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Mindfulness-Based Interventions for Young People With Cancer

An Integrative Literature Review

KEY WORDS

Adolescent
Cancer
Mindfulness
Young people

Background: Mindfulness-based interventions (MBIs) have demonstrated benefits for adults with chronic illness and are becoming increasingly popular among children and young people. Mindfulness-based interventions could have benefits for young people with cancer throughout the treatment journey, through to survivorship.

Objective: The aim was to review intervention studies about MBI used with young people with cancer between the ages of 10 and 29 years. **Methods:** Six electronic databases were searched. The methodological quality of the included studies was assessed using the Joanna Briggs Institute critical appraisal tools. **Results:** Six contemporary studies met the inclusion criteria. Three studies adapted MBI to be age appropriate and some studies modified the intervention based on cancer-specific needs of young people. Formal and informal MBI activities were found to be acceptable by young people; however, recruitment of the participants was identified as a barrier. Variability in psychosocial outcomes was noted in the review by some demonstrating improvement in areas such as mindfulness, anxiety, and social isolation and others not eliciting significant benefits. **Conclusions:** Mindfulness-based intervention shows promise as an acceptable intervention that may improve psychosocial well-being for young people with cancer. Future research studies with adequate sample sizes are warranted to determine the effectiveness of MBI among young people with cancer. **Implications for Practice:** Mindfulness-based intervention seems to be a promising approach to promote psychosocial well-being

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and reduce disease burden in young people with cancer. As validated MBI may be implemented without expert training, this could be promoted by healthcare providers, including nurses who care for young people with cancer.

■ Background

The emotional effect of a cancer diagnosis during adolescence and young adulthood is enormous owing to the constant need to readjust to different phases of the cancer journey in the midst of the stress associated with developmental tasks.^{1–3} Posttraumatic stress, anxiety, depression, and poor quality of life are common in young people with cancer,⁴ which substantially contributes to the burden of disease.² Psychosocial health interventions have been shown to improve psychosocial functioning and resilience in young people with cancer.⁵ However, studies also reveal the inadequacy of accessible and targeted mental health services for this unique subpopulation.⁶ Evidence indicates that interventions for younger cancer survivors should consider age- and cancer-related challenges and be tailored to meet unique needs, such as peer group alienation, concerns with developing sexuality, and anxiety related to physical appearance.^{3,6–8}

One promising avenue of support is mindfulness-based interventions (MBI), which teach an acceptance-based approach to unpleasant physical or emotional stressors and empower a state of awareness without judgment.^{9–11} Globally, MBIs have been shown to be an effective intervention to facilitate coping with the challenges experienced by adults with chronic illness,¹² including cancer,¹³ as well as children and young people with psychiatric illness.¹⁴ A systematic review on the usefulness of MBI to cope with symptoms related to chronic illness in adolescents found significant improvements in physical symptoms and psychosocial well-being, including interpersonal relationships, kindness, self-awareness, attitude, behavior, and self-care.¹⁵ Taken together with the finding that lower levels of stress and less uncertainty have been reported among adolescents and young adults (AYAs) with a high mindful dispositional trait,¹⁶ MBI could potentially have benefits for young people with cancer. Specific benefits include facilitating acquisition of skills to nonjudgmentally accept challenges, including fear and uncertainty,¹⁷ throughout the cancer journey from treatment through to survivorship. Although there may be some difficulties in the utilization of MBI, owing to mobility restrictions and disease limitations, little is known about the benefits of this approach with this population. Given the proven efficacy of MBI in promoting both physical and emotional well-being in other populations,^{10–15,17} it is important that the potential benefits are adequately explored among young people with cancer. Although the evidence base for the utility of MBI in adolescents with chronic illness is growing, the nature of how MBIs are being modified to meet the needs of young people with cancer, and their efficacy, remains unclear.

Aims

The aim of this integrative literature review was to identify the features, feasibility, acceptability, and effectiveness of MBI for

young people with cancer. Specifically, this review aimed to address the following questions:

1. What are the characteristics of MBI?
2. What is the format and delivery mode of MBI?
3. What is the feasibility of implementing MBI?
4. Are MBIs acceptable to young people with cancer?
5. Do MBIs improve psychosocial well-being of young people with cancer?

Terminology

In this review, MBI was defined as any intervention that focused on mindfulness-based present moment activities, including formal and informal meditation and yoga, either self-directed or delivered by health professionals. Young people in this review refers to individuals within the age bracket of 10 to 29 years.^{18,19} Feasibility in this review refers to the practicality in recruitment of participants for MBI programs, study completion, and adherence to the intervention. Acceptability of the intervention included the usefulness of the activities of MBI and general feedback on the intervention. Finally, psychosocial well-being referred to the impact of MBI on psychosocial outcomes.

■ Methods

Design

To examine the extent and range of the literature available, an integrative review was conducted following an adaption of Whittemore and Knaf's²⁰ 5-stage framework (problem identification, literature search, data evaluation, data analysis, and presentation). This methodology allows for the inclusion of diverse methodologies and is an apt approach for the evaluation and synthesis of evidence that has direct relevance to practice.²⁰

Inclusion and Exclusion Criteria

The following inclusion criteria were used to select relevant articles: (1) participants between the ages of 10 and 29 years; (2) participants have (or had) a diagnosis of cancer; and (3) the study explored MBI. Restrictions were not placed on the quality of the study, study design, date of publication, or setting, as the aim of this integrative literature review was to explore all available data on MBI for young people with cancer. However, studies that were not published in English, did not report psychosocial outcome/s, focused on chronic illness more broadly, or did not differentiate the impact of MBI

on young people and adults or children younger than 10 years were excluded.

Search Strategy

A methodical literature search was carried out using the databases CINAHL, Cochrane, EMBASE, MEDLINE, PubMed, and PsycINFO. To broaden the search, gray literature was also searched via Google and advanced Google scholar, guided by the Canadian Agency for Drugs and Technologies in Health gray literature checklist.²¹ In addition, citations of relevant studies and the reference lists were hand searched for further pertinent literature (Figure 1). Subject headings and MeSH terms included “mindfulness,” “meditation,” “yoga,” “biofeedback,” “guided imagery,” or “relaxation techniques” and “cancer” or “neoplasm” and “young people” or “adolescent.” To ensure the appropriateness of search strategies, a university librarian was consulted.

Study Selection

Using the above inclusion and exclusion criteria, 123 records were identified and examined for eligibility by a reviewer (S.P.). This initial review was based on title, resulting in 28 records being excluded because of duplication. The remaining 95 records were then reviewed by S.P. based on the abstract and relevance; 87 records were excluded at this stage. A second reviewer (L.R.) then read the full-text of the remaining 8 articles to confirm eligibility of the studies, with a further 2 studies not meeting the inclusion criteria. The final 6 studies were included in this integrative literature review (Figure 1).

Quality Assessment

Quality assessment of the included studies was independently performed by 2 reviewers (S.P. and L.R.) using the Joanna Briggs

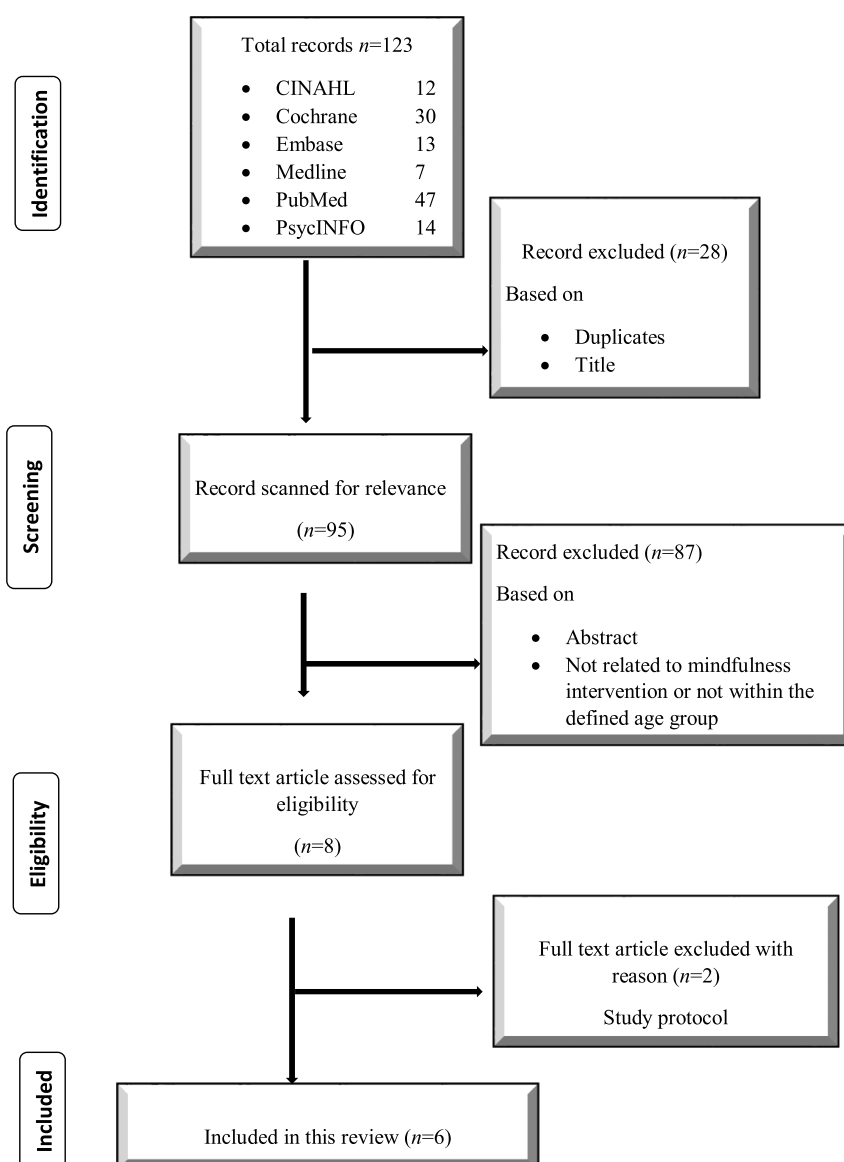


Figure 1. Flowchart of the study selection process.

Institute critical appraisal tools “Checklist for Quasi-Experimental Studies (nonrandomized experimental studies)” (Table 1) and “Checklist for Qualitative Studies” (Table 2).²² The final appraisal report was reviewed and discussed with a third reviewer (Y.S.) until consensus was reached on scores. Each applicable item in the checklist was scored by assigning 1 point. The final scoring of each paper was calculated as a percentage and the quality was rated as strong (80%-100%), moderate (60%-79%), and weak (<60%).²³

■ Results

All 6 studies included in this integrative review were intervention studies that explored the acceptability, feasibility, and effectiveness of MBI with young people who had cancer. Four of the studies^{24–27} originated from the United States, 1 study²⁸ was from Belgium, and the other²⁹ was from Canada. The sample size of these studies ranged from 13 to 35 participants, with most studies^{24–28} focusing on individuals in the cancer survivorship stage, while Malboeuf-Hurtubise et al²⁹ recruited young people at all stages of cancer.²⁹ See the description of the studies in Table 3.

Characteristics of MBI

Mindfulness is the awareness developed by paying attention purposefully, moment to moment and nonjudgmentally.^{9,10} A range of similar activities, such as mindful breathing,^{24–28} mindful eating,^{24,25,29} body scanning,^{26,28,29} mindful walking,^{28,29} and yoga,^{27–29} were included in the studies, outlined in Table 4. Furthermore, mindfulness activities were directed toward identifying, accepting, and dealing with life challenges and difficult emotions.^{24–29} Malboeuf-Hurtubise et al²⁹ adapted mindfulness interventions from Mindfulness-Based Stress Reduction (MBSR; an evidence-based 8-week intervention developed in the 1970s by Jon Kabat-Zinn and colleagues) and Van der Gucht²⁸ adhered to MBSR and Mindfulness-Based Cognitive Therapy (cognitive approaches to manage depressed mood) protocols. Some studies

adapted MBI to meet the age-appropriate^{28,29} and cancer-specific^{26–28} needs of young people (Table 4).

Format and Delivery Mode of MBI

All studies used some form of technology in the delivery of MBI, either as a primary approach or for home practice. Eysenbach et al²⁶ provided the MBI as a mobile phone application and young people had the opportunity to interact with each other through a Facebook-based social support group. The programs that used face-to-face modes or videoconferencing methods were facilitated by certified mindfulness trainers.^{24,25,27–29} Home practice was encouraged by providing recorded meditation audios/videos and/or by sending reminder messages.^{24–29} Furthermore, Lathren et al²⁵ suggested strategies for participants to safely terminate activities should they experience overwhelming emotion or distress. The duration of most of the MBI programs was 90 minutes for a period of 8 weeks^{24,25,28,29} (Table 4). The MBI programs were delivered either by trained instructors,^{24,25} a clinical psychologist,^{28,29} a sociologist,²⁹ or a yoga instructor²⁷ in the face-face mode, whereas Eysenbach et al,²⁶ who adopted the mobile-based intervention, had no ongoing support from trainers.

Feasibility of MBI Among Young People With Cancer

Recruitment of participants was a frequently identified barrier in all of the studies.^{24–29} For example, Malboeuf-Hurtubise et al²⁹ reported that among 15 eligible participants who expressed interest, only 7 completed the initial phase of the study and there was further attrition of 2 participants at the 6-month follow-up. Furthermore, in the 3-month follow-up study by Van der et al,²⁸ of the 21 AYA participants eligible, 16 participated in the MBI and 14 successfully completed the study. The enrolment rate for Hooke et al²⁷ was 34% in their study, which included a yoga intervention and 6 face-to-face sessions. In the study by Eysenbach et al,²⁶ a total of 20 AYAs consented to participate and 17 completed

✻ **Table 1 • Joanna Briggs Institute Critical Appraisal Checklist for Quasi-Experimental Studies (n = 5)**

	Eysenbach et al (2019)	Campo et al (2017)	Van der Gucht et al (2017)	Hooke et al (2016)	Malboeuf et al (2016)
1. Is it clear in the study what is the “cause” and what is the “effect” (ie, there is no confusion about which variable comes first)?	Yes	Yes	Yes	Yes	Yes
2. Were the participants included in any comparisons similar?	N/A	N/A	N/A	N/A	No
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	N/A	N/A	N/A	N/A	No
4. Was there a control group?	N/A	N/A	N/A	N/A	Yes
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Yes	Yes	Yes	Yes	Yes
6. Was follow-up complete, and if not, were differences between groups in terms of their follow up adequately described and analyzed?	N/A	N/A	N/A	N/A	Yes
7. Were the outcomes of participants included in any comparisons measured in the same way?	N/A	N/A	N/A	N/A	Yes
8. Were outcomes measured in a reliable way?	Yes	Yes	Yes	Unclear	Yes
9. Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes
Total (maximum 9)	100%	100%	100%	75%	77.78%

**Table 2 • Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research (n = 2)**

	Eysenbach et al (2019)	Lathren et al (2018)
1. Is there congruity between the stated philosophical perspective and the research methodology?	No	Yes
2. Is there congruity between the research methodology and the research question or objectives?	Yes	Yes
3. Is there congruity between the research methodology and the methods used to collect data?	Yes	Yes
4. Is there congruity between the research methodology and the representation and analysis of data?	Yes	Yes
5. Is there congruity between the research methodology and the interpretation of results?	Yes	Yes
6. Is there a statement locating the researcher culturally or theoretically?	Unclear	Unclear
7. Is the influence of the researcher on the research, and vice versa, addressed?	Yes	Yes
8. Are participants, and their voices, adequately represented?	Yes	No
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Yes	Yes
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Yes	Yes
Total (maximum 10)	80%	80%

the intervention and follow-up questionnaires. Lastly, the study by Campo et al²⁴ reported that 66% of the recruited participants completed the postintervention survey.

Time constraints,^{24,27} illness,²⁸ distance from the intervention site,^{27,29} lack of interest in the MBI,^{26,27,29} adolescents with cancer who did not perceive they were affected by stress, sleep disturbances, or unstable mood²⁹ were the reported barriers to recruitment. Revisiting the unpleasant memories of cancer was also identified to be an obstacle to participation.²⁹ The need for logistical support and competing caregiver' commitments were additional challenges precluding young people's involvement in studies.^{27,29} To address challenges in recruitment and attrition, Malboeuf-Hurtubise et al²⁹ suggested a blended approach (face-to-face in combination with online support) with a reduced number of sessions (4 sessions). They further recommended that the intervention be conducted outside the clinical cancer setting to reduce stigma and other negative psychosocial factors associated with cancer.²⁹

Acceptability of MBI Among Young People With Cancer

Campo et al²⁴ reported that they had exceeded the benchmark they had set for acceptability of the mindfulness intervention, with 75% of participants attending 6 of the 8 sessions. Young people reported that they liked the mindfulness intervention, including the mindfulness mobile application,²⁶ face-to-face group discussions,²⁹ videoconference,^{24,25} or online social support²⁶ and agreed that the 90-minute duration and 8 weekly sessions were appropriate. However, disrupted Internet connectivity was identified as a challenge in the study that used a video conference platform to deliver the mindfulness intervention.²⁴ Audio meditation was reported to be acceptable by participants as it helped them to relax, reminded them to be mindful, and reduced anxiety.²⁴ Sharing emotions in the peer group setting and hands-on exercises such as mindful eating were also reported to be acceptable by young people with cancer.²⁹ Home practice was encouraged in all studies. Hooke et al²⁷ reported that 69% of participants practiced yoga at home at least once a week and Campo et al²⁴ found that participants practiced informal exercises an average of 4.02 days

per week. Suggestions to improve the mindfulness application included adding a support group, incorporating cancer-specific content, and having engaging activities, such as a quiz, and a place for reflection.²⁶

There were some difficulties noted within the study by Lathren et al.²⁵ First, practicing formal self-kindness and emotional self-care was difficult for participants, in terms of trusting their own compassionate voice. Time constraints and daily life stressors also impacted on daily practice. Body scan exercises created some uneasiness and anxiety initially, owing to bodily changes associated with cancer. However, with encouragement from the facilitator, participants were able to accept their body's current state nonjudgementally.²⁵

Psychosocial Outcomes of MBI Among Young People With Cancer

Psychosocial outcomes were measured using validated tools in all studies. To illustrate, mindfulness was measured using the Children's Acceptance and Mindfulness Measure^{26,28,29} and quality of life was explored using the Pediatric Cancer Quality of Life Inventory.^{26,29} A number of studies demonstrated significant improvement in quality of life,²⁸ self-compassion,²⁴ stress,²⁶ mindfulness,^{24,28} and reduction in anxiety,²⁴ depression,²⁴ and social isolation²⁴ after the implementation of MBI. Other studies reported no significant impact of MBI. In the study conducted by Hooke et al,²⁷ scores for fatigue, sleep, and anxiety did not significantly change in the group that received the yoga-based intervention; however, a trend toward decreased anxiety was found.

Studies by Eysenbach et al and Malboeuf-Hurtubise et al did not elicit significant improvements in perceived social support,²⁶ mindfulness,^{26,29} body image,²⁶ depression,²⁹ anxiety,²⁹ or quality of life.^{26,29} Van der Gucht et al²⁸ reported that fear of cancer recurrence did not significantly change after the mindfulness intervention. Most of the studies²⁴⁻²⁷ measured immediate impact, 4 to 8 weeks after the intervention. Malboeuf-Hurtubise et al²⁹ followed-up with the participants at 6 months and reported high attrition. Van der Gucht et al²⁸ followed up the participants 3 months after MBI and found a medium effect size in

Table 3 • Characteristics of Studies in the Review

Author (Year)	Design, Population	Intervention	Measures	Findings/Results	Limitations	Score
Campo et al (2017)	Design: single-arm feasibility study t1: Baseline (n = 32) t2: week 8 (n = 21) Population: 18-29-year-old AYA survivors	Mindful Self-compassion (MSC) interventions	Feasibility and acceptability: – Attendance rates – Intervention satisfaction scale Psychosocial outcomes: SCS, MAAS, PROMIS, BIS, BRS, PTGI	– 84% of participants attended 6/8 classes – 95% of participants enjoyed sessions and 100% reported that MSC would help to cope with stress – Psychosocial outcomes, except for resilience, demonstrated significant changes Aim 1: – Open to mindfulness – Fear of recurrence – Expressed need for connecting with other AYAs Aim 2: – Completed average of 16.9 of the 28 sessions and engaged (mean, 112.5 min) with mobile app – Half of the participants responded to the moderators' Facebook post and reported to be enjoying the app and support group – No significant differences on quantitative outcome measures	– No comparison group – Participants self-selected, were well educated and highly motivated women – Participants needed to be active on social media – Age range limited to 18-29 y – Only AYAs with sarcoma and off treatment patients were included – Factors such as gender and developmental stage that may have had an impact on psychosocial outcomes, in addition to MBI, were not studied	Strong: 100%
Eysenbach et al (2019)	Design: aim 1: qualitative design Population: 10 AYAs 14-23 y Design: aim 2: single-arm pre-post evaluation t1: Baseline (n = 17) t2: week 4 (n = 16) Population: 14-23-year-old AYA survivors	Mindfulness for Resilience in Illness Intervention Program	Aim 1: Interviews to develop MBI program Feasibility and acceptability: – Mindfulness app and Facebook Social Support Group usage (sessions, days, and time) – Acceptance questionnaire Psychosocial outcomes: CAMM, PSS, PCQL-32, BIS	– 32% enrolment rate; yoga attendance was 90%; and 100% completion – Decreased trend in anxiety score – Fatigue, sleep, and balance remained stable	– Self-reliance and common humanity component of MSC addressed peer isolation – Self-support skill found useful during stressful encounters – Learned to adopt compassionate emotional self-care – Facilitated the development of positive relationships and eased anxiety – Body scan exercise was perceived as a challenge because of changes related to cancer	Aim 1: Strong: 80% Aim 2: Strong: 100%
Hooke et al (2016)	Design: 1-group, within-subject, repeated-measures design t1: week 1 (n = 13) t2: week 6 (n = 13) t3: week 11 (n = 13) Population: 10-17-year-old cancer survivors	Yoga intervention	Feasibility measures: assented/consented, attended and completed sessions Psychosocial outcomes: PedsQL, Fatigue Scale, ASWS, BOT-2, STAI	– Self-reliance and common humanity component of MSC addressed peer isolation – Self-support skill found useful during stressful encounters – Learned to adopt compassionate emotional self-care – Facilitated the development of positive relationships and eased anxiety – Body scan exercise was perceived as a challenge because of changes related to cancer	– Small sample size and restricted geographical areas – Participants were motivated	Moderate: 75%
Lathren et al (2018)	Design: descriptive qualitative analysis approach Population: twenty 18-29-year-old AYA survivors	MSC interventions	Audio recording of the video-chat sessions	– Self-reliance and common humanity component of MSC addressed peer isolation – Self-support skill found useful during stressful encounters – Learned to adopt compassionate emotional self-care – Facilitated the development of positive relationships and eased anxiety – Body scan exercise was perceived as a challenge because of changes related to cancer	– Descriptive approach of the study limited theory generation – Change over the course of cancer treatment could not be elicited as participants were in the completion stage – Participants were well-educated women	Strong: 80%

(continues)

Table 3 • Characteristics of Studies in the Review, Continued

Author (Year)	Design, Population	Intervention	Measures	Findings/Results	Limitations	Score
Malboeuf-Hurtubise et al (2016)	Design: quasi-experimental pretest-posttest design t1: baseline – Experimental (n = 7) – Control (n = 7) t2: week 8 – Experimental (n = 7) – Control (n = 6) t3: 6 mo – Experimental (n = 4) Population: 11-18-year-old AYAs with cancer	MBI	Feasibility measures: – Feedback on acceptability Psychosocial outcomes: BYI, PANAS-C, PCQL-32, PSQI, CAMM	– Poor attendance rate for group session – Participants reported liking the intervention – No significant differences in psychosocial outcome measures	– Nonrandomization, nonequivalence group, and small sample size	Moderate: 78%
Van der Gucht et al (2017)	Design: Pre-post follow-up within-subject design t1: 8 wk before MBI (n = 16) t2: 1 wk before MBI (n = 16) t3: week 1 of MBI (n = 14) t4: 3 mo after MBI (n = 14) Population: 14-24-year-old AYA survivors	8 Age-appropriate 90-min sessions of MBI developed from MBSR and MBCT manuals Home practice was encouraged	Feasibility measures: – Homework engagement and retention rate Psychosocial outcomes: PedsQL 4.0, DASS-21, LEIDS-R, RPA, ATS-R, FCRI, CAMM	– Of 16 enrolled, 14 completed the program – Level of engagement with homework ranged from more than once a month to daily practice at posttreatment – 81% in QoL and 87% in emotional distress improved – Attitudes toward self (87%) and mindfulness skills (90%) was improved – No significant difference in fear of cancer recurrence	– Self-selected, nonrandomized, small sample – Nonspecific effect of social support and long-term impact of intervention was not assessed	Strong: 100%

Abbreviations: ASWS, The Adolescent Sleep-Wake Scale; ATS-R, Attitudes Towards Self-Revised; AYA, adolescent and young adult; BIS, Body Image Scale; BOT-2, The Bruininks-Oseretsky Test of Motor Proficiency; BRS, Brief Resilience Scale; BYI, Beck Youth Inventories; CAMM, Child and Adolescent Mindfulness Measure; DASS-21, Depression Anxiety Stress Scales; FCRI, Fear of Cancer Recurrence Inventory severity subscale; LEIDS-R, Leiden Index of Depression Sensitivity; MAAS, Mindful Attention Awareness Scale; MBI, mindfulness-based intervention; MBCT, Mindfulness-Based Cognitive Therapy; MBSR, Mindfulness-Based Stress Reduction; PANAS-C, Positive and Negative Affect Schedule-Child; PCQL-32, The Pediatric Cancer Quality of Life Inventory-32; PedsQL 4.0, Pediatric Quality of Life Inventory; PROMIS, Patient-Reported Outcomes Measurement System; PSS, Perceived Social Support; PSQI, Pittsburgh Sleep Quality Index; PTGI, Posttraumatic Growth Inventory; QoL, quality of life; RPA, Responses to Positive Affect; SCS, Self-compassion Scale; STAI, Spielberger State Trait Anxiety Inventory.

Table 4 • Details of the MBI

Author (Year)	Intervention and Mode of Delivery	Activities and Duration	Modification Based on Age and Cancer	Benefits and Recommendations for Practice
Campo et al (2017) and Lathren et al (2018)	Mindful Self-compassion (MSC) interventions Mode: Videoconference session	Activities: – Mindful eating – Body scan – Writing a compassionate letter to oneself – Affectionate breathing meditation – Discussion and reflection Duration: 8 wk of 90-min sessions	Not mentioned	Benefits: – Significantly improved self-compassion, mindful attention awareness, body image perception, and coping with posttraumatic stress – Significantly reduced anxiety, depression, and posttraumatic distress – Improved resilience, reduced peer isolation and body concerns Recommendations for practice: – Social media platforms for recruitment – Delivery of MBI through videoconference – Pre-preparation on how to terminate practice in discomfort/distress – Additional emotional support during the initial body scan practice activities – Keep group size to under 10 members – Short duration for formal practice – Develop manualized MSC program for standardizing delivery – Implement MBI in telehealth clinical settings for AYA cancer survivors
Eysenbach et al (2019)	Mindfulness for Resilience in Illness Intervention Program Mode: – Mobile app – A private Facebook group – A provider guide	Breathing and listening to body: – Focusing attention on breathing and body scan – Breathing exercises Dealing with difficult emotions: – welcoming and recognizing emotions Dealing with negative thoughts: – Recognizing and dealing with thoughts – Skillful distraction exercise Being kind to oneself; – Compassion and gratitude Duration: 4 wk	Mobile app included video hosting 2 sarcoma survivors	Benefits: – No significant improvement in social support, mindfulness, body image, or quality of life Recommendations for practice: – Mobile device to complement or extend the benefit of face-to-face MBI program – Informal mindfulness and resiliency practice is preferred to daily directed practice by AYAs
Hooke et al (2016)	Yoga intervention Mode: – Face-to-face session with DVD for home practice	– Mindful breathing – Opening seated meditation – Gentle stretching exercises – Warm-up poses and cool down stretches Duration: 6 wk of 45-min sessions	Modified yoga to accommodate different physical activity levels as a result of cancer treatment	Benefits: – Significant decrease in anxiety – No change in fatigue, sleep, and balance Recommendations for practice: – Select appropriate geographical location for better accessibility of intervention – Safety measures implemented for yoga practice is mandatory for AYAs

(continues)

Table 4 • Details of the MBI, Continued

Author (Year)	Intervention and Mode of Delivery	Activities and Duration	Modification Based on Age and Cancer	Benefits and Recommendations for Practice
Malboeuf-Hurrubise et al (2016)	<p>MBI Mode:</p> <ul style="list-style-type: none"> – Face-to-face session with recorded copy of meditation for home practice 	<ul style="list-style-type: none"> – Mindful eating – Body scan meditation – Heartfulness meditation – Mountain meditation – Walking meditation – Breathing meditation – Mindful movement through yoga-like poses – Group discussion on mindfulness through pain – Focus on thoughts and judgments <p>Duration: 8 wk of 90-min sessions</p>	<ul style="list-style-type: none"> – MBI content modified to be more explanatory, playful, and clear – Discussions were made age-appropriate by including daily life experience 	<p>Benefits:</p> <ul style="list-style-type: none"> – No significant change in mood, sleep, and quality of life <p>Recommendations for practice:</p> <ul style="list-style-type: none"> – Active participation of AYAs in MBI design – Computer/technology based MBI in delivery – Assess readiness to change before the intervention may promote adherence – Shortened MBI curriculum (6 sessions) – Integrate peer support in MBI to encourage home practice – Implement MBI for all phases (active treatment phase, terminally ill stage, transition period and survivorship stage) of cancer
Van der Gucht et al (2017)	<p>MBI Mode:</p> <ul style="list-style-type: none"> – Face-to-face session with audio meditation for home practice 	<ul style="list-style-type: none"> – Focus on the breath – Body scan – Breathing space – Mindful yoga – Insight meditation – Walk meditation – Psychoeducation including, self-care and fear of cancer recurrence <p>Duration: 8 wk of 90-min session</p>	<ul style="list-style-type: none"> – Body scan reduced to 20 min instead of 40 min – Repeated activities – More informal practice – Age-specific language-psychoeducation included fear of cancer recurrence 	<p>Benefits:</p> <ul style="list-style-type: none"> – Significantly reduced emotional distress, negative attitude and improved quality of life and mindfulness <p>Recommendations for practice:</p> <ul style="list-style-type: none"> – Blended approach, such as 4 face-to-face group sessions alternated with online sessions to increase participation – MBI provided outside the clinical setting to reduce stigma – MBI should be targeted toward ethnic minority and low socioeconomic groups

Abbreviations: AYA, adolescent and young adult; MBI, mindfulness-based intervention.

improvement in quality of life and a large effect size in emotional distress, attitude toward self, and mindfulness.

■ Discussion

The focus of this literature review was to summarize and critically appraise the literature on MBI targeting young people with cancer. A total of 6 studies including 122 young people were analyzed. This integrative literature review revealed the scarcity of studies in the domain of MBI in young people with cancer. The overall reporting quality, assessed using Joanna Briggs Institute critical appraisal tools,²² varied from moderate to strong; however, studies did not sufficiently report on potential bias. Most^{24,26–29} of the studies were quasi-experimental designs, with single group assessment before and after MBI, with no comparison group. This review highlights that the designs of the included studies were preliminary in nature, exploring feasibility and initial outcome measurements. Moreover, there were no studies that explored long-term practice adherence or impact, which means there is a lack of evidence on the sustained impact of MBI. Although randomized controlled trials are considered to be the gold standard to test the efficacy of interventions, alternative research designs,³⁰ such as preintervention and postintervention measurement without a control group, could be a feasible approach in evaluating the effect of MBI in young people with cancer.³¹

The core activities of MBSR developed by Jon Kabat Zinn in the late 1970s included body scan, breathing meditation, mindful eating, stretching or yoga and walking meditation, which facilitated nonjudgmental present moment awareness.¹⁰ Our review highlighted that these were the common activities used in the MBI studies. In general, studies have suggested that psychosocial interventions should be tailored to meet age-appropriate and cancer-related needs.^{6,15} Although studies in this review attempted to adapt MBI to be developmentally and age-appropriate^{27,28} and cancer-specific,^{26–28} the validity of their modifications is uncertain, as they have not been rigorously evaluated.

Psychotherapeutic Internet-based³² and remotely delivered interventions⁷ for AYA cancer survivors have previously been reported to be acceptable and feasible. The mode of delivery of MBI was notably varied in the included studies, varying between online platform,²⁶ videoconferences,^{24,25} or face-to-face^{27–29} approaches. The study that exclusively used a face-to-face approach recommended blended or online based platforms,²⁹ as this approach allowed the intervention to be accessible to a geographically dispersed population, who may be affected by poor health.^{7,32} However, there are currently no studies that have explored the relative effectiveness and feasibility of various methods for delivery of MBI in young people with cancer. All studies engaged the participants in group discussion or interaction, which has previously been reported to be a favorable element of MBI.¹⁵

Face-to-face delivery of MBI was conducted by trained professionals in the studies^{24,25,27–29}; however, the details of other trainer characteristics were not mentioned. On the other hand, the intervention that adopted a mobile-based intervention delivered the program without a MBI trainer.²⁶ LeVasseur et al³³ suggested that a minimum of 5 years of experience in teaching

the program in a healthcare setting after training and having an open, warm, and friendly approach were the necessary qualities of a MBI trainer.

In our review, we found that young people reported acceptability, finding the formal and informal MBI activities useful. They expressed a need to include further interaction with peers with cancer, as an additional component to the MBI, to maximize psychosocial well-being. However, recruitment and retention of this vulnerable population were repeatedly reported as a challenge in the included studies. There is a similar trend in other studies with young people who have a chronic illness.¹⁵ Social media has been the preferred and most effective recruitment strategy in the oncology setting,³¹ in particular among young people^{30,32} who are generally active on social media.

Although the studies used standardized tools to explore the psychosocial outcomes, different tools were used to assess similar outcomes, which leads to difficulties in comparing findings across studies.³⁴ To illustrate, mindfulness was explored either by using the Mindful Attention Awareness Scale²⁴ or the Children's Acceptance and Mindfulness Measure,^{26,28,29} and quality of life was measured with Pediatric Cancer Quality of Life Inventory,^{26,29} Pediatric Quality of Life Inventory Multidimensional Fatigue Scale,²⁷ or Pediatric Quality of Life Inventory Generic Core Scales.²⁸ It would be helpful if researchers could agree on key outcome measures, and use similar tools, when evaluating psychosocial impact of MBI.

Being nonjudgmental to the present moment reduces preoccupation with fears for the future, anxiety, and physical symptoms among young people with cancer.³⁵ Significant improvements in 1 or more components of psychosocial outcomes were reported in some studies.^{24,27,28} However, feasibility studies^{26,29} with a small sample size could not elicit significant differences before and after the MBI. For example, benefits in mood, quality of life, and sleep could not be elicited by Malboeuf-Hurtubise et al²⁹ because of a small number of participants and a high attrition rate. Mindfulness-based interventions may also elicit unexpected effects. Practicing the body scanning was initially perceived to be a negative experience in a qualitative study,²⁵ whereas in another study,²⁹ it facilitated sleep.

Limitations

We acknowledge the difficulty in drawing conclusions about the effectiveness of MBI among young people with cancer through this integrative literature review because of the following: (1) lack of studies with a large sample size, (2) interventions were not designed specifically to address the developmental needs of young people, (3) interventions were not tailored to cancer specific needs, and (4) lack of evidence on the long-term effects of MBI and participant adherence.

Implications for Practice

Preliminary evidence suggests that MBI could be acceptable and feasible and may be implemented by trained professionals across a range of modalities. Supportive care is one of the key responsibilities of healthcare providers, and MBI could potentially promote psychosocial well-being and reduce disease burden

for young people with cancer. If further research suggests effectiveness, they could be promoted by a range of healthcare providers, including nurses, psychologists, and other allied health professionals who care for young people with cancer.

Recommendations for Future Research

The review has highlighted the acceptance of MBI and its possible benefits in promoting psychosocial well-being for young people with cancer. Although only 6 studies were included in this review, all were contemporary and highlighted that this is an emerging field of research. Future studies with adequate sample sizes are needed to explore the long-term impact of MBI with young people with cancer. Future research areas that have not been explored include (i) identification of suitable mindfulness programs and determination of what duration of time is required to elicit clinical change/s; (ii) clinical trials with culturally diverse AYA cancer participants conducted across multi-sites, at various stages of the cancer journey; (iii) evaluation of MBI on its own versus MBI as part of a broader psychosocial intervention.

Practitioners should involve AYA cancer patients in the design of the intervention at all stages to increase adherence and acceptability. A blended approach using face-to-face and online platforms will facilitate accessibility. Sessions should be of a short duration (preferably 6 sessions). Group sessions, with small participant numbers (preferably <10), should be incorporated to promote adherence. Pre-preparation on how to terminate MBI activities, should distress occur, is a necessity.

Conclusions

The cancer trajectory is challenging for young people. This review provided insight into the extent, range, and characteristics of MBI when it is implemented for young people with cancer. Young people generally appreciated MBI; however, the review has identified a gap in age-appropriate, cancer-specific mindfulness interventions. It remains unclear as to what is the most effective and feasible mode of delivery of MBI for young people with cancer. In addition, the review identified significant recruitment challenges, which limited the ability to explore the benefits of MBI for this vulnerable population. Despite these shortcomings, MBI shows promise as an acceptable intervention which has the potential to improve psychosocial well-being for young people with cancer.

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