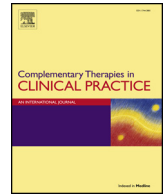




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## Mindfulness-based intervention among People living with HIV/AIDS: A Systematic Review

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## 1. Introduction

Unprecedented progress in the areas of public health, pharmacology, clinical care, and medical science has gradually shifted HIV infection from an inevitable fatal condition into a manageable chronic disease. A recent study reported that people living with HIV/AIDS (PLWHA) are expected to live in their early 70's (which approaches life expectancy of the general population). Specifically, those who are treated before their CD4 counts fall below 350 cells/mm<sup>3</sup> [1,2]. Although great advances, such as antiretroviral therapy (ART), have increased life expectancy for PLWHA, a high degree of psychological and physical distress persists [3–6]. PLWHA accrues additional unique stressors in conjunction with general stressors associated with chronic diseases. These unique stressors may include chronic life threatening conditions, loss of perceived control over health, pressure to strictly adhere to a medication regimen, anticipatory grief, excessive stigma and changes of major behavioral changes such as sexual behavior [7,8]. These stressors directly (by suppress immune response, stimulating viral replication, and diminution of the CD4 + T cell) and indirectly (by impeding ART adherence and treatment access) impacts the progression of HIV/AIDS [9–13]. In addition to disease progression, it also affect the psychological health and quality of life which often triggers the onset of additional complications including anxiety, depression, tardiness, sleeplessness, headaches, despair, and weight gain [14]. This evidence suggests that PLWHA's wellness (including physical and mental health) and overall Quality of Life (QoL) is impaired due to chronic stress and depression [11].

To reduce these aforementioned negative impact of stressors in PLWHA, various mindfulness-based interventions (MBI) have been investigated. These include Mindfulness-Based Stress Reduction (MBSR), Yoga, Qigong, TaiChi, and various meditation and breathing techniques [15,16]. Mindfulness is commonly defined as the state of being aware of and attentive to the present surroundings [17]. Thus, MBI attempt to enhance a state of consciousness to improve overall health and wellness. Several studies have studied MBI and its utility in coping with stress, improving physical and mental health, QoL, and other

physiological parameters [8,18–21].

Irrespective of increasing use of MBI, there is a lack of comprehensive understanding of MBI improving stress-related outcomes (anxiety, depression, and positive mood, substance use, pain, sleep, and overall quality of life) among PLWHA. Based on the Cochrane library database search and literature review, very few systematic reviews have been identified in this specific area. Also, available reviews were either limited to one specific MBI (e.g. MBSR or Yoga) [22–24] or did not specifically focus on PLWHA [22,23,25]. To the best of our knowledge, there has not been any review that has evaluated the efficacy of MBI in PLWHA.

The purpose of the present review was to conduct a comprehensive and up-to-date assessment of the MBI literature with a focus on identifying key components and their effects on stress-related outcomes among PLWHA. Specifically, this review aims to answer the following three research questions.

1. What are the key attributes of the MBI?
2. What is the efficacy (or harms if any) of MBI on stress-related outcomes?
3. What is the impact of the MBI on HIV/AIDS disease progression among PLWHA?

## 2. Methods

## 2.1. Study search and selection strategy

A literature search was performed utilizing the following databases: Alt HealthWatch, CINAHL Plus with Full Text, PubMed, PsycINFO, and Web of Science with full text through October 2017. The keywords used for the search included: *Mindfulness-based*, *Mindfulness-based Stress Reduction (MBSR)*, *Mindfulness-based Cognitive Therapy (MBCT)*, *Mind-body Therapies*, *Yoga*, *Qigong*, and *Meditation* in combination with *HIV*. A Boolean search strategy was implemented. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement [26].

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**Table 1**  
Criteria for inclusion/exclusion of studies in the review.

	Inclusion	Exclusion <sup>a</sup>
Population and condition of interest	Adult populations (18 years or older) who have been diagnosed with HIV	People without HIV or not diagnosed with HIV; Children (under 18 years old) as mindfulness-based intervention administered to children is different in nature
Interventions	Structured mindfulness-based intervention with a minimum of 4 h of instructor-guided training. Such as MBSR, MBCT, Qigong, Yoga, and Meditation)	Lacking mindfulness component of the intervention
Comparisons of interest	Compare to other control group which could include participants engaging in other forms of intervention such as exercise, social support etc.	N/A
Outcomes	Quantitative response from stress-related scales; Conditions specific to HIV/AIDS; and other health conditions	Qualitative response on stress-related outcomes or HIV/AIDS-related outcomes as it might need different set of analysis; Mortality rate from HIV/AIDS after the intervention is not included as this will require longer follow up period
Study Design	Randomized Controlled Trials and Quasi-experimental studies; Longitudinal studies	Nonrandomized designs such as observational studies; articles without original data (editorials, reviews, and comments); and dissertations

<sup>a</sup> Studies published in abstract only form (posters, oral presentations) and dissertations.

Inclusion criteria for screening articles were: (i) population: PLWHA; (ii) intervention: MBI such as MBSR, MBCT, Yoga, Meditation, and Qigong; (iii) design: randomized control trial and quasi-experimental; (iv) outcome: stress-related physical and mental health, QoL, and physiological biomarkers; (v) publication: peer-reviewed articles with full-text availability in English. The comprehensive list of inclusion and exclusion criteria is provided in [Table 1](#).

The initial search identified 423 articles (Alt HealthWatch = 13, CINAHL Plus with Full Text = 62, PubMed = 227, PsycInfo = 40, Web of science = 81). After removing duplicate articles and subsequent screening 43 articles remained. In addition, seminal works referenced by the authors of the publications that met the original inclusion criteria or relevant systematic review were manually explored and 2 articles were identified. The abstracts of the 45 studies were screened by two independent reviewers to identify articles meeting the inclusion criteria. This process led to excluding 21 articles. The remaining 24 articles were considered for full-text review. After full-text review, 9 articles were excluded due to not meeting inclusion criteria (not related with mindfulness-based intervention (n = 3), no control group (n = 2), participants under 18 years old (n = 2), not RCT or quasi experimental (n = 1), not related with HIV population (n = 1). Eventually, 15 articles were included in the review and data synthesis process. This article selection process is presented in [Fig. 1](#).

## 2.2. Data extraction

The following data was extracted from the selected articles for the review: (i) study details and sample population (author, year, location, participants eligibility criteria, sample characteristics); (ii) intervention attributes (type, key components, intensity, frequency, program duration, attrition, and program feasibility); (iii) Outcome Measurements (measurements, outcomes, and salient outcomes).

## 3. Results

[Table 2](#) shows the synthesis of the study population based on the article reviewed. A majority of the studies were conducted in the United States (US = 8, India = 2, Iran = 2, Spain = 1, Canada = 2). Out of 15 studies, 13 were randomized controlled trial and 2 were quasi-experimental. Frequently stated eligibility criteria for the participants in the studies included: Participants with a CD4 T-cell count of at least 200 cells/mL (n = 6), no substance use issues (n = 6), and no significant mental health issues (n = 10). The sample size in the studies varied from 22 to 175 [32,35], with most of the studies (n = 12) having a sample size less than or around 30. The average age range of the participants in the studies ranged from 34 to 50 years old [20,21]. The average number of years of HIV diagnoses was reported in seven studies, ranging from 6.5 to 19.8 years [31,35].

### 3.1. Intervention key attributes

[Table 3](#) reports the key attributes and feasibility issues of MBI. The most frequently used MBI were Yoga (n = 5) and MBSR (n = 5). Other forms included MBCT (n = 2), Tai Chi (n = 2), and Transcendental meditation (n = 1). Key components specified in the studies included: bodily movement (n = 12), meditation (n = 10), breathing techniques (n = 6), group discussion (n = 3), and relaxation techniques (n = 2). Auxiliary components included a focused gaze, cultivating mindfulness in daily activities, cognitive exercise, and guided imagery. Instructor guided in-class training ranged from 10 to 50 h [19,33]. Ten of the fifteen studies explicitly suggested home-based practice. The number of hours recommended for home-based practice ranged from 20 to 120 h [19,20]. Duration of intervention ranged from 4 to 24 weeks, with a majority at 8 weeks (n = 9) [20,32]. The attrition rate of the studies ranged from 0% to 48% [20,34]. Positive aspects of MBI as mentioned in the studies included cost-effective (n = 4), supported/accepted by the target population (n = 7), and simple to administer (n = 3). Major challenges raised across studies were small sample size (n = 11) and the short duration of the program (n = 5). Additional challenges included high attrition rate (n = 5) due to time commitment and inconvenience, the likelihood of HIV disclosure (n = 1), participants compensation (n = 1), and difficult in implementing the intervention in non-clinical settings (n = 1).

### 3.2. Stress-related outcomes

[Table 4](#) summarizes the synthesized MBI stress related outcomes. Frequently measured outcome variables included QoL (n = 10), stress (n = 8), anxiety and depression (n = 5), and endocrine response to stress (n = 3). QoL was most often measured utilizing via the MOS-short form (SF)-36 questionnaire. Stress, anxiety, and depression were assessed via the Perceived Stress Scale, the Hospital Anxiety and Depression Scale and the Beck Depression Inventory, respectively. Additionally, saliva, cortisol, and DHEA-S were common measurements of the endocrine responses to stress. Other variables that were relevant across studies were loneliness, social support, mindfulness, mental health, positive and negative affect, spirituality and ART side effects and adherence.

Of the 10 studies that measured QoL, the effectiveness of MBI was significant ( $p < 0.05$ ) in 8, while the remaining 2 studies did not reach significant improvement. Eight studies measured perceived stress and 4 reported MBI as a significant reduction in total perceived stress while 3 studies reported the reduction not statistically significant and 1 study reported the perceived stress levels elevating post-intervention. Out of five studies that measured anxiety and depression 3 noted the significant effect ( $p < 0.05$ ) of MBI, while other two studies did not find a significant effect. Of the 3 studies examining endocrine responses only

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