Original Article

Impact of COVID Pandemic on the Mental State of Health Workers: A Study of Mindfulness-based Interventions

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Abstract

Background: An increasing number of studies have been conducted on the prevalence of COVID-19 to develop strategies to combat the disease. However, less attention has been paid to the mental health of medical professionals.

Objectives: To investigate whether a mindfulness-based stress reduction (MBSR) course in Tibet could improve the mental health of medical personnel during the COVID-19 epidemic.

Methods: One hundred and eighteen medical staff were randomly selected from July 2022 to September 2022. After baseline enrolment, the control group (n=59) received baseline healthcare services, while the intervention group (n=59) received a 2-month positive intervention MBSR course in addition to baseline healthcare services. After the intervention, the intervention group underwent a final assessment, and the control group was subjected to MBSR for 2 months. The Self-Rating Depression Scale (SDS), Self-Consciousness Scale (SCS), and the Chinese version of the Cohen Perceived Stress Scale (CPSS) were used to measure the emotional well-being of medical personnel.

Results: The intervention group had significantly lower CPSS and SDS scores at the end of the MBSR course (P<0.01), and SCS scores were significantly increased during M2 (P=0.009), compared to M0. In the control group, the scores of SDS (P=0.223), SCS (P=0.112), and CPSS (P=0.131) in M2 were not significantly different from those in M0. The intervention and control groups showed statistically significant differences in CPSS scores (P=0.013), SDS scores (P=0.001), and SCS scores (P=0.029) at the end of the MBSR session.

Conclusion: It can be concluded that MBSR sessions can effectively alleviate negative emotions triggered by work stress and depression and improve self-compassion during an epidemic. It is recommended to participate in a scientific MBSR course to improve emotional well-being to some extent.

Keywords: COVID-19, Emotional health, Medical staff, Mindfulness-based stress reduction, Physiological signals

1. Background

Since a worldwide outbreak (1-3), coronavirus pneumonia (COVID-19) has been treated as a highly infectious, rapidly spreading, and multiply transmissible disease with a higher mortality rate than influenza (4-6). In addition to psychosocial problems, COVID-19 also leads to severe mental disorders (7). It's no secret that care teams are exposed to significant work stress during an epidemic, and it is essential to acknowledge and address the mental health challenges in the healthcare community (8). A report from China revealed that half of the country's healthcare workers suffered from depression during the epidemic (9). The results of another study demonstrated that 36.9% of healthcare workers had a mental health disorder (10). Based on the findings of a study in Oman, 25.9% of medical staff suffered from severe anxiety and 56.4% from high stress (11).

Mindfulness was first introduced in the broad philosophical terminology of Buddhism (12), whose practice includes formal forms (e.g., breathing, sitting, walking, and body scanning) or informal forms (e.g., mindfulness in daily life). Mindfulness-based stress reduction (MBSR), a targeted, mindfulness-based stress management program devolved by Jon Kabat-Zinn, is one of the earliest and most far-reaching mindfulness programs in the West (13, 14). Nurses with a nurse practitioner title or higher, who have received systematic training in positive thinking stress reduction therapy programs, typically act as executors in positive thinking therapy sessions (15). In MBSR, in the spirit of mindfulness meditation, the patient is instructed to remain in a comfortable position, close the eyes slightly, breathe mindfully, and gradually empty their mind following instructions to meditate on the emotional processes experienced, such as happiness and sadness, and finally, receive post-session exercises (16).

Qualitative interviews and assessments of cognitive and psychological symptoms at specific time points are designed to evaluate the effectiveness of stress reduction therapy through positive thinking over time (17, 18). Several mindfulness-based intervention (MBI) programs (e.g., MBSR) have been established, and the number of randomized controlled trials of MBIs has recently increased (19, 20). It has been shown that MBIs can help manage a range of psychosocial problems,

such as sadness, worry, stress, and sleep deprivation ([21]), although their effectiveness in different contexts remains to be explored ([22]).

The present study was conducted to determine whether the positive thinking intervention program can improve the mental health of healthcare workers by comparing the mental health scores obtained by the Self-Rating Depression Scale (SDS), the Chinese version of the Cohen Perceived Stress Scale (CPSS), and Self-Consciousness Scale (SCS), and thus providing data to support the physical and mental health of medical personnel.

2. Objectives

To investigate whether a mindfulness-based stress reduction (MBSR) course in Tibet could improve the mental health of medical personnel during the COVID-19 epidemic.

3. Methods

3.1. Settings

This was a prospective randomized controlled trial. Volunteer participants were recruited and sent to Tibet from July 2022 to September 2022 to support the fight against the epidemic, including frontline medical personnel. Personal information (e.g., age and gender) and scale scores were collected.

Eligible individuals were clinical staff aged 20-50 years and with a work experience of > 0.5 years. On the other hand, exclusion criteria were severe cardiovascular disease and psychiatric and other immune disorders; a history of psychotropic drug use; and previous practices (e.g., meditation ≥15 min/day and yoga within the past 6 months) or

ongoing psychosocial interventions. Forty subjects who failed to pass the baseline assessment and 39 subjects who experienced a decline in performance were excluded. Ultimately, staff from tertiary hospitals throughout China being responsible to support the protection of Tibet from the epidemic were included in the study. Subjects were randomly selected (1:1) from a list generated using an online randomization program (Randomizer.org). Participants were fully informed of the aims and procedures of the study, and all consented to participate in the study by verbally agreeing to do so. No human genetic data were collected, and given the unpredictability of disease outbreaks during the conduct of the study, ethical approval was not obtained for this study.

3.2. Participants

During the publication period, the total number of enrolled medical personnel was 299, of which 99 were placed on a waiting list, for a response rate of 84.22% (n=355). The number of planned participants was 233 (77.93%) and the actual number of participants was 197 (65.89%) after the announcement of a specific positive thinking course. A total of 118 medical staff (39.46%) reached the completion point of the positive thinking course. The final scores of SDS, CPSS, and SCS scales for 118 medical professionals were collected for analysis ([Figure 1]).

3.3. Intervention

The effect of MBI on the emotional well-being of Tibetan medical professionals was examined. Twenty-four 10-20-minute video-based audio meditations were recorded for an 8-week online
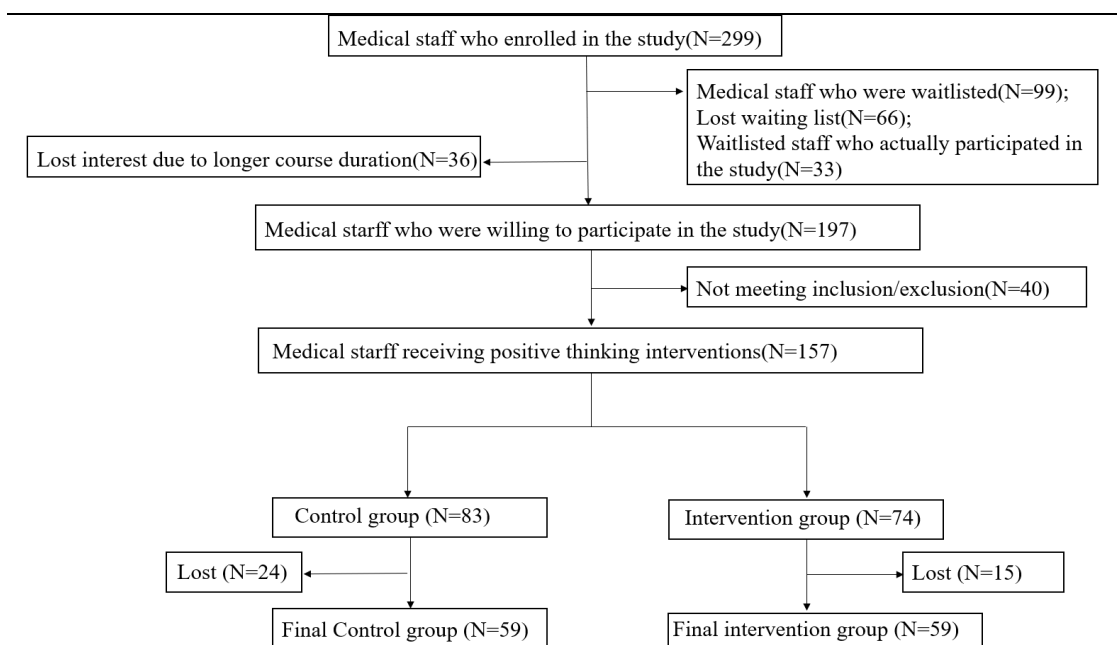

Figure 1. Participant flow diagram

Table 1. Mindful-based stress reduction courses information

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Course content	Awareness of the full experience	Creative seeing and responding	Power of the present moment	Habits and experiences	The possibility of choice	Personal practice	Integration into life	A calm view of a new life
Duration/session(min)	30	30	40	40	30	30	60	60

MBSR course covering awareness of the whole experience, creative seeing and responding, the power of the present moment, habits and experiences, the possibility of choice, personal practice, integration into life, and a calm view of a new life. The process of MBSR is presented in Table 1. The intervention group could receive the MBSR curriculum at any time of the day (online format). All MBSR course creators were qualified to teach the positive thinking course. The training was attended three times a week for 8 weeks. A WeChat punch card app was set up for participants to sign in after each session, and the investigator made reminder calls to subjects who had not signed in for over 7 days. All members of the intervention group were required to complete the intervention in the order specified in the video. They were encouraged by email after completion without receiving material rewards. Weekly sessions were offered after 7-8 weeks to ensure that participants were able to adhere to the intervention over a longer period. The control group received no positive thinking activities (e.g., yoga, meditation, and breathing techniques) during the 8-week MBSR programme in the intervention group, however, implemented them after 8 weeks via an online video learning mode analogous to the intervention group. The results of the various scale scores were collected via a questionnaire.

3.5. Measurement of feasibility

The feasibility of the study was assessed using response, engagement, and return rates. The completion time was defined as participants completing 8 weeks of the positive thinking intervention. A course satisfaction survey was also administered at the end of the study. The satisfaction survey was a scoring system (from 1 to 5, with higher scores indicating higher satisfaction levels).

3.6. Assessment tools

The SDS (1965) scale, which includes 20 different factors and is rated on a 4-point Likert scale, was used to assess participants' anxiety levels [23]. Higher scores represented increased anxiety. The alpha coefficient for the baseline SDS score in this study was obtained at 0.90.

Subjective stress was measured by the 14-item CPSS [24], which includes questions about recent events and indicates how stressful they were perceived on a 5-point scale. Total scores can range on a scale from 0 to 70, with a higher score demonstrating a higher level of self-reported stress.

The alpha coefficient for the baseline CPSS score in the present study was evaluated at 0.88.

The SCS [25] was used to assess whether subjects adopted a positive basic attitude toward themselves in difficult situations. Self-compassion includes self-love, awareness that we are part of a common humanity, and the ability to hold one's emotional experiences in balanced consciousness (positive thinking). The 26-item SCS comprises 6 subscales (self-kindness=5 items, self-judgment=5 items, common humanity=4 items, isolation=4 items, mindfulness=4 items, and overidentification=4 items). The replies are rated on a 5-point Likert scale (from 1=seldom to 5=often). The scores on the SCS scale were proportional to the degree of self-compassion. In the current study, the reliability of this instrument was obtained at 0.93 measured by Cronbach's alpha coefficient method.

3.7. Statistical analysis

All analyses were performed in SPSS22 software. Qualitative data were reported in terms of the number and frequency. Group differences were analyzed by Chi-square test, one-way analysis ANOVA, and univariate analysis of covariance (ANCOVA), with M0 and M2 outcomes modeled as a function of the intervention group (categorical covariate), stratified factor study center (categorical covariate), intervention duration (categorical covariate), and respective baseline values (linear covariate). Estimates of effect size, 95% confidence intervals (CIs), and p-values were then obtained for 118 estimates of group differences. Paired t-tests were performed to analyze changes within groups over time. P-values of ≤ 0.05 were considered statistically significant.

4. Results

4.1. Baseline analysis

A total of 118 medical members were enrolled in this study. The baseline data of the 118 subjects are tabulated in Table 2. There were no significant differences between the experimental and control groups in baseline data, including gender (P=0.09), position (P=0.24), age (P=0.13), academic qualifications (P=0.41), ethnicity (P=0.10), marital status (P=0.22), past smoking and alcohol consumption (P=0.32), and body mass index (P=0.07).

4.2. Scale scoring results

Scale scores are summarized in Table 3. The

Table 2. Baseline information

	All subjects (n=118)	Intervention group (n=59)	Control group (n=59)	P-value
Gender				
Male	29 (24.58%)	12 (20.34%)	17 (28.81%)	0.091*
Female	89 (75.42%)	47 (79.66%)	42 (71.19%)	
Position				
Doctor	37 (31.36%)	17 (14.29%)	20 (16.81%)	0.242*
Nursing staff	81 (68.64%)	42 (85.71%)	39 (83.19%)	
Age (years)				
20-30	47 (39.83%)	21 (35.59%)	26 (44.07%)	
30-40	42 (35.59%)	23 (38.98%)	19 (32.20%)	0.131*
40-50	29 (24.58%)	15 (25.42%)	14 (23.73%)	
Academic qualifications				
Specialist	15 (12.71%)	9 (15.25%)	6 (10.17%)	
Undergraduate	56 (47.76%)	30 (50.85%)	26 (44.07%)	0.412*
Postgraduate	47 (39.83%)	20 (33.90%)	27 (45.76%)	
Ethnicity				
Han Chinese	94 (79.66%)	50 (84.75%)	44 (74.58%)	0.100*
Another ethnicity	24 (20.34%)	9 (15.25%)	15 (25.42%)	
Marital status				
Married	65 (55.08%)	35 (59.32%)	30 (50.85%)	0.224*
Unmarried	53 (44.92%)	24 (40.68%)	29 (49.15%)	
History of smoking and drinking				
Yes	17 (14.41%)	6 (10.17%)	11 (18.64%)	0.319*
No	101 (85.59%)	53 (89.83%)	48 (81.36%)	
BMI (kg/m²)	27.76±2.78	25.84.17±1.14	29.10±4.13	0.067**

*Chi-square test, **One-way ANOVA, BMI: Body mass index

intervention program showed significantly lower CPSS scores (Δ =-3.14; 95% CI=-9.17 to -0.11) and SAS scores (Δ=-4.22; 95% CI=-8.38 to -0.01), however, higher SCS scores (Δ=3.98; 95% CI=0.22 to 5.59) in M2, compared to the control group. The positive within-group effect was maintained over the M0-M2 period in the intervention group.

4.3. Measure of feasibility

A total of 118 (83.05%) medical staff (39.46%) completed the positive thinking course. Of these, 98 subjects were satisfied with positive thinking course 5, 17 (14.41%) participants were satisfied with positive thinking course 4, and 3 (2.54%) medical staff did not provide feedback on their satisfaction with the positive thinking course.

Table 3. Impact of study interventions on subjects' reported outcomes

		M0	M2			
	Group	**Mean±SD**	**Mean±SD**	***P_within**	****P_between**	**Cohen's d**
CPSS	Intervention	13.9±2.1	11.7±3.11	<0.001	0.013	0.33
	Control	13.1±2.5	12.9±2.73	0.131		
SDS	Intervention	41.88±5.34	34.81±2.73	<0.001	0.001	0.11
	Control	39.23±4.14	41.33±5.01	0.223		
SCS	Intervention	32.1±4.1	37.9±5.14	0.009	0.029	0.31
	Control	33.3±5.5	33.6±4.72	0.112		

*Paired t-test, **Univariate analysis of covariance (ANCOVA)
CPSS: Cohen Perceived Stress Scale; SDS: Self-Rating Depression Scale, SCS: Self-Compassion Scale

5. Discussion

COVID-19 is still raging in several countries around the world (26, 27). Medical staff on the frontlines of controlling and intercepting the outbreak face infection risk poses a serious risk to their mental health due to high workload and stressful working conditions, compartmentalized lifestyles, and feelings of self-blame for not being able to save the lives of critically ill patients. It has been reported that the prevalence of anxiety and sadness among medical staff has increased significantly (28). The mental health of medical personnel has become an important public health issue. The results of the current study showed that a positive thinking intervention could improve the mental health of

medical personnel according to the results of the SDS, CPSS, and SCS scales during the COVID-19 epidemic. After 8 weeks of MBSR training sessions, medical staff in the intervention group demonstrated a significant decrease in anxiety and depression scores and a significant improvement in self-compassion (effect size=0.84) and stress on average. The Lancet has called for research on how the COVID-19 epidemic has affected the emotional well-being of medical staff (29). It is recognized worldwide that people in the medical field are increasingly suffering from mental health problems.

The MBSR program may have a positive impact on the psychological mechanisms of action by relieving the body and mind, thereby reducing the psychological stress response. Studies have suggested

that systematic intervention of MBSR sessions can help avoid adverse emotions (30-32). The course has been reported to activate the left prefrontal cortex of the brain and upregulate the level of positive emotions perceived by the body (33). Gockel et al. showed no significant improvement in self-compassion after a 10-week positive thinking intervention in students using MBSR, which was inconsistent with our findings. Bluth et al. (34) studied 67 adolescents in the southeastern United States and concluded that improvement in self-compassion was generally due to the increased efficacy of the positive thinking intervention, which was consistent with our findings. This suggests that MBSR can relieve stress and reduce negative emotions. In addition, previous studies have indicated that after training in positive thinking, medical personnel often reported improved life status in the present moment and showed more supportive connections with others (35).

There were some limitations in our study. Given the short duration of medical staff support in Tibet, we could not conduct a follow-up. Secondly, the study population in the sample included mainly Asians, which might limit the generalizability of the results. Finally, there was a high dropout rate during the study, and an almost average number of participants did not complete the baseline survey. Therefore, our study fell short of expectations, and we look forward to further large cohort studies in the next step.

6. Conclusion

An MBSR program during the COVID-19 epidemic may significantly alleviate anxiety and depression and lead to higher levels of self-compassion among medical personnel. This has significant implications for the mental health of medical personnel during the COVID-19 pandemic. Currently, there is little literature on the effectiveness and acceptability of MBSR courses. There should be an increased focus on the mental health status of medical personnel to provide a standardized, safe, and accessible platform for medical personnel to help them maintain their mental health status over the long term.

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Footnotes

Conflicts of Interest: All researchers declared that they were not biased in their work.

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