

IS MINDFULNESS-BASED STRESS REDUCTION EFFECTIVE IN REDUCING STRESS DURING COVID-19 PANDEMIC AND INCREASING LEVEL OF SATISFACTION AMONG HEALTH CARE PROFESSIONALS? A META- ANALYSIS OF RCTs

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ABSTRACT

Introduction: During Covid-19 pandemics, healthcare workers are on the front lines putting themselves and their families at risk this could result in mental health problems .stress is a major obstacle for health care personnel that makes them less satisfied, less capable of making the best choices and could have difficulties when confronted with their patients which affects patient's care.

Mindfulness – Based stress reduction (MBSR) is a program aimed to improve awareness of one's mental processes, become flexible and act with the principal of compassion. (2). Many researches proposed MBSR for helping practitioners of becoming less vulnerable to stressors. However, results were inconclusive.

Objective: To evaluate the effectiveness of MBSR intervention in stress reduction and enhancing level of satisfaction among health care professionals.

Method and design: Meta-analysis of Randomized Controlled Trials (RCTs).

Data Source: Medline, Psych info, PubMed, Web science and Cochrane Library Database from 2009 till 2019 for related RCTs.

Selection Criteria: Published RCTs Comparing Mindfulness- Based Stress Reduction with other modalities for stress reduction and improving level of satisfaction among health care workers and stressed personnel were eligible for inclusion.

Data Collection and analysis: Data entered organized in Microsoft excel 2010 then exported to comprehensive meta-analysis software version 3. Pooled: for analysis of multiple studies, and found adjusted accumulative outcome Z score method: to test difference in mean. Test for heterogeneity: Cochran's Q test and I².

Results: In the ALL 6 included studies, 2896 subjects. There is significant improvement in perceived stress score significantly more among intervention (MBSR) group with pooled significant difference (Mean change-3.47 & SE 1.01, Z score 8.11) with no significant heterogeneity among studies. There is significant job satisfaction improvement in MBSR group significantly more than other group with pooled significant difference (mean change 5.18, SE 1.23, Z score 13.2) with no significant heterogeneity.

Conclusion: these finding support that MBSR program is effective in reducing stress and increases job satisfaction among health care professionals.

KEYWORDS: Mindfulness, Health workers, Stress, COVID-19 Pandemic, Systematic review, RCTs.

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INTRODUCTION

Stress and Burnout are the drawbacks of any health professional work life especially with increasing the stressors through the pandemic that affects health workers' mental health. It may affect their level of satisfaction, productivity as well as self-compassionate. Furthermore, being under stress makes the professionals less capable of making the best choices and could have difficulties when confronted with his patients which in turn affects patient's care [1, 2].

Mindfulness – Based stress reduction program is defined as bringing one's complete attention to what is happening in the present moment in a non-judgmental way, aimed to improve awareness of one's own mental processes, become flexible, listen attentively, being non-judgmental and act with the principal of compassion[3,4]. In the recent decades many researches proposed MBSR as a potential tool helping practitioners of becoming less vulnerable to stressors, Burnout as well as improving resilience and self-compassionate [4-7]. However, recent studies show inconclusive results about this association meta-analysis based on RCTs in this era [7,8,9], furthermore most of the trials done on the non-clinical setting, yet only limited research done on clinical population[8,9]. Therefore, to help to ensure health care providers and patient safety, we used the data published RCTs in the last 10 years to carry out a meta-analysis with the main aim to Evaluate the effectiveness of Mindfulness – Based stress reduction intervention in promoting health care professional's mental health and wellbeing in terms of stress reduction, Burnout and level of satisfaction.

METHODS

We conducted a literature search to identify all systematic reviews Published RCTs indexed in Medline, Psych info, PubMed, Web science and Cochrane Library Database from 2009 till 2019 for to carry out a meta-analysis using the key words of "mindfulness, health workers, stress, COVID-19 Pandemic, systematic review "and "RCTs". Hand check of reference lists of all included studies was done for

potential studies.

Inclusion and exclusion criteria: All systematic reviews based on RCTs Comparing Mindfulness- Based Stress Reduction with other modalities for stress reduction and improving the level of satisfaction among health care workers and stressed personnel were eligible for inclusion provided that a) main outcome is perceived stress and level of satisfaction) articles published in English. Non-systematic review of observational studies and case reports were excluded.

Statistical analysis

Data Collection and analysis: Data entered organized in Microsoft excel 2010 then export to comprehensive meta-analysis software version 3

Pooled: for analysis of multiple studies, and found adjusted accumulative outcome

Z score method: to test difference in mean.

Test for heterogeneity: Cochran's Q test and I²: Under null, it is approximately distributed as a chi-square with k-1 degrees of freedom for test heterogeneity and homogeneity of studies results and finding.

RESULTS

6 included studies, 2896 subjects. Table (1) shows Socio demographic distribution (mean age 45.85±14.5 and female were majority with average percentage of 78.12%.the largest study was "Lamothe et al. 2016 "of 2379 cases followed respectively, with " Davis et al. 2018, "Pérula-de Torres et al. 2019", "Lin et al. 2018", "Lengacher et al. 2009" whilst "Valley M and Stallones L. 2017 "only had 20 subjects.

table (2) show the Change assessment between baseline score and post intervention score between studied groups regard perceived stress and illustrates that Pérula-de Torres et al. 2019, Lengacher et al. 2009, Lamothe et al. 2016, Lin et al. 2018, Valley M and tallonesL. 2017 and Davis et al. 2018 found significant improvement in score significantly more among intervention group with pooled significant difference (Mean change-3.47 & SE 1.01, Z score 8.11). Funnel (figure 3) showing, no significant heterogeneity: Cochran Q: 8.96, P: 0.391, I² (Inconsistency) 3.54, 95% CI for I²

0.74-6.98, Homogeneity among studies were founded. No bias account for differences in results among studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studied. Change assessment between baseline score and post intervention score between studied groups regard Job satisfaction.

Table 1: Distribution of demographic data.

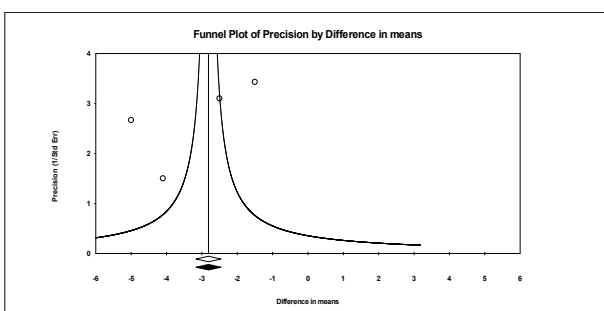
Study	N	AGE	SEX	
			Male	Female
Pérula-de Torres et al. 2019	132 cases	49.54±12.65	NA	NA
Lengacher et al. 2009	84 cases	57.87±9.68	0.00%	100.00%
Lamothe et al.	2379 cases	41.5±10.85	19.00%	81.00%
Lin et al. 2018	90 cases	31.41±8.8	6.70%	93.30%
Valley M and	20 cases	NA	0.00%	100.00%
Davis et al. 2018	191 cases	51.4±11.85	83.70%	16.30%

Socio demographic distribution as mean age from all studied was 45.85±14.5 and female were majority with average percentage of 78.12%

Table 2: Change assessment between baseline score and post intervention score between studied groups regard perceived stress:

Study	Intervention group		Other group		Z	P	
	Mean Change	SE	Mean Change	SE			
Pérula-de Torres et al. 2019	NA	NA	NA	NA	---	---	
Lengacher et al. 2009	-3.25	1.21	-0.25	0.14	8.24	0.00**	
Lamothe et al. 2016	-2.58	0.98	0.52	0.08	6.33	0.00**	
Lin et al. 2018	-4.32	1.12	-0.31	0.11	11.2	0.00**	
Valley M and tallonesL. 2017	-0.95	0.23	-0.24	0.08	2.88	0.002*	
Davis et al. 2018	-3.89	0.88	-0.55	0.88	7.64	0.00**	
Pooled	-3.47	1.01	-0.37	0.13	8.11	0.00**	

Pérula-de Torres et al. 2019, Lengacher et al. 009, Lamothe et al. 2016, Lin et al. 2018, Valley M and tallonesL. 2017 and Davis et al. 2018 found significant improvement in score significantly more among intervention group with pooled significant difference



Funnel showing distribution of heteroginicty and its result showed in table below

Test for heteroginicty	
Cochran Q	8.96
P	0.391
I ² (Inconsistency)	3.54
95% CI for I ²	0.74-6.98

No significant heteroginicty

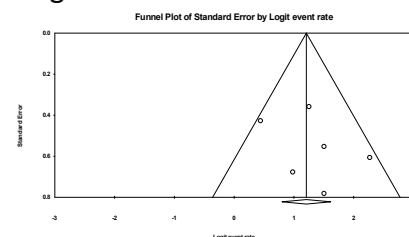
Homogeneity among studies were founded. No bias account for differences in results among studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studied

Table (3) depicts that all studied found significant improvement in intervention group significantly more than other group with pooled significant difference (mean change 5.18, SE 1.23, Z score 13.2).

Table 3: Change assessment between baseline score and post intervention score between studied groups regard positive emotion.

Study	Intervention group		Other group		Z	P	
	Mean Change	SE	Mean Change	SE			
Pérula-de Torres et al. 2019	NA	NA	NA	NA	---	---	
Lengacher et al. 2009	3.31	0.95	-0.15	0.02	8.24	0.00**	
Lamothe et al. 2016	0.88	0.21	0.51	0.06	1.33	0.223	
Lin et al. 2018	5.01	1.32	1.62	0.05	11.2	0.00**	
Valley M and tallonesL. 2017	1.32	0.22	0.35	0.11	2.28	0.031*	
Davis et al. 2018	4.13	0.77	0.74	0.13	12.9	0.00**	
Pooled	2.98	0.85	0.62	0.23	7.99	0.00**	

All studied found significant improvement in intervention group significantly more than other group except Lamothe et al. 2016, with pooled significant difference



Funnel showing distribution of heteroginicty and its result showed in table below

Test for heteroginicty	
Cochran Q	5.7
P	0.398
I ² (Inconsistency)	2.98
95% CI for I ²	0.25-3.54

No significant heteroginicty

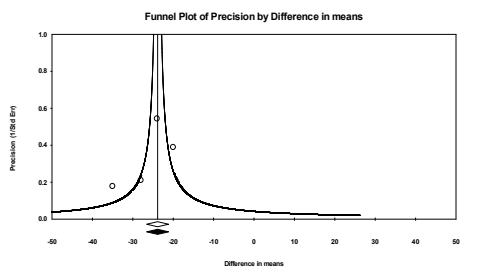
Homogeneity among studies were founded. No bias account for differences in results among

studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studied

Table 4: Change assessment between baseline score and post intervention score between studied groups regard negative emotion.

Study	Intervention group		Other group		Z	P	
	Mean Change	SE	Mean Change	SE			
Pérula-de Torres et al. 2019	NA	NA	NA	NA	---	---	
Lengacher et al. 2009	-0.98	0.12	-0.69	0.09	1.24	0.287	
Lamothe et al. 2016	-1.89	0.22	-0.54	0.06	3.13	0.002*	
Lin et al. 2018	-3.12	0.69	0.87	0.08	5.28	0.00**	
Valley M and tallonesL. 2017	-1.87	0.27	0.35	0.11	4.13	0.00**	
Davis et al. 2018	-1.98	0.35	0.64	0.13	8.98	0.00**	
Pooled	-2.08	0.28	0.62	0.23	7.99	0.00**	

All studied found significant improvement in intervention group significantly more than other group except Lengacher et al. 2009, with pooled significant difference



Funnel showing distribution of heterogeneity and its result showed in table below

Test for heterogeneity	
Cochran Q	7.66
P	0.419
I ² (Inconsistency)	2.64
95% CI for I ²	0.72-3.991

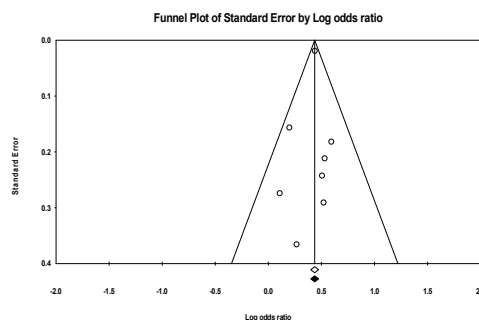
No significant heterogeneity

Homogeneity among studies were founded. No bias account for differences in results among studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studied

Table 5: Change assessment between baseline score and post intervention score between studied groups regard Job satisfaction.

Study	Intervention group		Other group		Z	P	
	Mean Change	SE	Mean Change	SE			
Pérula-de Torres et al. 2019	8.65	2.11	1.12	0.32	12.9	0.00**	
Lengacher et al. 2009	3.21	0.95	-0.15	0.02	8.24	0.00**	
Lamothe et al. 2016	4.55	1.41	0.51	0.06	10.3	0.00**	
Lin et al. 2018	4.11	0.98	-1.62	0.05	15.2	0.00**	
Valley M and tallonesL. 2017	2.99	0.87	0.35	0.11	5.28	0.00**	
Davis et al. 2018	6.88	1.77	0.74	0.13	12.5	0.00**	
Pooled	5.18	1.23	0.42	0.18	13.2	0.00**	

All studied found significant improvement in intervention group significantly more than other group with pooled significant difference **Funnel showing distribution of heterogeneity and its result showed in table below**



Homogeneity and symmetry founded and illustrated in funnel plot

Test for heterogeneity	
Cochran Q	3.87
P	0.422
I ² (Inconsistency)	2.54
95% CI for I ²	0.44-4.36

Not Significant heterogeneity

Homogeneity among studies were founded. No bias account for differences in results among studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studied Results

DISCUSSION

Meta-analysis is a quantitative, formal, epidemiological study design used to systematically assess previous research studies to derive conclusions about that body of research.

Outcomes from a meta-analysis may include a more precise estimate of the outcomes, than any individual study contributing to the pooled analysis. The examination of variability or heterogeneity in study results is also a critical outcome [6, 9].

The benefits of meta-analysis include a consolidated and quantitative review of a large, and often complex, sometimes apparently conflicting, body of literature. The specification of the outcome and hypotheses that are tested is critical to the conduct of meta-analyses, as is a sensitive literature search. Results from observational studies and some limited Randomized control trials have concluded that MBSR could be helpful in reducing perceiving stress among chronic

illness and malignancy diagnosed patients [10], other studies showed a limited effect among nurses and medical students [11,12]. This suggest that there are other factors that contributes to perceiving stressors[6,13]. Matched case control studies have shown that among severely overloaded critical care unites and emergency nurses there has been an association between workload, stressors and level of satisfaction. However, the interpretation of these studies is affected by the risk of confounding as well as type 2 errors due to small sample sizes [13,14]. Previous systematic reviews confirmed that MBSR is effective in reducing stressor and negative emotions of health care providers.

This meta-analysis provided evidence supporting the effect of mindfulness stress-based reduction on decreasing perceiving stress, negative emotions and increased level of satisfaction for the health care providers to achieve high quality rather than quantity. Our meta-analysis included only 6 RCTs, All of which were published in the last 10 years. The results of this meta-analysis showed significant improvement in perceived stress score significantly more among intervention (MBSR) group with pooled significant difference (Mean change-3.47 & SE 1.01, Z score 8.11) with no significant heterogeneity among studies. There is significant job satisfaction improvement in MBSR group significantly more than other group with pooled significant difference (mean change 5.18, SE 1.23, Z score 13.2) with no significant heterogeneity. However, all the included studies used the 8 week short term MBSR intervention that make study of its long term effect is fundamental in this context.

Strength of the Analysis: The analysis was done of 6 RCTs studies. Homogeneity among studies were founded. No bias account for differences in results among studies, which are not due to chance, after quantifying all factors. We found no significant heterogeneity and we reported agreement between studies.

Limitation of the analysis: The randomized controlled trials of the review included are of 2896 subjects only. Small sample sizes of some of the trials could lead to type 2 errors

(accepting the null hypothesis when it is false). Therefore, larger trials are warranted in the future.

Conclusion and implications for Research: This meta-analysis which included a total of 2896 subjects support that MBSR program is effective in reducing stress and increases job satisfaction among health care professionals.

Implications:

On workers' level: Decreasing stressful work atmosphere and improving employees' satisfaction and ultimately for the patients they serve.

On patient's level: Receive respectful, non-judgmental compassionate care

CONCLUSION

This meta-analysis which included a total of 2896 subjects supports that MBSR program is effective in reducing stress and increases job satisfaction among health care professionals. However further studies are needed to confirm the long-term effect and to guide clinical practice patterns.

Disclosure: This work is part of a Master's thesis of the Master's Program in Clinical Research, Center for Clinical Research and Management Education, Division of Health Care Sciences, Dresden International University, Dresden, Germany.

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