






# Types of Digital Mindfulness: Improving Mental Health Among College Students – A Scoping Review

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**Abstract:** The pressure of learning on students causes mental health problems in students. This can disrupt the student's academic process. The previous review still focused on the impact of digital mindfulness on students, but did not describe the various types of digital mindfulness on students' mental health. A digital image of mindfulness is needed to be a reference for health workers in providing health services to students. The purpose of this study is to describe types of digital-based mindfulness method to improve mental health in university students. The method used in this study was a scoping review. The databases used were CINAHL, PubMed, and Scopus. Search strategy used PRISMA for Scoping Review with keywords namely mindfulness, digital, mental health, and students. The inclusion criteria in this study were student samples, digital-based mindfulness therapy, randomized control trial and quasi-experiment designs, and publication year in the last 10 years (2014–2023). We found that 11 articles about digital-based mindfulness therapy is effective in improving mental health in college students. The types of digital mindfulness carried out are education, counseling, and meditation. Range of samples are 54–561 university students. In addition, there are also counseling services and therapy training guided by facilitators. Information is presented through video and audio that can be accessed at any time by students. Application development is needed by adding monitoring and evaluation features to monitor student compliance in conducting mindfulness therapy and counseling schedules. Then, the role of health workers through holistic mental health services by involving families can improve the process of developing services for students optimally.

**Keywords:** digital, mindfulness, mental health, students

## Introduction

Mental health is a major aspect in determining the health of an individual among students. Previous research at nineteen universities in eight countries found that 35% of students in their lifetime experienced at least one DSM-IV mental disorder, namely anxiety, mood, or substance disorder where 31.4% experienced it within the last 12 months.<sup>1</sup> Previous research on freshmen mental health problems at a university showed that 12.69% of students experienced psychiatric problems.<sup>2</sup> The American College Health Association's National College Health Assessment (NCHA) survey of 157 institutions and 98,050 students, found that 53% of students reported experiencing moderate or severe levels of stress within the past 12 months.<sup>3</sup> Findings on college students in the US suggest that there are approximately 22.1% of college students diagnosed and/or being treated by a psychologist or psychiatrist as having excessive anxiety.<sup>4</sup> In Indonesia, it was found that 47.7% of university students experienced mild to severe depression and 27.4% experienced anxiety.<sup>5</sup>

The disruption of student mental health is influenced by several factors, including the imbalance between physical activities, thinking activities, communication patterns, and associations, as well as daily lifestyles.<sup>6</sup> These factors can affect students' mental health in both positive and negative ways. Sources of mental health problems experienced by students can be in the form of academic standard exams, fear of failure, task or workload, being away from home, and

also financial problems.<sup>7</sup> Other studies have also shown that mental health problems in students occur due to academic pressure and changes in learning methods from offline and online during the covid-19 pandemic.<sup>8,9</sup>

Disrupted mental health impacts various aspects of people's lives. When depression is long-lasting and of moderate or severe intensity, it can become a serious health condition.<sup>10</sup> It can cause the affected person to suffer greatly and be unable to function well at work, at school and in the family. 800,000 people die by suicide every year. Suicide is the second leading cause of death among 15–29 year olds.<sup>10</sup> Other research shows that the negative impact that occurs due to unaddressed stress causes the need for an effort to reduce the stress level of students.<sup>11</sup> Psychological disorders can have an impact on their academic achievement, emotional management, and also their functioning in social relationships.<sup>12</sup> Psychological disorders also make it difficult for students to achieve academic achievement, because psychological disorders can encourage students to dropout.<sup>10,13</sup>

In recent years, many studies have been conducted on the effect of intervention on mental health problems experienced by university students.<sup>14,15</sup> One study showed that mindfulness is effective in reducing stress levels in university students during online learning.<sup>16</sup> Mindfulness is a person's ability to consciously enjoy the present moment, accepting it without giving a judgment (nonjudgement).<sup>17</sup> Mindfulness brings students to focus on realizing the current condition, accepting it with full sincerity, without reacting and giving judgment to this moment.<sup>18</sup> Other research also shows that counseling is an effective effort in reducing depression and anxiety problems in online learning survivors.<sup>19</sup>

The importance of digital mindfulness is increasingly underscored by research findings showing its positive effects on sleep, emotional regulation, stress, depression, anxiety and improving overall quality of life.<sup>20</sup> As technology continues to develop, applications and digital tools are increasingly sophisticated in providing personalized mindfulness experiences, according to each user's needs.<sup>21</sup> The urgency of digital mindfulness as a mental health intervention lies not only in its proven effectiveness, but also in its potential to reach and empower many individuals around the world.<sup>22</sup> As the global mental health burden increases, a deeper understanding of the benefits of digital mindfulness becomes increasingly vital for forming effective strategies to improve mental wellbeing in this digital era.

Previous scoping reviews on mindfulness interventions show that mindfulness therapy can effectively improve psychological wellbeing in college students.<sup>23</sup> The research shows that there is a method of mindfulness intervention that uses the use of technology, so further reviews are needed to analyze technology-based mindfulness therapy. Previous research shows that mindfulness training can improve aspects of psychosocial well-being.<sup>17</sup> While mindfulness is traditionally taught in person, and consumers are increasingly turning to smartphone-based mindfulness apps as an alternative medium for training. This study is the first scoping review that discusses digital-based mindfulness to reduce mental health problems in university students.

Digital mindfulness combines traditional mindfulness principles with advanced technology, forming an innovative approach to improving mental health.<sup>21</sup> The combination of mindfulness practices and digital technology creates new opportunities to provide broader, flexible and affordable mental health support. Previous systematic review showed that the effects of digital mindfulness can significantly reduce stress and depression.<sup>24</sup> However, there is no review that describes various types of digital mindfulness to improve mental health in students. Various information about digital mindfulness is needed to provide an overview for health workers in improving their mental health.

Mental health is important to improve the learning process in university students. Mental health problems in college students cause disruption to the academic process and lead to suicide risk. Mindfulness therapy is one of the efforts to reduce mental health problems in college students. The utilization of technology is an effort to improve the mindfulness intervention process so that it can reach all students. The purpose of this study is to describe types of digital mindfulness to improve mental health in university students.

## Materials and Methods

### Design

The authors used a scoping review design in this research. This method aims to discuss various research results on topics and issues that are currently a world problem.<sup>25</sup> Researchers can describe various previous findings from any databases.<sup>26</sup> This research will adopt a systematic methodological approach by adhering to the stages of using the PRISMA for Scoping Review checklist as a detailed methodological guide. The initial stages of the research will begin with selecting research questions, identifying inclusion and exclusion criteria, and researching literature search strategies.<sup>27</sup> The next

step will involve searching and selecting relevant studies, where this research will conduct a thorough search on leading academic databases from three databases namely CINAHL, PubMed, and Scopus. After collecting articles that meet the inclusion criteria, this research will analyze the data, compile significant findings, and identify possible knowledge deviations. This process will be accompanied by the preparation of a report that complies with the PRISMA format, describes the results through extraction tables, and describes the various types of digital mindfulness.<sup>27</sup> Article identification used PRISMA Extension for Scoping Reviews (PRISMA-ScR) to obtain articles about digital mindfulness on student mental health. This research question is how digital mindfulness can improve mental health in university students.

## Search Methods

The authors used keywords to search for articles. The keywords used consisted of three concepts: digital mindfulness, mental health, and students. The authors used a search strategy to determine the various keywords used in three databases, namely: CINAHL, PubMed, and Scopus. The authors chose these three databases because they are large databases that have published many reputable articles. The article search was conducted from May 2023 – June 2023 used the keywords “digital mindfulness” OR “technology mindfulness” OR “apps mindfulness” AND “mental health” OR “mental condition” OR “mental state” AND “students” OR “college students”. The question in this review is how does digital-based mindfulness affect college students’ mental health?

## Inclusion and Exclusion Criteria

The search strategy in this study used the PRISMA Extension for Scoping Review (PRISMA-ScR) flow chart to select articles (Figure 1). Inclusion criteria and exclusion criteria were set by the authors in the article selection process. The authors used PCC’s framework as the basis for determining keywords in this study.

Populations: Students, college students

Concept: digital mindfulness, technology mindfulness

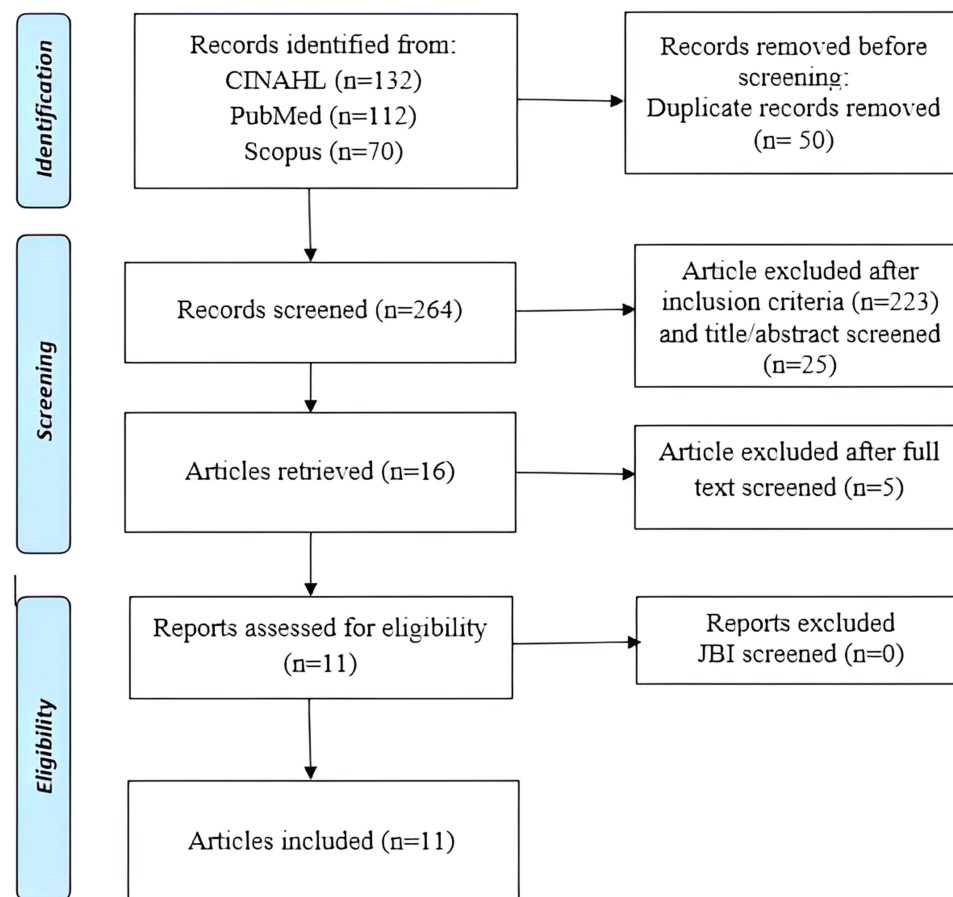
Context: mental health

The inclusion criteria in this study are original research with a randomized control trial or quasi-experiment design to find various technology-based mindfulness interventions, English language, the sample is university students, full-text, and the publication period of the last 10 years (2013–2023) to get the latest research that discusses the intervention (Figure 1). The exclusion criteria in this study were that the sample was not a student and the mindfulness intervention was not technology-based.

## Data Extraction

After obtaining articles based on the results of the article search and elimination based on the inclusion criteria and exclusion criteria, the authors read the full-text articles to find appropriate articles in accordance with the research objectives. Then the authors performed data extraction by entering important data from the article into a manual table. The authors also summarized the findings based on the required data. The data extraction table included authors and year of publication, country, study design, sample, intervention description, and study results. The presentation of manual tables can make it easier for authors to compare the findings of the articles obtained.

The assessment of this article was carried out independently by two researchers independently with a focus on validity, methodology, and overall research quality. Evaluation is carried out on the continuity of the line of argumentation, the adequacy of empirical evidence, and the success of the research in answering the research questions asked. The second researcher focuses on the accuracy and validity of the results, and investigates whether the data interpretation is in accordance with the proposed theoretical framework. If there is a debate between researchers, then a discussion is held between the two researchers. If there is still no decision, a third author is invited to provide an assessment of the article being reviewed.



**Figure 1** PRISMA Flow Diagram.

**Notes:** PRISMA figure adapted from Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Creative Commons.<sup>28</sup>

## Quality Appraisal

Article quality assessment was conducted using the Joanna Briggs Institute (JBI) instrument. The purpose of the article quality assessment was to obtain high quality articles in the scoping review. The JBI instrument contains 13 statements for articles with randomized control trial design and 9 statements for articles with quasi-experiment design. The assessment of the article is done by the authors by giving a score to each statement. If there was a debate between authors, the last authors was invited to give a score to the article found. A score of 1 was given for the answer option yes and a score of 0 for the answer options no, unclear, and not applicable. The JBI score standard that the authors set for review was 75% (Table 1).

## Data Analysis

Data analysis used descriptive qualitative based on the results of the review of articles that have been read by the authors. The findings obtained by the authors are described briefly in the results section. In addition, the authors also classified the interventions obtained based on the similarity of the interventions. When eliminating based on full-text, the authors double-checked the articles found. Data analysis was performed by two independently trained authors. If there were differences of opinion between the two authors, then deliberation and discussion of the contents of the article were carried out. However, if it is still unfinished, then the third author is invited to provide additional assessment of the disputed articles.

**Table 1** JBI Critical Appraisal Tool

Authors, Published Year	JBI Critical Appraisal Tool	Study Design
[29]	84.6% (11/13)	RCT
[19]	92.3% (12/13)	RCT
[30]	88.9% (8/9)	Quasi experiment
[31]	88.9% (8/9)	Quasi-experiment
[32]	92.3% (12/13)	RCT
[33]	92.3% (12/13)	RCT
[34]	100% (13/13)	RCT
[35]	92.3% (12/13)	RCT
[36]	84.6% (11/13)	RCT
[37]	76.9% (10/13)	RCT
[38]	84.6% (11/13)	RCT

## Results

The authors obtained 314 articles based on the results of initial research from three databases: CINAHL, PubMed, and Scopus. After that, the authors downloaded the articles using the reference manager and used the Mendeley application for article elimination based on article duplication. The authors found 50 duplicate articles, then the authors eliminated based on the inclusion criteria and exclusion criteria, the authors found 41 articles. Then the authors eliminated based on the title and abstract, the authors finds 16 articles. The next step is the authors eliminates articles by reading full-text articles, the authors gets 11 articles that match the research objectives. Before data extraction, the authors assessed the quality of the article using the JBI instrument. The following are the results of the authors' assessment (JBI standard score is 75%) (Table 1):

Based on the characteristics of the articles, the authors found that most of the study results came from developed countries, namely 1 article from New Zealand, 1 article from, 1 article from the Netherlands, 4 articles from the USA, 1 article from Australia, 1 article from Spain, and 2 articles from China. One article came from a developing country, Iran. The authors also found that almost all articles used RCT design (9 articles) and 2 articles used quasi-experiment design. The respondents in the reviewed articles were college students with a sample size range of 54–3214 college students. The research results show that the mental health problems that often arise are stress, depression and anxiety.

The results of the scoping review that the authors has done based on the search for articles through the PRISMA flow chart show that 11 articles show digital mindfulness is an effective intervention to reduce mental health problems in adolescents. Students get therapy of digital mindfulness with three types, there are education, counseling, and meditation. Presentation of information through audio and video regarding application usage guidelines, information about mindfulness, and therapy guidelines by facilitators. Participants are also facilitated with counseling to overcome mental health problems experienced by students. The following are the results of data extraction in this scoping review (Table 2):

## Digital Mindfulness Focused Education

The Mindfulness App was conducted for 7 days to alleviate symptoms of stress, anxiety, and depression. Participants are then trained to meditate for 10 minutes/day. The online meditation was guided by a facilitator. The purpose of meditation is to recognize signs of psychological stress on the body, focus on breathing, increase patience, find balance between external and inner needs, calm and relax through breathing, and strengthen compassion through love.<sup>33</sup>

Table 2 Extraction Data

No	Authors & Year	Outcome	Country	Design	Sample	Intervention	Result
1.	[29]	Distress, college adjustment, resilience, self-efficacy	New Zealand	RCT	250 first-year university students (M:17.87 years, SD: 0.47 years; 67.6% women, 32.4% men)	App-based mindfulness meditation Instrument: 19-item College Adjustment Test, 6-item Brief Resilience Scale, 8-item New General Self-efficacy Scale	Effectively improving resilience and self efficacy, and reducing distress and college adjustment.
2.	[19]	Perceived stress, self-regulation and life satisfaction	Netherlands	RCT	64 university students mean age was 24.75 years (SD = 5.42, range: 18–48 years)	App-based mindfulness meditation Instrument: the German version of the Perceived Stress Scale (PSS-10), the self-regulation scale (SRS-10), and the Questionnaire for the Assessment of Happiness	Significantly decrease perceived stress, increased self-regulation and life satisfaction
3.	[30]	Depression, stress, and anxiety	Iran	Quasi experiment	68 students (mean ages= 24.29 ± 3.21 years)	Mindfulness-Based Stress Management m-Health app Instrument: Depression, anxiety, and stress scale (DASS-21)	Significantly reducing depression, stress, and anxiety.
4.	[31]	Stress, mindfulness, and self-compassion	USA	Quasi-experiment	104 participants (mean ages: 20.41)	Mindfulness Meditation Mobile App “Calm” Instrument: the Perceived Stress Scale, the Self-Compassion Survey Short-Form (SCS-SF)	Significantly reducing stress and improving mindfulness and self-compassion
5.	[32]	Weight, weight-related behaviors, and stress.	Australia	RCT	90 participants (mean ages: 20.16 years)	Mindfulness App Trial Instrument: Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ), the Perceived Stress Scale, and the Mindful Eating Questionnaire (MEQ)	Effectiveness for reducing stress and eating behaviors.
6.	[33]	Stress and depression	USA	RCT	561 university students (mean ages= 21.4)	App-based mindfulness practice instrument: the Perceived Stress Scale and y the Beck Depression Inventory	Effectively reducing stress and depression
7.	[34]	Symptoms of depression	USA	RCT	72 college students (Mage = 21 years, age range: 18–48 years)	Gamification of Meditation Instrument: the Patient Health Questionnaire-9	Significantly reducing symptoms of depression
8.	[35]	Anxiety, empathy, self-compassion	Spain	RCT	154 healthcare students mean age of 23 years (SD: 4.16)	Mindfulness-based mobile app Instrument: The State-Trait Anxiety Inventory (STAI), The Jefferson Scale of Physician Empathy (JSPE), The Self-Compassion Scale (SCS)	Significant increase in self-compassion and reducing anxiety
9.	[36]	Depression, anxiety, stress	China	RCT	120 undergraduate nursing students (mean ages 19.31 ± 0.85)	Mindfulness-based online intervention Instrument: Depression-Anxiety-Stress Scale (DASS-21)	Significantly reduction of anxiety and stress symptoms, as well as the improvement of mindfulness level and perceived social support
10.	[37]	Mental wellbeing	China	RCT	1255 college students (mean 32.52, SD:12.41)	Internet-Based Mindfulness Training Instrument: The WHO 5-item mental wellbeing and the Mental Health Inventory	Effectively improving mental health, psychological distress, life satisfaction, and sleep disturbance.
11	[38]	Depression, anxiety, and stress	USA	RCT	54 students (mean: 23.53, SD: 3.17)	Internet-Based Mindfulness Intervention Instrument: 7-item Generalized Anxiety Disorder, Patient Health Questionnaire-9, Depression Anxiety Stress Scale	Effectively reducing depression, anxiety, and stress



The Mindfulness-based mobile app was accessed by participants over the course of 8 weeks, with each participant engaging in listening, practicing, and practicing mindfulness in their daily activities. The app provides short videos with explanations on the basics of mindfulness, self-compassion, and physiological stress reactions, as well as audio segments that guide mindfulness practice, totaling more than 200 minutes of sessions. It aims to enable participants to practice mindfulness therapy independently.<sup>35</sup>

Mindfulness-based online intervention is a 2-week intervention with a duration of 30–40 minutes/day. The app content was mindfulness education, meditation exercises, and homework journaling. The mindfulness app includes video and audio of mindfulness meditation, mindfulness stretching, and mindfulness walking. It shows that mindfulness apps are effective in reducing mental health problems in college students.<sup>36</sup>

## Digital Mindfulness Focused Counseling

The online mindfulness program is conducted for 8 weeks. Participants receive education about mindfulness therapy for 1 week, then participants are trained by facilitators to be able to do mindfulness therapy independently. Participants also receive counseling services to overcome the problems they face.<sup>19</sup>

Gamification is an online meditation program that can be accessed through mobile phones, tablets, and computers. Activities include education on mental health and meditation exercises for 10 sessions. Participants are also given counseling to resolve mental health issues experienced by them. The main focus of gamification is to increase students' knowledge in conducting independent practice in mindfulness therapy.<sup>34</sup>

## Digital Mindfulness Focused Meditation

App-based mindfulness meditation is practiced for 10 minutes per day. The app is a meditation training that can be done independently by the client. The mindfulness meditation therapy included mindful breathing, body scanning, sitting meditation, emotion training, spatial focus meditation, and attention opening. Participants received an introductory intervention about mindfulness first for 10 days, and then practiced mindfulness therapy.<sup>29</sup>

Online mindfulness therapy is conducted in groups. Students received mindfulness-based stress (MBSR) to improve skills such as body scanning, sitting meditation, and movement exercises. Participants received therapy for 20 days through an app that presented educational videos related to mindfulness therapy. So that participants can still access information through the application.<sup>30</sup>

Mindfulness Meditation Mobile App is a “7 Days of Calm” program to reduce mental health problems in students. Participants are given education about self-awareness. Participants received an intervention for 10 minutes/day with meditation in the form of body scanning, breath focus, and love. Participants also had the opportunity to select stress, sleep, self-compassion, and concentration. Participants received the intervention for 8 weeks with daily reminders through the app.<sup>31</sup>

Mindfulness App is an app that contains lectures and audios on mental health. Students are given 3 months on mental health. Students are trained online to do simple breathing exercises in audio and articles. Then students are also given a module to learn to do meditation independently.<sup>32</sup>

The Internet-Based Mindfulness Training consists of 8 sessions of 30 to 45 minutes/session. Activities include didactic reading, experiential learning, and daily life application. Activities are carried out by presenting meditation techniques with deep breathing, stretching, and journaling techniques to overcome the problems faced by students.<sup>37</sup>

Internet-Based Mindfulness Intervention was conducted for 4 weeks with a duration of 45–60 minutes/session. The intervention included breath relaxation, working through difficulties, and paying attention to daily life. Afterwards, participants used journaling techniques to track their progress.<sup>38</sup>

## Discussion

The results of this scoping review show that there are 11 articles that discuss digital mindfulness to reduce mental health problems in college students. Digital mindfulness activities include education, counseling, and meditation. Mindfulness therapy is carried out using applications, websites, and mobile health. Mindfulness is carried out with the monitoring of facilitators, namely health workers such as nurses and psychologists.

Mindfulness is paying full attention without trying to change thoughts, body sensations, or effects that arise as a result of the experience. The practice of mindfulness is a consistent attitude and strong belief to remain aware of the situation at hand and acceptance of the situation as a whole.<sup>39</sup> Individuals who practice mindfulness become more alert, open, and fully aware of the situation in the present moment, are able to breathe and respond with more awareness and stop judging circumstances and people in the world and can reduce the tendency to respond reactively.<sup>40</sup>

The application program offered is mindfulness training through audio and video features as instructions for mindfulness training. The existence of audio and video can clarify or direct participants to a state of awareness, focusing on what is happening around them.<sup>41</sup> Both formats aim to make it easier for users to use the application. Previous research has shown that the use of educational and instructional videos is effective in improving the self-management of students experiencing mental health problems.<sup>32,33</sup> This is in line with other research which shows that the use of video and audio can make it easier for users to understand the features available in the application.<sup>42,43</sup>

This review shows that digital mindfulness is widely applied in developed countries. The widespread adoption of digital mindfulness in developed countries reflects the complexity of economic, technological and mental health dynamics in these environments.<sup>44</sup> Advanced technological infrastructure, such as broad and high-speed internet access, provides a solid foundation for the development and adoption of digital mindfulness applications.<sup>24</sup> The success of this implementation is also influenced by the high awareness and understanding of mental health among developed societies, which creates significant demand for mental health innovation, including through digital approaches.<sup>45</sup> High levels of digital literacy in developed countries indicate that their people are better able to access and use mental health technology, strengthening the adoption of digital mindfulness.<sup>46</sup> This adoption is also related to the unique cultural, social and economic context in each developed country. Governments and health institutions in developed countries need to consider these dynamics in designing effective strategies to promote mental health through digital solutions, while ensuring inclusivity and accessibility for all levels of society.

Internet-based mindfulness presents educational content about mindfulness therapy. Mindfulness presentation in a short video presentation consisting of 3 concepts, namely: The core point of mindfulness, the practice of mindfulness, and the benefits of mindfulness.<sup>47</sup> Knowledge enhancement is an effort to empower participants and increase their understanding to maintain mental health. Previous studies have shown that high knowledge in participants can increase their ability to do things mindfully.<sup>29,48</sup> In addition, participants with high knowledge about mindfulness therapy also have a role for participants to do the therapy independently.<sup>49,50</sup>

The main activity in mindfulness practice is to meditate with mindfulness. Participants do the meditation guided by the facilitator online. Meditation activities can be done with breathing, sitting meditation, and also moving exercises.<sup>51</sup> Efforts to guide meditation therapy can also be done by providing modules or guidelines for implementing meditation therapy.<sup>52</sup> This is supported by previous research that online meditation training can improve students' ability to meditate.<sup>50,53</sup> Meditation aims to improve students' ability to relax themselves so that they can focus on dealing with the problems they face. This is in line with previous research which shows that meditation therapy can improve the mental health of students who experience anxiety during online learning.<sup>54,55</sup> Meditation can also reduce stress problems in students due to the pressure of online learning.

Counseling is one of the services in online mindfulness therapy. Counseling aims to overcome mental health problems experienced by students. Counseling is conducted by mental nurses and psychologists on a one-to-one basis.<sup>36,56</sup> Counseling also seeks to help make decisions about the problems faced by students. Previous research shows that counseling can effectively help solve problems due to learning pressure in students.<sup>57,58</sup> Counseling students can also help increase students' resilience and hardiness in facing the online learning process.<sup>59,60</sup> Counseling can also reduce symptoms of depression experienced by students during online learning.<sup>44</sup>

The implementation of using the mindfulness android application begins with an explanation related to the application, followed by mindfulness therapy for 1–6 months. The length of use of the application can make participants become more focused and aware of the problems being experienced or faced and then call to find a solution and not give a negative assessment of the conditions being faced.<sup>61</sup> The duration of application use varies according to the duration of audio and video instructions from the application. Compliance checking is needed to find out whether the research participants do the mindfulness exercises as targeted, through.<sup>19</sup> Participants' compliance in doing mindfulness exercises



using the application affects students' ability to practice mindfulness. This is in line with previous research that monitoring and evaluation of the use of the application and student perseverance are needed in improving their mental health.<sup>37</sup> The monitoring feature is one of the efforts of the facilitator to ensure that students have carried out mindfulness therapy as directed.<sup>61</sup>

Mindfulness apps are an attempt to improve the effectiveness of therapy and reach a wider audience. The development of technology is a potential to provide mental health services online. Mental health services can be carried out using websites and applications to make it easier for users to access various features about mindfulness therapy. Health workers still need to pay attention to various aspects holistically to students in providing therapy to improve their mental health.

## Limitations

This study has limitations, namely the databases used, namely 3 databases: CINAHL, PubMed, and Scopus. However, these databases are large databases so that they can reach various research results on digital mindfulness therapy to improve students' mental health. In addition, the year of publication was also limited to the last 10 years, the authors aim was to obtain the latest findings regarding the use of technology in mindfulness therapy. This research also cannot provide an analysis of the effectiveness of three digital mindfulness methods to improve mental health in college students.

## Conclusion

Based on the results of the authors search, there are 11 articles that discuss digital-based mindfulness therapy for improving mental health in university students. The authors found that there were three types of digital mindfulness found, namely digital mindfulness focused on education, counseling and meditation. The sample used in this research ranged from 54–561 respondents. The results of the intervention show that there is an improvement in mental health in university students. The use of applications and websites is a means of presenting information about student mental health and the implementation of mindfulness therapy. In addition, mindfulness therapy is also trained by facilitators online to students. The application also provides counseling services to assist students in overcoming problems faced due to learning pressure.

The implication of this research is that the application of digital-based mindfulness therapy can be carried out by health workers in optimizing mental health services online. In addition, the government can adapt the mindfulness therapy application so that it can be accessed by students in general and in collaboration with universities and schools. Recommendations for further research are that primary research is needed in developing countries regarding the implementation of digital mindfulness to improve the mental health of college students using various methods that have been found in this scoping review.

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