Psychometric properties of Chinese version of Dementia Management Strategies Scale among family caregivers

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KEY MESSAGES

1. Psychometric properties of the Chinese version of the Dementia Management Strategies Scale have good reliability and validity among Chinese family caregivers for people with dementia in Hong Kong.

2. Levels of adaptive and non-adaptive management strategies used by family caregivers are moderate. Females, spouses, those who perceived better current health than 1 year ago, and those who received two to three community support services indicated higher levels of management strategies used.

3. The levels of management strategies used by family caregivers correlate with their distress and self-efficacy and dementia relatives' symptom severity.

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Introduction

Dementia is a neurodegenerative disorder that typically occurs in old age. It is characterised by cognitive impairment and behavioural and psychological symptoms such as agitation, apathy, and personality changes; its prevalence increases from 0.8% at age 60 to 64 years to 19.1% at ≥85 years.[1] Caregiving stress and burden are common in families having a relative with dementia. Family education on dementia management strategies can reduce the functional decline in people with dementia, lower familial burden of care, enhance self-efficacy of family caregivers in handling disruptive behaviours of demented relatives, and reduce the likelihood of institutionalisation of dementia relatives to aged care facilities.[2-4]

A study using the 28-item Dementia Management Strategies Scale (DMSS) identified three major types of caregiving strategies in dementia care (criticism, encouragement, and active management) that are correlated with caregiving burden and intention of institutionalising their relatives.[3] Modification of dementia management strategies is associated with families' self-efficacy and coping ability in caregiving and may lead to a better sense of competence and a more rewarding experience, contributing to a therapeutic homecare environment.[4] The DMSS covers a wide range of adaptive and non-adaptive strategies in dementia care and is useful for health care professionals to assess and identify family caregivers who are lack of appropriate and effective strategies in coping with challenges in caregiving. Unlike the Task Management Strategy Index (TMSI)[5] that only assesses positive coping tasks, DMSS can be used to examine both adaptive and non-adaptive strategies of caregivers in dementia care. Therefore, it is important to translate and validate the DMSS in a Chinese population and to assess the levels of different management strategies used by caregivers in caring for their dementia relatives.

Methods

This was a two-phase study to test the psychometric properties of the Chinese version of DMSS. Phase 1 tested the semantic equivalence of the original English and translated Chinese version and examined content validity and test-retest reliability of the Chinese version. Phase 2 assessed internal consistency, reproducibility, responsiveness, and construct validity of the Chinese version, and identified the management strategies used by caregivers and related factors by completing the questionnaire twice over 6 months.

Study subjects were recruited from two elderly service centres that provide day and residential dementia care for over 500 families in Kowloon and Hong Kong Island. In phase 1, a bilingual nurse researcher and a Chinese-English translator translated and back-translated the DMSS independently. An expert panel comprising five mental health professionals and three family

caregivers were recruited to rate the relevance of items of DMSS in assessing the management strategies in dementia care. A convenience sample of 20 Chinese-English bilingual caregivers of dementia relatives completed the original English and translated Chinese versions of DMSS for testing the semantic equivalence. In addition, another convenience sample of 40 caregivers completed the Chinese version twice over a 2-week interval for assessing the test-retest reliability. In phase 2, about 210 pairs of family caregivers and their dementia relatives were randomly selected from the client lists to participate. This sample size could achieve a 95% confidence interval for each of the three DMSS subscales (standard deviation=6.6-6.9, n=107) within a margin-of-error of ±1.0 from the population mean.[4]

The inclusion criteria for caregivers were: (1) being the main primary caregiver (age ≥18 years) of a dementia relative for ≥3 months on activities of daily living for ≥2 hours per day; and (2) able to understand and read Chinese language. The inclusion criteria for the dementia relatives were: (1) age ≥60 years, (2) with mild to moderate stage of dementia according to the DSM-IV or the Clinical Dementia Rating[4] assessed by a psychiatrist, and (3) able to understand verbal Cantonese/Mandarin. Family caregivers presenting with acute psychiatric symptoms or cognitive impairments were excluded, as were dementia relatives presenting with serious deteriorating health conditions or moving to long-term aged care facilities in the upcoming 6 months.

In phase 2, four instruments were used: the Chinese version DMSS, TMSI, Self-Efficacy Questionnaire for Chinese Family Caregivers, and Neuropsychiatric Inventory. All four instruments demonstrated good internal consistency and construct validity.[1-5] After informed written consent was obtained, each participant was assisted by a research nurse to complete the questionnaires by reading the questionnaire items and rating scales. Six months later, the participants completed a similar set of questionnaires at home or the study centres.

The item equivalence between the Chinese and English versions of the DMSS was evaluated using weighted kappa value, and their total scale/subscale equivalences were assessed by intraclass correlation coefficient. Content of validity index of the translated DMSS was calculated at both item and scale levels based on percentage of agreement between panel members on the relevance of each item to dementia management strategies, and Pearson's moment correlation test was used to evaluate the test-retest reliability of the Chinese version at a 2-week interval.

Construct validity of the translated DMSS was established by: (1) testing the correlations between each of its subscale score and TMSI total score for convergent and divergent validity; and (2) using exploratory factor (principal components analysis followed by varimax rotation) with half of the sample randomly selected from the full data set and confirmatory factor analyses using LISREL 9.1 to generate and conclude the factor solution as explained by the scale items. Internal consistency of the DMSS was calculated using Cronbach's alpha coefficients.

Data from dementia relatives reported little or no change in neuropsychiatric symptoms at the 6-month interval. Reproducibility of the Chinese version was assessed using the intraclass correlation coefficients (random effects one-way ANOVA). Responsiveness of the DMSS to change in neuropsychiatric symptoms was evaluated by (1) observed change for two measurements (mean difference [test 1 minus test 2]) and (2) effect sizes (observed change divided by standard deviation of baseline score), examining whether a change in DMSS mean scores followed the expected change patterns in Neuropsychiatric Inventory symptom scores.

Results
Phase 1
Convenience samples of 20 and 40 family caregivers were recruited for assessing equivalence and test-retest reliability, respectively, with response rates of 95% and 93%. Non-response was mainly due to time constraints and unwilling to discuss their family issues.

The 34-item Chinese version of DMSS had a good semantic equivalence with the original English version on both the items and total scale; 30 items had a kappa value of 0.87-0.94 and the remaining 4 (items 10, 20, 24, and 28) had a kappa value of 0.80-0.84, which is slightly below the acceptable value of 0.85. The intraclass correlation coefficients between the two versions were 0.89 (P=0.01) for the total scale and 0.82-0.93 for the three subscales.[3] Only minor amendments on the key wordings of a few items were made. The Chinese version also showed good content validity, with the content of validity index being 0.90-1.00 at the item level and 0.96 at the scale level. Test-retest reliability coefficients for the Chinese version of DMSS over 2-week interval were r=0.90 for the total scale (P=0.01) and 0.87-0.93 for the three subscales (P=0.02-0.007).

Phase 2
A total of 211 family caregivers (and their dementia relatives) completed the questionnaire (response rate, 75.4%). Seventy caregivers refused to participate mainly due to lack of interest (n=32) or too busy and time inconvenience (n=30). Respondents and those refused to participate were comparable in terms of socio-demographics and clinical characteristics (P>0.10, Table 1).

TABLE 1. Characteristics of family caregivers and dementia relatives*

Characteristics	Respondents (n=211)	Those refused to participate (n=70)	χ² / t	P value
Family caregivers			1.38	0.36
Female	141 (66.82)	42 (60.00)		
Male	70 (33.18)	28 (40.00)		
Age, y	48.76±19.12 (21-62)	49.48±20.16 (20-64)	1.30	0.20
Relationship with dementia relative			1.49	0.33
Spouse	81 (38.39)	25 (35.71)		
Child	79 (37.44)	25 (35.71)		
Sibling/parent	40 (18.96)	15 (21.43)		
Others (eg, granddaughter)	10 (4.74)	5 (7.15)		
Monthly household income, HK$			1.80	0.19
≤10 000	50 (23.70)	15 (21.43)		
10 001–20 000	93 (44.08)	30 (42.86)		
20 001–40 000	57 (27.01)	19 (27.14)		
>40 000	10 (4.74)	6 (8.57)		
Education level			2.19	0.12
Primary or below	33 (15.64)	14 (20.00)		
Secondary	142 (67.30)	39 (55.71)		
Tertiary	36 (17.06)	17 (24.29)		
Persons sharing with caregiving			2.48	0.10
Spouse	49 (23.22)	16 (22.86)		
Child	55 (26.07)	18 (25.71)		
Sibling/other relatives	67 (31.75)	26 (37.14)		
Domestic helper	40 (18.96)	10 (14.29)		
Duration of caregiving, mo	18.34±9.91 (8-32)	17.19±9.98 (7-36)	1.34	0.25
Time of caregiving, hr/wk	4.84±1.98 (2-8)	4.10±2.07 (2-7)	2.08	0.10
Types of daily tasks assisted for relative (eg, bathing, dressing and toileting)	7.81±2.25 (4-12)	8.90±4.02 (4-14)	1.98	0.11
General health conditions				
Visiting medical doctor (1=none to 4= >2 times per month)	2.12±1.01 (1-4)	-		
No. of hospital admission	1.52±1.01 (0-4)	-		
Use of psychotropic drugs	98 (42.65)	-		
Level of sleeping difficulty (1=generally sufficient to 3=generally insufficient)	2.05±0.80	-		
Weight change >5 pounds	105 (49.76)	-		
Perceived current health (1=much better to 5=much worse than 1 year ago)	3.51±1.32 (1-5)	-		
Presentation of physical symptoms (1=none to 3=often)				
Headache	1.59±1.02	-		
Dizziness	2.01±0.70	-		
Heart palpation	1.36±1.12	-		
Worsening of memory	1.98±0.60	-		
Unstable emotion	2.31±0.40	-		
Anxiety	2.10±0.52	-		
Constipation	1.33±0.89	-		
Stomach ache	1.59±0.93	-		

* Data are presented as mean±SD (range) or No. (%) of subjects

TABLE 1. (cont'd)

Characteristics	Respondents (n=211)	Those refused to participate (n=70)	χ² / t	P value
Community support services received			2.48	0.10
Community psychiatric team (psychogeriatric)	89 (42.18)	25 (35.71)		
Family therapy	36 (17.06)	9 (12.86)		
Respite care	49 (23.22)	17 (24.29)		
Self-help/mutual support group	42 (19.91)	11 (15.71)		
Cognitive behaviour therapy / mindfulness training	32 (15.17)	10 (14.29)		
Others (eg, day care centre)	78 (36.97)	20 (28.57)		
Dementia relatives			1.74	0.25
Male	96 (45.50)	31 (44.29)		
Female	115 (54.50)	39 (55.71)		
Age, y	66.40±8.29	67.49±9.21	1.38	0.30
55-60	14 (6.64)	4 (5.71)		
61-65	40 (18.96)	8 (11.43)		
66-70	71 (33.64)	24 (34.29)		
>70	86 (40.76)	34 (48.57)		
Type of dementia			1.25	0.24
Alzheimer's disease	98 (46.45)	34 (48.57)		
Vascular/frontotemporal	53 (25.12)	17 (24.29)		
Lewis bodies/semantic	42 (19.91)	13 (18.57)		
Others	18 (8.53)	6 (8.57)		
Hospitalisation in the past 3 months				
No. of hospitalisation	1.12±0.90	1.30±0.81	1.10	0.30
Length of hospitalisation, d	10.18±5.90	9.01±4.79	1.89	0.23
No. of family members living with patient	2.15±0.90 (1-4)	2.34±0.98 (1-4)	1.56	0.20
Duration of dementia, mo	17.40±9.54 (8-35)	19.13±10.49 (7-34)	1.14	0.28
Mobility			2.13	0.11
Use wheelchair	58 (27.49)	18 (25.71)		
Walk with a stick/frame	79 (37.44)	30 (42.86)		
Walk independently	74 (35.07)	22 (31.43)		
Psychiatric medications			1.97	0.25
Anti-depressants	28 (13.27)	8 (11.43)		
Anti-convulsants	7 (3.32)	4 (5.71)		
Atypical anti-psychotics	12 (5.69)	8 (11.43)		
Conventional anti-psychotics	11 (5.21)	7 (10.00)		
Hypnotics	18 (8.53)	7 (10.00)		
Others (eg, lithium salts)	8 (3.79)	4 (5.71)		
Psychiatric treatments receiving			1.96	0.15
Community psychiatric team visits & education	78 (36.97)	19 (27.14)		
Cognitive remediation	32 (15.17)	9 (12.86)		
Memory training (eg, reminiscence)	59 (27.96)	10 (14.29)		
Exercise and self-care training	58 (27.49)	10 (14.29)		
Complimentary therapies	27 (12.80)	6 (8.57)		
Others (eg, relaxation & self-regulation)	30 (14.22)	10 (14.29)		

Construct validity

All corrected item–total correlations were positive, with 32 of 34 items within the range of 0.30-0.75. After confirmed the factorability with half of the randomly selected sample (n=143), principal components analysis and Catell's scree test indicated that there were three components (criticism towards older relative, showing encouragement, and active management strategies) with eigen-values of >1.2, with 32 items having factor loadings of ≥0.40. Only two items were deleted from item rotation: item 29: "I was kept busy just cleaning up or repairing things after the damage my older relative had done" (0.16) and item 33: "I tried to soothe my relative's emotions when he/she got upset" (0.18). After varimax rotation, all 32 items had high loadings of >0.40 on only one factor, except for item 30: "I made sure my older relative got enough medications to keep him/her calm/cooperative". The three-factor solution (criticism towards older relative [12 items], showing encouragement [10 items], and active management strategies [10 items]) explained 72.06% of total variance of management strategies (Table 2).

For confirmatory factor analysis, the three-factor model with paths between all factors showed much better fit based on all fit indices (χ^2/df=1.92, P=0.58, AGFI=1.01, TLI=1.04, RMSEA=0.034, WRMR=0.76) than the model suggested by the original authors. Critical ratios for regression weights were >2.0 indicating each item with a significant contribution at 0.05 level to its associated factors. Path diagram of the best fit three-factor model indicated moderate correlations between three factors (0.50-0.58) and their included items (0.49-0.73).

Internal consistency and convergent and divergent validity

Internal consistency of the Chinese version DMSS was high in caregivers, with Cronbach's alpha being 0.89 for overall scale and 0.86-0.90 for three subscales. All corrected item–total correlations were positive (0.30-0.69) and its overall scale and subscales were also moderately and positively intercorrelated (P<0.01). As expected, the total score and the three subscales were positively correlated with the mean total score of TMSI (r=0.50, P=0.008) and its subscales (r=0.46-0.56, P=0.09-0.007). As the subscale 'criticism towards older relative' was reversed coded, the adaptive strategies used (TMSI total score) were negatively associated with this subscale, indicating good divergent validity, whereas the total score and the other two subscales were positively associated with the TMSI total score indicating good convergent validity.

Reproducibility and responsiveness to change in neuropsychiatric symptoms

Reproducibility of the Chinese version DMSS between the two assessments (6-month interval) in the caregivers (n=107), who reported no major changes in both their distress level and the older relatives' neuropsychiatric symptoms, were good (intraclass correlation coefficient=0.87, F=5.12, df=105, P=0.01). In addition, the observed changes in mean DMSS score among the caregivers (n=104) in response to negative changes in neuropsychiatric symptom severity ranged from 9.26 to 15.89 for total score, and from 2.45 to 4.12 for the three subscales. The change in mean scores correlated with the patterns of changes in their TMSI total scores (r=0.50, P=0.005). The Chinese version also showed moderate effect sizes for detecting an increase in symptom severity in dementia relatives (n=52) in overall score (effect size Cohen's d=0.58), and in three subscales (effect size ranged from 0.50 for 'criticism towards older relative' to 0.60 for 'active management strategies'). There were small to moderate effect sizes for detecting symptom improvement (or decrease in Neuropsychiatric Inventory score; n=54) in the overall score (effect size=0.52) and three subscales (effect sizes=0.34-0.52).

DMSS scores among family caregivers and their correlates

The DMSS overall and/or subscale scores correlated negatively with distress (P=0.05-0.006) and positively with self-efficacy in caregiving (P=0.05-0.007), perceived current health (P=0.05-0.01), neuropsychiatric symptoms (P=0.05), amount of non-adaptive strategies used (P=0.01-0.008), time of caregiving (P=0.05-0.03), and caregiver's age (P=0.05) [Table 3].

There were positive correlations (using partial correlation coefficients) between the amount of non-adaptive strategies used and difficulty in sleeping, dizziness, memory worsening, unstable emotions, and anxiety (r_p=0.31-0.39, P=0.04-0.05). There were negative correlations between the DMSS subscale score of 'criticism towards older relative' and difficulty in sleeping, headache, unstable emotions, and anxiety (r_p=0.30-0.40, P=0.04-0.05).

Discussion

The Chinese version DMSS demonstrated good psychometric properties for assessing family caregivers' perusal of various active, positive, and encouraging strategies in dementia care, as well as avoiding for criticism and blame on the older relatives, or their illness and its related problematic behaviours. The high weighted kappa values and intraclass correlations indicated that the items were appropriately translated and retained the similar meaning as the original English version in assessing dementia management strategies among Chinese caregivers. The high test-retest reliability, internal consistency, and reproducibility also supported

TABLE 2. Results of varimax rotation of three factors identified in the Chinese version Dementia Management Strategies Scale*

Item		Factor loading		
		Factor 1 (Criticism towards older relative)	Factor 2 (Showing encourage-ment)	Factor 3 (Active management strategies)
1	I yelled or acted enraged; it was often the only way to get my way with him/her. (26)	0.68		
2	I criticised or scolded my older relative to try to prompt better behaviour from him/her. (15)	0.56		
3	I threatened my relative with undesirable consequences if he/she did not cooperate. (21)	0.60		
4	I withdrew from my older relative. (22)	0.59		
5	I blamed my older relative for having created the difficulties. (1)	0.53		
6	I was firm with my older relative, and insisted that he/ she live up to certain expectations I have for him/her. (13)	0.44		
7	I told my relative to stop doing things that caused worry because of what it did to me (or to other family members). (29)	0.51		
8	I left the situation for a while when relating to my older relative got too difficult. (27)	0.56		
9	I tried to get my relative to agree to do certain things, or to do them in a certain way. (31)	0.55		
10	I asked my relative to explain why he/she was doing something, to draw his/her attention to his/her mistakes. (11)	0.51		
11	I tried to communicate to my older relative how concerned or worried I was about him/her. (32)	0.48		
31	I overlooked or ignored my older relative's feelings when I suspected that paying attention to them might lead to unpleasantness between us. (8)	0.50		
12	I tried to engage my older relative in discussing his/her feelings and emotions. (4)		0.69	
13	I made a point of praising him/her when he/she did what I considered appropriate. (5)		0.64	
14	I tried to help my older relative look on the bright side of things. (20)		0.63	
15	I tried to reason with my older relative. (28)		0.58	
16	I encouraged my relative to adopt a fighting attitude toward his/her disability, and to do as much as possible for him/herself. (16)		0.56	
17	I tried to suggest ideas my older relative might accept and follow through on. (23)		0.52	
18	I showed special amounts of physical affection. (7)		0.49	
19	I encouraged my older relative to keep up with friends, to visit them by him/herself. (9)		0.48	
32	I tended to indulge my older relative. (17)		0.45	
34	I tried to hold my anger and frustration in, to protect my older relative from these feelings. (18)		0.49	
20	I tried to arrange my older relative's environment to safeguard him/her against causing problems, getting into trouble, or endangering him/herself. (10)			0.67
21	I tried to do many things for my relative since he/she is no longer capable of doing them. (6)			0.61
22	I tried to divert my relative's attention when he/she began to feel upset. (12)			0.56
23	I repeated the same things over and over again, to make sure my older relative got them. (19)			0.53
24	I tried to arrange situations I hoped would be stimulating to my older relative (mentally or emotionally). (2)			0.52
25	I kept a close eye on what my older relative was doing so that I could head off any problems before they developed too far. (3)			0.51
26	I tried to have my relative participate in as much of the ordinary family routine as possible. (25)			0.50
27	I tried to teach everyone involved to approach my older relative in the same, planned way. (33)			0.47
28	I tried to make sure my relative got enough physical activity or exercise. (34)			0.48
30	I made sure my older relative got enough medications to keep him/her calm or cooperative. (30)	(0.40)		0.47
	Eigen value	6.61	5.52	5.30
	Percentage of variance explained	27.57	23.80	20.69

* Item 3 had fairly high factor loading on two factors (1 and 3). It was retained in factor 3 only after consideration of its meaning and level of loading

TABLE 3. Correlations between Dementia Management Strategies Scale (DMSS), Task Management Strategy Index (TMSI), and other variables in 211 respondents

Measures	DMSS	DMSS			TMSI	Non-adaptive strategies used
		Criticism towards older relative	Showing encouragement	Active management strategies		
DMSS	1.00					
Criticism towards older relative	0.518†	1.00				
Showing encouragement	0.608‡	0.503†	1.00			
Active management strategies	0.540†	0.498†	0.583†	1.00		
TMSI	0.496†	0.458†	0.506†	0.562†	1.00	
Non-adaptive strategies used	-0.469†	-0.502†	-0.398*	-0.283	-0.383*	1.00
Neuropsychiatric Inventory (distress)	-0.468†	-0.382*	-0.564†	-0.431†	-0.451†	0.288
Neuropsychiatric Inventory (symptoms)	-0.312*	-0.346*	-0.265	-0.350*	-0.360*	0.344*
Self-Efficacy Questionnaire for Chinese Family Caregivers	0.502†	0.346*	0.489†	0.547†	0.679‡	0.551†
Time of caregiving (hrs/week)	0.358*	0.261	0.301*	0.398*	0.391*	0.238
Perceived current health	0.402†	0.310*	0.420†	0.400†	0.368*	0.386*
Caregiver age	0.298	0.246	0.287	0.324*	0.288	0.188
Dementia relative's age	-0.212	-0.234	-0.198	-0.224	-0.246	0.308*
Duration of dementia	0.298	0.283	0.278	0.238	0.216	0.198
Physical symptoms (partial correlation coefficients after adjusting for covariates)						
Sleeping difficulty	-0.189	-0.298*	-0.198	-0.102	-0.258	0.342*
Headache	-0.306*	-0.348*	-0.278	-0.236	-0.284	0.298
Dizziness	-0.252	-0.212	-0.276	-0.104	-0.302	0.380*
Heart palpation	-0.248	-0.234	-0.212	-0.131	-0.288	0.214
Memory worsening	-0.189	-0.220	-0.288	-0.182	-0.311	0.312*
Unstable emotion	-0.322*	-0.398*	-0.198	-0.202	-0.338*	0.364*
Anxiety	-0.316*	-0.348*	-0.274	-0.298	-0.364*	0.392*
Constipation	-0.168	-0.122	-0.188	-0.148	-0.156	0.245
Stomach ache	-0.214	-0.136	-0.202	-0.241	-0.234	0.261

* P<0.05
† P<0.01
‡ P<0.001

that the translated version has a high potential to be applied to families caring for a dementia relative in Chinese populations.[1,4] The overall scale and two subscales ('showing encouragement' and 'active management strategies') demonstrated good convergent validity with the TMSI, and the remaining one subscale ('criticism towards older relative') demonstrated good divergent validity with the TMSI indicating strong association with family caregivers' adaptive strategies used for dementia care. Therefore, the Chinese version DMSS with the three factors can measure both positive and negative coping/management strategies used by caregivers, and relationships with their families' distress and negative attitudes (criticism) towards the older relatives, as suggested by the original authors and other study.[4,6]

In addition, the Chinese version DMSS showed a good responsiveness to changes in these mental and behavioural symptoms of dementia with moderate effect sizes for detecting symptom deterioration over 6 months. The DMSS is useful, particularly the more active management strategies (effect size=0.60) and positive encouragement (effect size=0.56), to detect the changes in dementia symptoms and important predictors of caregivers' management of dementia relatives' problematic behaviours.[5,6]

With the association between the DMSS score and psychosocial variables, more efforts and time contributed to dementia management strategies, particularly the adaptive ones, is likely to reduce distress (ie, negatively correlated) and improve self-efficacy and perceived health status in caregiving by the caregivers.[3,5] The DMSS might be useful to reflect

the amount of non-adaptive strategies adopted by these caregivers, in turns detecting their perceived current health status and a variety of somatic symptoms such as sleeping difficulty, unstable emotions and anxiety state (which were correlated with both the DMSS and amount of non-adaptive strategies used in this study).

There are limitations to this study: (1) family caregivers' self-reports might be subjective or inaccurate to see the actual degree of their management strategies use in actual dementia care setting; (2) the participants were selective, recruiting from two community care centres only where similar socio-economic backgrounds and mental healthcare services; (3) the relationships between dementia management strategies and their socio-demographic, clinical and psychosocial characteristics were studied using cross-sectional descriptive but not a longitudinal and predictive design; and (4) there was not sufficient sample for either exploratory or confirmatory factor analysis, thus the model fitness might have been inflated. In addition, the use of confirmatory factor analysis was weak for testing model-fit of the data due to upward bias or overestimation with a large number of measured variables (items).

Conclusion

This study supports the reliability and validity of the Chinese version DMSS in measuring family caregivers' level of dementia management strategies. It can be applied to mental health practice for better understanding and measuring the levels of caregiving strategies among dementia populations. This self-report Chinese version DMSS is easy to administer and requires minimal training and simple interpretations from the caregivers' own perceptions. It can be further tested in and applied to various types and duration of dementia, as well as different Chinese communities.

Acknowledgements

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