Effectiveness of Caregivers' Yoga Module on Psychological Distress and Mental Well-Being among Caregivers of Patients Admitted to Neurological Rehabilitation Wards of a Tertiary Care Institute, Bengaluru, Karnataka, India

Sailaxmi Gandhi[1] Vinaya Kumar Palled[1] Maya Sahu[1] Aarti Jagannathan[2] Meeka Khanna[3] Amrutha Jose[4]

[1]Department of Nursing, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka, India
[2]Psychiatric Social Work, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka, India
[3]Neuro Rehabilitation, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka, India
[3]Department of Biostatistics, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka, India

Address for correspondence Maya Sahu, Department of Nursing, National Institute of Mental Health and Neurosciences (NIMHANS), Hosur Road, Bengaluru 560 029, Karnataka, India (e-mail: mayamonsahu@gmail.com).

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Abstract

Background Caregivers of patients admitted to neurorehabilitation wards may experience higher psychological distress (PD) and poor mental well-being (MWB). This study aimed to empower caregivers to cope effectively with PD and maintain well-being by practicing yoga.

Materials and Methods A total of 34 caregivers were randomized to the experimental group (EG) and waitlisted control group in a multiphase manner. Data were collected using sociodemographic schedule, Kessler's Psychological Distress scale–10, and Warwick–Edinburgh's Mental Well-being Scale. Caregivers' yoga module (CYM) consisting of *satsanga* (theory), *asanas* (postures), *pranayama* (breath control), imagery, meditation, and relaxation techniques was taught to those in the EG at 35 m/d for eight consecutive days. They were encouraged to continue on their own for another 3 weeks. Posttest data were collected from both groups on the 15th and 29th days. Analysis was done with IBM SPSS statistics version 22 (IBM Corp., Armonk, New York, United States).

Results There was statistically significant reduction of PD and improvement of MWB among caregivers of EG within (PD: $F = 17.78$, $p < 0.001$; MWB: $F = 5.48$, $p < 0.03$) and between (PD: $F = 15.87$, $p < 0.001$; MWB: $F = 15.87$, $p < 0.01$) the groups after the CYM. A significant negative correlation was found between pretest MWB and PD ($r = -0.579$, $p < 0.01$). Caregivers who were married and caregivers' perception of poor improvement of patient condition were significantly associated with PD.

Conclusion Findings provide preliminary evidence for the effectiveness of CYM on PD and MWB among caregivers of patients admitted to neurorehabilitation wards.

Keywords
- caregiver
- caregivers' yoga module
- mental well-being
- psychological distress
- yoga

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Introduction

Over the last few decades, psychological distress (PD) among caregivers of individuals with neurological, neurosurgical, and mental disorders has been well documented in the literature. Long-term hospital stay, poor knowledge about illness, illiteracy, and poverty could be some of the other reasons. Studies suggest that impact of caregiving for someone with illness brings the risks of mental ill health to the carer in the form of emotional stress, depressive symptoms, or clinical depression.[1,2] Because of high burden and responsibilities, caregivers experience poorer self-reported health and lower life satisfaction and engage in fewer health promotion activities.[1] In case of caregiving for spouses, the stress is interpersonal in nature and focus must be encouraged on the positive aspects of the caregiver's relationship to mitigate stress.[3] Early identification of the vulnerable caregivers is required to target effective health promotion.[4] More tailored approach to understanding the needs of caregivers is required, particularly in terms of time since diagnosis and care recipient, to provide more effective support.[5,6]

A study was conducted by Jagannathan et al about the needs of caregivers of inpatients who have schizophrenia, wherein about 5 focus group discussions (FGDs) from 30 caregivers were recorded and transcribed, and similar needs were grouped and ranked according to their order of importance. The main needs that emerged were needs regarding managing the behavior of patients (29%), managing sociovocational problems of patients (21%), health issues of caregivers (18%), education about schizophrenia (15%), rehabilitation (13%), and managing sexual and marital problems of patients (5%). The authors advocated a pyramid of needs in which all needs are to be addressed, and FGDs revealed that caregivers required assistance to manage all their needs and expressed their willingness to participate in any training that would address their needs.[7] Intervention should include attention to the mental health and recovery of the caregivers in addition to the patient's recovery.[8] Interventions may also include cognitive and psychological supportive therapies, supportive strategies such as rapport building and establishing buy-in and communication,[9] behavioral management, daily functional activities, stress management, self-efficacy techniques,[10] and competency-based caregivers' training.[11] Early interventions for caregivers ensure low initial level of burden, which may have a positive effect on social support, depression, and anxiety.[12] Stress management is also one of the proven interventions that help the caregiver to cope up with the distress.[13]

Extensive research done in the field of yoga supports the evidence that certain practices of yoga have impact on physical and mental components, for example, reducing heart rate and systolic and diastolic blood pressure; managing stress, anxiety, and depression; and improving the sense of emotional, social, and spiritual well-being.[14,15] Various studies have been conducted to assess the effect of yoga among caregivers of patients with neurological and neurosurgical disorders,[16,17] oncological disorder,[18] and psychiatric disorder[19] in acute care settings. Models have already been developed earlier. However, the problems and the distress faced by the patients of neurorehabilitation wards may be more severe as most of the neurological disorders are chronic in nature and require long-term care. Hence, in this study, researchers have tried to adopt the same caregivers' module that was used earlier, to the caregivers of patients admitted to neurorehabilitation wards. In addition, till date, there are no Indian studies that explored the effect of yoga on mental well-being (MWB) and PD among caregivers attending chronically ill patients of neurorehabilitation wards. Thus, the study aims to assess the effect of caregivers' yoga module (CYM) on the mentioned variables.

Materials and Methods

The study adopted the true experimental pretest–posttest design. The investigator used the principles of experimental design by using multiphase randomization of assigning patients to control and experimental groups (EGs) and withholding the intervention of CYM to the waitlisted group till the data for the study were collected.

Caregivers of patients admitted to neurological rehabilitation wards were invited to participate in the study on the basis of the following inclusion criteria: (a) both genders, (b) caregivers of patients admitted to neurorehabilitation wards for at least 2 weeks, (c) caregivers' age: 18 to 60 years, and (d) languages known by caregivers: Kannada/Hindi/English. Caregivers who reported to have severe psychiatric, neurological, or orthopaedic disorders or who were practicing yoga/relaxation techniques/physical exercise regularly for the past 1 month were excluded from the study.

The study was approved by the institute's ethics committee. The nature and purpose of the study were explained to the participants, and they were told that they had the right to withdraw the consent during the study. Consenting participants were informed in detail about the assessments, CYM, and follow-up. Permission was also obtained from the treating consultants that patients will be randomized and followed up for assessments in the next 1 month. Written informed consent was taken from the participants. A total of 37 healthy consented caregivers were randomly allocated to the EG and waitlisted control group (WCG) in a multiphase manner.

Random Allocation

Random allocation of the participants to the EG and WCG was done in a multiphase manner by using a random number table generated by the statistician. Concealment was not done as the second author was involved in both assessments and treatment. Among the 37 caregivers who were recruited for the study as per the eligibility criteria, 34 caregivers participated in the study, with 17 in EG and 17 in WCG. Assessments began after allocation.

Assessments

The assessments were done using the following measures.

Sociodemographic Schedule

The sociodemographic schedule was evolved by the researchers, which included demographic characteristics of caregivers along with physical and physiological variables. Data were collected

with respective measuring instruments such as sphygmomanometer, pulse oximeter, weighing scale, and inch tape.

Demographic characteristics of the patients included age and gender, and clinical variables were diagnosis of illness, ward, date of admission, activities of daily living (ADL), illness improvement, etc.

ADL: The ADL of patients was measured using the Barthel's scale or the Barthel's ADL index. It has shown high interrater reliability (0.95) and test–retest reliability (0.89) and has been used in multiple major diagnostic conditions.

Illness improvement refers to the caregivers' perception of improvement in the health of their patient noticed after admission to the neurorehabilitation wards and assessed by using visual analog scale from 1 to 10-point line, 1 cm between each point. The scores are grouped as 1 to 5 as poor improvement and 6 to 10 as good improvement.

Warwick–Edinburgh's Mental Well-Being Scale

This scale is a 14-item, 5-point Likert scale with a minimum score of 14 and a maximum score of 70, which covers subjective well-being and psychological functioning. The scale consists of 14 positively worded items, all covering both hedonic and eudemonic aspects of MWB. Warwick–Edinburgh's Mental Well-Being Scale (WEMWBS) has been validated in India as well as in many other countries.[20]

Kessler Psychological Distress Scale–10

This scale consists of 10 questions about nonspecific PD and seeks to measure the current level of anxiety and depressive symptoms a person may have experienced in the 4 weeks prior to the interview. Individual's score less than 20 represents that the individual is likely to be well, 20 to 24 represents potentially higher risk to have mild mental disorders, 25 to 29 represents potentially higher risk to have moderate mental disorder, and 30 and more represents potentially higher risk to have severe mental disorder,[21] Kessler's Psychological Distress Scale–10 (K10) has been used in the Indian population among caregivers,[22] and its sensitivity was found to be 100%, whereas specificity was 81.30%.[23]

These assessments were conducted before starting the interventions. Postinterventional data were collected again on the 15th day and 29th day after the 1st day of preassessment and intervention of CYM for EG, using a face-to-face interview method or telephonic conversation from both EG and WCGs simultaneously. The CYM was withheld from the control group initially during the process of study but was given to the WCG posttest data collection.

Caregivers' Yoga Module

The CYM is a validated and tested module by Jagannathan et al.[12] Eight sessions of yoga interventions were given to EG, and the participants in the EG were asked to practice yoga by themselves regularly. Yoga interventions were not given to the WCG until posttest data were collected, but they received psychological support as usual from the treating team. Details of the sessions are summarized in ►**Table 1**.

Dropouts

Data were collected from the 37 participants by using sociodemographic schedule, K10, and WEMWBS. Among them, three female participants dropped out of the study in the EG, citing personal reasons of inability to continue to participate for intervention. The data collected from the participants who dropped out of the study were excluded from the analysis. Data collected from the 34 participants were analyzed and interpreted and presented in the form of tables and graphs.

Practice at Home

Caregivers who learned CYM were expected to practice the same at home. The researchers encouraged the caregivers to continue without monitoring so as to test the efficacy of such a module. However, it was difficult to authenticate the home practice without monitoring.

Data Analysis

Descriptive statistics such as frequency, mean, percentage, and standard deviation were used to describe the demographic characteristics of the sample. Inferential statistics such as independent *t* test and repeated-measures analysis of variance were used to evaluate the effectiveness of CYM on the participants among EG. Chi-squared test was used to analyze the association between the selected sociodemographic variables and the pretest MWB and PD. The Karl Pearson's coefficient of correlation was used to determine the correlation between pretest MWB and PD among the participants. Analyses were conducted using SPSS software version 22.

Results

To verify the homogeneity of the sociodemographic characteristics of the participants between control and EGs, independent *t* test and chi-squared test were used. The Fisher's exact test was used for variables that were categorical in nature with 2 × 2 tables. Both EG and control groups were homogeneous in relation to their sociodemographic variables (►**Table 2**) and physical and physiological variables (►**Table 3**) as *p*-value was not statistically significant.

Both EG and control groups were homogeneous in relation to their patient profile as *p*-value was not statistically significant (►**Table 4**). There was no statistically significant difference in pretest MWB scores between EG and control groups ($p = 0.582$, $t = -0.556$). There was also no statistically significant difference in pretest PD between EG and control groups ($p = 0.591$, $t = 0.591$). Thus, before intervention, both the EG and control groups with regard to MWB and PD were homogeneous in nature.

CYM had a significant effect within groups ($F = 17.78$, $p < 0.001$) and between groups ($F = 15.87$, $p < 0.001$) on PD. Pairwise comparison showed that there was a significant difference between pretest–posttest and pretest–follow-up at $p < 0.01$, suggesting that CYM was found to be effective among caregivers of neurorehabilitation wards. There was no significant difference found between posttest and follow-up. CYM had a significant effect within groups ($F = 5.48$, $p < 0.03$

Table 1 Sessions of caregivers' yoga module

Sessions	Content	Duration	Yoga intervention method
Session 1	Preassessment	10 min	Face-to-face/interactive session with caregivers
	Satsanga 1. Definition of yoga and *Pañcakosaviveka* 2. Yogic concept of health, disease, and stress 3. *Prāṇāyāma* for *Cittavrttinirodhah* 4. *Āsanas* and relaxation techniques for *Cittavrttinirodhah* 5. Concept of Karma Yoga 6. Bhakti Yoga: Chanting of mantra and Ślokās for *Cittavrttinirodhah* 7. Happiness analysis	30 min	Lecture-cum-discussion
Rest of the sessions	Practice 1: Hands in and out Practice 2: *Bhujangasana* breathing Practice 3: *Salabhasana* breathing Practice 4: *Suryanamaskara* Practice 5: Cyclic meditation IRT *Arthakatichakrasana* (left and right) *Arthachakrasana* *Padahasthasana* QRT *Vajrasana* *Sasankasana* *Ardhaustrasana* DRT Practice 6: *Kapalabhati* Practice 7: *Nadisuddhi* Practice 8: *Nadanusandhana* (A-Kara, U- Kara, M-Kara)	1 min 1 min 1 min 3 min 1 min 1 min 1 min 1 min 3 min 1 min 1 min 1 min 10 min 3 min 3 min 3 min	
		Total = 35 min	

Abbreviations: DRT, deep relaxation technique; IRT, instant relaxation technique; QRT, quick relaxation technique.

and between groups ($F = 15.87$, $p < 0.01$) on MWB. Pairwise comparison showed that there was a significant difference between pretest and posttest although no significant difference was found between pretest–follow-up and posttest–follow-up (►**Table 5**).

It was found that there was a statistically significant negative correlation between caregivers' pretest MWB and pretest PD ($r = -0.579$, $p < 0.01$), implying that the increase in MWB was associated with the lower level of PD.

►**Table 6** shows significant association between MWB and PDs with the selected sociodemographic variables. Marital status of caregivers was significantly associated with pretest PD ($p = 0.03$). Married individuals were found to have more distress than the unmarried ones. Illness improvement of the patient was significantly associated with caregivers' PD. There was statistically significantly ($p = 0.49$) higher PD among caregivers whose patients had poor improvement. However, no other statistically significant association was found between MWB and PDs with the selected sociodemographic variables of caregivers or their patients.

Discussion

The study provides preliminary findings on the effectiveness of CYM in lowering the PD and improving the MWB. At the baseline, both EG and control groups were homogeneous in relation to their sociodemographic profile, patient profile, and baseline PD and MWB as p-value was not statistically significant (►**Tables 2** –**4**).

All the three participants who dropped out of the study were females. It may be due to more responsibilities or lack of interest. The National Alliance for Caregiving[24] found that female caregivers spend more time providing care than male caregivers. A stepwise multiple regression analysis conducted by Osayomi and Adegboye[25] identified that male gender was found to be a significant risk factor for PD.[25] However, in the current study, men outnumbered women in both control and EGs to participate in the study.

It was observed that participants belonging to Islam and Christianity had consented and enthusiastically participated in the study. It may be attributed to the fact that although yoga is an activity that is traditionally and culturally associated with the Hindu community, it has got wider acceptability in other religions also.

The majority of the participants in the EG (52.9%) and the control group (58.8%) had an annual income of up to INR 20,000, reflecting that National Institute of Mental Health and Neuro Sciences (NIMHANS), being the tertiary care public service institution, provides services to the poor in an affordable manner. Previous literature found socioeconomic status to be a contributing factor in PD. Firdaus[26] found that people in lower income group are at greater risk of becoming

Table 2 Sociodemographic characteristics of caregivers in experimental and control groups (n = 34)

Sociodemographic variables	Group, frequency (%)		χ^2	p-Value
	Experimental (n = 17)	Control (n = 17)		
Age, y				
15–30	10 (50)	10 (50)	[a]	1.00
31–60	7 (50)	7 (50)		
Gender				
Male	14 (82.4)	12 (70.6)	[a]	0.69
Female	3 (17.6)	5 (29.4)		
Religion				
Hindu	15 (88.2)	13 (76.5)	[a]	0.66
Non-Hindu	2 (11.8)	4 (23.5)		
Education				
Up to 10th standard	5 (29.4)	9 (52.9)	[a]	0.30
Above 10th standard	12 (70.6)	8 (47.1)		
Occupation				
Unemployed	6 (35.3)	2 (11.8)	[a]	0.23
Employed	11 (64.7)	15 (88.2)		
Marital status				
Unmarried	9 (52.9)	6 (35.3)	[a]	0.50
Married	8 (47.1)	11 (64.7)		
Family annual income (INR)				
<20,000	9 (52.9)	10 (58.8)	1.719	0.43
20,000–40,000	2 (11.8)	4 (23.6)		
>40,000	6 (35.3)	3 (17.6)		
Family structure				
Nuclear	9 (52.9)	14 (82.4)	[a]	0.15
Joint	8 (47.1)	3 (17.6)		
Residence				
Rural	9 (52.9)	12 (70.6)	[a]	0.49
Urban	8 (47.1)	5 (29.4)		
Duration of caregiving, d				
<30	9 (52.9)	6 (35,3)	3.37	0.16
30–60	3 (17.6)	8 (47.1)		
>60	5 (29.4)	3 (17.6)		
Relationship with patient				
Spouse	3 (17.6)	3 (17.6)	7.90	0.10
Children	6 (35.3)	1 (5.9)		
Parent	3 (17.6)	6 (35.3)		
Siblings	4 (23.5)	2 (11.8)		
Others	1 (5.9)	5 (29.4)		

Abbreviation: INR, Indian Rupee.
[a]The Fisher's exact test was done for 2×2 tables directly; hence, test statistics χ^2 have not been mentioned.

distressed, but higher income is not always the guarantor of psychological well-being.

In this study, the mean pretest PD was under the category of moderate PD, and the mean pretest score of MWB in EG was 54.82 (SD = 8.8) and in control group was 53.06 (SD = 9.64). Similar findings were noticed in a population survey (n = 7,020) conducted in England, where the mean score for MWB was 51.61 (SD = 8.71).[27]

The present study findings report that CYM was effective in reducing PD and improving MWB among caregivers of neurorehabilitation wards (►**Table 6**), which is in line with prior studies. In a randomized controlled study, EG who received

Table 3 Physical and physiological variables of caregivers in experimental and control groups (n = 34)

Physical and physiological variables	Group, mean (SD)		T	p-Value
	Experimental (n = 17)	Control (n = 17)		
Height, cm	160.76 (5.60)	159.18 (6.71)	–0.750	0.46
Weight, kg	60.35 (10.13)	56.29 (7.41)	–1.334	0.20
Body mass index	23.47 (4.54)	22.25 (2.94)	–0.932	0.36
Systolic blood pressure, mmHg	116.71 (9.19)	116.18 (12.31)	–0.142	0.89
Diastolic blood pressure, mmHg	74.59 (8.80)	73.24 (11.39)	–0.388	0.71
Respiratory rate, cycles/ min	18.65 (1.23)	18.12 (1.17)	–1.292	0.21
Resting pulse rate, beats/min	74.12 (14.43)	77 (12.08)	–0.632	0.54

Abbreviation: SD, standard deviation.

Table 4 Sociodemographic and clinical variables of patients admitted to neurorehabilitation wards (n = 34)

Sociodemographic variables	Frequency (%)		χ^2	p-Value
	Experimental (n = 17)	Control (n = 17)		
Age, y				
15–30	0	3 (17.6)	3.891	0.15
31–45	5 (29.4)	6 (35.3)		
46–60	12 (70.6)	8 (47.1)		
Gender				
Male	11 (64.7)	13 (76.5)	[a]	0.71
Female	6 (35.3)	4 (23.5)		
Onset of illness				
Abrupt	13 (76.5)	9 (52.9)	[a]	0.29
Nonabrupt	4 (23.5)	8 (47.1)		
Diagnosis				
Spinal cord injury	11 (64.7)	7 (41.2)	4.975	0.18
Head injury	1 (5.9)	4 (23.5)		
Vascular accident	3 (17.6)	1 (5.9)		
Guillain–Barrie syndrome	2 (11.8)	5 (29.4)		
Illness improvement				
Poor improvement	7 (41.2)	13 (76.5)	[a]	0.81
Good improvement	10 (58.8)	4 (23.5)		
ADL				
More dependent	14 (82.4)	13 (76.5)	[a]	0.15
Less dependent	3 (17.6)	4 (23.5)		

Abbreviation: ADL, activities of daily living.
[a]The Fisher's exact test was done for 2×2 tables; hence, test statistics χ^2 have not been mentioned.

yoga intervention for ~30 minutes per day, 5 days per week, for 1 month, showed significant reduction (32.90%, $p < 0.001$) in PD, whereas the control group did not show any significant decrease in PD ($p = 0.103$).[28] Knobben,[29] in a meta-analysis on 32 studies on the effect of yoga on mental health outcomes, found positive results and effect on MWB, emotional well-being (EWB), and social well-being (SWB) (overall $g = 0.62$, EWB $g = 0.56$, MWB $g = 0.53$, and SWB $g = 0.42$). Similarly, one more meta-analysis showed significantly greater improvements in PD ($p = 0.003$).[30] Statler et al[31] found improvement in psychological indices such as improvement in concentration, decreased trait anxiety, and improved motivation at $p < 0.001$ following 10 weeks' practice of yoga.

About four caregivers whose PD scores were maintained more than 30 even after intervention were referred to a liaison psychiatrist associated with neurorehabilitation wards for further evaluation.

The findings showed that the increase in MWB was associated with lower level of PD. Similar to the current findings, an epidemiological descriptive study (n = 516) found that participants with a higher level of psychological well-being had a lower level of psychopathological symptoms.[32]

Table 5 Effectiveness of caregivers' yoga module: results of repeated-measures ANOVA (n = 34)

Measure	Experimental group	Control group	*F*, *p*-Value			Pairwise comparisons, *p*-Value		
	Mean (SD)		Within group (time)	Interaction	Between group (time and group interaction)	Baseline versus posttest	Posttest versus follow-up	Baseline versus follow-up
Psychological distress								
Baseline	25.47 (8.58)	27.41 (10.77)	17.78, <0.001*	1.91, 0.17	15.87, 0.001*	<0.01*	0.060	<0.01*
15th day	22.47 (8.83)	26.71 (10.02)						
29th day	20.0 (8.96)	27.29 (10.55)						
Mental well-being								
Baseline	54.82 (8.84)	53.60 (9.65)	5.48, 0.03*	2.95, 0.096	15.87, 0.001*	0.03*	0.10	NS
15th day	58.71 (7.76)	52.82 (9.83)						
29th day	60.0 (8.35)	51.88 (10.57)						

Abbreviations: ANOVA, analysis of variance; NS, not significant; SD, standard deviation.
*Significant at $p < 0.05$.

Table 6 Association between psychological distress and mental well-being with selected demographic variables

Variables	Sample distribution	Psychological distress	*p*-Value
Marital status of caregivers			
Unmarried	15	22.67 (6.630)	0.03[a]
Married	19	29.42 (10.469)	
Illness improvement of patients			
Poor improvement	20	29.10 (9.781)	0.049[a]
Good improvement	14	22.64 (7.890)	

[a]Significant at $p < 0.05$.

Another study (n = 1,933) found that variables that were positively associated with MWB were negatively associated with PD and vice versa, which supports the evidence of this study.[33]

The findings also showed significant association between marital status of caregivers and PD (p = 0.03), whereas no other sociodemographic variables had significant association with PD. The finding that illness improvement of patient was significantly associated with the MWB of caregiver may be due to the positive or negative outcome of treatment received by the patient. The findings were supported and contradicted by previous studies.[34-36] Urban living, employment, education, and being married were associated with higher level of MWB.[36] Occupation[35] and income[34] were associated with PD. Job insecurity was positively associated with PD, and lower income groups had 7.14% of higher PD than that of the normal population. Previous studies also did not find any significant association with age and gender.

This study has several strengths. First, it is the first study to explore the effect of yoga on PD among caregivers of patients admitted to neurorehabilitation wards. Second, this study was a randomized controlled study, and last yoga was used as an adjunctive therapy for caregivers to cope up with PD and improve their MWB. This study was not an exception to certain limitations such as the study was not blinded and small sample size, which makes it difficult to generalize the findings. The researchers included the following clinical variables of the patient: diagnosis, illness improvement, and dependency on ADL, whereas morbidity and disability also could have directly affected the stress and MWB of their caregivers. Similarly, the study dealt with two prominent variables, PD and MWB, whereas other variables such as depression, anxiety, or other mood condition should be assessed in future research with a larger sample size. In this study, the participants in the EG continued the module for 3 weeks, without monitoring, which has a possibility to change the nature and quality of the intervention. Hence, the authors recommend regular, may be weekly once, practices with the expert to maintain the evenness of the sessions.

Conclusion

This study provides the baseline data regarding the effectiveness of CYM on PD and MWB among caregivers of the patients admitted to neurorehabilitation wards. Similar studies with a larger sample size could be an eye-opener for mental health professionals for implementing suitable and affordable interventions for their country and local community and generalizing the findings for persons with mental illness.

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Conflict of Interest
None declared.

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