

Agitated behaviors among elderly people with dementia living in their home in Taiwan

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Background/aims: Limited research has been conducted on agitated behavior in Taiwan and dementia among community-dwelling elderly. Therefore, this study focused on community elderly with dementia and a factor analysis of an inventory of their agitated behaviors was conducted.

Patients and methods: Participants (N=221) completed the Chinese Cohen-Mansfield Agitation Inventory, community form. Item analysis and exploratory factor analysis assessed reliability, validity, and the underlying factor structure.

Results: Five factors were extracted and accounted for 44.53% of the total variance. This study classified agitated behaviors into 5 main subtypes: physically agitated behaviors, destructive behaviors, verbally agitated behaviors, handling things behavior, and aggressive behaviors.

Conclusion: The results indicate that differences in the agitated behavior of elderly with dementia exist with respect to cultural background and setting. This novel research and its findings serve as a reference for assessing the agitated behaviors of elderly with dementia living in their homes. Applications may exist for other countries with Chinese/Taiwanese populations.

Keywords: agitation, aggressive behavior, behavioral problem, caregiver, factor analysis, dementia

Introduction

The prevalence distribution of agitated behavior among elderly with dementia living in communities has risen from 22% to 88%.¹⁻³ Due to differences in the definition of agitated behavior and in the evaluation instruments used among various studies, a rather significant differentiation exists in this prevalence range. Agitated behavior is the main source of distress for caregivers of elderly with dementia; therefore, provision of a valid and reliable evaluation instrument can help caregivers to assess the agitated behavior, understand the stage of progression, and evaluate the results of treatment intervention.^{4,5} The agitation inventory that was developed by Cohen-Mansfield⁶ with credibility is commonly used for the assessment of agitated behavior in elderly people with dementia.

Previous studies have indicated that various classified behavioral problems may stem from a common cause, and a universal treatment can be applied according to the subtype of each behavioral problem.⁷⁻¹⁰ Verbally aggressive behavior (VAB), such as complaining, screaming, and repetitive sentences or questions, may stem from a need for assistance with physiological or emotional discomfort. Physically nonaggressive behavior (PNAB), such as pacing, is found to be linked to healthier individuals. Thus, it can be inferred that PNAB may possibly be beneficial to elderly with severe dementia. It is therefore recommended that caregivers permit or even promote such behaviors. Physically aggressive behavior (PAGB) may be caused by nerve damage from severe

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dementia, the feeling of abandonment, or prolonged negative personal relationships.⁷ These abovementioned results illustrate that in order to understand agitation in elderly with dementia, not only do their individual behaviors need to be monitored, but investigations specifically focusing on different types of agitated behavior must also be conducted.

A small number of studies have investigated the classification of agitated behavior. The most common subtypes include 1) PNAB, such as restlessness and pacing; 2) PAGB, such as hitting, grabbing onto people, pushing, and kicking; 3) verbally nonaggressive behavior (VNAB), such as complaining and constant requests for attention; and 4) verbally aggressive behavior (VAGB), such as cursing, verbal aggression, and temper outbursts.^{11–14}

The Cohen-Mansfield^{11,13} Agitation Inventory, community form (CMAI-C), was used in the assessment of agitated behavior of elderly in day care centers, and 3 types of agitated behaviors were extracted from the factor analysis: VNAB, PNAB, and VAGB. During this study, though the criteria for factor extraction for PAGB was not reached because of the impact it has on the patient's family, Cohen-Mansfield still divided the community agitated behavior scale into four subtypes. First, "physically nonaggressive behavior," which includes restlessness, pacing, or wandering, trying to get to a different place, inappropriate dressing or undressing, repetitious mannerisms, and handling things inappropriately. Second, "physically aggressive behavior," which includes hitting people, themselves, or objects, kicking people or objects, grabbing onto or clinging to people, pushing other people, biting people or objects, and scratching people, themselves, or objects. Third, "verbally nonaggressive behavior," which includes repetitive sentences or questions, relevant (or irrelevant) verbal interruptions, complaining or whining, constant requests for attention, negativism, uncooperativeness, or unwillingness, and being verbally bossy or pushy. Fourth, "verbally aggressive behavior," which includes making strange noises, screaming/shouting or howling, cursing or verbally threatening behavior, and temper outbursts.^{11,13}

The abovementioned 3 or 4 subtypes of classification of agitated behavior are currently the most common classification methods. However, as there are differences in agitated behavior between institutionalized elderly with dementia and elderly with dementia staying at home, and their cultural backgrounds, researchers from different countries continue to investigate different methods of classification.^{12,14,15} In Taiwan, limited studies have been conducted on the agitated behavior of institutionalized dementia patients. In regard to

the assessment of agitated behaviors, only Lin et al¹⁵ has tested the reliability and validity of the Chinese Cohen-Mansfield Agitation Inventory, community form (CCMAI-C) with institutionalized dementia patients, but its subtype has yet to be investigated, likewise for the studies pertaining to the agitated behavior assessment of community elderly with dementia and the investigation on the assessment's subtype. Therefore, this study will focus on elderly with dementia living in their own homes and conduct a factor analysis of their agitated behaviors.

Patients and methods

Study setting and participants

Participants were recruited from neurological clinics within 3 hospitals and a community care management center in northern Taiwan. Patients were included in the study if they met the following criteria: 1) diagnosed with dementia by a psychiatrist or neurologist, 2) >65 years old, 3) living in a home setting in northern Taiwan, and 4) scored >50 on the CCMAI-C. Inclusion criteria for caregivers were 1) living with a dementia patient, 2) spending the majority of time on the patient's care, and 3) 18 years or older. Participants were assessed for study outcomes in their homes.

Design and procedure

A cross-sectional, exploratory design was used to investigate the behavioral problems of elderly individuals with dementia. This research was approved by the Human Subjects Protection Committee of Chang Gung Memorial Hospital in Taiwan.

A research nurse contacted eligible subjects at the outpatient clinics of 3 hospitals and cases referred by the local care management center to explain the purpose and method of the study, subjects' right to withdraw participation at any time, and to obtain written consent. All participants provided written informed consent. Data were collected by caregivers' self-report regarding to care receivers' behavioral problems.

Measurement of agitation

Agitation was measured by the CCMAI-C;^{6,16–18} the CCMAI-C has been shown to be valid and reliable for a Taiwanese sample.¹⁹ There are 37 items in the English version of CMAI for Community and 44 items in the Chinese version. The additional 7 items in the CCMAI-C are "Unable to sleep," "Complaining of being hurt or stolen by someone," "Claiming to kill him/herself," "Picking things up incessantly," "Searching for things incessantly," "Requesting

food incessantly,” and “Going to the toilet incessantly.”¹⁸ From the results of original factor analysis of CCMAI, that the additional 7 items were not classified into subtypes of the original CCMAI. However, all the items were still included in the measurement of overall agitation according to the original author’s suggestion.

Family caregivers were asked to report the frequency of the agitation in the preceding 2 weeks; each item is rated on a 7-point scale, ranging from 1 (never happened) to 7 (several times in an hour). In our previous study, Cronbach’s alpha (α) for the overall scale was 0.88. Cronbach’s α for the PNAB, PAGB, VAGB, and VNAB subscales were 0.79, 0.75, 0.87, and 0.78, respectively.¹⁹

Data analysis

Data were analyzed using SPSS version 20.0 (IBM Corporation, Armonk, NY, USA) and AMOS version 20.0 (IBM Corporation). First, the interitem consistency and discriminability for each item of the CCMAI-C was carried out by item analysis according to the critical ratio (CR) and item-total correlation (ITC) value. Second, the construct validity of the CCMAI-C was performed using exploratory factor analysis with principal axis factoring and direct oblimin rotation. Third, the internal consistencies of the CCMAI-C overall scale and subscales were estimated by Cronbach’s α .

Results

Participant characteristics

Of the 630 dementia patients screened, 251 patients and their caregivers met the inclusion criteria, and 221 agreed to participate in the study. The majority were female (56%) with an average age of 78.4 years (SD =6.74). Furthermore, 47% had no formal education and 42% were mildly dependent on caregivers to perform activities of daily living (ADLs), as indicated by an average Chinese Barthel Index score of 77.70 (SD =27.15). All patients had an average Mini-Mental State Examination score of 12 (SD =7). As regards dementia severity, 48% had mild dementia, 33% had moderate dementia, and 19% had severe dementia as determined by the Clinical Dementia Rating Scale. The majority were diagnosed with Alzheimer’s disease (55%), 38% with vascular dementia, and on average participants had dementia for 38 months (SD =28). The patients’ characteristics are listed in Table 1.

Item analysis

Item analysis was performed using the CR test and ITC. The intention was to determine the CR value in order to assess

Table 1 Patient characteristics (N=221)

Characteristics	Mean \pm SD/range	n (%)
Age (years)	78.4 \pm 6.74	
Gender		
Male		97 (43.9)
Female		124 (56.1)
Education background		
No formal education		103 (46.6)
Primary school		56 (25.3)
Junior high school		27 (12.2)
High school		19 (8.6)
College or above		16 (7.3)
ADL performance	77.70 \pm 27.15	
0–20 (severely dependent)		14 (6.3)
21–60 (moderately dependent)		41 (18.6)
61–95 (mildly dependent)		93 (42.1)
96–100 (independent)		73 (33.0)
Cognitive status	12.40 \pm 6.85	
Clinical dementia rating		
Mild		107 (48.4)
Moderate		72 (32.6)
Severe		42 (19.0)
Duration of illness (months)	37.80 \pm 28.17	
Range	2–92	
Diagnosis		
Alzheimer’s disease		122 (55.2)
Vascular dementia		83 (37.6)
Mixed dementia		16 (7.2)

Abbreviation: ADL, activity of daily living.

internal consistency as measured through item correlation with the total score. Interitem correlation will also examine the similarity among test items. ITC obtained the correlation coefficient ranging from 0.3 to 0.8. Significant items with a CR value of 0.01 were extracted with a CR test. Items that failed to reach the standard of both the ITC and CR were excluded. As a result, 5 items from the CCMAI-C were deleted including verbal sexual advances, physical sexual advances, grabs onto or clings to people, pushes other people, and hurts self with harmful object, with 37 items remaining. A summary of the item analysis is given in Table 2.

Factor analysis

Factor extraction was based on the following criteria: 1) eigenvalues >1 , 2) factor loadings ≥ 0.3 , and 3) 3 or more items loading on any given factor. Of the remaining 37 items 5 factors were extracted, which accounted for 44.53% of the total variance. Each factor accounted for 21.90%, 7.14%, 5.68%, 5.25%, and 4.56% of the variance, respectively.

The first factor, labeled physically agitated behavior (PAB), contained 10 items. The second factor was labeled destructive behavior (DB) and contained 4 items. The third

Table 2 Item analysis of the CCMAI-C (items =42)

Item	Mean	SD	Critical ratio	Test for homogeneity		
				Item-total correlation	Corrected item-total correlation	Cronbach's α if item deleted
1. Repetitive sentences or questions	4.43	2.18	-6.04*	0.37**	0.29	0.88
2. Relevant verbal interruptions	2.02	1.72	-2.97**	0.25**	0.17	0.88
3. Irrelevant verbal interruptions	2.15	1.87	-6.31*	0.50**	0.44	0.87
4. Making strange noises	1.70	1.52	-6.09*	0.44**	0.38	0.88
5. Screaming/shouting or howling	1.48	1.25	-3.87*	0.32**	0.27	0.88
6. Complaining or whining	2.33	1.73	-6.35*	0.52**	0.47	0.87
7. Unwarranted requests for attention or help	1.88	1.57	-7.89*	0.56**	0.51	0.87
8. Negativism, uncooperativeness, unwillingness	2.55	1.73	-6.45*	0.44**	0.38	0.88
9. Cursing or verbally threatening behavior	1.81	1.39	-6.48*	0.54**	0.50	0.87
10. Spitting	1.68	1.60	-5.02*	0.36**	0.30	0.88
11. Verbally bossy or pushy	1.57	1.33	-5.27*	0.49**	0.45	0.88
12. Making verbal sexual advances	1.10	0.49	-1.73	0.14***	0.12	0.88
13. Making physical sexual advances/exposure	1.11	0.49	-1.92	0.28**	0.26	0.88
14. Restlessness or fidgeting behavior	2.90	2.25	-11.29*	0.62**	0.56	0.87
15. Pacing or aimless wandering	2.57	2.13	-7.08*	0.51**	0.45	0.88
16. Trying to get to a different places	1.75	1.38	-4.62*	0.37**	0.32	0.88
17. Inappropriate dressing or disrobing	1.67	1.31	-6.18*	0.41**	0.36	0.88
18. Repetitious mannerisms	2.31	2.11	7.36*	0.56**	0.50	0.87
19. Handling things inappropriately	2.05	1.78	-7.96*	0.59**	0.54	0.87
20. Grabbing or snatching things from others	1.11	0.57	-2.55***	0.37**	0.35	0.88
21. Hoarding or collecting objects	2.13	1.78	-7.27*	0.53**	0.47	0.87
22. Hiding things	2.08	1.75	-7.88*	0.47**	0.41	0.88
23. Temper outburst/anger	3.04	1.75	8.67*	0.57**	0.52	0.87
24. Hitting people, self, or objects	1.35	0.86	-3.76*	0.53**	0.51	0.88
25. Kicking people or objects	1.09	0.44	-3.02**	0.48**	0.47	0.88
26. Throwing things	1.30	0.97	-4.31*	0.46**	0.42	0.88
27. Tearing or destroying objects	1.20	0.87	-3.22**	0.43**	0.40	0.88
28. Grabbing onto or clinging to people	1.22	0.87	-2.12***	0.29**	0.26	0.88
29. Pushing other people	1.20	0.74	-1.93	0.29**	0.26	0.88
30. Biting people or things	1.05	0.40	-2.03***	0.41**	0.40	0.88
31. Scratching people, self, or things	1.12	0.61	-2.95**	0.28**	0.26	0.88
32. Hurting self with harmful object	1.06	0.49	-1.93	0.29**	0.28	0.88
33. Hurting others with harmful objects	1.06	0.38	-2.54***	0.47**	0.46	0.88
34. Appear to fall intentionally	1.06	0.33	-2.68**	0.35**	0.33	0.88
35. Eating/drinking nonfood substances	1.09	0.43	-3.23**	0.46**	0.45	0.88
36. Unable to sleep	2.80	1.76	-5.70*	0.39**	0.32	0.88
37. Complaining of being hurt or stolen	1.91	1.54	-7.39*	0.51**	0.46	0.87
38. Claiming to kill him/herself	1.24	0.81	-4.07*	0.40**	0.37	0.88
39. Picking things up incessantly	1.63	1.47	-5.66*	0.40**	0.35	0.88
40. Searching for things incessantly	2.46	1.94	-9.42*	0.55**	0.49	0.87
41. Requesting food incessantly	2.33	1.93	-5.52*	0.37**	0.30	0.88
42. Going to the toilet incessantly	2.24	2.16	-4.46*	0.38**	0.30	0.88

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Abbreviation: CCMAI-C, Chinese Cohen-Mansfield Agitation Inventory, community form.

factor, labeled VAB, contained 9 items. The fourth factor was labeled handling things behavior (HTB) and contained 5 items while the fifth factor, labeled AGB, contained nine items. Details of the factor structure and item loadings are presented in Table 3.

Reliability

The internal consistency for the overall scale was 0.88. For each subtype of agitation, internal consistency was as follows: PAB, $\alpha = 0.75$; DB, $\alpha = 0.69$; VAB, $\alpha = 0.75$; HTB, $\alpha = 0.76$; and AGB, $\alpha = 0.71$. All values indicated

Table 3 Factor structure and reliability of the CCMAI-C (items =37)

Item	Factor 1 PAB	Factor 2 DB	Factor 3 VAB	Factor 4 HTB	Factor 5 AGB
14. Restlessness or fidgety behavior	0.677				
15. Pacing/aimless wandering	0.659				
18. Repetitious mannerisms	0.516				
8. Negativism, uncooperativeness, or unwillingness	0.499				
23. Temper outburst/anger	0.488				
16. Trying to get to a different places	0.465				
36. Unable to sleep	0.402				
10. Spitting	0.369				
17. Inappropriate dressing or disrobing	0.360				
42. Going to the toilet incessantly	0.303				
30. Biting people or things		-0.940			
33. Hurting others with harmful objects		-0.836			
27. Tearing/destroying objects		-0.504			
26. Throwing things		-0.476			
3. Unrelated verbal interruptions			0.629		
7. Making unwarranted requests for attention			0.609		
6. Complaining or whining			0.523		
9. Cursing or verbally threatening behavior			0.508		
11. Being verbally bossy or pushy			0.488		
1. Repetitive sentences or questions			0.487		
2. Relevant verbal interruptions			0.462		
41. Requesting food incessantly			0.410		
37. Accused of being hurt or stolen			0.398		
22. Hiding things				-0.685	
19. Handling things inappropriately				-0.588	
21. Hoarding or collecting objects				-0.587	
40. Searching for things incessantly				-0.583	
39. Picking things up incessantly				-0.557	
25. Kicking people or objects					-0.762
20. Grabbing or snatching things from others					-0.662
24. Hitting people/self/objects					-0.559
38. Claiming to kill him/herself					-0.539
34. Appearing to fall intentionally					-0.523
31. Scratching people/self/things					-0.501
35. Eating/drinking nonfood substances					-0.474
4. Making strange noises					-0.461
5. Screaming/shouting or howling					-0.405
Eigenvalues	8.10	2.64	2.10	1.94	1.69
Explain variance (%)	21.90	7.14	5.68	5.25	4.56
Cumulative variance (%)	21.90	29.04	34.73	39.97	44.53
Cronbach's α	0.75	0.69	0.75	0.76	0.71

Abbreviations: AGB, aggressive behavior; CCMAI-C, Chinese Cohen-Mansfield Agitation Inventory, community form; DB, destructive behavior; HTB, handling things behavior; PAB, physically agitated behavior; VAB, verbally agitated behavior.

acceptable reliability. Results of the reliability analysis are shown in Table 3.

Discussion

Through exploratory factor analysis, this study has classified agitated behaviors into 5 subtypes: PAB, DB, VAB, HTB, and AGB. These differ from the 4 subtypes of agitated behavior derived by Cohen-Mansfield.¹³

In this study, negative/uncooperative behaviors appeared in the subtype PAB, while in the CMAI-C, it appears within VNAB. This may have been caused by the refusal to cooperate with or reluctance to participate in the activities of this study. Activities such as eating, bathing, or going out involve a physical elements and are therefore classified as PAB. Regardless of this study or the findings of the CMAI-C, negative/uncooperative behaviors are all classified under nonaggressive behaviors.

There is only 1 verbal subtype, VAB, in the factor structure identified in this study, and it is similar to the results of Cohen-Mansfield's investigation of agitated behavior for elderly in day care centers. The results of Cohen-Mansfield et al's¹¹ study identified 3 types of agitated behaviors: 1) PNAB, 2) VAB, and 3) AGB. Items "making strange noises" and "screaming/shouting or howling" appear in AGB in this study, while they appear in VAGB in CMAI-C. Irrespective of this, the abovementioned behaviors are both classified under aggressive behaviors.

A notable finding from the current research is that the second factor and the fourth factor, which are "DB" and "HTB", respectively, are not included in Cohen-Mansfield's CMAI-C. While in the Dutch and Korean version of their studies as well as the study by Rabinowitz et al²⁰ a subtype similar to HTB was found. Labeled as "hiding/hoarding," this factor consisted entirely of hiding and hoarding behaviors. In this study, the HTB subtype contained 5 varying items (handling things inappropriately, hoards or collects objects, hiding things, picking things up incessantly, and searching for things incessantly). Such a difference may arise from the sample of the current research, elderly with dementia living at home, as other studies assessed those residing in nursing homes. The difference in setting may produce differences in the agitated behaviors exhibited. Furthermore, this subtype is not represented in other researches, an outcome that may be influenced by limiting the number factors extracted to 3 or the low rate of occurrences.^{5,20}

Both subtypes DB and HTB are classified under "things" related to agitated behavior. During the process of gathering data, the interviews with family caregivers conducted in the current research reveal that elderly with dementia living in their homes demonstrate the behavior of collecting, hoarding, and/or destroying items. Examples of such behavior include hoarding or destroying tissues, papers, slippers, foods, and other items. This phenomenon is especially apparent in female patients with dementia. As elderly in Taiwan tend to exhibit the characteristics of saving and collecting, the question of whether this phenomenon is related to the life of the elderly and/or the difference in cultures in the East and West needs further investigation.

The results of this study also identified that being "unable to sleep" and "going to the toilet incessantly" are 2 common behaviors of the elderly with dementia who live in their homes in Taiwan. However, the community form of Cohen-Mansfield's CMAI does not contain these 2 behaviors; furthermore, the result classification also differs from country to country. With the consideration of differences between cultures, it is recommended that local measuring scales or

classification methods be used in the future when monitoring of agitated behavior in elderly with dementia is needed.

The results indicate that differences in the agitated behavior of elderly with dementia exist with respect to cultural background and setting. Additionally, participants were mostly elderly with mild or moderate dementia (81%), and those with severe dementia formed the minority (19%). As a result, occurrences of the AGB in severe dementia in this study were rare. In Taiwan, as severe dementia patients increase the difficulty of care for family caregivers, most of these patients have been institutionalized, thereby making the majority of community cases mild and moderate^{19,21} and resulting a limitation to this study, as it is difficult to detect the behavior characteristics of severe dementia patients. However, this study does show the characteristics of care for dementia patients living at home in Taiwan.

Conclusion

To our knowledge, the vast majority of current research on the classification of agitation focuses on patients living in nursing homes and rarely specifies patients cared for by family caregivers. Therefore, these results not only can serve as a source of reference for the assessment of agitated behaviors in elderly with dementia living at home in Taiwan but also may be applicable to other countries with Chinese populations and those where health care providers support Chinese/Taiwanese immigrants. Future studies exploring how patients should be treated differently according to the subtype of agitated behavior and/or specific interventions for different subtypes of behavioral problems are suggested.

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Author contributions

All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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