

Adherence to standardized 8-week mindfulness-based interventions among women with breast or gynecological cancer: a scoping review

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Abstract

Participant adherence to standardized 8-week mindfulness-based interventions (MBIs) may be challenging, and adaptations from intervention protocols have been reported in mindfulness research. We conducted a scoping review to determine how women with breast or gynecological cancer adhered to standardized 8-week MBIs delivered in intervention studies. Searches were conducted for articles published till February 2020 in PubMed, Embase, CINAHL EBSCO, PsycINFO Ovid SP, and Cochrane Library Wiley. The following outcomes were investigated: class and silent retreat attendance, intervention completion rate (ICR), adherence to home practice, and reasons for dropping out from an MBI study. Among the 25 included MBI studies, mindfulness-based stress reduction was the most often delivered intervention and mostly women with stage I–III breast cancer were represented. The duration of classes varied from 1.5 to 3.5 hours. Planned home practice varied from 20 to 60 min/day, and silent retreat varied from 4.5 to 8 hours. Due to heterogeneity in the reporting of class attendance, the data could not be pooled. Six studies reported an average class attendance ranging from 5 to 8.2 classes. Overall, intervention completion rate (the proportion who completed all classes) varied from 26.3% to 100%; however, discontinuations were not systematically reported. Home practice time was reported in 20% of the studies and ranged from 17 to 24 min/day. The main reasons for dropping out from an MBI study were health-related problems, organizational challenges, travel distance, and lack of motivation/commitment. About 70% of the studies reported some data on participant adherence, revealing a relatively high overall frequency of class attendance. However, the monitoring and reporting of participant adherence should be improved in future studies to increase our knowledge on the required amount of participant engagement to improve health outcomes and facilitate the implementation of effective interventions on a larger scale.

Keywords: Adherence, Cancer, Compliance, Dropouts, Mindfulness, Systematic review

1. Introduction

About 35% of patients with cancer use complementary treatments in the United States.^[1] Patient-centered integrative medicine refers to combining conventional medicine and

evidence-based complementary treatments.^[2] Globally, complementary treatments include biological (eg, phytomedicine, diet) as well as mind-body interventions (eg, hypnosis, acupuncture, and meditation including mindfulness-based stress reduction [MBSR]).^[2] Mindfulness-based interventions (MBIs) are grounded in mindfulness meditation, defined as a deliberate awareness of the present experience in a non-judgmental attitude.^[3] Standardized MBIs like MBSR^[4] or mindfulness-based cognitive therapy (MBCT)^[5] consist of 8 weekly in-group classes (up to 3.5 hour/class) with an additional silent retreat (up to 7.5 hours) delivered during this 8-week period. The classes include body scan, sitting meditation, gentle yoga, mindful walking, group discussions, and psychoeducation. Between weekly classes, home practice is required with 45 min/day of formal practice (with pre-recorded guided meditations), and 15 min/day of informal practice.

Standardized MBSR or MBCT is effective for mental health outcomes (mainly anxiety and depression) in oncology.^[6,7] Although most MBIs studies include women with breast cancer, results cannot yet be generalized to other gynecological cancers, less represented in published studies to date. In addition, participant adherence (eg, attendance to classes) to all components of MBIs may be challenging, and reduced versions have been adapted (eg, 1.5 hour classes or 4–6 classes).^[8] Small but significant associations were reported between a higher adherence to home practice of MBSR or MBCT and better clinical outcomes like psychological functioning (eg, anxiety).^[9,10] Recently, a dose–response analysis (prediction of specific outcomes in relation to the amount of use of an intervention) including 203 randomized controlled trials (RCTs) of MBIs (≥1

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class) reported that mindfulness (as an outcome) was also impacted by the dose of the intervention (face-to-face contact; program intensity and use).^[11] In contrast, in the same study, no evidence for dose–response relationships was found for psychological outcomes like depression or anxiety.^[11] Experts present controversial opinions about the expected length of formal practice, and the minimal dose of MBIs needed to impact outcomes in a clinically meaningful way is still unclear.^[8] Overall, literature shows that participant adherence in MBIs studies could be better described.^[9,12]

Reporting guidelines for nonpharmacological interventions recommend to describe how interventions are delivered (ie, their dosage), including the degree of participant adherence to those plans.^[13] This information might promote stronger conclusions on dose-related effects,^[14,15] and increase the robustness of the analysis of the MBIs being tested.^[16] In addition, systematic information on participants' degree of adherence to the prescribed dosage will promote evidence-based implementation strategies. In this perspective, we conducted a scoping review with an overall aim of determining the adherence of women with breast or gynecological cancer to standardized 8-week MBIs delivered in intervention studies. The specific objectives were to:

1. Describe participants class and silent retreat attendance, intervention completion rate (ICR), and adherence to home practice within MBI studies.
2. Describe the reasons for dropping out from an MBI study.

2. Methods

2.1. Inclusion and exclusion criteria

This review included intervention studies involving adult women with breast or gynecological cancer independent of the disease stage. The inclusion criteria were: standardized group face-to-face 8-week MBIs; studies with less intense interventions in terms of duration of the classes, silent retreat, and assigned home practice; and intervention studies, that is, RCTs, quasi-experiments, and pre-post studies. Publications were included in any language that could be understood by the study team (English, French, German, or Italian). Articles with mixed cancer populations (other than breast and gynecological), articles involving interventions with mindfulness as a minor part of the treatment, conference abstracts, reviews, opinion papers, editorials, and comments on original articles were excluded. The outcomes of interest were: the class and silent retreat attendance, ICR, adherence to home practice, and reasons for dropping out from an MBI study.

2.2. Search strategy and data selection

Articles were searched following a 2-step approach. In step 1, a librarian performed a first search until November 2018 (no limitation in the timeframe) on PubMed, Embase, CINAHL EBSCO, PsycINFO Ovid SP, and Cochrane Library Wiley. The PRISMA guideline for systematic reviews was followed. In step 2, an update of the literature was performed in February 2020 by the first author with the same methodology. No filters were applied. Keywords used were: breast/genital/fallopian/vagina*/vulvar/vulval/ ovarian/ovary/uterus/uterine/endometri*/gyn(a)ecologic*; neoplasm*/cancer*/tumo(u)r*/carcino*/sarcom*/malignan*; female; mindfulness/meditation/MBSR/MBCT/MBCR. Keywords on outcomes were not included in search strategy. Search strategy

is presented in the supplemental digital content (SDC) Table 1, <http://links.lww.com/OR9/A25>. The first author screened titles, abstracts, and relevant full texts. Overlapping results from same samples were excluded during full text review.

2.3. Data extraction

The first and third authors performed the data extraction independently. Discrepancies were discussed, and the last author was solicited in case of disagreements.

Attendance referred to the number of women who participated in classes or in silent retreat. Where possible we calculated the ICR (as the proportion of women who completed all classes)^[17] applying the following formula (higher rates indicate a higher proportion of participants who completed all the 8 classes):

$$\text{ICR (\%)} = \frac{\text{number who completed intervention} \times 100}{\text{number assigned to intervention group}}$$

Adherence to home practice was defined as the amount of home practice completed daily (in minutes per day). Participants who dropped out from an MBI study referred to women who were assigned to the mindfulness group but did not complete the study.

The reasons for study dropouts for control groups are accessible in SDC, Table 2, <http://links.lww.com/OR9/A25>. Additional data on study participation (number assessed for eligibility, number eligible, number ineligible and reasons for ineligibility, reasons for refusing to take part in an MBI study, study participation rates, and study completion rates) are available in SDC, Table 3, <http://links.lww.com/OR9/A25>.

3. Results

A total of 1164 articles were screened based on their titles and abstracts. After full-text examination, 26 articles were included in the scoping review, referring to 25 intervention studies since 1 study was reported in 2 articles. All included publications were in English. The main reasons for exclusion were related to designs or interventions that did not fit our inclusion criteria (Fig. 1).

The included studies were published between 2004 and February 2020. Majority were conducted in western countries, mainly the United States, Canada (n=11), and European countries (n=6). Non-RCT studies were predominant (n=14). Five studies^[18–22] included active control groups. Majority of the studies included women with breast cancer.^[18–41] Four studies^[19,24,32,40] included all stages of breast cancer, with majority of the patients being stage 0–III. Four studies^[20,29,39,42] did not report stages of cancer. Stafford et al^[29] did a pre-post study and included women (n=53) with breast (71%) or gynecological cancer (29%). Zhang et al (2019)^[42] included specifically women with gynecological cancer (n=70) in their RCT. Chung et al^[33] (n=32) and Eyles et al^[30] (n=20) focused specifically on women with metastatic cancers.

Most of the tested interventions were MBSRs (n=17). The weekly classes varied from 1.5 to 3.5 hours, and 2 studies did not report the duration of the classes provided.^[21,26] Planned home practice time ranged from 20 to 60 minutes, and 13 studies did not report the duration of the planned home practice time.^[18,21–23,26,27,34,35,38–42] A silent retreat was delivered in 11 studies,^[18,19,22–24,26,28,30,32,36,41] with a duration varying from 4.5 to 8 hours. In 3 studies, a silent retreat was not delivered,^[31,37] or a

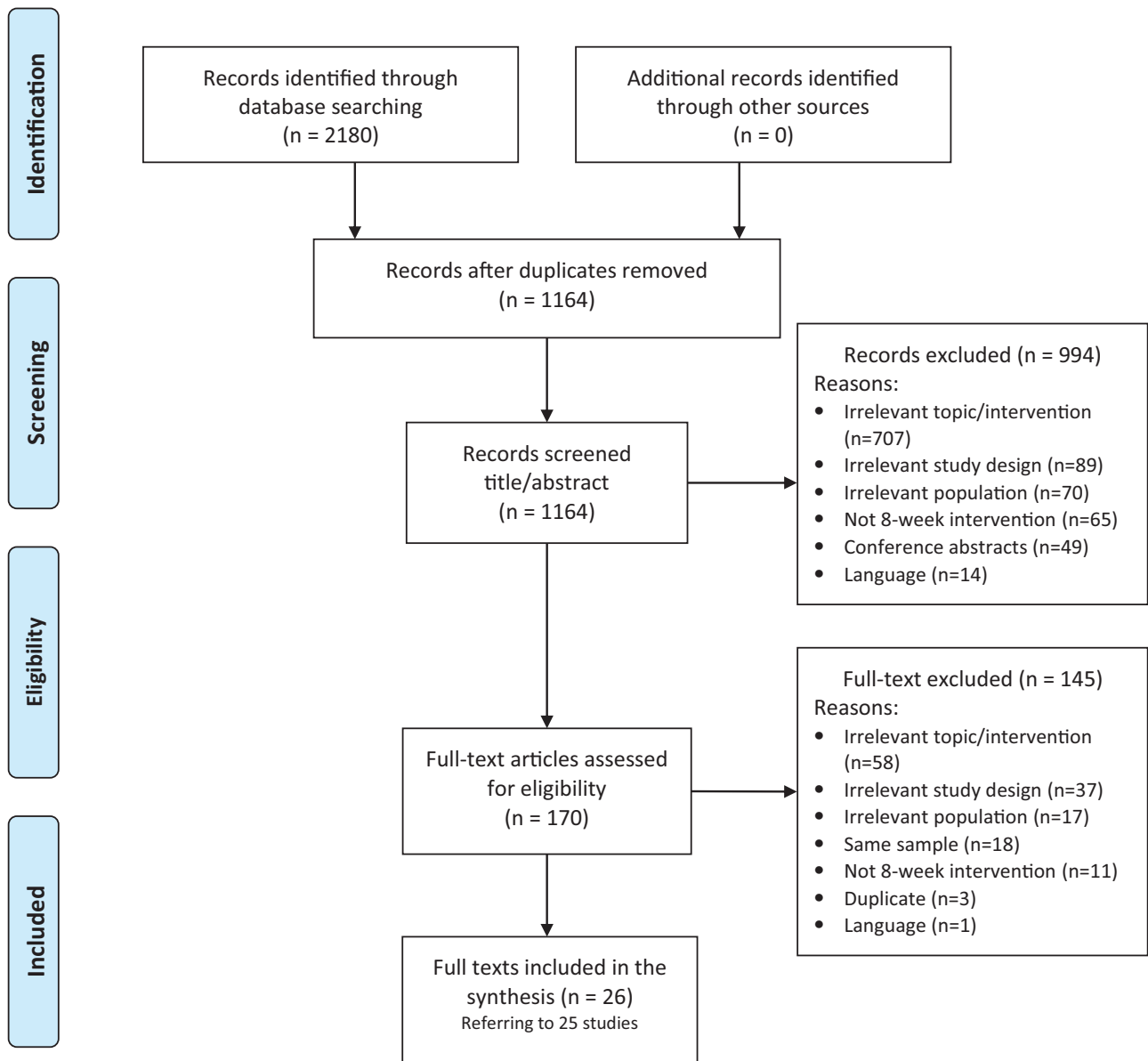


Figure 1. Flow diagram of the study selection. From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097.

6-hour optional silent retreat was provided.^[29] Twelve studies gave unclear or no information about the delivery of a silent retreat or its duration (Table 1).^[20,21,25–27,33–35,38–40,42]

2.4. Participants adherence to mindfulness-based interventions

Class attendance varied among the different studies. Due to heterogeneity in the class attendance reporting, data could not be pooled. Some authors reported the number of attenders for groups of classes (categorization varying among studies),^[19,22,23,25,28,29,30,33,37] whereas other authors reported the mean number of classes attended.^[24,26,28,30,31,37] Six studies did not report any data on class attendance as well as ICR.^[18,21,34,38–40] Fixed cut-offs for ICR varied among studies: ≥ 6 classes completed,^[25,29,30] ≥ 5 classes completed,^[28] or ≥ 4 classes

completed.^[33] In 9 studies, it was unclear whether participants completed the 8 classes or some participants discontinued (missed ≥ 1 class).^[20,22,24,26,32,35,36,41,42] ICRs were reported in 3 studies; Tacon et al (2011) reported a total number of participants (n = 65, women with breast cancer, stages I–II) completing all classes (ICR = 100%);^[27] Carlson et al (2013) reported an ICR of 68.1% (n = 113, women with breast cancer, mainly stage 0–III)^[19] and Lengacher et al (2011) reported an ICR of 26.3% (n = 19, women with breast cancer, stage 0–III).^[25] Overall, ICR varied from 26.3% to 100%; however, discontinuations were not systematically reported.

Completion of a silent retreat was reported in 5 studies.^[19,23,24,26,30] The other studies were unclear or did not report any data on silent retreat attendance. Adherence to home practice was reported in 5 studies^[25,26,28,31,43] and ranged from 17 to 24 min/day (Table 2).

Table 1

Characteristics of the MBIs as described in the studies included in the review.

Authors	Year	Country	Cancer type, stages, N (n stage IV)	Study design	8-week Intervention	Classes duration, h	Home practice duration, min/day	Silent retreat (y = yes; = no); duration, h	Controls
Tacon et al ^[40]	2004	USA	Breast, 0–IV*, 27 (4)	Pre-post	MBSR	1.5	n/r	n/r	—
Tacon et al ^[39]	2006	USA	Breast, n/r, 40 (n/r)	Pre-post	MBSR	1.5	n/r	n/r	—
Witek et al ^[23]	2008	USA	Breast, 0–II, 75 (—)	Quasi-experimental	MBSR	2.5	n/r	y; 8†	Usual care
Matousek et al ^[24]	2010	Canada	Breast, 0–IV, 62 (6)	Pre-post	MBSR	2.5	45–60	y; 6	—
Lengacher et al ^[25]	2011	USA	Breast, 0–III‡, 19 (—)	Pre-post	MBSR (BC)	2	45	n/r	—
Matchim et al ^[26]	2011	USA	Breast, 0–II, 36 (—)	Quasi-experimental	MBSR	n/r	n/r	y; n/r	Usual care
Tacon et al ^[27]	2011	USA	Breast, I–II, 65 (—)	Pre-post	MBSR	1.5	n/r	n/r	—
Henderson et al ^[18]	2012	USA	Breast, I–II, 180 (—)	RCT	MBSR	2.5–3.5	n/r	y; 7.5	– Nutrition educational program – Usual care
Hoffman et al ^[28]	2012	England	Breast, 0–III, 229 (—)	RCT	MBSR	2–2.5	40–45	y; 6	Wait-list
Carlson et al ^[19]	2013	Canada	Breast, 0–IV‡, 271 (3)	RCT	MBCR	1.5	45	y; 6	– Supportive expressive therapy – 1-day stress management seminar
Tamagawa et al ^[43] NCT00390169									
Stafford et al ^[29]	2013	Australia	Breast, n/r Cervical, n/r Ovarian, n/r Vaginal, n/r Endometrial, n/r, 53 (n/r)	Pre-post	MBCT	2	60	Optional (according to health state); 6	—
Würtzen et al ^[41]	2013	Denmark	Breast, I–III, 336 (—)	RCT	MBSR	2	n/r	y; 5	Usual care
Eyles et al ^[30]	2015	England	Breast, IV, 20 (20)	Pre-post	MBSR	2–2.5	30	y; 4.5	—
Johannsen et al ^[31]	2016	Denmark	Breast, I–III, 129 (—)	RCT	MBCT	2	45	n	Wait-list
Bisseling et al ^[32]	2017	Netherlands	Breast, 0–IV , 64 (6)	Pre-post	MBSR	2.5	45	y; 6	—
Chung et al ^[33]	2017	Korea	Breast, IV, 32 (32)	Quasi-experimental	MBSR [¶]	2	54	n/r	Wait-list
Kenne et al ^[20]	2017	Sweden	Breast, n/r, 177 (n/r)	RCT	MBSR	2	20	n/r	– Self-instructing MBSR (no group) – Usual care
Norouzi et al ^[34]	2017	Iran	Breast, II, 24 (—)	RCT	MBCT	2.5	n/r	n/r	Usual care
Pintado et al ^[21]	2017	Mexico	Breast, I–II, 29 (—)	RCT	MBCR	n/r	n/r	n/r	5 Group sessions of personal image advice
Vaziri et al ^[35]	2017	Iran	Breast, I–III, 20 (—)	Quasi-experimental	MBCT	2	n/r	n/r	Wait-list
Zhang et al ^[36]	2017	China	Breast, I–III, 60 (—)	RCT	MBSR (BC)	2	40–45	y; 8	Usual care
Park et al ^[37]	2018	Japan	Breast, I–III, 13 (—)	Pre-post	MBCT	2	20–45	n	—
Witek et al ^[22]	2019	USA	Breast, 0–III, 192 (—)	RCT	MBSR	2.5	n/r	y; 6	Cancer recovery and health education
Zhang et al ^[42]	2019	China	Cervical, n/r, 70 (n/r)	RCT	MBSR	2	n/r	n/r	Usual care
Elimimian et al ^[38]	2020	USA	Breast, I–III, 94 (—)	Pre-post	MBSR	2	n/r	n/r	—

MBCT = mindfulness-based cognitive therapy, MBCR = mindfulness-based cancer recovery, MBSR = mindfulness-based stress reduction, MBSR (BC) = mindfulness-based stress reduction for breast cancer, n/r = not reported, or unclear information (eg, dosage not reported, intervention described in the background, but not sure all components or dosage was planned to be the same).

* Inclusion of localized and metastatic cancers—unclear whether stage 0–IV or I–IV.

† Reported as a full-day retreat in the article—to our knowledge mindfulness meditation retreats do not last >8 hours.

‡ Final sample composed of stage 0–I.

§ Initial stages I–III planned.

|| Inclusion of patients with curative and palliative treatment—supposed 0–IV stages, unclear.

¶ Without yoga (bone metastasis – poor performance status).

2.5. Reasons for dropping out from an MBI study

The main reasons provided in the studies as reported by participant who dropped out from an MBI study were: health-related problems, organizational challenges, travel distance and lack of motivation/commitment (Table 3). Eight studies did not report or were unclear about the reasons for dropping out from an MBI study.^[18–21,36,39–41]

4. Discussion

This scoping review describes participants adherence to standardized 8-week MBIs delivered in intervention studies and the main reasons for dropping out from an MBI study. Our review revealed a relatively high overall adherence to MBIs by women with breast or gynecological cancer. The mean class attendance ranged from 5 to 8.2 classes, and the ICR varied between 26.3%

and 100%. Home practice ranged from 17 to 24 min/day and was only reported for women with breast cancer.

More generally, Parsons et al (2017) reported a mean of 29 min/day of home practice (n = 43 studies) for both the patients and healthy participants^[9] and represented 64% of the amount of practice recommended in the manualized MBSR^[41] and MBCT programs.^[5] These results are comparable to home practice performed by women with breast cancer in our review. The main reasons for dropping out from an MBI study were mostly health-related problems, organizational challenges, travel distance, and lack of motivation/commitment. This information suggests that adaptations of the format might help to increase participant adherence to MBIs. Format changes like online MBIs are emerging in the context of cancer. An online version of the MBCR was tested among highly distressed patients with any stage of cancer. Results showed that 83.3% attended ≥5 classes.

Table 2
Participant adherence to MBIs.

Authors	Year	Intervention dropout or discontinuation	Class attendance	Intervention completion rate (%)	Adherence to home practice (HP)
Tacon et al ^[40]	2004	n/r	n/r	n/r	n/r
Tacon et al ^[39]	2006	n/r	n/r	n/r	n/r
Witek et al ^[23]	2008	6	4: n = 1 5–6: n = 12 7–8: n = 31 All day retreat: n = 31	n/r	n/r
Matousek et al ^[24]	2010	4	Mean: 8.2* (±1.1)	91.9 [†]	n/r
Lengacher et al ^[25]	2011	14	≥3: n = 18 ≥4: n = 16 ≥5: n = 14 ≥6: n = 12—cut-off [§] ≥7: n = 10 8: n = 5	26.3	Median: 17 min/day [‡]
Matchim et al ^[26]	2011	4	Mean 6.3; range (4–8) Retreat: n = 9	78.9 [†]	n = 7/15 completed 51%–71% of all HP n = 5/15 completed < 50% of all HP n = 3/15 completed 71%–100% of all HP
Tacon et al ^[27]	2011	0	8: n = 65	100	n/r
Henderson et al ^[18]	2012	n/r	n/r	n/r	n/r
Hoffman et al ^[28]	2012	19	0: n = 5 1: n = 1 2–4: n = 13 ≥5: n = 95—cut-off Mean: 6.2 [¶] (±2.1)	n/r	Mean: 21 min/day
Carlson et al ^[19]	2013	36	0: n = 15 1–3: n = 10 5–8: n = 11 9: n = 77	68.1	Yoga: mean 7 min/day Meditation: mean 13 min/day ^{§§}
Tamagawa et al ^[43]					
NCT00390169					
Stafford et al ^[29]	2013	11	0/8: n = 3 1/8: n = 3 2/8: n = 5 6–8: n = 42—cut-off ^{††}	n/r	n/r
Würtzen et al ^[41]	2013	31	n/r	81.5 [†]	n/r
Eyles et al ^[30]	2015	1	Mean: 8/9 range (6–9) ≥6 n = 19—cut-off [§]	n/r	n/r [#]
Johannsen et al ^[31]	2016	14	Mean 5/8 (±2.2)	n/r	Mean: 24 min/day
Bisseling et al ^[32]	2017	10	n/r	84.4 [†]	n/r
Chung et al ^[33]	2017	11	≤3: n = 10 ≥4: n = 9—cut-off ^{**}	n/r	n/r
Kenne et al ^[20]	2017	2	n/r	97.0 [†]	n/r
Norouzi et al ^[34]	2017	n/r	n/r	n/r	n/r
Pintado et al ^[21]	2017	n/r	n/r	n/r	n/r
Vaziri et al ^[35]	2017	2	n/r	80 [†]	n/r
Zhang et al ^[36]	2017	1	n/r	96.7 [†]	n/r
Park et al ^[37]	2018	1	Mean: 7.7/8 ≥7: n = 12 ≤4: n = 12 5–6: n = 15 7–8: n = 57	n/r ^{††}	n/r
Witek et al ^[22]	2019	26		72.9 [†]	n/r
Zhang et al ^[42]	2019	4	n/r	88.6 [†]	n/r
Elimimian et al ^[38]	2020	n/r	n/r	n/r	n/r

MBI = mindfulness-based intervention, n/r = not reported or unclear information.

* Among 9 classes (including retreat).

† Unclear whether all classes were completed or if some participants discontinued.

‡ Median time: sitting 34 min/week; walking 2 min/week; body scan 19 min/week; yoga 0 min/week.

§ The authors considered ICR when ≥6 classes were completed.

|| The authors considered ICR when ≥5 classes were completed.

¶ Among 8 classes (excluding retreat).

The authors reported that home practice mean was of 27.40 min/day during the 8 weeks. However, it is unclear if home practice was estimated by adding classroom participation and home practice time, or only home practice time.

** The authors considered ICR when ≥4 classes were completed.

†† No dropout, but discontinuation unclear: no participant missed >1 class.

‡‡ Cut-off of ≥6 classes is reported in Stafford et al (2015)^[49] with the same sample.

§§ Home practice was reported for 38 women among the 113 women assigned to the MBCR group.

Table 3**Reasons for dropping out from a study.****Reasons for dropping out from a study (women assigned to MBI)**

- Health-related problems (treatment schedules, comorbidities, health status)^[22,26,28–30,32–35,37,38]
- Organizational challenges (eg, schedules conflicts/commitments—work, social, family)^[22,24–26,28,30–32,38,42]
- Lack of motivation/commitment^[25,30,31,42]
- Travel distance^[23,26,28,42]
- Lack of interest^[23,33,42]
- Reluctance to face other patients^[28,32]
- Course not suitable^[28]
- Emotionally challenging^[31]
- Other expectations^[32]
- Hearing and language^[31]

MBI = mindfulness-based intervention.

The average number of classes attended was 6 (range, 0–9), silent retreat included, and the mean home practice duration was 25 min/day, 6 days/week.^[44] These results are comparable to those of the face-to-face interventions reported in our review. Thus, adaptations of the MBIs to different contexts and patients' needs should be further investigated. However, careful attention should be paid to the description of how they are delivered, the monitoring, and reporting of participant adherence and related barriers. Our review shows that reports on the reasons for dropping out from a study were lacking. These data are important to learn which changes should be made to increase participant adherence. Similarly, nearly half of the studies on MBIs tested in various populations did not report data on dropouts,^[45] thus limiting the interpretation of implementability of MBIs in specific settings.

To our knowledge, this review is the first to include qualitative and quantitative data to determine participant adherence to MBIs. However, although most of the studies provided some information on participant adherence, inconsistencies in the monitoring and reporting made comparison between the studies difficult. These inconsistencies hampered data synthesis. Thus, the exact amount of the participants' engagement to improve health outcomes still remains unclear.^[43] The development of guidelines structuring the reporting of MBI studies like those existing for acupuncture interventions for example is recommended.^[46,47] If the above-mentioned limitations are addressed in future studies, the preparation, interpretation, and comparison of MBI studies might improve greatly.^[12] A limitation of our review is the screening of the articles that was done by the first author only. Other relevant articles might have been missed or excluded. Furthermore, only the data for 8-week MBIs were included.

To conclude, about 70% of the studies reported some data on participant adherence, revealing a relatively high overall frequency of class attendance. However, the monitoring and reporting of adherence should be improved in future studies. This could increase our knowledge on the amount of participant engagement needed to improve health outcomes and facilitate the implementation of effective interventions on a larger scale.

Conflicts of interest statement

The authors declare that they have no financial conflict of interest with regard to the content of this report.

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