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Effects of a modified mindfulness-based cognitive therapy for family caregivers of people with dementia: A pilot randomized controlled trial

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Abstract:

Background: Caregivers of people with dementia experience high stress levels. Mindfulness-based cognitive therapy has been found to be effective in reducing stress and improving the psychological well-being of several populations.

Objective: To explore the feasibility and preliminary effects of a modified mindfulness-based cognitive therapy for family caregivers of people with dementia.

Methods: In a single-blinded, parallel-group, randomized controlled trial, 36 caregivers of people with dementia were randomized to either the intervention group, receiving the 7-session modified mindfulness-based cognitive therapy in 10 weeks; or the control group, receiving the usual family care and brief education on dementia care. The brief education sessions were similar in frequency and duration to the intervention group. Various psychological outcomes of caregivers were assessed and compared at baseline, immediately post-intervention, and at the 3-month follow-up. A focus group with eight participants from the intervention group was conducted to identify the strengths, limitations, and difficulties of the intervention.

Results: Intervention feasibility was established with a high completion rate of 83% (completing 5 out of the 7 sessions) and a low attrition rate of 11.1%. The duration of the average weekly home-based mindfulness practice of the caregivers was 180 minutes (S.D. = 283.8). The intervention group experienced a statistically significant decrease in stress levels ($Z = -1.98$, $p = 0.05$, Cohen's $d = 0.7$) and depressive symptoms ($Z = -2.25$, $p = 0.02$, Cohen's $d = 0.8$) at the post-test; and a decrease in stress ($Z = -2.58$, $p = 0.01$, Cohen's $d = 0.9$), depressive symptoms ($Z = -2.20$, $p = 0.03$, Cohen's $d = 0.7$), and burden ($Z = -2.74$, $p = 0.006$, Cohen's $d = 1.0$),

and improved quality of life (physical)(Z = -1.68, p = 0.09, Cohen's d = 0.6) at the 3-month follow-up compared to the controls. A focus group conducted immediately after the intervention revealed three major themes: Impacts on the family caregivers, Impacts on the people with dementia, and Difficulty in practicing mindfulness.

Conclusion: The findings support the feasibility and preliminary effects of the modified mindfulness based cognitive therapy on reducing the stress of caregivers and improving their psychological well-being. Some potential effects on people with dementia (e.g., improvements in behavioral problems) were reported by the caregivers. A future study with a larger and more diverse sample is proposed to evaluate the longer-term effects and generalizability of the modified mindfulness-based cognitive therapy and the impacts on people with dementia.

1. Introduction

The number of people with dementia is increasing at an alarming rate because populations around the world are aging. Dementia is a neurodegenerative disease, which causes a person to gradually lose the ability to take care of himself/herself. Family caregivers need to take on a wide range of caregiving tasks, including providing assistance in daily activities and managing illness-related behavioral problems, such as wandering and agitation. This usually leads to high levels of stress for caregivers and to different psychological comorbidities (Välimäki et al., 2015). Hence, various non-pharmacological interventions have been designed to help family caregivers improve their mental health and quality of life, including respite care, counseling, and support groups (Gaugler et al., 2016; Müller et al., 2017). However, these interventions have not been consistent with regard to effectiveness, especially in the sustainability of their effect on reducing stress (Dam et al., 2016). Caregiver stress can induce a series of physical, psychological, and social problems such as depression and anxiety (Damjanovic et al., 2007; McCurry et al., 2007). As the number of people with dementia living in the community continues to increase, there is a need to provide family caregivers with an intervention that is sustainable and cost-effective to release their stress and improve their psycho logical well-being.

Stress is a two-way process that involves the presence of stressors in the environment, and the response and appraisal of the individual who is subjected to the stressors (Lazarus and Folkman, 1984). Most current interventions (e.g., respite care, training in caring skills) adopt the problem-solving approach and are aimed at manipulating the stressors of the family caregivers of people with dementia to relieve

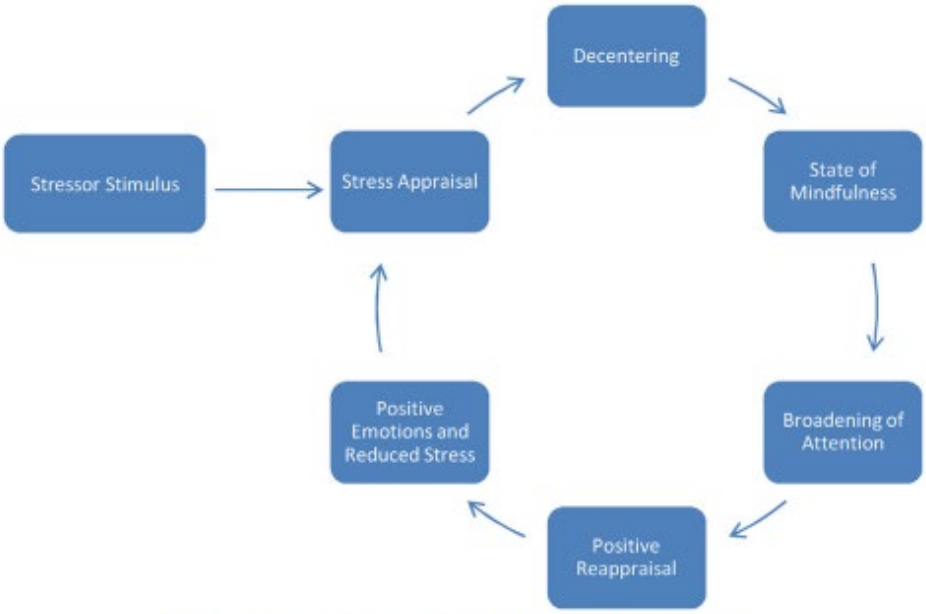

Fig. 1. Mindful coping model (adopted from Garland et al., 2011).

their stress. However, caregiving stress is chronic, and much of it is related to the cognitive decline of the care recipients, which is difficult to modify. Thus, an emotion-focused approach, e.g. a cognitive behavioral intervention, has been adopted to manage the caregiving stress of caregivers of people with dementia (Iavarone et al., 2014).

A recent systematic review investigating the effectiveness of different psychosocial interventions among family caregivers of people with dementia found that some modern forms of cognitive behavioral therapy had promising effects, including mindfulness based cognitive therapy (Kishita et al., 2018). Mindfulness-based cognitive therapy has been regarded as the third wave of modern cognitive behavioral

therapy (Hunot et al., 2010), and was originally designed for people with recurrent depression (Segal et al., 2013). The aim of mindfulness-based cognitive therapy is to raise the participants' self-awareness in the present moment and to foster inner calm and a non-judgmental mind, so that the participants can observe their thoughts and feelings from a distance, without judging them to be good or bad, but just accepting them for what they are; therefore, mindfulness-based cognitive therapy is not just a relaxation skill but also a cognitive intervention (Jain et al., 2007). This process has previously been described in the mindful coping model (Fig. 1), which asserts that the mindfulness-based cognitive therapy will help the participants to decenter themselves from the source of their stress and broaden their attention in a non-judgmental manner (Garland et al., 2011). The shift in their focus of attention may generate new meanings for the participants, causing them to engage in a process of positive reappraisal and leading to a reduction in stress. Mindfulness-based cognitive therapy involves a wide range of group-based activities, including mindful walking, body scanning, group sharing, and educating the participants about psychological health. The activities in mindfulness-based cognitive therapy serve different purposes, and are aimed at providing caregivers with diverse experiences and an understanding of mindfulness and psychological health, in order to generate greater improvements in well-being and stress (Segal et al., 2013).

In a recent systematic review, only five experimental pilot studies investigating the effect of mindfulness in family caregivers of people with dementia were identified (Kor et al., 2018). Although an immediate effect was found, the long-term effect was unclear and the demanding face-to-face mindfulness sessions resulted in a high attrition rate in prior studies. Family caregivers of people with dementia often have caring tasks that are numerous, highly demanding, and of long duration. The original mindfulness based

cognitive therapy (a weekly 150-minute session over 8 weeks, plus a 7.5-hour retreat) might not suit them because of its high intensity and long duration. Thus, the author and the team modified the original mindfulness-based cognitive therapy proto col in the previous feasibility study conducted between 2016 and 2017 and involving 56 family caregivers of PWD (Author initial, 2017). In the feasibility study, the caregivers were divided into two groups receiving different modalities of the mindfulness-based intervention, namely, the mindfulness-based stress reduction program and mindfulness-based cognitive therapy. The results showed a significant within-group effect on stress reduction among the family caregivers in both groups, with the mindfulness based cognitive therapy being found to be more appropriate for the caregivers, as it encouraged them to disengage themselves from repeatedly thinking negative thoughts. After collecting feedback from the family caregivers, the mindfulness-based cognitive therapy protocol was further modified for this pilot randomized controlled trial, including in content, duration, and number of sessions.

2. Methods

2.1. Study design and objectives

This study was conducted from October 2017 to August 2018 as a prospective, single-blinded, parallel-group, pilot randomized controlled trial, and registered with ClinicalTrial.gov (Ref: NCT03354819). The aim was to explore the feasibility and preliminary effects of the modified mindfulness-based cognitive therapy on family caregivers of people with dementia. From this, the following research objectives were derived:

1. To examine the feasibility and acceptability of conducting the modified mindfulness-based cognitive therapy among family caregivers of people with dementia

2. To evaluate the duration and patterns per week of the practice of mindfulness by the participants

3. To explore the preliminary effects of a modified mindfulness based cognitive therapy for family caregivers of people with dementia on stress (the primary outcome), depression, anxiety, resilience, quality of life, burden (the secondary outcomes), and level of mindfulness (the process indicator) immediately post intervention (T1) and at the 3-month follow-up (T2), compared with the controls.

2.2. Participants

The participants were family caregivers of people with dementia. The criteria for participation included: (a) being 18 years or older; (b) being a family caregiver of an individual with a confirmed medical diagnosis of dementia who has been residing in the community; and (c) having been providing care for at least 3 months prior to recruitment. A family caregiver is defined as an unpaid individual who has a significant personal relationship with the person with dementia and is involved in assisting him/her with activities of daily living. Excluded were those with (a) a history of mental disorders; (b) serious or chronic pain and/or physical diseases such as cancer and cardiovascular disease; and/or (c) who had participated in any mindfulness intervention, cognitive therapy, or structured psychosocial intervention in the 6 months prior to recruitment. Cocks and Torgerson (2013) suggested that the sample size for a pilot controlled trial should be around 10% of what would be needed in the main study. The sample size of the main randomized controlled trial of the

mindfulness-based cognitive therapy for family caregivers, estimated with a conservative effect size of 0.3 at a study power of 0.80, would be around 180 subjects. Therefore, 36 subjects (18 subjects per study group) were recruited.

2.3. Recruitment and randomization

Convenience sampling was adopted to recruit participants in a community center run by a non-governmental organization that provides elderly care services for people with dementia and their caregivers. The process of recruitment took place between September and December 2017. The eligible participants were randomized to either the modified mindfulness-based cognitive therapy group, which received mindfulness activities, psycho education on caregiving, and a peer sharing session; or the control group, which received the usual family care and brief education on dementia care. To follow the allocation concealment mechanism, an independent research assistant randomized the subjects into the control versus the modified MBCT groups using the computer generated random numbers (generated by an independent statistician) from a list of eligible caregivers. The participants would be informed of their group allocation via a sealed opaque envelope, which was concealed to the researchers and the assessors.

2.4. Interventions

2.4.1. The modified mindfulness-based cognitive therapy group

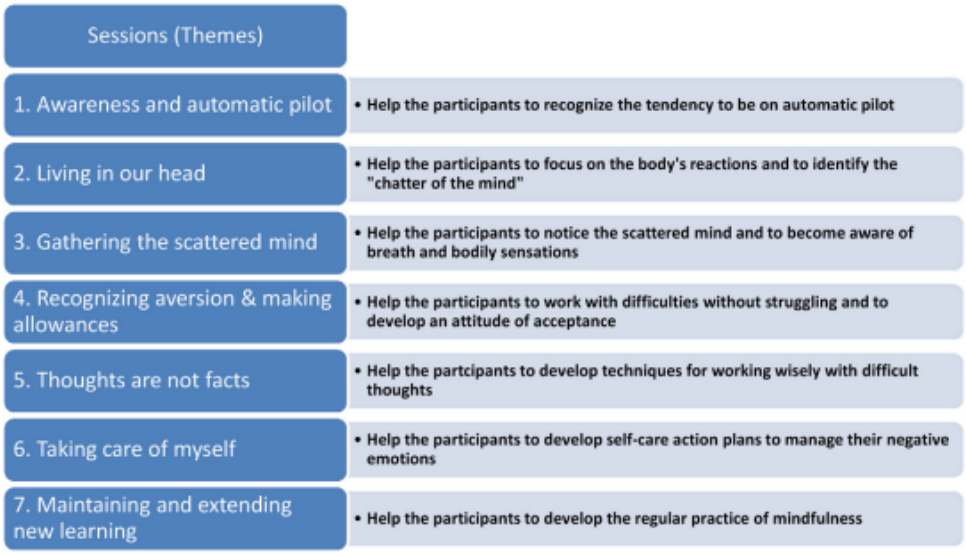

Fig. 2. Modified mindfulness-based cognitive therapy program.

A group-based, 10-week, 7-session (2 h each) modified mind fulness-based cognitive therapy program was adopted for the intervention group, which consisted of 18 participants (see Fig. 2). The protocol of the modified mindfulness-based cognitive therapy program was attached in the Appendix A. The program included various mindfulness activities (e.g., mindful walking, body scanning, mindful eating), psychoeducation on caregiving, and group sharing. The aim was to help the participants to develop mindfulness skills through the formal and informal practice of mindfulness, and to help them to integrate these skills into their everyday life. An audio (mp3) recording of guided mindfulness activities was provided to all of the participants to enhance their daily practice of mindfulness. Compared with the original mindfulness-based cognitive therapy protocol, we made the following changes by: a) integrating the content of the fourth and fifth sessions (about unpleasant feelings and being aware of difficult feelings, thoughts, and sensations) into one session and abridging the full-day, 8-hour retreat in order to shorten the face to-face training sessions; b) providing a weekly telephone follow up between the 5th

and 7th sessions to monitor the participants' progress and adherence to the practice of mindfulness; c) extending the last three sessions from weekly to bi-weekly, in order to help the participants develop a habit of practicing mindfulness on a daily basis. The size of the intervention group was 18 participants, in order to maintain sufficient group interactions between the mindfulness-based cognitive therapy instructor and all of the participants. The modified mindfulness-based cognitive therapy protocol was reviewed by an expert panel, which included mindfulness interventionists, nurses experienced in dementia care, and clinical psychologists, to validate the contents of the protocol.

To ensure standardization and adherence in delivering the modified mindfulness-based cognitive therapy and the brief education on dementia care according to the protocols, checks of intervention fidelity were conducted weekly during the intervention period based on a fidelity checklist. A fidelity rate of >90% is considered acceptable by the NIH Behavior Change Consortium (Bellg et al., 2004).

2.4.2. Control group (usual family care and brief education on dementia care)

The participants in the control group received the usual family care and brief education on dementia care to act as a control for the socialization and interaction effects of the mindfulness-based cognitive therapy program. The brief education program consisted of seven sessions, with the same group size, duration, and frequency as the sessions in the mindfulness-based cognitive therapy. The contents included education sessions on dementia care, training in caregiving skills, and group sharing on caregiving tasks. The program was delivered by a nurse with experience in dementia care.

2.5. Ethical considerations

Ethical approval for this study was obtained from the ethics committee of The Hong Kong Polytechnic University. Before randomization, written consent was sought from the family caregivers to participate in the study on a voluntary basis. Each participant was allowed to clarify questions about the purpose and procedures of the study. The participants were given assurances that their identity and the personal information that was collected would remain confidential, and that they had a right to withdraw from the study at any time. No harmful effect of mindfulness-based cognitive therapy was reported in the previous studies. The potential harm to the participants may be some negative emotions being triggered when the caregivers shared their own personal experience. In order to minimize the risks, all the research assistants and MBCT teacher were trained to identify the emotional distress and handle some emergency situations such as suicide ideation in the caregivers. A data monitoring committee that consisted of three independent experts from the fields of mental health nursing and gerontology was also formed to assure the safety of the participants and their protection from harm as a result of the intervention. Throughout the study period, the committee received notice of the outcome measurements (e.g., level of anxiety, stress, and depression) and they would refer the caregivers to the health care professionals for further assessments if needed.

2.6. Measures

The family caregivers were invited by the trained research assistant, who was blind to intervention allocation, to complete a set of outcome measures (described below) at baseline (T0), immediately after the intervention (T1), and at the 3-month follow-up (T2). For the modified mindfulness-based cognitive therapy group, the baseline results (T0 baseline) of the Five Facets Mindfulness Questionnaire (FFMQ)

were measured at the end of the third session (the mid-point of the intervention), after the participants had learned most of the basic skills and principles of mindfulness (McCown et al., 2017).

Feasibility of the interventions. The assessment of the feasibility of the modified mindfulness-based cognitive therapy included an examination of the recruitment rate, the attrition rate, and the frequency of the practice of mindfulness.

Perceived Stress Scale (PSS). The participants' perceived stress was measured using the Chinese version of the PSS (Leung et al., 2010), which was developed to measure the degree to which situations in one's life are appraised as stressful (Cohen et al., 1983). It contains 10 items on a 5-point Likert-type rating scale, from 0 (never) to 4 (very often). The Chinese version of the PSS was tested on 1800 adults living in the community in Hong Kong (Leung et al., 2010). The results showed that the instrument has acceptable levels of psychometric properties, including internal consistency, with a Cronbach's alpha of 0.85, and a test-retest reliability coefficient of 0.85 (Chu and Kao, 2005; Leung et al., 2010).

Zarit Burden Scale (ZBI). The caregiver burden of the participants was measured using the Chinese version of ZBI (Chan et al., 2005). It was designed for assessing the subjective burden of caregivers, which is defined as the extent to which caregivers perceived their emotional or physical health, social life, and financial status to have changed as a result of caring for their relative with dementia (Zarit et al., 1980). It is comprised of 22 items, including the factors most frequently mentioned by caregivers as problem areas, such as the caregivers' health, psychological well-being, finances, social life, and the relation ship between the caregiver and the patient with dementia. It was translated into Chinese in 2005. The test-retest reliability of the Chinese version was 0.99 and the split-half correlation coefficient was 0.81 (Chan

et al., 2005). The correlation between the ZBI and the General Health Questionnaire was 0.59, and that between the ZBI and the Activity Survey was 0.57.

Center for Epidemiological Studies Depression Scale (CESDS). The participants' depression was measured using the Chinese version of CESDS (Chin et al., 2015), which is a self-reported measure of depression containing 20 items (Radloff, 1977). It measures the common symptoms of depression in terms of depressed mood, feelings of guilt and worthlessness, and feelings of helplessness. The scores range from 0 to 60, with higher scores indicating increasing levels of depression. The Chinese version of CESDS was tested in a community center where 3686 Chinese adults were receiving primary care services (Chin et al., 2015). The results showed that the instrument has acceptable levels of psychometric properties, including a test-retest reliability of 0.91 and an internal consistency of 0.86 for general depression.

Hospital Anxiety and Depression Scale-Anxiety (HADS-A). The level of anxiety was measured using the Chinese version of HADS-A (Wang et al., 2009), which is a 7-item, self-reported instrument that includes specific items for assessing generalized anxiety, including tension, worry, fear, panic, difficulties in relaxing, and restlessness (Zigmond and Snaith, 1983). The scores range from 0 to 21. The Chinese version of the scale was tested among 314 Chinese patients with heart disease. The results showed high internal consistency with a Cronbach's alpha of 0.85 and a test-retest reliability of 0.90 (Wang et al., 2009). This scale was also validated in the community samples, and showed a close correlation with the Hamilton Rating Scale of Depression and Anxiety (Pearson's coefficient = 0.67 and 0.63) (Chan et al., 2010).

Brief Resilience Scale (BRS). The participants' level of resilience (the ability to bounce back or recover from stress) was measured using the Chinese version of the BRS (Lai and Yue, 2014), which is a 6-item, self-reported, 5-point rating scale. The scores range from 6 to 30. The Chinese version of this scale was tested among 349 Chinese undergraduate students. A factor analysis revealed that it contained six factors, with a factor loading ranging from 0.68 to 0.91 (Smith et al., 2008). The results showed that the instrument has acceptable levels of psychometric properties, including high internal consistency with a Cronbach's alpha of 0.76 (Lai and Yue, 2014).

12-Item Short Form Health Survey Version 2 (SF-12v2). Health related quality of life was measured using the Chinese version of the SF-12v2 (Lam et al., 2005), which is a 12-item, self-reported, 5- point rating scale. The scores range from 0 to 100, with higher scores indicating better health-related quality of life. The Chinese version of the SF-12v2 was tested among 2410 Chinese adults who were randomly selected from the general population of Hong Kong. The results showed that the instrument has acceptable levels of psychometric properties, including high internal consistency with a Cronbach's alpha of 0.70 and a test-retest reliability of 0.7 (Lam et al., 2013).

Mastery of mindfulness (Level of mindfulness). Since the primary objective of the modified mindfulness-based cognitive therapy program is to help the participants cultivate an attitude of mindfulness, the level of mindfulness was measured as a process indicator using the Chinese version of the Five Facets Mindfulness Questionnaire Short Form (FFMQ-SF) (Hou et al., 2014), which is commonly used to measure mindful awareness in studies of mindfulness (Baer et al., 2008). It is a self-reported questionnaire that measures the five facets of mindfulness, namely,

observing, describing, acting with awareness, not being judgmental of inner experience, and not reacting to inner experience (e.g., “I’m good at finding words to describe my feelings”). The higher the score, the higher is the level of mindfulness. The Chinese version of the FFMQ-SF was tested among community-dwelling Chinese adults (n = 230) and clinical patients with significant psychological distress (n = 156) (Hou et al., 2014). The results from both the community and the clinical samples showed good test-retest reliability of 0.82 and a high level of internal consistency, with a Cronbach's alpha of 0.80 (Hou et al., 2014).

2.7. Focus group

A focus group interview was conducted by the author (Kor) with eight participants from the modified mindfulness-based cognitive therapy group. A semi-structured interview guide (see Appendix B) was used, with the aim of identifying the strengths, limitations, and difficulties of the modified mindfulness-based cognitive therapy program. Purposive sampling was adopted by selecting equal proportions of participants with different levels of stress reduction (measured using PSS; score reductions ranged from 5% to 50%) after undergoing the modified mindfulness-based cogni tive therapy.

2.8. Data analysis

Data were entered, managed, and analyzed using the IBM SPSS Statistics Version 23.0. An intention-to-treat (ITT) principle was used for analyzing the data and the last observation carried forward (LOCF) method was used to replace missing data (Hamer and Simpson, 2009). The homogeneity of the study groups was examined by comparing the participants’ characteristics and the baseline outcome scores of the two groups using the Mann Whitney U test for continuous variables and the Chi-square test

for categorical variables. The recruitment rate, attrition rate, and duration of the practice of mindfulness of the participants were analyzed using descriptive statistics to determine the feasibility of implementing the modified mindfulness-based cognitive therapy among family caregivers. Because of the small sample size, the Mann-Whitney test and the Wilcoxon's Signed-Ranks test were adopted to investigate the between-group and within-group effects on all of the outcomes variables, including those listed in the Perceived Stress Scale, Hospital Anxiety and Depression Scale Anxiety, Center for Epidemiological Studies Depression Scale, Zarit Burden Inventory, Brief Resilience Scale, and the Short Form 12- item Health Survey (version 2) between T0, T1, and T2. The caregivers' mastery of mindfulness was analyzed using the Wilcoxon's Signed-Ranks test and comparing the results for T0, T1, and T2.

The focus group interview was digitally audio-recorded and transcribed verbatim for a content analysis. Emergent themes were discussed and agreed upon by the authors (Kor and Liu). Themes and categories about the caregiver's experiences,

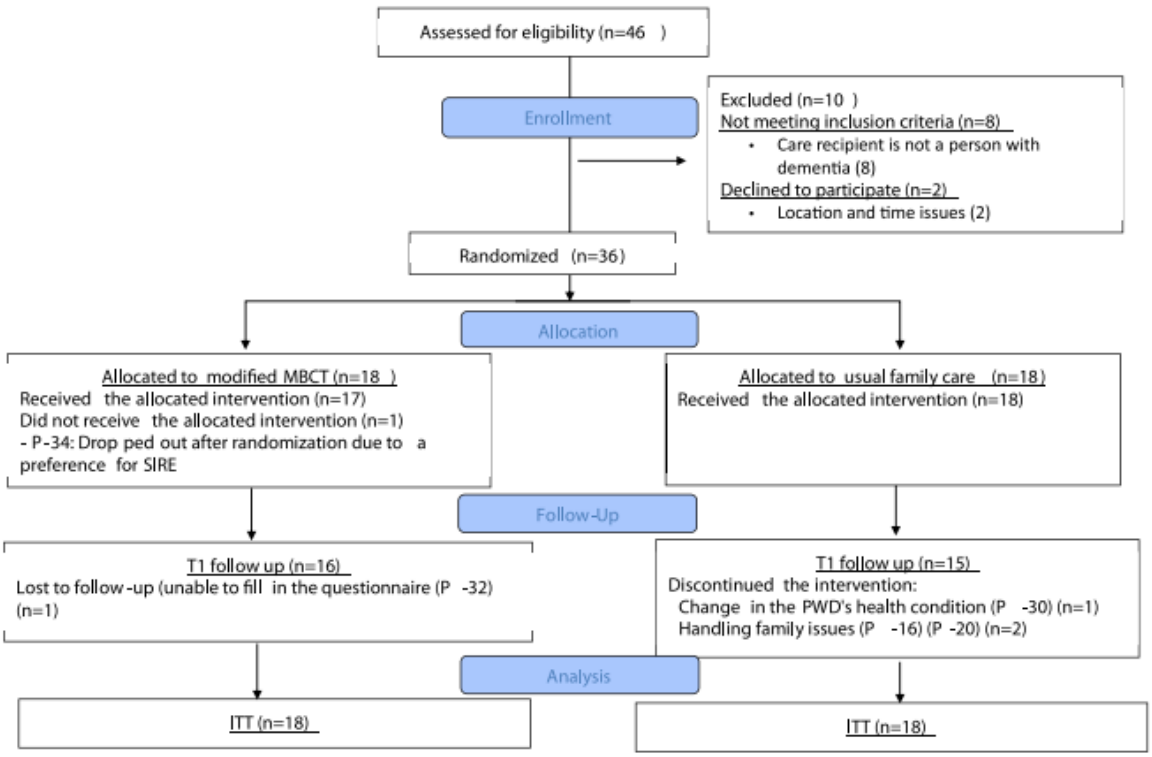

Fig. 3. CONSORT Flow Chart.

and about the perceived benefits and difficulties of the modified mindfulness based cognitive therapy, were formed to describe the strengths and limitations of the programs.

3. Results

3.1. Characteristics of the participants

Forty-six family caregivers showed an interest in participating this study. Of these, 38 met the sample selection criteria and 36 agreed to take part in the study (please refer to the CONSORT flow chart in Fig. 3). The demographic characteristics of the family caregivers are summarized in Table 1. The majority of the participants were female (83.3%) and their mean age was 57.1 (S.D. = 10.6) years. Most of the participants were adult children of a person with dementia (69.4%). The average duration of caregiving was 75.1 months.

3.2. Feasibility of the modified mindfulness-based cognitive therapy

The attendance rate for the modified mindfulness-based cognitive therapy group was 79.4% (S.D. = 24.6), while that for the control group was 72.2% (S.D. = 30.8). The respective completion rates (defined as having attended 70% or more of the sessions) were 83% and 80%. There was no significant difference in attendance rate between the two groups (79.4% for the modified mindfulness-based cognitive therapy group and 72.2% for the control group) ($p = 0.45$). Both groups reported no adverse events, and the overall drop-out rate was 11.1%. The average duration of the practice of mindfulness at home by the participants in the mindfulness-based

Table 1
Characteristics of the participants.

	All (n = 36)	MBCT (n = 18)	Control (n = 18)	Mann-Whitney's test	
				Z value	p value
Gender (%)					
Male	6(16.7)	4(22.2)	2(11.1)		
Female	30(83.3)	14.4(77.8)	16(88.9)		
Age					
Mean (SD)	57.1 (10.6)	58.2(8.2)	56.0(12.7)		
Relationship (%)					
Spouse	6(16.7)	4(22.2)	2(11.1)		
Parents	25(69.4)	10(55.6)	15(83.3)		
Parents in law	3(8.3)	3(16.7)	0(0)		
Sibling	2(5.6)	1(5.6)	1(5.6)		
Income per month (%)[#]					
Less than $2000	10(27.8)	4(22.2)	6(33.3)		
$2000 - $9999	6(16.7)	5(27.8)	1(5.6)		
$10,000 - $19999	8(22.2)	3(16.7)	5(27.8)		
More than $20000	12(33.3)	6(33.3)	6(33.3)		
Education level (%)					
Primary	2(5.6)	1(5.6)	1(5.6)		
Secondary	18(50)	7(38.9)	11(61.1)		
Tertiary or above	16(44.4)	10(55.6)	6(33.3)		
Employment status (%)					
Employed	18(50)	10(55.6)	8(44.4)		
Retired	16(44.4)	7(38.9)	9(50)		
Unemployed	2(5.6)	1(5.6)	1(5.6)		
Duration of care (Month)					
Mean (SD)	75.1(78.8)	81.8(77.2)	68.4(82.1)		
Duration of care per week (hours)					
Mean (SD)	76.9(62.6)	69.7 (62.8)	84.1 (63.3)		
Experience in attending a caregiver skills training workshop					
Yes	7(19.4)	3(16.7)	4(22.2)		
No	29(80.6)	15(83.3)	14(77.8)		
Experience in attending a stress management workshop					
Yes	4(11.1)	3(16.7)	1(5.6)		
No	32(89.9)	15(83.3)	17(94.4)		
Study outcomes at baseline					
Mean (SD)					
PSS	28.03(7.56)	29.22(9.10)	26.83(5.64)	−0.49	0.62
CESD	21.22(13.54)	23.44(14.58)	19.00(12.44)	−0.65	0.52
HADS_Anxiety	8.68(5.08)	9.89(5.66)	7.44(4.25)	−1.30	0.19
ZBI	43.81(15.58)	44.22(17.78)	43.39(13.54)	−0.05	0.96
BRS	18.25(4.65)	18.72(5.21)	17.78(4.11)	−0.98	0.33
SF12_PCS	57.08(13.57)	55.68(14.92)	58.48(12.35)	−0.51	0.61
SF12_MCS	28.59(9.40)	30.06(8.52)	27.12(10.22)	−0.63	0.53

Remarks: [#] *US$1 = HK$7.8.* PSS, Perceived Stress Scale; CESD, Center for Epidemiological Studies Depression Scale; HADS, Hospital Anxiety and Depression Scale; ZBI, Zarit Burden Inventory; BRS, Brief Resilience Scale; SF12_PCS, Short Form 12 Physical Component Summary Score; SF12_MCS, Short Form 12 Mental Components Summary Score.

Table 2
Duration of the practice of mindfulness.

Duration of practicing mindfulness per week (mins)	Number of subjects	%
60 <	0	0
60 — 120	7	41.3
121 — 180	7	41.3
181 — 240	1	5.9
Above 240	2	11.8
Total	17	100

cognitive therapy group was 180 min (S. D. = 283.8) per week (Table 2). No harmful or adverse effects from the practice of mindfulness were found.

3.3. Preliminary effects of the modified mindfulness-based cognitive therapy

The results of the Mann-Whitney test indicated that the modified mindfulness-based cognitive therapy group reported significantly greater improvements than the control group from baseline (T0) to immediately post-

intervention (T1) in perceived stress (Z = -1.98, p = 0.05, Cohen's d = 0.7) and depression (Z = -2.25, p = 0.02, Cohen's d = 0.8); and from baseline (T0) to the 3-month follow-up (T2) in perceived stress (Z = -2.58, p = 0.01, Cohen's d = 0.9), depression (Z = -2.20, p = 0.03, Cohen's d = 0.7), and burden (Z = -2.74, p = 0.006, Cohen's d = 1.0) (see Table 3).

Table 3
Data analysis on study outcomes and effect sizes (Between groups).

		MBCT (n = 18)		Control (n = 18)		95% Confidence intervals (Pre – Post-test mean difference)	Mann-Whitney's test for between-group comparisons of mean difference		
Instrument	Time	*M*	*SD*	*M*	*SD*	Lower and upper limits	*Z*	*p value*	Effect size (d)
PSS	Pre	29.22	9.10	26.83	5.64				
	Post	24.10	8.12	25.89	5.23	−8.61, 0.05	−1.98	0.05*	0.7
	Follow-up	23.28	7.36	27.56	4.60	−11.19, -2.14	−2.58	0.01*	0.9
CESD	Pre	23.44	14.58	19.00	12.44				
	Post	15.11	12.17	18.28	10.45	−15.05, -0.18	−2.25	0.02*	0.8
	Follow-up	17.78	10.00	21.56	11.81	−16.22,-0.22	−2.20	0.03*	0.7
HADS_Anxiety	Pre	9.89	5.66	7.44	4.25				
	Post	7.50	4.46	8.06	2.58	−6.26, 0.26	−1.64	0.10	0.6
	Follow-up	8.944	3.49	7.33	2.89	−4.15, 2.48	−0.49	0.62	0.2
ZBI	Pre	44.22	17.78	43.39	13.54				
	Post	37.17	16.57	40.72	14.15	−13.98, 5.20	−0.52	0.61	0.3
	Follow-up	31.94	12.55	43.07	11.75	−19.84, -4.07	−2.74	0.006*	1.0
BRS	Pre	18.72	5.21	17.78	4.11				
	Post	18.94	5.21	19.06	3.95	−3.95, 1.84	−1.11	0.27	0.2
	Follow-up	19.66	5.07	17.69	3.47	−1.97, 4.00	−0.92	0.36	0.2
SF12_PCS	Pre	55.68	14.92	58.48	12.35				
	Post	61.74	10.48	56.78	13.20	−0.30, 15.81	−1.65	0.10	0.6
	Follow-up	61.85	10.50	56.78	13.20	−0.19, 15.93	−1.68	0.09*	0.6
SF12_MCS	Pre	30.06	8.52	27.12	10.22				
	Post	26.06	8.07	27.05	8.36	−9.81, 1.95	−1.30	0.20	0.4
	Follow-up	26.06	8.07	27.05	8.36	−9.81, 1.95	−1.30	0.20	0.4

* $p \leq 0.05$, PSS, Perceived Stress Scale; CESD, Center for Epidemiological Studies Depression Scale; HADS, Hospital Anxiety and Depression Scale; ZBI, Zarit Burden Inventory; BRS, Brief Resilience Scale; SF12_PCS, Short Form 12 Physical Component Summary Score; SF12_MCS, Short Form 12 Mental Components Summary Score.

Table 4
Data analysis on study outcomes and effect sizes (Within-group effects).

		Wilcoxon's signed-rank test for within-group effects						
		MBCT (*n* = 18)			Control (*n* = 18)			
Instrument	Time	*Z*	*p value*	Effect size (d)	*Z*	*p value*	Effect size (d)	
PSS	Post	−2.71	0.007*	1.7	−0.91	0.36	0.4	
	Follow-up	−2.75	0.006*	1.7	−0.40	0.69	0.2	
CESD	Post	−2.57	0.01*	1.5	−0.10	0.92	0.04	
	Follow-up	−1.71	0.09	0.9	−1.56	0.12	0.77	
HADS_Anxiety	Post	−1.45	0.15	0.7	−0.74	0.46	0.35	
	Follow-up	−0.76	0.45	0.4	−0.17	0.86	0.08	
ZBI	Post	−1.54	0.12	0.8	−1.42	0.16	0.71	
	Follow-up	−3.2	0.001*	2.3	−0.28	0.78	0.13	
BRS	Post	−0.12	0.91	0.06	−1.29	0.20	0.64	
	Follow-up	−1.20	0.23	0.59	−0.34	0.74	0.16	
SF12_PCS	Post	−2.03	0.04*	1.1	−0.50	0.62	0.24	
	Follow-up	−2.02	0.04*	1.1	−0.50	0.62	0.24	
SF12_MCS	Post	−1.63	0.10	0.8	−0.37	0.71	0.17	
	Follow-up	−1.63	0.10	0.8	−0.37	0.71	0.17	

* $p \leq 0.05$, PSS, Perceived Stress Scale; CESD, Center for Epidemiological Studies Depression Scale; HADS, Hospital Anxiety and Depression Scale; ZBI, Zarit Burden Inventory; BRS, Brief Resilience Scale; SF12_PCS, Short Form 12 Physical Component Summary Score; SF12_MCS, Short Form 12 Mental Components Summary Score.

In addition, the Wilcoxon's signed-rank test indicated that the modified mindfulness-based cognitive therapy group had a significant within-group effect from baseline (T0) to immediately post-intervention (T1) in perceived stress (Z = -1.98, p = 0.05, Cohen's d = 0.7), depression (Z = -2.25, p = 0.02, Cohen's d = 0.8), and health-related quality of life (physical) (Z = -2.03, p = 0.04, Cohen's d = 1.1);

and from baseline (T0) to the 3-month follow-up (T2) in perceived stress (Z = -2.75, p = 0.006, Cohen's d = 1.7), depression (Z = -1.71, p = 0.09, Cohen's d = 0.9), burden (Z = -3.2, p = 0.001, Cohen's d = 2.3), and health-related quality of life (physical) (Z = -2.02, p = 0.04, Cohen's d = 1.1) (see Table 4).

3.3.1. Mastery of mindfulness

Concerning levels of mastery of mindfulness among the participants in the modified mindfulness-based cognitive therapy group, a significant effect was found from T0 to T1 (Z = -2.57, p = 0.01, Cohen's d = 0.60) and from T0 to T2 (Z = 2.58, p = 0.01, Cohen's d = 0.61), but there were no significant changes from T1 to T2 (Z = -0.83, p = 0.41, Cohen's d = 0.40).

3.4. Focus group

Eight participants ranging in age from 46 to 68 (mean = 56.9, S. D. = 8.1) were invited to join the focus group. The majority were the children (n = 5) or spouse (n = 3) of a care-recipient. Three themes with corresponding categories emerged from the data: a) Impacts on the family caregivers, b) Impacts on the people with dementia, c) Difficulty in practicing mindfulness (see Table 5).

Table 5
Results of the focus group interview.

Categories	Quotations
Theme: Impacts on the family caregivers	
Increased self-awareness	"My self-awareness has increased, and I am now more aware of my bodily and physical responses." –03-PU-12
Feelings of relaxation	"I always feel calm and become more relaxed after practicing mindfulness every day." –02-PU-08
Increased concentration	"I was easily being distracted when practicing mindfulness in the past, but now my concentration has improved. I can concentrate for a longer period of time to practice." –05-PU-19
Improved sleep quality	"Although I am still stressed when caring for the PWD, my sleep quality has improved." –08-PU-15
Theme: Impacts on the people with dementia	
Categories	Quotations
Improvements in behavioral problems	"After practicing mindfulness, my acceptance of my mother's behavior has increased. I try not to argue with her delusional thoughts . . . . I also found that her delusions have improved." –10-PU-05
Increased interactions between the family caregiver and the people with dementia	"I feel that my mother can recognize my changes and she speaks more with me." –13-PU-11
Theme: Difficulty in practicing mindfulness	
Categories	Quotations
Disturbed by the PWD	"Once I try to close my eyes to practice at home, my mother will talk to me and wake me up. Now I can only practice when she goes to bed." –20-PU-08
Time constraints	"It is difficult to squeeze some time in to practice." –26-PU-26
Occupied by caregiving tasks	"I really want to attend the last session, but no one can take care of my mother at home." –30-PU-05

4. Discussion

To our knowledge, this is the first study to explore the feasibility and preliminary effects of a modified mindfulness-based cognitive therapy program for the family caregivers of people with dementia. The findings from this study suggest that this therapy is a feasible and acceptable psychosocial program for the target population, in view of the high completion rate, attendance rate, and the positive feedback collected from the focus group interview. Even though the family caregivers had taken on various caregiving roles and were busy caring for the people with dementia,the retention rate was high, at over 80%.

Although the intervention had been shortened, a significant increase in levels of mindfulness as measured by the Five Facets Mindfulness Questionnaire was identified immediately after the program and also at the 3-month follow-up. A prior study with a similar number of sessions also demonstrated a moderate to large effect size on psychological outcomes (Speca et al., 2000). The beneficial effects of the mindfulness intervention not only resulted from the caregivers' in-class participation but also from their practice of mindfulness at home (after class). The regular out-of-class practice of mindfulness could make it possible for a person to cultivate mindfulness skills in everyday life, which could lead to improved psychological functioning such as a reduction in symptoms, reduced stress, and enhanced well-being (Carmody and Baer, 2008). To understand adherence to the practice of mindfulness and the formation of the habit of mindfulness, a recent systematic review of 43 interventional studies on mindfulness (N= 1427) indicated that D. =283.8). This supports the argument that our brief and modified mindfulness-based cognitive therapy protocol is sufficient to increase the level of mindfulness in caregivers of people with dementia and can also help some caregivers to develop the habit of practicing mindfulness at home.

Another interesting finding were the large differences in the duration of the weekly practice of mindfulness among the participants, ranging from 60 to 315min. There is some evidence to suggest that the practice of mindfulness is associated with improvements in symptoms of depression and anxiety if engaged in for a certain minimum number of times a week (3 or more times a week) (Perich et al., 2013). However, there have been no studies on the relationship between the frequency of practicing mindfulness and the minimum duration of each practice session for the improvement of symptoms. Parsons et al. (2017) explained that the practice of mindfulness is about cultivating awareness of the present moment, without judging or evaluating, not just spending time on a yoga mat. It was not easy to understand how people truly engage in their home practice. Information about the duration of their practice sessions can only provide a small amount of information about their learning experience. In a recent meta-analysis, only a small to moderate association between the participants' home practice and the treatment outcome was found (Parsons et al. (2017). The level of mindfulness and the duration of practice should be taken into account together to indicate the mastery of mindfulness. Although there were large differences in practice duration, all of the participants were able to practice for 3 times a week or more, and there was a significant increase in their level of mindfulness.

The study also provides preliminary evidence of the sustainable effect of the modified mindfulness-based cognitive therapy at the 3-month follow-up on reducing stress, improving symptoms of depression, and alleviating the sense of burden felt by the caregivers. Since the behavioral symptoms and disease progression of people with dementia can fluctuate and are unpredictable, family caregivers often repeatedly experience negative thoughts and worries, resulting in high levels of stress and negative emotions (Carmody and Baer, 2008). The modified mindfulness based

cognitive therapy helps caregivers to be aware of and identify their repetitive negative thinking patterns. A more accurate perception and understanding of their present experiences can cause them to reappraise their current situation and lead to a greater sense of calmness, resulting in a reduction in stress (Hölzel et al., 2011). Furthermore, the daily practice of mindfulness could help caregivers to disengage from their negative thinking, resulting in the alleviation of depressive symptoms. Our findings are also supported by a recent systematic review indicating that mindfulness interventions have the potential effect of reducing stress and improving symptoms of depression in the family caregivers of people with dementia (Kor et al., 2018).

Dementia tends to progress slowly, with the average amount of time from the appearance of obvious symptoms until death being about 8–10 years. Symptoms usually develop slowly and worsen over time, so the demands on those providing daily care to people with dementia progressively increase. Therefore, the intervention for family caregivers should be sustainable and also empower the caregivers to face everyday challenges. The findings showed that the beneficial effect of the modified mindfulness-based cognitive therapy program could last for at least 3 months post-intervention, a result that may be related to the regular practice of mindfulness on the part of the caregivers. In the modified mindfulness-based cognitive therapy program, we provided an audio (MP3) recording of guided mindfulness exercises for the family caregivers to use when practicing after class, extended the interval of the sessions to once every two weeks from once a week (from the 5th to 10th weeks), and also monitored their progress via telephone in order to encourage the caregivers to cultivate the habit of practicing mindfulness and to apply a mindful attitude to their daily activities. We believe that this is the major reason for the sustainable effects that we found in our study, since previous studies (Brown et al., 2015; Epstein-Lubow et al.,

2011; Oken et al., 2010) did not incorporate such modifications and only showed the beneficial effects immediately after the intervention. After completing the modified mindfulness-based cognitive therapy program, the family caregivers became mindful and were able to identify their negative emotions with a non-judgmental attitude, which could have empowered them to face the stress and negative emotions from daily caregiving.

Resilience is a process of positive adaptation to acute and chronic stress (Jenson and Fraser, 2006). In this study, we hypothesized that levels of resilience would increase after participation in the modified mindfulness-based cognitive therapy program; however, no significant changes were found. The Blister Callus Model of Resiliency suggests that an increase in resilience will result from repeated exposure to and recovery from stressful events (Peterson et al., 2014), so that changes in resilience would be affected by the caregiving tasks encountered in daily life. Indeed, in a systematic review of 25 trials on enhancing resilience, resilience was generally found at least 3 months post-intervention (Leppin et al., 2014). Because of the limited diversity of the samples in the study and the short duration of the follow-up period, we suggest that a future study should measure changes in resilience over a longer follow-up period to (e.g., 6 months) to determine whether there have been any potential benefits.

A non-significant effect was also found in the anxiety level of the caregivers. We believe that this is also related to the limited diversity of the samples in the study. We found that the majority of caregivers were able to attend the program because of support from domestic helpers or from relatives who shared the caring tasks. The level of anxiety at baseline (Mean = 8.67, S.D. = 5.08) was much lower than the cut-off point of 11–14 (moderate level of anxiety) (Bjelland et al., 2002). The relatively

low level of anxiety made it more difficult to observe the effect of the modified mindfulness-based cognitive therapy. To include more diverse samples, we suggest that a respite service be provided for people with dementia to make it easier for the caregivers to take part in the intervention sessions.

The family caregivers in the focus group described the impact that their practice of mindfulness had on the mood and behavioral problems of the care recipients. This study was primarily about the effects of mindfulness on the family caregivers of people with dementia; therefore, we did not measure any outcomes related to the people with dementia. In fact, the behavioral problems of people with dementia are affected by the interactions between them and their family caregivers (Songet al.,2018).The modified mindfulness based cognitive therapy empowered the family caregivers to handle daily challenges, including managing the behavioral problems of people with dementia, by making them more tolerant and accepting of such problems. A family caregiver said, “I used to blame my mother with dementia when she repeatedly asked questions. But now I can slow down and take a deep breath before making any reply to her.” In the future main study, we will include some outcomes related to the people with dementia.

5. Limitations

The current study was limited by its small sample and because the participants were recruited from a single community center, which decreases the generalizability of the findings. Moreover, all of the outcome measures focused solely on family caregivers. The modified mindfulness-based cognitive therapy program promoted the cultivation of a mindful attitude in family caregivers, to help them to cope with the activities of daily living. This might also have affected the behavioral symptoms of the people with dementia; thus, outcomes related to the people with dementia should also

have been measured. Lastly, while all outcomes were measured through the use of self-reported questionnaires, the assessors might have made inferences on the type of intervention that was being implemented when they interacted with the caregivers. It is recommended that objective measures or physiological indexes (e.g., cortisol levels) be added in a future study to measure the effects of the intervention.

6. Conclusion

The findings in this pilot study support the view that the modified mindfulness-based cognitive therapy is a feasible and acceptable psychosocial care program for the family caregivers of people with dementia. The program provides caregivers with the skills to practice mindfulness at home or to deal with stressful situations, which can empower them to face the everyday challenge of caring for people with dementia. The preliminary results indicated that the modified mindfulness-based cognitive therapy is an effective intervention for reducing stress and enhancing the well-being of family caregivers. A future study with a larger and more diverse sample is proposed, in order to evaluate the longer-term effects of the program and increase the generalizability of the study.

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