/10911359.2020.1823294)]
171. Moeini B, Bashirian S, Soltanian AR, Ghaleiha A, Taheri M. Examining the effectiveness of a web-based intervention for depressive symptoms in female adolescents: applying social cognitive theory. *J Res Health Sci*. Aug 19, 2019;19(3):e00454. [[FREE Full text](#)] [Medline: [31586376](https://pubmed.ncbi.nlm.nih.gov/31586376/)]

172. Di Consiglio M, Fabrizi G, Conversi D, La Torre G, Pascucci T, Lombardo C, et al. Effectiveness of NoiBene: A Web-based programme to promote psychological well-being and prevent psychological distress in university students. *Appl Psychol Health Well Being*. May 2021;13(2):317-340. [doi: [10.1111/aphw.12251](https://doi.org/10.1111/aphw.12251)] [Medline: [33595198](https://pubmed.ncbi.nlm.nih.gov/33595198/)]
173. Gabrielli S, Rizzi S, Bassi G, Carbone S, Maimone R, Marchesoni M, et al. Engagement and effectiveness of a healthy-coping intervention via chatbot for university students during the COVID-19 pandemic: mixed methods proof-of-concept study. *JMIR Mhealth Uhealth*. May 28, 2021;9(5):e27965. [FREE Full text] [doi: [10.2196/27965](https://doi.org/10.2196/27965)] [Medline: [33950849](https://pubmed.ncbi.nlm.nih.gov/33950849/)]
174. Toh SHY, Tan JHY, Kosasih FR, Sündermann O. Efficacy of the mental health app intellect to reduce stress: randomized controlled trial with a 1-month follow-up. *JMIR Form Res*. Dec 14, 2022;6(12):e40723. [FREE Full text] [doi: [10.2196/40723](https://doi.org/10.2196/40723)] [Medline: [36515984](https://pubmed.ncbi.nlm.nih.gov/36515984/)]
175. Ang WHD, Shorey S, Zheng ZJ, Ng WHD, Chen EC, Shah LBI, et al. Resilience for undergraduate students: development and evaluation of a theory-driven, evidence-based and learner centered digital resilience skills enhancement (RISE) program. *Int J Environ Res Public Health*. Oct 05, 2022;19(19):12729. [FREE Full text] [doi: [10.3390/ijerph191912729](https://doi.org/10.3390/ijerph191912729)] [Medline: [36232028](https://pubmed.ncbi.nlm.nih.gov/36232028/)]
176. Marciniak MA, Shanahan L, Myin-Germeys I, Veer IM, Yuen KSL, Binder H, et al. Imager-A mobile health mental imagery-based ecological momentary intervention targeting reward sensitivity: A randomized controlled trial. *Appl Psychol Health Well Being*. May 2024;16(2):576-596. [doi: [10.1111/aphw.12505](https://doi.org/10.1111/aphw.12505)] [Medline: [37942875](https://pubmed.ncbi.nlm.nih.gov/37942875/)]
177. Rohde J, Marciniak MA, Henninger M, Homan S, Paersch C, Egger ST, et al. Investigating relationships among self-efficacy, mood, and anxiety using digital technologies: randomized controlled trial. *JMIR Form Res*. Aug 14, 2023;7:e45749. [FREE Full text] [doi: [10.2196/45749](https://doi.org/10.2196/45749)] [Medline: [37578827](https://pubmed.ncbi.nlm.nih.gov/37578827/)]
178. Silva LJS, Monteiro REM, Meneses DAD, Bandeira ID, Lopez LCS. Efficacy of an online intervention for anxiety prevention: A clinical trial. *Psicologia: Teoria e Prática*. 2023;25(3):1-19. [doi: [10.5935/1980-6906/eptpcp15070.en](https://doi.org/10.5935/1980-6906/eptpcp15070.en)]
179. Salamanca-Sanabria A, Richards D, Timulak L, Connell S, Mojica Perilla M, Parra-Villa Y, et al. A culturally adapted cognitive behavioral internet-delivered intervention for depressive symptoms: randomized controlled trial. *JMIR Ment Health*. Jan 31, 2020;7(1):e13392. [FREE Full text] [doi: [10.2196/13392](https://doi.org/10.2196/13392)] [Medline: [32003749](https://pubmed.ncbi.nlm.nih.gov/32003749/)]
180. Světlák M, Linhartová P, Knejzlíková T, Knejzlík J, Kóša B, Horníčková V, et al. Being mindful at university: a pilot evaluation of the feasibility of an online mindfulness-based mental health support program for students. *Front Psychol*. 2020;11:581086. [FREE Full text] [doi: [10.3389/fpsyg.2020.581086](https://doi.org/10.3389/fpsyg.2020.581086)] [Medline: [33505332](https://pubmed.ncbi.nlm.nih.gov/33505332/)]
181. Bonnesen CT, Thygesen LC, Rod NH, Toftager M, Madsen KR, Jensen MP, et al. Preventing stress among high school students in Denmark through the multicomponent healthy high school intervention—the effectiveness at first follow-up. *Int J Environ Res Public Health*. Jan 18, 2023;20(3):1754. [FREE Full text] [doi: [10.3390/ijerph20031754](https://doi.org/10.3390/ijerph20031754)] [Medline: [36767122](https://pubmed.ncbi.nlm.nih.gov/36767122/)]
182. Theurel A, Witt A, Shankland R. Promoting university students' mental health through an online multicomponent intervention during the COVID-19 pandemic. *Int J Environ Res Public Health*. Aug 22, 2022;19(16):10442. [FREE Full text] [doi: [10.3390/ijerph191610442](https://doi.org/10.3390/ijerph191610442)] [Medline: [36012078](https://pubmed.ncbi.nlm.nih.gov/36012078/)]
183. Listiyandini RA, Andriani A, Afsari N, Krisnamurthi P, Moulds M, Mahoney A, et al. Evaluating the feasibility of a guided culturally adapted internet-delivered mindfulness intervention for Indonesian university students experiencing psychological distress. *Mindfulness*. Apr 16, 2024;15(5):1095-1108. [doi: [10.1007/s12671-024-02346-1](https://doi.org/10.1007/s12671-024-02346-1)]
184. Kenny R, Fitzgerald A, Segurado R, Dooley B. Is there an app for that? A cluster randomised controlled trial of a mobile app-based mental health intervention. *Health Informatics J*. Sep 2020;26(3):1538-1559. [FREE Full text] [doi: [10.1177/1460458219884195](https://doi.org/10.1177/1460458219884195)] [Medline: [31702409](https://pubmed.ncbi.nlm.nih.gov/31702409/)]
185. Mizuta R, Maeda N, Tashiro T, Suzuki Y, Kuroda S, Ishida A, et al. Effectiveness of metaverse space-based exercise video distribution in young adults: randomized controlled trial. *JMIR Mhealth Uhealth*. Jan 16, 2024;12:e46397. [FREE Full text] [doi: [10.2196/46397](https://doi.org/10.2196/46397)] [Medline: [38227355](https://pubmed.ncbi.nlm.nih.gov/38227355/)]
186. Goozee R, Barrable A, Lubenko J, Papadatou-Pastou M, Haddad M, McKeown E, et al. Investigating the feasibility of MePlusMe, an online intervention to support mental health, well-being, and study skills in higher education students. *J Ment Health*. Oct 2024;33(5):576-586. [doi: [10.1080/09638237.2022.2069699](https://doi.org/10.1080/09638237.2022.2069699)] [Medline: [35549804](https://pubmed.ncbi.nlm.nih.gov/35549804/)]
187. Dumarkaite A, Truskauskaitė-Kuneviciene I, Andersson G, Kazlauskas E. The effects of online mindfulness-based intervention on posttraumatic stress disorder and complex posttraumatic stress disorder symptoms: a randomized controlled trial with 3-month follow-up. *Front Psychiatry*. Mar 30, 2022;13:799259. [FREE Full text] [doi: [10.3389/fpsyg.2022.799259](https://doi.org/10.3389/fpsyg.2022.799259)] [Medline: [35432020](https://pubmed.ncbi.nlm.nih.gov/35432020/)]
188. Harith H, Nik Farid ND, Yahya A, Mohd Shuib NL. The effectiveness of EduMind for mental health promotion among youths. *Cureus*. May 2024;16(5):e61462. [FREE Full text] [doi: [10.7759/cureus.61462](https://doi.org/10.7759/cureus.61462)] [Medline: [38826914](https://pubmed.ncbi.nlm.nih.gov/38826914/)]
189. Maciejewski J, Smoktunowicz E. Low-effort internet intervention to reduce students' stress delivered with Meta's Messenger chatbot (Stressbot): A randomized controlled trial. *Internet Interv*. Sep 2023;33:100653. [FREE Full text] [doi: [10.1016/j.invent.2023.100653](https://doi.org/10.1016/j.invent.2023.100653)] [Medline: [37575678](https://pubmed.ncbi.nlm.nih.gov/37575678/)]
190. Mendes DCG, de Almeida AY, Lucas CV, Soares L, Bermúdez i Badia S. A Pilot Study to Evaluate the Feasibility of a Science-Based Game Called Symphony to Alleviate Depression Symptoms. In: Papadopoulos GA, Achilleos A, Pissaloux E, Velázquez R, editors. *ICT for Health, Accessibility and Wellbeing. IHAW 2022. Communications in Computer and Information Science*, vol 1799. Cham. Springer; 2023:147-161.

191. Ha S, Kim J. Designing a scalable, accessible, and effective mobile app based solution for common mental health problems. *International Journal of Human-Computer Interaction*. Apr 26, 2020;36(14):1354-1367. [doi: [10.1080/10447318.2020.1750792](https://doi.org/10.1080/10447318.2020.1750792)]
192. Krifa I, Hallez Q, van Zyl LE, Braham A, Sahli J, Ben Nasr S, et al. Effectiveness of an online positive psychology intervention among Tunisian healthcare students on mental health and study engagement during the Covid-19 pandemic. *Appl Psychol Health Well Being*. Nov 22, 2022;14(4):1228-1254. [doi: [10.1111/aphw.12332](https://doi.org/10.1111/aphw.12332)] [Medline: [34939332](https://pubmed.ncbi.nlm.nih.gov/34939332/)]
193. Krafft J, Potts S, Schoendorff B, Levin ME. A randomized controlled trial of multiple versions of an acceptance and commitment therapy matrix app for well-being. *Behav Modif*. Mar 2019;43(2):246-272. [doi: [10.1177/0145445517748561](https://doi.org/10.1177/0145445517748561)] [Medline: [29262693](https://pubmed.ncbi.nlm.nih.gov/29262693/)]
194. Levin ME, Hicks ET, Krafft J. Pilot evaluation of the stop, breathe and think mindfulness app for student clients on a college counseling center waitlist. *J Am Coll Health*. Jan 2022;70(1):165-173. [doi: [10.1080/07448481.2020.1728281](https://doi.org/10.1080/07448481.2020.1728281)] [Medline: [32150519](https://pubmed.ncbi.nlm.nih.gov/32150519/)]
195. Arnett JJ. Emerging adulthood. A theory of development from the late teens through the twenties. *Am Psychol*. May 2000;55(5):469-480. [Medline: [10842426](https://pubmed.ncbi.nlm.nih.gov/10842426/)]
196. Gordon RS. An operational classification of disease prevention. *Public Health Rep*. 1983;98(2):107-109. [FREE Full text] [Medline: [6856733](https://pubmed.ncbi.nlm.nih.gov/6856733/)]
197. Fusar-Poli P, Correll CU, Arango C, Berk M, Patel V, Ioannidis JPA. Preventive psychiatry: a blueprint for improving the mental health of young people. *World Psychiatry*. Jun 2021;20(2):200-221. [FREE Full text] [doi: [10.1002/wps.20869](https://doi.org/10.1002/wps.20869)] [Medline: [34002494](https://pubmed.ncbi.nlm.nih.gov/34002494/)]
198. Luo C, Sanger N, Singhal N, Patrick K, Shams I, Shahid H, et al. A comparison of electronically-delivered and face to face cognitive behavioural therapies in depressive disorders: A systematic review and meta-analysis. *EClinicalMedicine*. Jul 2020;24:100442. [FREE Full text] [doi: [10.1016/j.eclinm.2020.100442](https://doi.org/10.1016/j.eclinm.2020.100442)] [Medline: [32775969](https://pubmed.ncbi.nlm.nih.gov/32775969/)]
199. Thompson EM, Destree L, Albertella L, Fontenelle LF. Internet-based acceptance and commitment therapy: a transdiagnostic systematic review and meta-analysis for mental health outcomes. *Behav Ther*. Mar 2021;52(2):492-507. [doi: [10.1016/j.beth.2020.07.002](https://doi.org/10.1016/j.beth.2020.07.002)] [Medline: [33622516](https://pubmed.ncbi.nlm.nih.gov/33622516/)]
200. Naslund JA, Aschbrenner KA, Kim SJ, McHugo GJ, Unützer J, Bartels SJ, et al. Health behavior models for informing digital technology interventions for individuals with mental illness. *Psychiatr Rehabil J*. Sep 2017;40(3):325-335. [FREE Full text] [doi: [10.1037/prj0000246](https://doi.org/10.1037/prj0000246)] [Medline: [28182469](https://pubmed.ncbi.nlm.nih.gov/28182469/)]
201. Youth-centred digital health interventions: a framework for planning, developing and implementing solutions with and for young people. World Health Organization. URL: <https://www.who.int/publications/i/item/9789240011717> [accessed 2025-04-26]
202. Williams AJ, Jones C, Arcelus J, Townsend E, Lazaridou A, Michail M. A systematic review and meta-analysis of victimisation and mental health prevalence among LGBTQ+ young people with experiences of self-harm and suicide. *PLoS One*. 2021;16(1):e0245268. [FREE Full text] [doi: [10.1371/journal.pone.0245268](https://doi.org/10.1371/journal.pone.0245268)] [Medline: [33481862](https://pubmed.ncbi.nlm.nih.gov/33481862/)]
203. di Giacomo E, Krausz M, Colmegna F, Aspesi F, Clerici M. Estimating the risk of attempted suicide among sexual minority youths: a systematic review and meta-analysis. *JAMA Pediatr*. Dec 01, 2018;172(12):1145-1152. [FREE Full text] [doi: [10.1001/jamapediatrics.2018.2731](https://doi.org/10.1001/jamapediatrics.2018.2731)] [Medline: [30304350](https://pubmed.ncbi.nlm.nih.gov/30304350/)]
204. Sharland E, Rzepnicka K, Schneider D, Finning K, Pawelek P, Saunders R, et al. Socio-demographic differences in access to psychological treatment services: evidence from a national cohort study. *Psychol Med*. Nov 2023;53(15):7395-7406. [FREE Full text] [doi: [10.1017/S0033291723001010](https://doi.org/10.1017/S0033291723001010)] [Medline: [37194490](https://pubmed.ncbi.nlm.nih.gov/37194490/)]
205. Bergin AD, Vallejos EP, Davies EB, Daley D, Ford T, Harold G, et al. Preventive digital mental health interventions for children and young people: a review of the design and reporting of research. *NPJ Digit Med*. 2020;3:133. [FREE Full text] [doi: [10.1038/s41746-020-00339-7](https://doi.org/10.1038/s41746-020-00339-7)] [Medline: [33083568](https://pubmed.ncbi.nlm.nih.gov/33083568/)]
206. Schuster R, Kaiser T, Terhorst Y, Messner EM, Strohmeier L, Laireiter A. Sample size, sample size planning, and the impact of study context: systematic review and recommendations by the example of psychological depression treatment. *Psychol Med*. Apr 2021;51(6):902-908. [FREE Full text] [doi: [10.1017/S003329172100129X](https://doi.org/10.1017/S003329172100129X)] [Medline: [33879275](https://pubmed.ncbi.nlm.nih.gov/33879275/)]
207. Melville KM, Casey LM, Kavanagh DJ. Dropout from Internet-based treatment for psychological disorders. *Br J Clin Psychol*. Nov 2010;49(Pt 4):455-471. [doi: [10.1348/014466509X472138](https://doi.org/10.1348/014466509X472138)] [Medline: [19799804](https://pubmed.ncbi.nlm.nih.gov/19799804/)]
208. Farris MS, Devoe DJ, Addington J. Attrition rates in trials for adolescents and young adults at clinical high-risk for psychosis: A systematic review and meta-analysis. *Early Interv Psychiatry*. Oct 2020;14(5):515-527. [FREE Full text] [doi: [10.1111/eip.12864](https://doi.org/10.1111/eip.12864)] [Medline: [31422583](https://pubmed.ncbi.nlm.nih.gov/31422583/)]
209. Abshire M, Dinglas VD, Cajita MIA, Eakin MN, Needham DM, Himmelfarb CD. Participant retention practices in longitudinal clinical research studies with high retention rates. *BMC Med Res Methodol*. Feb 20, 2017;17(1):30. [FREE Full text] [doi: [10.1186/s12874-017-0310-z](https://doi.org/10.1186/s12874-017-0310-z)] [Medline: [28219336](https://pubmed.ncbi.nlm.nih.gov/28219336/)]
210. Fleming T, Bavin L, Lucassen M, Stasiak K, Hopkins S, Merry S. Beyond the trial: systematic review of real-world uptake and engagement with digital self-help interventions for depression, low mood, or anxiety. *J Med Internet Res*. Jun 06, 2018;20(6):e199. [FREE Full text] [doi: [10.2196/jmir.9275](https://doi.org/10.2196/jmir.9275)] [Medline: [29875089](https://pubmed.ncbi.nlm.nih.gov/29875089/)]

211. Jong ST, Stevenson R, Winpenny EM, Corder K, van Sluijs EMF. Recruitment and retention into longitudinal health research from an adolescent perspective: a qualitative study. *BMC Med Res Methodol*. Jan 16, 2023;23(1):16. [FREE Full text] [doi: [10.1186/s12874-022-01802-7](https://doi.org/10.1186/s12874-022-01802-7)] [Medline: [36647003](https://pubmed.ncbi.nlm.nih.gov/36647003/)]

Abbreviations

CBT: cognitive behavioral therapy
DMHI: digital mental health intervention
LGBTQ+: lesbian, gay, bisexual, transgender, and queer
OSF: Open Science Framework
RCT: randomized controlled trial

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