

Why you should read this article:

- To enhance your knowledge of online mindfulness-based interventions, their benefits and limitations
- To explore systematic reviews of recent research into online mindfulness-based interventions
- To better understand which of your patients could benefit from online mindfulness-based interventions

Online mindfulness-based interventions and their use in mental health practice

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic has emphasised the importance of online therapeutic interventions for people experiencing mental health issues. Online mindfulness-based interventions can be a flexible and accessible way for people to receive support. They have been shown to reduce symptoms of stress, anxiety and depression in diverse clinical populations. However, they can produce side effects and they are not suitable for everyone. The aim of this article is to inform mental health nurses and nursing students about the benefits and limitations of online mindfulness-based interventions for people experiencing mental health issues.

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Keywords

anxiety, communication, depression, mental health, mental health therapies, mindfulness, professional, stress, talking therapies, telehealth

MINDFULNESS INVOLVES focusing one's attention on the present moment and observing 'what is happening' in that moment (Kabat-Zinn 2003). Mindfulness has been described as 'awareness that emerges through paying attention on purpose, in the present moment, and non-judgementally to the unfolding of experience moment to moment' (Kabat-Zinn 2003).

The coronavirus disease 2019 (COVID-19) pandemic has emphasised the importance of supporting people's mental health and the value of being able to deliver therapeutic interventions remotely. During the pandemic, mental health services have identified a need, among people experiencing mental health issues, for continuing online interventions (Holmes et al 2020). Online interventions have an important role in mental health services.

The aim of this article is to inform mental health nurses and nursing students about online mindfulness-based interventions and

their benefits and limitations for use with people experiencing mental health issues.

Mindfulness-based interventions

Mindfulness-based interventions are complex self-management interventions used in mental health and other clinical settings. The first clinical mindfulness-based intervention was developed around 1980 by Jon Kabat-Zinn for people experiencing chronic pain. It became known as mindfulness-based stress reduction (MBSR) (Santorelli et al 2017). The conventional, pre-internet method of delivering MBSR involved eight weekly face-to-face group sessions lasting between 2.5 and 3.5 hours and a one-day silent retreat. MBSR covers several formal mindfulness techniques, including meditation focused on the body (body scan), gentle yoga and sitting and walking meditation. The sessions involve learning and practising mindfulness techniques and discussing the experience of mindfulness – a practice known

as ‘enquiry’. Participants are encouraged to use the techniques at home and commit to long-term daily practice (Santorelli et al 2017).

A number of other mindfulness-based interventions followed MBSR, including mindfulness-based cognitive therapy (MBCT) (Teasdale et al 2000), acceptance and commitment therapy (ACT) (Hayes et al 2004), mindfulness-based childbirth and parenting (Duncan and Bardacke 2009) and mindfulness-based eating awareness training (Kristeller and Wolever 2010).

These mindfulness-based interventions all involve developing one’s awareness through mindfulness techniques (for example, meditation), developing a particular attitude (for example, kindness or curiosity) and understanding human vulnerability (for example, by exploring experiences of distress) (Crane 2017).

It is important that healthcare professionals understand how mindfulness-based interventions work so that they can be used in clinical practice. A systematic review of eight studies investigated the active components of complex interventions and explored how mindfulness-based interventions can work for adults with mental health issues (Stein and Witkiewitz 2020). The review included a diverse population ($n=758$) of adults living in the community who experienced stress, people with clinical or subclinical anxiety and/or depression, and female trauma survivors. The researchers examined the active components of MBSR, MBCT and generic mindfulness interventions as well as core mindfulness processes such as focused attention. Despite variations in the interventions and populations, they found that increased acceptance and increased mindfulness were credible mechanisms for enhancing mental health in adults (Stein and Witkiewitz 2020).

Much of the evidence supporting the use of mindfulness-based interventions has been developed with highly competent mindfulness-based interventions teachers. If teaching standards are not maintained outcomes may be affected, so the competence of teachers is an important factor (Piet et al 2016). A mindfulness-based interventions teacher is someone who demonstrates mindfulness techniques to others, such as patients, healthcare professionals or students. Becoming a mindfulness-based interventions teacher involves various layers of training including (Crane et al 2010):

» Foundation training – for example, participating in mindfulness-based interventions and engaging in sustained personal practice.

» Basic teacher training – for example, attending a mindfulness-based interventions teacher training course and co-facilitating mindfulness-based interventions.

» Advanced training – for example, supervising other mindfulness-based interventions teachers.

The need to maintain standards of training and supervision when delivering mindfulness-based interventions has staffing and skill mix implications, which can make it challenging to use mindfulness-based interventions in mental health practice (Rycroft-Malone et al 2019).

Online mindfulness-based interventions

During the COVID-19 pandemic a need emerged for mental health support that could be delivered online (Holmes et al 2020). Online mindfulness-based interventions can be ‘live’ (synchronous) using videoconferencing or pre-recorded (asynchronous) using computer-based materials and/or mobile applications (apps) (Fish et al 2016). They can provide more anonymity, accessibility and scalability than conventional in-person group interventions and represent a cost-effective alternative (Spijkerman et al 2016).

Live online mindfulness-based interventions enable immediate interaction with the teacher and participants but imply attending scheduled classes and require sufficient numbers of teachers who can work online. Pre-recorded computer-based online mindfulness-based interventions do not normally include live interaction with others but have the advantages of being accessible on demand and reduce the need for teachers (Fish et al 2016). Mindfulness-based intervention apps are accessed via mobile devices, are usually delivered without contact with teachers or participants, and provide a high level of flexibility for users.

One systematic review evaluated commercially available mindfulness-based intervention apps ($n=192$) (Schultchen et al 2021). Most were free of charge ($n=157$, 82%). They were designed to enhance well-being ($n=175$, 91%), reduce stress ($n=144$, 75%), reduce physical health issues ($n=58$, 30%), reduce anxiety ($n=55$, 29%), reduce depression ($n=23$, 12%), regulate emotions ($n=26$, 14%), promote behavioural change ($n=19$, 10%), provide entertainment ($n=12$, 6%), enhance social behaviour ($n=12$, 6%) and/or reduce addiction issues ($n=2$, 1%) (Schultchen et al 2021). Only a small proportion of apps had been evaluated using randomised controlled trials (RCTs) ($n=7$, 4%). The researchers also identified issues with data security, which

Key points

- Online mindfulness-based interventions can be easier to access and more flexible than in-person interventions, but they are not suitable for everyone
- Online mindfulness-based interventions have been shown to produce significant small-to-medium beneficial effects on stress, anxiety, depression and mindfulness
- Potential challenges with online mindfulness-based interventions include lack of adherence and the absence of group dynamics
- Potential side effects of mindfulness-based interventions include anxiety, depression, unpleasant thoughts, confusion, disorientation and alienation
- Lack of access to the internet and low health literacy may restrict the use of online mindfulness-based interventions

emphasises the need for independent guidance on the use of mindfulness-based intervention apps (Schultchen et al 2021).

Access

Compared with conventional, in-person group mindfulness-based interventions, online mindfulness-based interventions are easier to access for some hard-to-reach populations (for example, rural communities); people may also find online support more flexible and convenient (Stjernswärd and Hansson 2020).

One cross-sectional US-based online survey asked 500 respondents about their preference for receiving mindfulness-based interventions (Wahbeh et al 2014). The survey captured data from an adult (mean age 39 years) and predominantly female ($n=340$, 68%) population who reported issues with depression ($n=381$, 76%) and/or symptoms of post-traumatic stress disorder ($n=353$, 71%). More respondents selected online interventions ($n=210$, 42%) than in-person individual interventions ($n=190$, 38%) and in-person group interventions ($n=100$, 20%) (Wahbeh et al 2014). Because it was conducted online, the survey may have attracted respondents who are more comfortable than others using digital technologies and it may therefore have overestimated the acceptability of online mindfulness-based interventions. The survey was completed before the COVID-19 pandemic, and people's readiness to engage with online mindfulness-based interventions may have increased since.

The effects of the COVID-19 pandemic and enhanced digital technologies mean that people increasingly 'live their lives online', but there are concerns that not everyone has access to such technologies, resulting in digital inequality (Mitchell et al 2019). Access to digital technologies can be particularly challenging in deprived communities, where people may not have a reliable internet connection and/or may not be able to afford digital devices (McCloud et al 2016). Another potential challenge of using online mindfulness-based interventions is low health literacy, which can make it difficult for people to incorporate health-related information into their lives (Liu et al 2020).

Adherence

Online mindfulness-based interventions can be used as an alternative to in-person group mindfulness-based interventions, but there are potential challenges with adherence. Some people may use online mindfulness-based interventions less often than instructed, while others may drop out completely (Fish et al

2016). Non-adherence – which occurs when people stop using an online mindfulness-based intervention or use it in a way its developers did not intend – may diminish the effectiveness of the intervention (Spijkerman et al 2016). In their systematic review, Spijkerman et al (2016) found adherence rates ranging between 40% and 92% (adherence being defined as the completion of all sessions). In another systematic review, Fish et al (2016) investigated the use of online mindfulness-based interventions delivered without teacher involvement. They looked at five RCTs, four feasibility studies and one qualitative study, and found that early drop out was common and often higher than with in-person group mindfulness-based interventions (Fish et al 2016).

Group dynamics

In in-person group mindfulness-based interventions, group dynamics may affect people's experience and outcomes. Researchers have explored the role of the group and whether interactions between participants support the effectiveness of interventions. Imel et al (2008) studied 606 people who were learning mindfulness-based interventions as part of a group to assess whether that setting affected clinical outcomes. They found that learning mindfulness-based interventions in a group had additional benefits for psychological symptoms but limited effects on physical symptoms. A meta-synthesis of seven clinical studies found that group interventions assisted participants to develop 'a shared sense of distress', provided a 'validating and normalising experience' and appeared to 'increase levels of motivation' (Cairns and Murray 2015). However, the potential negative effects of a lack of group dynamics in online mindfulness-based interventions can be reduced by using 'live' videoconferencing (Moulton-Perkins et al 2022).

Self-management skills

A case study of 38 people living with residual depressive symptoms who had participated in an online mindfulness-based intervention demonstrated that they were able to develop certain self-management skills (Felder et al 2014). Participants had undertaken an eight-week online mindfulness-based intervention, which involved attending online sessions lasting between 60 minutes and 90 minutes via videoconferencing and learning mindfulness techniques such as body scan. Participants had a history of severe depression but were not severely depressed at the time of the study. The study demonstrated how participants developed new methods to relate to their

thoughts, feelings and sensations, and how they increased their ability to 'step back' and avoid becoming trapped in negative cycles of unhelpful thinking and unpleasant experiences (Felder et al 2014).

Effectiveness of online mindfulness-based interventions

This section provides a brief overview of the effectiveness of online mindfulness-based interventions in healthcare settings by summarising the findings of four systematic reviews and meta-analyses: Spijkerman et al (2016), Sevilla-Llewellyn-Jones et al (2018), Gál et al (2021) and Liu et al (2022). While other evidence is available, these systematic reviews provide a selective overview of the literature and synthesise results from multiple studies. Table 1 summarises the four systematic reviews.

Spijkerman et al (2016) reviewed 15 RCTs from across the world, including the US, Sweden, China and the UK, reporting data from a diverse population of 2,360 participants. Participants came from clinical and non-clinical settings and were experiencing a variety of somatic and/or psychological issues. Online mindfulness-based interventions included MBSR, ACT and MBCT. Comparison groups received waiting list control, online discussion groups, expressive writing, behavioural activation or online psycho-education. A random effects model was used to compute pre-post, between-group effect sizes for various outcomes: stress, anxiety, depression, well-being and/or quality of life, and mindfulness. The meta-analysis showed a medium beneficial effect on stress and a small beneficial effect on anxiety, depression, well-being and/or quality of life, and mindfulness (Spijkerman et al 2016).

Sevilla-Llewellyn-Jones et al (2018) examined the effectiveness of online mindfulness-based interventions in 919 participants experiencing clinical mental health issues based on 12 studies, of which ten were RCTs. The interventions included MBSR and other integrated mindfulness-based interventions, for example ACT. Eight studies included a follow-up period. In the RCTs, comparison groups received waiting list control, behavioural activation, online discussion forums, empathetic listening or treatment as usual. Online mindfulness-based interventions showed a large effect size in reducing depression and increasing mindfulness skills. They produced a medium effect size on anxiety and a small effect size on quality of life (Sevilla-Llewellyn-Jones et al 2018).

Gál et al (2021) examined the use of mindfulness-based intervention apps for

improving well-being and mental health outcomes. They reviewed 34 RCTs conducted with a range of 7,612 clinical and non-clinical participants. The most common apps were Headspace and Calm. Most studies asked participants to engage with the app on a daily basis. Some studies included a follow-up period of varying length (between one week and 24 weeks). Most of the comparison groups received waiting list control, attention control training or an active psychological intervention. The meta-analysis showed a small beneficial effect for stress, anxiety, depression and psychological well-being. There were no significant effects on the other outcomes (Gál et al 2021).

Liu et al (2022) examined the effectiveness of online mindfulness-based interventions for improving the mental health of people living with physical health issues. They reviewed nine RCTs with a total of 1,315 participants. Physical health issues included chronic pain, cancer, tinnitus, heart disease and spinal cord injury. Experimental groups received ACT, generic mindfulness-based intervention (MBI), mindfulness-based cancer recovery (MBCR) or MBSR. Comparison groups received waiting list control, online discussion forums and/or psychoeducation, or unbranded or generic mindfulness-based interventions other than MBSR and MBCT. Outcomes included stress, anxiety, depression, well-being and mindfulness. Statistical analysis involved calculating standardised mean differences and using 95% confidence intervals to estimate the effect size. The meta-analysis showed a moderate beneficial effect for stress and mindfulness, a small beneficial effect for anxiety and depression, and a non-significant effect for well-being (Liu et al 2022).

These four systematic reviews suggest that online mindfulness-based interventions can produce significant small-to-medium beneficial effects on stress, anxiety, depression and mindfulness. None of the studies reviewed directly compared online with in-person group interventions, which makes it challenging to determine whether one would be more effective than the other. Making firm conclusions about the effectiveness of online mindfulness-based interventions is further complicated by the small number of studies and by variations in study design, in participants' clinical presentation and in the type, content and quality of interventions.

Concerns regarding mindfulness-based interventions

Mindfulness-based interventions are sometimes presented as a catch-all solution used without

consideration of possible weaknesses (Van Dam et al 2018). Research into mindfulness-based interventions has been criticised for methodological limitations. Goldberg et al (2017) conducted a systematic review to determine whether the quality of research into mindfulness-based interventions had improved over time. They examined 142 studies published between 2000 and 2016 and found that there had been little improvement in the quality of research in that period. The main concerns were the use of short follow-up periods, the lack of attention to the competence of the teacher and the limited use of control groups (Goldberg et al 2017).

There have been concerns about the ever-increasing number of mindfulness-based

interventions and whether they align with recognised mindfulness protocols or simply represent a form of relaxation therapy (Cullen 2011). This is an important distinction because mindfulness and relaxation are separate modalities that work in different ways. One difference between the two is the aim: with mindfulness the aim is for the person to notice and accept emotions or issues, while with relaxation the aim is for the person to reduce the level of stress and anxiety they experience (Luberto et al 2020). Mindfulness and relaxation also produce different outcomes. Jain et al (2007) recruited 83 students reporting distress into an RCT examining the effects of mindfulness meditation versus somatic relaxation training compared with

Table 1. Summary of four systematic reviews into online mindfulness-based interventions

Study	Number and types of studies included	Total number of participants*	Population	Age range (years)	Type of intervention	Delivery mode
Spijkerman et al (2016)	15 RCTs	2,360 (1,211)	<ul style="list-style-type: none"> » Employees » Students » People with: <ul style="list-style-type: none"> — Anxiety — Depression — Chronic pain — Tinnitus — Cancer 	18-58	<ul style="list-style-type: none"> » MBSR (<i>n</i>=8) » ACT (<i>n</i>=5) » MBCT (<i>n</i>=2) 	<ul style="list-style-type: none"> » Web-based (<i>n</i>=11) » Web/virtual classroom (<i>n</i>=3) » Smartphone/apps (<i>n</i>=1)
Sevilla-Llewellyn-Jones et al (2018)	10 RCTs and 2 non-controlled studies	919 (468)	<ul style="list-style-type: none"> » People with: <ul style="list-style-type: none"> » Anxiety (<i>n</i>=6) » Depression (<i>n</i>=4) » Bipolar disorder (<i>n</i>=1) » Bulimia nervosa (<i>n</i>=1) 	33-46	<ul style="list-style-type: none"> » Mindfulness (<i>n</i>=2) » MBSR (<i>n</i>=1) » ACT (with behavioural activation/CBT) (<i>n</i>=8) » AFPP (<i>n</i>=1) 	<ul style="list-style-type: none"> » Web-based (<i>n</i>=10) » Smartphone/apps (<i>n</i>=1) » Both (<i>n</i>=1)
Gál et al (2021)	34 RCTs	7,612 (3,260)	<ul style="list-style-type: none"> » Employees » Students » Pregnant women » Intensive care patients » Women with breast cancer » People with: <ul style="list-style-type: none"> — Chronic pelvic pain — Myeloproliferative neoplasm 	17-58	<ul style="list-style-type: none"> » Apps such as: <ul style="list-style-type: none"> » Headspace (<i>n</i>=16) » Calm (<i>n</i>=4) » App Development Work (<i>n</i>=4) » Aramgar (<i>n</i>=1) » Smiling Mind (<i>n</i>=1) » 10% Happier (<i>n</i>=1) » DeStressify (<i>n</i>=1) » Stop, Breathe, Think (<i>n</i>=1) » Pacifica (<i>n</i>=1) » 7mind (<i>n</i>=1) » Spire (<i>n</i>=1) » VGZ Coach (<i>n</i>=1) » Wildflowers (<i>n</i>=1) 	Apps (<i>n</i> =13)
Liu et al (2022)	9 RCTs	1,315 (645)	<ul style="list-style-type: none"> » People with: <ul style="list-style-type: none"> » Chronic pain (<i>n</i>=3) » Cancer (<i>n</i>=3) » Tinnitus (<i>n</i>=1) » Heart disease (<i>n</i>=1) » Spinal cord injury (<i>n</i>=1) 	43-58	<ul style="list-style-type: none"> » ACT (<i>n</i>=3) » MBI (<i>n</i>=3) » MBCR (<i>n</i>=2) » MBSR (<i>n</i>=1) 	<ul style="list-style-type: none"> » Web-based (<i>n</i>=7) » Smartphone/apps (<i>n</i>=1) » Virtual classroom (<i>n</i>=1)

*Number of participants receiving online mindfulness-based interventions; ACT = acceptance and commitment therapy; AFPP = affect-focused psychodynamic psychotherapy; App = mobile application; CBT = cognitive behavioural therapy; CI = confidence interval; g = Hedge's *g* is a measure of effect size; MBCR = mindfulness-based cancer recovery; MBCT = mindfulness-based cognitive therapy; MBI = generic mindfulness-based intervention; MBSR = mindfulness-based stress reduction; *P* = *P*-value; RCT = randomised controlled trial; SMD = standardised mean difference

a control group receiving no treatment. They found that mindfulness and relaxation both reduced distress and enhanced mood, but that mindfulness had more of a positive effect on unhelpful thoughts and rumination than relaxation (Jain et al 2007).

Another concern is that mindfulness-based interventions are often regarded as risk-free, despite evidence suggesting that side effects such as anxiety, depression, unpleasant thoughts, confusion, disorientation, alienation, pain and threats to the person's sense of reality can occur (Baer et al 2019). People who are offered mindfulness-based interventions need to understand the risks involved (Van Dam et al 2018). Challenges and side effects of mindfulness-based interventions may

originate from the intervention itself, from the participant and/or from the teacher (Baer et al 2019). The reporting of side effects in studies on mindfulness-based interventions can be suboptimal (Van Dam et al 2018). When studies have examined side effects, they showed that up to 11% of people who participate in mindfulness-based interventions may experience some form of side effects (Baer et al 2019).

Implications for practice

The COVID-19 pandemic has had significant negative effects on people's mental health and has changed mental health service provision (Holmes et al 2020). Online mindfulness-based interventions are a viable alternative to conventional in-person group

Duration of intervention	Intervention in comparison group	Effect on stress	Effect on anxiety	Effect on depression	Effect on well-being and/or quality of life	Effect on mindfulness
2-12 weeks	<ul style="list-style-type: none"> » Waiting list control (n=9) » Online discussion group (n=3) » Expressive writing (n=2) » Behavioural activation (n=1) » Online psycho-education (n=1) 	n=11 g=0.51, 95% CI=0.26 to 0.75 P<.001	n=11 g=0.22, 95% CI=0.05 to 0.39 P=.010	n=12 g=0.29, 95% CI=0.13 to 0.46 P=.001	n=9 g=0.23, 95% CI=0.09 to 0.38	n=12 g=0.32, 95% CI=0.23 to 0.42 P<.001
3-12 weeks	<ul style="list-style-type: none"> » Waiting list control (n=5) » Behavioural activation (n=1) » Online discussion forum (n=1) » Empathetic listening (n=1) » Treatment as usual (n=1) 	Not reported	n=12 g=-0.433, 95% CI=-0.725 to -0.141 P=.004	n=11 g=-0.609, 95% CI=-1.028 to -0.189 P=.004	n=10 g=0.362, 95% CI=0.049 to 0.674 P=.02	n=4 g=0.724, 95% CI=0.452 to 0.997 P<.001
10 days-8 weeks	<ul style="list-style-type: none"> » Waiting list control (n=21) » Attention control training (n=9) » Active psychological intervention (n=7) 	n=15 g=0.46, 95% CI=0.24 to 0.68	n=15 g=0.28, 95% CI=0.16, 0.40	n=15 g=0.33, 95% CI=0.24 to 0.43	n=5 g=0.29, 95% CI=0.14 to 0.45	Not reported
7-12 weeks	<ul style="list-style-type: none"> » Waiting list control (n=5) » Online discussion forum and/or psycho-education (n=4) » Online MBI other than MBSR or MBCT (n=3) 	n=3 SMD=-0.32, 95% CI=-0.52 to -0.13 P=0.001	n=5 SMD=-0.19, 95% CI=-0.33 to -0.04 P=0.01	n=5 SMD=-0.22, 95% CI=-0.37 to -0.07 P=0.004	n=5 SMD=1.12, 95% CI=-0.11 to 2.36 P=0.08	n=5 SMD=1.67, 95% CI=0.14 to 3.20 P=0.03

mindfulness-based interventions and offer a flexible self-management option for people experiencing stress, anxiety and depression (Spijkerman et al 2016).

Mental health nurses should consider recommending online mindfulness-based interventions in situations where social contacts are restricted, where there is limited access to mindfulness teachers, and/or when people prefer the flexibility of online support. However, not everyone will be able to use online mindfulness-based interventions and issues regarding internet access and health literacy must be considered.

Online mindfulness-based interventions are not suitable for everyone. With online mindfulness-based interventions there is an increased risk of suboptimal adherence and some interventions provide limited interpersonal contact (Fish et al 2016). It is important that mental health nurses inform

people that not everyone benefits from mindfulness-based interventions. If online and in-person mindfulness-based interventions are available, people's personal preferences should be considered when choosing between the two.

Conclusion

The COVID-19 pandemic has emphasised the importance of supporting people's mental health and the value of being able to deliver therapeutic interventions online. Online mindfulness-based interventions have been shown to produce significant small-to-medium beneficial effects in some people experiencing stress, anxiety and depression. Mental health nurses need to understand the benefits, limitations and side effects of online mindfulness-based interventions and consider whether they are suitable for their patients on an individual basis.

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