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Effectiveness of Mindfulness on Decreasing Stress in Health Professional Students: A Systematic Review

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ABSTRACT

Background: Stress in health professional students is increasing every year. Therefore it is necessary to implement stress management for the students. Mindfulness is an alternative which can be used to deal with stress.
Purpose: The purpose of this systematic review is to describe the effectiveness of mindfulness on decreasing stress in health professional students.
Methods: This systematic review was conducted by searching relevant articles published in online databases EBSCO, Science Direct, PubMed, and Google. The search was restricted to the full-text articles published in 2010-2017 and employed the RCTs and non-RCTs research designs with a mindfulness intervention.
Results: Of the ten articles reviewed, it was found that mindfulness could decrease stress in professional health students with a very significant p-value. The types of mindfulness administered to the health professional students included yoga therapy, MBSR therapy, and meditation therapy. In average, MBSR therapy is used for health professional students. This intervention is practiced through meditation which lasts for 5-35 minutes for 3-6 weeks.
Conclusion: The study reported that, in average, the intervention to decrease stress in health professional students is performed by using MBSR with a meditation of 5-35 minutes. The intervention is done for 3-6 weeks. Results found that MBSR mindfulness could decrease stress. Further research is needed to explore the effectiveness of mindfulness on other subjects such as students who get scholarships.

Keywords: Health professional students, health, mindfulness, stress, systematic review

BACKGROUND

High levels of stress are mostly found in medical students and other groups of students of healthcare professionals. A study on the prevalence of stress on medical students had been conducted in Malaysia with 396 participants. The results found that almost 41.9% of students experienced stress.

More than 29% of students reported experiencing stress in Korea and the United States (American College Health Association-National College of Health Assessment [ACHA-NCHA], 2013; Chung and Kim, 2010). Stress is known to cause social problems or suicide. Indeed, suicide is a serious problem in Korea and is the leading cause of death

in Korea in the age of twenties (Statistics of Korea, 2012). The American College Health Association (ACHA) has implemented the need of mental health care for the students in the nation and promoted health programs (Buchanan, 2012).

Stress is an important psycho-social factor in the educational process that can affect the academic achievement and welfare of the students (Jimenez et al., 2010). Many students were reported to significantly experienced stress since they had to work with patients in a clinical setting. The most stressful aspect of the nursing students' clinical practice was that the students directly see and witness the pain and suffering of the patients (Jimenez et al., 2010). However, for nursing students, the level of academic stress is even higher than clinical stress (Chan et al., 2011).

MBSR programs have been studied and received much attention. Scientific evidence has shown MBSR could reduce the stress of an individual through mind-body connections; practice in self-awareness in fixing his problems, by not rejecting the events that happen to him, and not thinking too deeply about the event that will happen tomorrow (Center for Mindfulness 2014; Kabat-Zinn, 2003). MBSR is an open opment in the setting of behavioral medicine for populations with various chronic pain and stress-related disorders (Baer, 2009). As Baer pointed out, the standard of MBSR is conducted as a 3 to the 6-week course for 5-35 minutes per week plus home exercises. An intensive mindfulness session throughout the day for 7-8 hours is performed in the sixth week. Some skills of mindfulness meditation are also taught. Body detection is a 45-minute practice where the attention is directed to the wrong areas of the body while lying down. Sitting meditation is practiced by sitting in a relaxed and awake position with closed eyes and attention to the sensation of breathing. Hath yoga is taught to help someone achieve a sensation of awareness/mindfulness of the body during movement and stretching. Participants also train their attention to walk, stand and eat.

PURPOSE

The purpose of this systematic review is to describe the effectiveness of mindfulness on decreasing stress in health professional students.

METHODS

Study design

This study is a systematic review. Relevant articles were searched with some inclusion and exclusion criteria and keywords. A further review was then conducted to determine the articles used in this study.

Inclusion and exclusion criteria

The inclusion criteria of this study are the articles which used the students of health professionals such as medicine, psychology, nursing, and community health who were practicing mindfulness. Meanwhile, the exclusion criteria are articles that do not have the full text of pdf format, provision of intervention other than mindfulness, and respondents out of the inclusion criteria.

Literature search strategies

The articles were searched through the online database of EBSCO, Science Direct, PubMed, and Google Scholar. An advance search was performed using the keywords of mindfulness, stress reduction, and health professional students. The results identified 1450 articles from EBSCO, 1000 articles from Science Direct, 1100 articles from PubMed, and 116 articles from Google Scholar.

A further review was conducted by screening the articles which had full text in pdf format and were published in 2009 to 2017. The results identified 44 articles from EBSCO, 40 articles from Science Direct, 46 articles from PubMed and 38 from Google Scholar.

All article titles which are deemed appropriate to the purpose of the study were screened to know whether the title of the article was similar and whether there were significant effects of mindfulness therapy. Ten best articles were selected. One out of these nine articles reported no significant effects of mindfulness since after a 6-month intervention of mindfulness, the related behavior reoccurred.

Table 1. Literature search strategy

Searching tools	EBSCO	Science Direct	PubMed	Google Scholar
Results of searching	1450	1000	1100	160
Full text, pdf, 2010-2017	44	40	46	38
Similar titles	1	-	-	-
Eligible, suitable with the inclusion and exclusion criteria.	3	4	2	1
Final selected articles			10	

Assessment of quality of the study

The Critical Appraisal Skills Program (CASP) was used in this study to assess the quality of the articles. CASP was accessed from www.casp-uk.net. The critical appraisal was performed by the researchers to know the quality of the article.

Data Extraction

Data extraction was performed by exploring the articles based on five themes: author, participant, intervention, and outcomes.

Data synthesis

Data were narratively described. The presentation of data included article characteristics, the effectiveness of the intervention, and outcomes after the implementation of the therapy.

RESULTS

Characteristics of the study

Ten articles were identified to use RCT (Randomized Control Trial) and non RCT design with high quality. One article published in 2009 to 2017 mentioned that a 3-6 week mindfulness therapy could reduce depression in students

Table 2. Summary of the study

Authors	Study design	Population	Control	Intervention	Outcomes Analyzed	Time Frame Measurement	Outcomes
Barbosa et al. (1)	Non-RCT matched control	N = 12 (Pod, OT, PT, nursing, and physician assistant)	N = 14(Pod, OT, PT, Nursing, and Physician Assistant).	MBSR eight weeks / two and a half hours + eight -hour retreat Mindful awareness daily activities and communication Med home practice of 35 minutes, formal MF, 5–15 minutes of informal practice Mindful movement qigong, body scan, yoga, sitting med mindful awareness of daily routines/communication	BAI, JSPE, and MBI	Baseline post at week 8 Follow-up week 11	Anxiety in intervention gp week 8 and 11
Song and Lindquist (2)	RCT	N = 23 nursing	N = 21 nursing Wait listed control	MBSR 2hours / week for eight weeks Consisted of guided instruction on MF med, gentle stretching and group discussion, and home assignments	DASS-21 MAAS —Korean Version	Before - After	Depression, anxiety, and stress Mindfulness
Keng	Cohort	N = 77	N=57	Four weeks x three-hour	MAAS, PSS, DASS-21,	Pre and	Improvements in

(3)	control	Fourth-year medicine (psych rotation) Self-selected gp	Fourth-year medicine (psych rotation) Self-selected gp Control—nothing	sessions of mindfulness - based stress management (adapted from MBCT and MBSR) - "Mindful Gym." Didactic teaching, mindful and loving kindness meditation, gratitude, mindful movement and application of principles 10–15 minutes daily MF exercises.(guided by instructions on DVD) 15–20 per group	GHQ-12, SHS, and SWLS	immediately post	depressive symptoms, perceived stress, anxiety, subjective happiness, and satisfaction with life Looked at the effect of trait mindfulness and whether mediated mindfulness.
Erogul et al. (4)	RCT	N = 29	N=30	MBSR involved 75 minutes, once/week for eight weeks gp instruction and 20 minutes individual home med/day X eight weeks. MBSR involved teaching MF med, body scan and breathing-based yoga and cognitive curriculum After week 4 shifted from guided to self-med.	PSS, SCS, and RS	Pre and immediately post-intervention and six months post-intervention	Perceived stress at study end, not a six-month post intervention self-compassion scores at the end and six months post RS scores no change at end or 6 months post
deVibe et al. (5)	RCT	N = 144 Medical / psychology	N = 144 Medical / psychology	MBSR Kabat Zinn One and a half hours X seven weeks, six hours session, 30 minutes daily MF prac	GHQ, MBI, PMSS, SWB, FFMQ, Self-report practice and # classes attended	Pre-and post intervention	Moderate decrease mental distress, small in crease subjective well-being and mindfulness facet in the intervention group

Kang et al. (6)	RCT	N = 16	N = 16	MBSR X eight weekly, one and a half to two-hour sessions MF med – body scan, breathing and walking med followed by self reflection	BP, HR, self-administered questionnaire, PWISF, STAI, and BDI	Pre and one week following intervention	Control and intervention started with one and a half hour lecture stress and coping, no diff depression scores, decrease stress and anxiety scores in intervention gp.
Ratanasiripong et al	RCT	N = 29 Biofeedback N = 29 mindfulness meditation Second year nursing	N = 31 Second year nursing	Biofeedback gp two training sessions on how to use the equipment. Mindfulness gp two training sessions On how to do Vipassana med.	PSS SAS from STAI	Pre and immediately post	Biofeedback—↓ anxiety levels, maintaining stress levels. Mindfulness—↓ anxiety levels↓ and perceived stress levels
Young et al	Non-RCT cohort control	15 third - year nursing students	15 third-year nursing students Control—nothing	MBSR 8 week course yoga, breathing, and body scan being mindful	F36 health survey, SCL - 90 and MMPI (Symptom check list)	Pre and post intervention	Small to medium effect for health related, sense of coherence and physical symptoms Psychological symptoms greatest↓

Astin	RCT	N = 14 Behavioral medicine	N = 14 Behavioral medicine Wait list control	MBSR, Kabat Zinn 8 wk / 2h Home = 45/d Med-body scan, sitting med, hatha yoga, and didactic presentations on stress No eight-hour retreat	Hopkins SC-90R (SLC-90_R) + additional items scale5 sleeping and eating GSI, SCI, INSPIRIT, and daily compliance diaries Questioned whether received something of value and what that was.	Pre post at eight weeks 6–9 months post (but only 5 of 12 participants and only GSI)	↓Overall psych symptoms,↑ sense of control and use of accepting or yielding mode of control, higher scales on measures of spiritual experiences in intervention gp post + ve changes maintained on GSI at six to nine
Yamada	Non RCT	N = 37	N = 23	Brief introductory material provided at first session 10min-guided sitting MF meditation at start of Psych class +2/wk+15 weeks led by instructor	Psychological well-being—FMI, MAAS, SCS, RRQ, PSS, and STAI Sense of capacity for learning— evaluation of mindful awareness practices Learning out comes—total scores + class assessments, for example, peer evaluations and exams	Pre-and post intervention	↑In mindful awareness traits, ↓in rumination,↓ state anxiety in intervention gp, no diff in academic performance, but 81% of students reported + ve effects of MAPS on learning

Interventions

Yoga Therapy

The purpose of this therapy is to reduce stress in individuals. Studies on the comparison of stress levels between men and women is still very limited. A study shows that yoga can reduce stress both in men and women (Sharma, 2012). This finding is supported by another study that yoga is associated with increased Gamma Amino Butyric Acid (GABA) associated with the relaxation process in the body (Streeter CC, 2007).

MBSR therapy

The MBSR program has been studied, and scientific evidence has shown that MBSR can have profound benefits through mind-body connections; the practice of mindfulness results in stress reduction (Center mindfulness 2014; Kabat-Zinn, 2003). There are several types of mindfulness therapy such as Mindfulness Based Stress Reduction (MBSR) and Mindfulness Meditation. MBSR is one type of therapy of mindfulness commonly used as an intervention of research. MBSR program is conducted as an 8 to the 10-week course, meeting 2–2.5 hours weekly coupled with home practice most days. An all-day intensive mindfulness session for 7–8 h in one day is held around the sixth week (Song & Lindquist, 2015).

MBSR programs are based on teaching participants to react nonjudgmentally to stressful events by focusing on automatic and dynamic stimuli (breath; body; eating; walking), and participants cultivate these skills (Zeidan, Johnson, Diamond, David, & Goolkasian, 2010). MBSR programs have been studied, and scientific evidence has been generated demonstrating that they can have a profound benefit via the mind-body connection; the practice of mindfulness results in an increase of awareness (Kabat-zinn, 2003).

Meditation therapy

Meditation is a mental exercise that can balance ones' physical, emotional, mental, and spiritual aspects (Iskandar, 2008). Meditation is the focusing of the mind toward the state of consciousness which brings the status of tranquility, clarity, and happiness that is the medium of the NSR (Sukmono, 2009). A study by Majid (2003) mentions that physical stress can be reduced by meditation.

All the aforementioned therapies in this systematic review are incorporated in mindfulness interventions. The differences in these three methods rely on the time duration and mode of administration. Intervention with yoga usually lasts for 15 minutes for 8 weeks, while MBSR lasts for 6-8 weeks with a duration of about 1-2 hours. Meanwhile, meditation is usually performed for 4-6 weeks with a duration of 10-15 minutes.

Effectiveness of mindfulness on decreasing stress level

Of the 10 articles reviewed, it was found that Mindfulness can decrease stress in professional health students, with a very significant p-value. A study by Barbosa (2013) with a population of 1300, in which 12 were selected for interventions samples and 14

were for the control group, reported that stress was a big problem for nursing students. In this study, it was also reported that mindfulness-based intervention conducted for 8 weeks with a duration of 35 minutes could decrease the stress level with a significant p-value of 0.005.

Yeoungsuk Song in 2015 also conducted a study with a population of 50 nurse students. Of this number, 44 students participated in the study and the other 6 students refused for participation. The selected students were divided into the treatment group (n=21) and control group (n=23). A mindfulness intervention was given for 8 weeks to the intervention group. The results indicated that mindfulness gave an influence on decreasing stress, anxiety and depression with p-value = 0.005.

DeVibe MBSR Kabat Zinn One and a half hours X seven weeks, six hours session, 30 minutes daily MF prac.The selected student were divied student N = 144Medical / psychology. Moderate decrease mental distress, small in crease subjective well-being and mindfulness facet in the intervention group. GHQ, MBI, PMSS, SWB, FFMQ, Self-report practice and # classes attended. Pre-and post intervention

Kang (2009) carried out a study on 41 nursing students. In this study, 21 students were assigned to the treatment group, and the other 20 were to the control group. The treatment in the form of mindfulness therapy was given for 8 weeks; each session lasted for 1-2 hours. The results reported significant reduction of stress ($F = 6.145$, $p = 0.020$), anxiety ($F = 6.985$, $p = 0.013$), and insignificant results were found in depression ($t = 1.986$, $p = 0.056$). A similar finding was also reported by Ratanasiripong (2015). Mindfulness gave significant effects on reducing stress in students ($p = 0.005$). In this study, 29 students were selected for the treatment group, and 31 were taken for the control group. The intervention was performed for 8 weeks; 2 meeting sessions each week Ratanasiripong (2015).

Furthermore, Yamada (2012) also conducted a study on the effects of mindfulness. The study recruited the samples of 60 participants (37 in the treatment group and 23 in the control group). Mindfulness intervention was given to the treatment group for 15 weeks. Two meeting session were carried out in each week. The results reported significant decreases in psychology students ($F (1.55) = 5.389$, $p <.05$) but not significant after treatment over 6 months.

Erogul et al. (2014) also reported that mindfulness with a combination of self-compassion have significant effects in reducing stress (0.58, $p = .23$), 95% CI [0.23, 0.92]. This study was aimed at investigating stress in medical students. A total of 29 students in the control group and 30 in the intervention group were recruited. Mindfulness intervention was given once a week for 75 minutes in 4 weeks. Mindfulness gave significant effects on reducing the students' stress level (Erogul et al., 2014). Another interesting finding was also reported by Keng (2015). Mindfulness intervention in 4 weeks and 3 hours in each session significantly reduced stress in the students ($p < 0.05$) (Keng, 2015).

Mindfulness was also evident to decrease stress in medical and psychology students (Vibe, Solhaug, & Tyssen, 2015). Vibe, Solhaug, & Tyssen (2015) investigated the effects of mindfulness in an intervention group (n=144) of medical and psychology students. A control group of 144 students was also used. Mindfulness intervention was given to the intervention group for 7 weeks; each meeting lasted for 30 minutes. The results reported very significant of mindfulness (5.3 versus 3.6, t286 = 5.37, p <0.001, d = 0.7) (Vibe, Solhaug, & Tyssen, 2015).

DISCUSSION

Mindfulness is such a therapy which is practiced by developing an awareness of oneself, with a sense of acceptance and not judging whatever happens to him (Kabat-Zinn, 1994). Mindfulness is a self-observation that distances the perception and response, allowing the mind to respond to the situation more effectively to the real reality. Hayes and Feldman (2004) mentioned that the state of mindfulness about oneself would clarify what he really feels to cure (fix) his mood with cognitive flexibility.

In dealing with stress in students, there are several therapy alternatives which can be used; one of which is mindfulness. It is evident that mindfulness can reduce the stress since this therapy can lead a person reach an alpha brain wave, i.e., a low frequency of brain wave. This alpha brain wave increases the secretion of norepinephrine, serotonin, and beta-endorphin levels, accompanied by a reduction in the level of blood production. The level of blood production is directly related to stress (Afandi et al., 2015, p. 76).

In studies conducted by Yamada et al. (2012), Yeoungsuk (2015), Astin (1997), Ratanasiripong (2015), Vibe, Solhaug, & Tyssen (2015), Barbosa (2013), Kang (2009), Erogul et al. (2014), and Song (2015), it was reported that mindfulness could significantly decrease stress. Mindfulness is varied, especially in the matter of duration and length of time of administration. In average, mindfulness therapy was administered for more than 4 weeks. Yamada et al. (2012) also pointed out that after 6 months, mindfulness therapy should be re-administered to the students to decrease their stress.

CONCLUSIONS AND IMPLICATIONS

From this review, it can be concluded that mindfulness can reduce stress in the health professional students. The type of mindfulness administered to the health professional students, in average, is MBSR. This intervention is practiced through meditation which lasts for 5-35 minutes for 3-6 weeks. In this review, it was evident that MBSR could significantly reduce stress in students.

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