The Effects of a Mindfulness Meditation Program on Quality of Life in Cancer Outpatients: An Exploratory Study

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Abstract

Objective. Numerous studies have investigated the efficacy of mindfulness meditation (MM) in managing quality of life (QoL) in cancer populations, yet only a few have studied the Asian population. The aim of this exploratory study is to evaluate the effect of a MM program on the QoL outcomes in Taiwanese cancer outpatients. *Methods.* Patients with various cancer diagnoses were enrolled and assigned to the MM group and usual care (UC) group. The meditation intervention consisted of 3 sessions held monthly. The outcomes of the whole intervention were measured using the World Health Organization Quality of Life (WHOQOL-BREF) instrument. *Results.* A total of 35 participants in the MM group and 34 in the UC group completed the study. The results showed that the postintervention scores were significantly higher than the preintervention scores in the MM group. In the UC group, there was no significant difference between preintervention and postintervention scores, except for the lower environment domain scores. There was no significant difference between the follow-up scores and postintervention scores in the MM group, indicating that improvement can be maintained for 3 months after completing the MM course. *Conclusions.* The present study provides preliminary outcomes of the effects on the QoL in Taiwanese cancer patients. The results suggest that MM may serve as an effective mind–body intervention for cancer patients to improve their QoL, and the benefits can persist over a 3-month follow-up period. This occurred in a diverse cancer population with various cancer diagnoses, strengthening the possibility of general use.

Keywords

oncology, meditation, quality of life, mind-body intervention, cancer

Introduction

The entire process of being diagnosed with cancer and its treatments is a profoundly stressful experience for patients and may lead to significant immediate and long-term psychological problems.[1] The prevalence rates of emotional distress range from 35% to 60% among cancer patients,[2] where negative implications include reduced health-related quality of life (QoL).[3,4] Therefore, patients have a growing interest in seeking out mind-body intervention as adjuncts to medical treatment in their efforts to cope with their illness and to promote healing. According to previous studies, the utilization rate of mind-body interventions ranged from 16.9% to 81.6% in different regions.[5-7] The rate in Taiwan was about 60.6% in cancer populations.[8] Many types of mind-body interventions have been developed and proven to have positive effects, such as enhancing patients' healing and recovery, promoting relaxation, and improving QoL.[9-11]

Among the different methods of psychological interventions, mindfulness meditation (MM) historically originated

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from the Eastern Buddhist meditation practice, which was the core of Buddha's teaching more than 2500 years ago, and was introduced to the West in the 1960s.[12] MM, an intervention focused on relaxation, mental training, and reduction of psychological distress, has extensive usefulness in health care and is perhaps one of the most critical components of the group-based meditation treatment programs such as the mindfulness-based stress reduction (MBSR) program.[13]

Several recent studies investigated the efficacy and utility of MM in managing symptoms in cancer populations. The findings from these studies suggested that MM may be effective for reducing sleep disturbance,[14] alleviating symptoms of stress and mood disturbance,[15] and improving immune function[16] and QoL[17-19] in cancer patients. In addition, a number of systematic reviews and meta-analyses of MM and MBSR for cancer patients further documented that MM and MBSR, in general, are effective in controlling symptoms and are clinically valuable self-administered interventions for cancer patients.[11,20,21]

Although the efficacy of a MM program on emotional symptoms and QoL have been shown by a number of studies reported above, nearly all of them were conducted in Western countries; only a few studies were found on Asian populations, much less the Taiwanese. Also, according to the 2005 statistical data from the Religious Affairs Section of the Ministry of the Interior (MOI) in Taiwan, approximately 35% of the Taiwanese population considered themselves as Buddhist and 30% as Taoist; thus, the concept of meditation should be cultivated in the daily lives of Taiwanese. However, the application of meditation as a therapeutic clinical intervention was rarely seen, not to mention the evaluation of its benefit with quantitative studies. The effect of the MM program in improving QoL is, therefore, still unclear in Taiwanese cancer patients. Thus, the aim of this exploratory study was to evaluate the effect of the MM program on QoL outcomes in Taiwanese cancer outpatients.

Methods

Study Design and Participants

This pilot study was conducted from January 2013 through December 2013 in the Linsen branch of Taipei City Hospital. The participants were recruited in the outpatient clinic through the use of recruitment flyers. Because this was an exploratory study, patients of any cancer type were included. The inclusion criteria were (1) age >18 years and (2) heterogeneous in type and stage of cancer diagnosis, as confirmed by the professional physician. Exclusion criteria were (1) diagnosis of psychiatric disorders, (2) meditation practice within a year, or (3) other conditions not suitable for study as assessed by the physician. Taking into account the ethical

issues and participants' compliance, the study was conducted as a nonrandomized controlled study. Patients willing to join the MM course were distributed to the MM group; patients having no interest but willing to fill out the follow-up questionnaire were distributed to the usual care (UC) group. Every enrolled participant provided informed consent, and the study was approved by the Human Ethics Committee of the hospital.

Intervention

The core concept was consistent with MBSR[22]: helping participants become more aware of how the mind works. It should be noted that the MM course was not intended to embrace all the elements included in the standard MBSR program. The standard MBSR includes 8 weekly sessions of about 2.5 hours. Considering that time commitments can be a barrier to cancer patients because of their physical status and potential for time conflicts with the time schedule of their regular physician visits, our intervention was shortened to 3 monthly sessions. The intervention consisted of 3 monthly sessions taught by a licensed clinical oncology physician who had years of meditation experience. To create a 3-session meditation program for the study, we specifically and selectively focused on sitting meditation and breathing skills, which were based on "insight" meditation, the foundation of mindfulness. Participants were encouraged to bring concentration and awareness to the breathing pattern (breathe in and breathe out), internal thoughts, and emotions. Each session lasted 2.5 hours and was divided into 3 parts: (1) 100-minute theoretical learning about relaxing methods and fundamental meditation skills (awareness of breath, thoughts, and emotions), (2) 30-minute meditation practice with relaxing music, and (3) 20-minute group process focused on experience sharing and supportive interaction between group members. In the first class, materials that included relaxing music, meditation practice guidelines, and other related handouts were provided to support daily home practice.

Outcome Measurements

The QoL outcomes were measured by a self-administered questionnaire of the Taiwan version of WHOQOL-BREF, an abbreviated version of the original WHOQOL-100 instrument developed by the World Health Organization Quality of Life (WHOQOL) Group. It contains 2 general items for overall QoL and health, and 26 items divided into 4 domains: physical health (7 items: pain and discomfort, energy and fatigue, sleep and rest, mobility, activities of daily living, dependence on medical substances, work capacity), psychological health (6 items: positive feelings; thinking, learning, memory, and concentration; self-esteem; bodily image and appearance; negative feelings; spirituality/religion/personal

beliefs), social relationships (4 items: personal relationships, practical social support, sexual activity, being respected/ accepted), and environment (9 items: freedom, physical safety, and security; home environment; financial resources; health and social care; opportunities for acquiring new information and skills; participation in and opportunities for recreation/leisure activities; physical environment; transport; eating/food), with each domain having scores ranging from 0 to 100. The validation of consistency coefficients ranged from 0.70 to 0.77.[23]

With the help of physicians, the self-report questionnaires were assessed at 3 time points: preintervention, postintervention, and follow-up. Participants in the MM group completed the questionnaire (1) before the intervention started (prescore), (2) postintervention (postscore), and (3) 3 months after the postscore measurement (follow-up score). Participants in the UC group completed the questionnaire (1) during enrollment (prescore), (2) 2 months later (postscore), and (3) 3 months after the postscore measurement (follow-up score).

Statistical Analysis

The data were analyzed using IBM SPSS Statistics for Windows software (Version 19.0; IBM Corp, Armonk, NY). Paired t-tests and independent t-tests were conducted to compare the preintervention and postintervention WHOQOL-BREF scores within groups and between the 2 groups. Spearman's rank correlation coefficient was used to compare the relationship between WHOQOL-BREF scores and demographic variables. A Generalized estimating equation (GEE) analysis was conducted to compare the change from prescores to postscores between the 2 groups. All P values were 2-tailed, and the α level of significance was set at .05.

Results

Demographic and Clinical Features of Cancer Patients

Figure 1 describes the number of individuals screened and enrolled as well as the retention numbers at postintervention and follow-up in the study. A total of 135 cancer patients were screened, and 47 of them were excluded from the study. The reasons for exclusion included the following: did not meet age inclusion criteria (n = 3), had meditation experience in the past year (n = 10), cognitive impairment (n = 5), taking antipsychotic medication (n = 14), illiterate with difficulty communicating in Mandarin (n = 8), neurological disorders (n = 3), and lack of physical strength to complete the course (n = 4). Among the 88 cancer patients enrolled in the study, 48 were assigned to the MM group and 35 completed the intervention, whereas 40 were assigned to the UC group and 34 completed the postmeasurement. The reasons
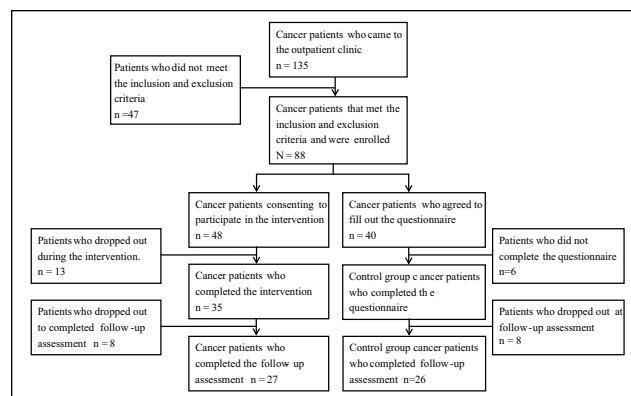

Figure 1. Study flowchart.

for withdrawal of participants from the study included conflicts in schedule, currently hospitalized, or being too ill. The demographic data as shown in Table 1 revealed the following information. The baseline characteristics, including age, sex distribution, cancer type distribution, and Eastern Cooperative Oncology Group Performance Status (ECOG) scores, were well balanced. However, the mean time since diagnosis in the MM group (3.0 ± 2.2 years) was significantly longer than in the UC group (1.7 ± 1.5 years), and the distributions of education level and religious affiliation were also significantly different.

Quality-of-Life Outcomes

The results regarding QoL are shown in Table 2. Independent t-tests were used to compare the preintervention scores between the MM and UC groups. The result showed that there was no significant difference between the 2 groups in all the 4 domains, suggesting that the initial QoL status of the 2 groups were similar. In addition, both the lowest baseline scores were in the physical health domain. To evaluate the effects of the intervention, a paired t-test was conducted to compare the preintervention and postintervention scores within groups separately. The results showed that the postintervention scores were significantly higher than the preintervention scores in the MM group, indicating that the MM course might have positive effects on the QoL in the MM group. Overall, the gain scores were 11.2 points in the physical health domain, 7.3 points in the psychological health domain, 4.3 points in the social relationship domain, and 7.2 points in the environment domain. As for the UC group, there was no significant difference between preintervention and postintervention scores in physical health, psychological health, and social relationship domains, but there was an observed reduction in the environment domain scores. Comparing the postintervention scores between the MM and UC groups, it can be observed that there was a significant difference in the physical and psychological

Table 1. Demographic Characteristics of Study Participants.

Characteristics	MM (n = 35)	UC (n = 34)	P
Age (years)			
Mean value ± SD	58.7 ± 7.8	59.1 ± 10.6	.867
Gender, n (%)			
Male	8 (22.9)	13 (38.2)	.165
Female	27 (77.1)	21 (61.8)	
Cancer diagnosis, n (%)			
Gastrointestinal tract	7 (20.0)	12 (35.3)	.134
Breast	16 (45.7)	11 (32.4)	
Lung	—	4 (11.8)	
Head and neck	6 (17.1)	4 (11.8)	
Genitourinary and gynecology	4 (11.4)	1 (2.9)	
Others	2 (5.7)	2 (5.8)	
Duration of cancer (years)			
Mean value ± SD	3.0 ± 2.2	1.7 ± 1.5	.006
ECOG score, n (%)			
0	8 (22.9)	11 (32.4)	.554
1	23 (65.7)	18 (52.9)	
2	4 (11.4)	5 (14.7)	
Education level	n (%)		
Primary education	1 (2.9)	9 (26.4)	.016
Secondary education	20 (57.1)	14 (41.2)	
Tertiary education	14 (40.0)	11 (32.3)	
Religious affiliation, n (%)			
None	—	7 (20.6)	.038
Christianity	1 (2.9)	2 (5.9)	
Buddhism	23 (65.7)	13 (38.2)	
Taoism and traditional beliefs	11 (31.4)	12 (35.3)	
Religious affiliation level,[a] n (%)			
Primary status	19 (54.3)	12 (35.3)	.141
Secondary status	8 (22.9)	8 (23.5)	
Tertiary status	7 (20)	7 (20.6)	
Quaternary status	1 (2.8)	2 (5.9)	

Abbreviations: MM, mindfulness meditation group; UC, usual care group.
[a]Primary status: religion as a way of living; secondary status: regular participation in religious activities; tertiary status: getting in touch with religion on experience of hardships or special situations; quaternary status: passive compliance with family-based religion.

Table 2. Comparison of WHOQOL Scores Between the MM and UC Groups.

		MM Group (n = 35)	UC Group (n = 34)	P^a
Physical health, mean score (SD)	Pre	67.3 (14.2)	67.6 (10.3)	.842
	Post	78.5 (11.1)	69.4 (11.9)	.002
	P^b	<.001	.177	
Psychological health, mean score (SD)	Pre	73.7 (13.1)	71.9 (13.1)	.830
	Post	81.0 (8.3)	71.9 (11.9)	.001
	P^b	.001	1.000	
Social relationships, mean score (SD)	Pre	76.7 (10.4)	77.1 (11.8)	.988
	Post	81.0 (9.4)	75.2 (10.7)	.054
	P^b	.015	.191	
Environment, mean score (SD)	Pre	72.1 (15.7)	78.7 (11.8)	.121
	Post	79.3 (10.1)	75.2 (10.9)	.238
	P^b	.002	.022	

Abbreviations: WHOQOL, World Health Organization Quality of Life; MM, mindfulness meditation group; UC, usual care group; Pre, preintervention; Post, postintervention.
[a]Compares scores between 2 groups.
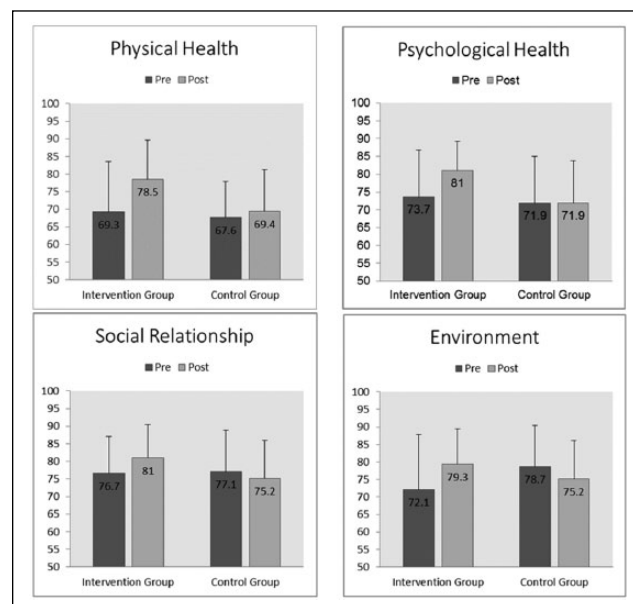[b]Compares prescores with postscores in each group.

Figure 2. Bar charts of WHOQOL scores between MM group and UC group. Post score of physical and psychological health in MM group significantly higher than those in the UC group. Abbreviations: WHOQOL, World Health Organization Quality of Life; MM, mindfulness meditation group; UC, usual care group; Pre, preintervention; Post, postintervention.

health domains between the 2 groups, where both the scores in the MM group were 9.1 points higher than those in the UC group, suggesting that after completing the MM, the QoL status of the MM group was improved and higher than the status of the UC group. The score variations are presented graphically in Figure 2.

To control group and time factors, a GEE analysis was conducted, and the results are shown in Table 3. The analysis indicated that the Group × Time interaction in all the 4 domains was significant, which meant that the difference scores (gain scores) of the MM group were significantly more than those of

the UC group in each domain. The gain scores of the MM group were 7.26 points more than the UC group in the physical health domain, 7.50 points more in the psychological health domain, 6.96 points more in the social relationship domain, and 10.65 points more in the environment domain.

Table 3. Analysis of QoL Scores Between MM and UC Groups With the Generalized Estimating Equation.

Parameters	B	Standard Error	Wald χ^2	P Value
Physical domain				
Intercept	67.03	1.72	1520.90	<.001
Group (MM vs UC)	2.29	2.92	0.61	.434
Time (Post vs Pre)	1.94	1.28	2.29	.130
Group × Time[a]	7.26	2.20	10.84	.001
Psychological domain				
Intercept	71.32	2.10	1149.58	<.001
Group (MM vs UC)	1.79	3.05	0.344	.557
Time (Post vs Pre)	0.59	1.48	0.158	.691
Group × Time[a]	7.50	2.48	9.173	.002
Social domain				
Intercept	76.47	2.05	1386.25	<.001
Group (MM vs UC)	−0.67	2.70	0.06	.804
Time (Post vs Pre)	−1.62	1.41	1.32	.250
Group × Time[a]	6.96	2.22	9.86	.002
Environmental domain				
Intercept	77.2	1.95	1562.66	<.001
Group (MM vs UC)	−5.69	3.27	3.02	.082
Time (Post vs Pre)	−2.79	1.38	4.09	.043
Group × Time[a]	10.65	2.59	16.92	<.001

Abbreviations: QoL, Quality of Life; MM, mindfulness meditation group; UC, usual care group; Pre, preintervention; Post, postintervention.
[a]Interaction parameter, which compares the change scores (improvement) difference between the MM group and UC group.

The follow-up scores were measured 3 months after the postscore measurement. A total of 27 participants in the MM group and 26 in the UC group returned the questionnaire. There was no significant difference in the baseline characteristics and the postintervention scores between the follow-up group and the original sample, indicating that the follow-up group was a representative sample of the original group. The results are shown in Table 4. There was no significant difference between the follow-up scores and postintervention scores in the MM group and the UC group. However, the QoL scores in the MM group were still higher than the scores in the UC group. This indicated that the improvement in QoL scores in the MM group could be maintained for at least 3 months after completing the MM course.

Discussion

To the best of our knowledge, this study is the first of its kind to evaluate the effect of MM on quality of life outcomes in Taiwanese cancer patients. As the results showed, the MM program was effective in improving the QoL of the MM group, especially in the physical and psychological health domains, which were consistent with previous studies.[16,19] The reported literature that used self-report questionnaires as assessment presented improved physical health outcomes.[15,24,25] Studies involving a similar meditation program with different populations have given evidence that meditation-based interventions can lead to a decrease in heart rate,[26] blood pressure,[27,28] and circulating stress hormones[27-29] and enhanced immune function.[29,30] Psychological benefits have also been reported, which include decrease in level of anxiety[31] and better overall psychological health.[26,32] The aforementioned literature supports the observed improvements in physical and psychological health QoL of the MM group participants. However, it is also possible that the positive anticipation of the patients could be a factor in the improvements in the psychological health domain scores.[11]

Although not statistically significant, it was observed that the religious affiliation proportion of participants between the MM and UC groups were different, with a greater number of Buddhists in the MM group and those of no religious affiliation in the UC group. Because of cultural elements, many Taiwanese consider themselves as Buddhist or Taoist, as mentioned in the introduction. This might be a potential reason for this difference. Though the meditation intervention in the present study modified from MBSR was designed to be free from specifically Buddhist and religious elements, the term *meditation* might still be associated with Buddhism easily among Taiwanese people, which might motivate some people to participate in the intervention in concordance with their religious practice. Further studies strengthening the design of interventions may help reduce this kind of bias.

Table 4. Comparison of the 3-Month Follow-up Scores With Postintervention Scores.

		MM Group (n = 2727)	UC Group (n = 26)	P^a
Physical health, mean score (SD)	Post	78.6 (12.1)	66.2 (10.3)	<.001
	Follow-up	77.1 (9.8)	64.2 (8.6)	<.001
	P^b	.467	.083	
Psychological health, mean score (SD)	Post	81.7 (8.4)	69.6 (11.7)	<.001
	Follow-up	78.1 (11.5)	67.9 (10.1)	.001
	P^b	.115	.214	
Social relationships, mean score (SD)	Post	81.3 (10.2)	73.1 (9.9)	.005
	Follow-up	80.0 (8.7)	72.9 (9.4)	.006
	P^b	.438	.840	
Environment, mean score (SD)	Post	79.7 (10.4)	74.2 (10.7)	.067
	Follow-up	80.1 (8.6)	73.9 (10.0)	.018
	P^b	.767	.739	

Abbreviations: MM, mindfulness meditation group; UC, usual care group; Post, postintervention.
[a]Compares scores between 2 groups.
[b]Compares postscores with follow-up scores in each group.

The levels of the average baseline score were 4 to 16 points higher than in the previous study,[33-36] indicating that the participants in this study generally had a good QoL before the intervention compared with a similar sample of cancer patients in previous studies. The reason for a higher average baseline score could be attributed to the fact that the participants in this study had been diagnosed for an average duration of 3.6/1.7 years, which could have modified their attitude in facing cancer, resulting in a better QoL even at the start of the intervention. Future research investigating newly diagnosed patients and comparisons with patients who have been diagnosed for a period of time may help clarify this particular result.

After controlling for group and time factors with GEE, it was observed that the gain scores of the MM group in each domain were significantly larger than the gain scores of the UC group, indicating that cancer patients receiving the MM program exhibited more improvement in their QoL than cancer patients only receiving the usual medical care.

The follow-up scores were measured 3 months after the postscore measurement. It can be observed that there was no significant difference between the follow-up scores and postintervention scores in the MM group. Compared with the UC group, the QoL scores in the MM group were still higher. This suggests that after completing the MM course, the benefits can persist for at least 3 months. However, the duration of cancer in the UC group was shorter than in the MM group. This suggests that it is possible that more of the UC group participants were still undergoing their treatment during the 3-month follow-up assessment, compared with the MM group participants. This could explain the difference in QoL score trajectories over time. Future research investigating the proportion of participants undergoing treatment and longer follow-up periods may also help clarify the change in QoL of the participants.

Also, it should be noted that patients who dropped out of the 3-month follow-up assessment appeared to have lower QoL scores because the postintervention scores of the MM group who finished the interventions (Table 2) were lower than the score of those who received the follow-up assessment (Table 4), which might imply that patients who had less benefit might find more opportunities to drop out, whereas patients experiencing the greatest improvement might be more likely to remain in the study at the 3-month follow-up assessment. This should be noted as a potential limitation to the present study.

There were several limitations in this study such as small sample size, lack of measurement of home practice in the MM groups, self-selection of interventions involving a high risk of bias, and the enrollment of patients who believed in the benefits of meditation or who had prior experience with meditation and, therefore, are more likely to enroll in a meditation program and report that they benefited from one. The study also recruited cancer patients who have the disease at various stages; hence, every patient's baseline QoL score, which corresponded to their respective disease progression status, was different, which may interfere with the results of the study. However, in this exploratory study, we can already observe the positive influence on QoL in the cancer participants. Studies involving a larger sample size and utilizing a randomized controlled type of trial may help demonstrate the current findings more clearly.

The present exploratory study provided strong support for the idea that 3-monthly sessions of mindfulness meditation can produce observable benefits. In a recent review, the correlation between numbers of in-class hours in MBSR and degree of improvement in psychological symptoms was not significant, suggesting that shorter versions of the MBSR program may be as helpful as longer versions, especially for those having difficulty participating for a long

period time.[37] However, it would be reasonable to suspect that the abbreviated program may reduce the generalizability of this study in comparison to studies of MBSR.

In summary, the present study provides preliminary outcomes of the effects of MM on QoL in Taiwanese cancer patients. The results suggest that MM may serve as an effective mind-body intervention for cancer patients to improve their QoL compared with the UC group and that the benefits can persist over a 3-month follow-up period. This occurred in a diverse cancer population with various cancer diagnoses, strengthening the possibility of program generalizability. However, further research will be needed to establish these findings more clearly.

Declaration of Conflicting Interests

Funding

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