

Wandering and fecal smearing in people with dementia

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ABSTRACT

Background: Wandering and fecal smearing (scatolia) are among the problematic behaviors in dementia, and many caregivers are troubled by these behaviors. The purpose of this study was to clarify the clinical characteristics of patients with these symptoms.

Methods: We performed a questionnaire survey. The questionnaire items were the age, sex, living environment, diagnosis, cognitive function, and activities of daily living. Other clinical characteristics were evaluated using the quality of life (QOL) questionnaire for dementia.

Results: A total of 246 patients with dementia were rated. Wandering was observed frequently in 23%, sometimes in 12%, rarely in 14%, and never in 51% of the patients; scatolia was observed frequently in 2%, sometimes in 8%, rarely in 15%, and never in 75%. Wanderers were more frequent among those with severe dementia. They displayed more restlessness, positive affect and attachment to others with respect to QOL. The patients with scatolia tended to get lower scores in tests of cognitive function and displayed more negative affect/actions with respect to QOL. Both wanderers and patients with scatolia suffered from insomnia more frequently.

Conclusions: These results suggest that both wandering and scatolia are behavioral symptoms intimately associated with cognitive dysfunction and insomnia.

Key words: dementia, scatolia, fecal smearing, wandering, Alzheimer's disease, vascular dementia

Introduction

Neuropsychiatric symptoms are present in more than 80% of people with dementia (Lyketsos *et al.*, 2002). They are associated with more hospitalizations (Wancata *et al.*, 2003), nursing home placement (Steele *et al.*, 1990), caregiver burden (Coen *et al.*, 1997), and economic cost (O'Brien *et al.*, 2000). Among many neuropsychiatric symptoms in dementia, wandering and fecal smearing (scatolia) are both troublesome behaviors and seem to be closely related with insomnia. Moreover, both are among the least understood behaviors (Algase, 1999; Nagaratnam *et al.*, 2001).

Wandering is relatively common among people with dementia (Algase, 1999; Burns *et al.*, 1990), and it is one of the most intriguing, hazardous, and least understood behaviors (Algase, 1999).

Wandering is poorly tolerated by carers (Rabins *et al.*, 1982) and is a prominent cause of hospital admission among dementia sufferers (Begg and McDonald, 1989). Over the years, the term "wandering" has been used to describe a multitude of behaviors exhibited by individuals with cognitive impairment. According to Hope and Fairburn (1990), the term "wandering" covers different types of behaviors, namely, aimless walking, night walking, pottering, and trailing. Only two features among various definitions of wandering seem to be common to all: those of an individual moving through space and of being cognitively impaired (Algase and Struble, 1992). Further, many authors do not regard purposeful movement as wandering (Algase, 1999; Lai and Arthur, 2003). Therefore, for this study, wandering is defined as aimless movement without a discernible purpose (Kiely *et al.*, 2000).

Scatolia can be defined as the presence of feces on the hands or any part of the body and/or furniture or walls (Begg and McDonald, 1989), and it is a severe burden for caregivers. Recently, the behavioral and psychological symptoms of dementia (BPSD),

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as well as cognitive deficits, have received much attention but little research has been conducted to clarify the characteristics of behavioral symptoms like scatolia in people with dementia (Nagaratnam *et al.*, 2001). Scatolia is among the least understood behaviors (Nagaratnam *et al.*, 2001). In this study, we conducted a survey in Japan of the clinical characteristics of those people with dementia who show wandering or scatolia behaviors.

Methods

Field survey – patient selection

Representative facilities from each of the six major types of institutions dealing with elderly people with dementia in Okayama Prefecture, Japan, were asked to participate in the study. In total, two psychiatric facilities, one hospital for the elderly with dementia, one nursing home, three geriatric health service facilities (GHSF), one group home, and two adult day-care centers agreed to take part. The survey was performed in June 1999. The patients with dementia were evaluated once. All persons in these facilities with a diagnosis of dementia over a month, except for the bedridden, were included in this study. None of the patients included had psychotic illnesses pre-existing their dementia.

Field survey – evaluation of behavioral symptoms

Behavioral symptoms such as wandering and scatolia were evaluated using a four-point multi-response scale ranging from “none” to “frequent” for the previous month. The frequencies were: none, less than once a month; rare, once a month to once a week; sometimes, several times a week; and frequent, almost every day. The evaluated items were wandering and scatolia.

Field survey – questionnaires

The profiles of elderly patients with dementia and the respondents to the questionnaires were investigated. The questionnaire items included the age, sex, living environment, and diagnosis of the patient with dementia, and the age, sex, and occupation of the respondents. The scores on the Nishimura Mental State scale (NM scale), Nishimura activities of daily living scale (N-ADL scale), and a quality of life questionnaire for dementia (QOL-D) were evaluated (Nishimura *et al.*, 1993; Terada *et al.*, 2002). The frequency of insomnia was also investigated.

The patients with Alzheimer’s disease (AD) met the American Psychiatric Association’s revised DSM-IV criteria for primary degenerative dementia

of Alzheimer type (American Psychiatric Association, 1994) as well as the NINCDS-ADRDA criteria for probable and possible Alzheimer’s disease without cerebrovascular events (McKhann *et al.*, 1984). The patients with vascular dementia (VaD) met the NINDS-AIREN criteria for probable vascular dementia (Román *et al.*, 1993). Mixed dementia cases consisted mostly of possible AD with cerebrovascular events.

Cognitive impairment in dementia patients was assessed using the NM scale, which is a popular bedside screening measure of the cognitive components of mental status in Japan. The ADL measurements were evaluated using the N-ADL scale, which is one of the most utilized scales for the evaluation of ADL in Japan (Nishimura *et al.*, 1993). In both scales, the maximum score is 50, and the lowest possible score is zero. The NM scores are: normal, 48–50; borderline, 43–47; mild dementia, 31–42; moderate dementia, 17–30; severe dementia, 0–16. In the N-ADL scale, five items are evaluated: walking/sitting, range of activities, dressing/bathing, eating, and excretion. Each item is given 0 to 10 points, and the total is regarded as the N-ADL scale score. The reliability of both scales when completed by nurses or nursing staffs has been reported to be good (Nishimura *et al.*, 1993).

The QOL-D consists of 31 items grouped into six response sets, each with its own scale. Each item is rated using a four-point multi-response scale ranging from “none” (1 point) to “frequent” (4 points). The six domains are: (1) positive affect, (2) ability to communicate, (3) negative affect and actions, (4) spontaneity and activity, (5) restlessness, and (6) attachment to others. In four domains of the QOL-D (positive affect, ability to communicate, spontaneity and activity, and attachment to others), a high score means a higher QOL, whereas in two domains of the QOL-D (negative affect and actions and restlessness), a high score means a lower QOL. The reliability of QOL-D when completed by nursing staff or family members has been reported to be good to excellent, and the validity is, to some extent, established (Terada *et al.*, 2002; 2005).

The frequency of insomnia in dementia patients was also evaluated using a four-point multi-response scale in the same way as the frequency of wandering and scatolia.

Field survey – respondents

Questionnaires were completed for all subjects by members of the nursing staff or family members who were well acquainted with the patients being rated. The nursing staff completed the

questionnaire if the subject was an inpatient, and the family member completed it if the subject was an outpatient. All raters had daily contact over more than a month with the individuals being studied. No attempt was made to select raters.

Statistical analyses

Statistical analyses were performed using SPSS (Statistical Package for Social Science) software v.14.0J. Comparison between two groups was performed using the Mann-Whitney U test. Comparison among three or more groups was performed using the Kruskal-Wallis H test. To identify which variables were significantly correlated with wandering or smearing feces, we used ordinal regression analysis. Wandering and smearing feces were treated as dependent variables. Covariates were age, NM scores, N-ADL scores, six subscores of QOL-D and insomnia. Factors were gender, diagnosis and living situation. A p level <0.05 was considered significant.

Results

Sample description

A total of 300 questionnaires were distributed, and 246 individuals with dementia were rated (collection rate 82%). The average age of those rated was 81.6 years (SD = 8.0). Of the subjects, 67% were female. The demographic and clinical characteristics of the subjects are shown in Table 1. The proportion of patients with Alzheimer's disease was 46%, with vascular dementia 29%, with mixed dementia 14%, and with other forms of dementia 11%. Living situations were mostly GHSF (41%) and hospital (40%).

Evaluation using the NM scale as a parameter of the severity of dementia showed most patients as having moderate to severe dementia (mean \pm SD: 14.6 ± 10.8) (Table 2). Evaluation using the N-ADL scale showed an even distribution of mild to severe impairment (mean \pm SD: 23.3 ± 13.2). The distribution of scores in six domains of QOL-D is shown in Table 2. The frequencies of insomnia in all cases were: frequent, 7%; sometimes, 14%; rare, 26%; none, 53%.

The mean age of the staff and family members who replied to the questionnaire was 36.5 ± 12.0 years. The majority of raters were female (80%), and their occupations were registered nurse (48.0%), nursing assistant (41.1%), and other (10.9%).

Table 1. Demographic characteristics of patients (N = 246)

CHARACTERISTICS	NUMBER	PERCENTAGES
Sex		
male	80	33
female	166	67
Age (years)		
-64	10	4
65-69	10	4
70-74	17	7
75-79	46	19
80-84	64	25
85-89	61	25
90-94	34	14
95-	4	2
Diagnosis		
AD	113	46
VaD	71	29
Mixed	35	14
Others	27	11
Living Situation		
GHSF	102	41
Hospital	99	40
Nursing home	26	11
Home	19	8

AD = Alzheimer's disease; VaD = Vascular dementia.

Mixed = mixed dementia.

GHSF = geriatric health services facility.

Wandering or scatolia - frequency

The frequencies of wandering in all cases were: frequent, 23%; sometimes, 12%; rare, 14%; none, 51% (Table 3). There was no meaningful difference between male and female subjects (Mann-Whitney: $U = 6403.5$, $Z = -0.490$, $p = 0.624$). There were no meaningful differences among the various diseases (Kruskal-Wallis: $C^2 = 2.578$, $F = 3$, $p = 0.461$), and living situation (Kruskal-Wallis: $C^2 = 4.080$, $F = 3$, $p = 0.253$).

Frequencies of scatolia in all cases were: frequent, 2%; sometimes, 8%; rare, 15%; none, 75% (Table 3). Males tend to show scatolia more frequently than females (Mann-Whitney: $U = 5901.5$, $Z = -1.870$, $P = 0.061$). There were no meaningful differences among the various diseases (Kruskal-Wallis: $C^2 = 3.893$, $F = 3$, $p = 0.243$), and living situation (Kruskal-Wallis: $C^2 = 2.282$, $F = 3$, $p = 0.516$).

Wandering - relationship with age, insomnia, NM scale, N-ADL scale and QOL-D

Table 4 displays the results of the ordinal regression analysis for wandering. Six variables were significantly associated with wandering: lower NM scale scores (OR = 0.18), higher N-ADL scale

Table 2. Scale scores and insomnia of patients (N = 246)

CHARACTERISTICS	NUMBER	PERCENTAGES
NM scale (0–50)		
–16	154	62
17–30	68	28
31–	24	10
N-ADL scale (0–50)		
–16	81	33
17–30	84	34
31–	81	33
QOL-D (1–4)		
positive affect		
1.0–1.9	74	30
2.0–2.9	105	43
3.0–4.0	67	27
ability to communicate		
1.0–1.9	58	24
2.0–2.9	87	35
3.0–4.0	101	41
negative affect/actions		
1.0–1.9	156	63
2.0–2.9	68	28
3.0–4.0	22	9
spontaneity and activity		
1.0–1.9	167	68
2.0–2.9	57	23
3.0–4.0	22	9
restlessness		
1.0–1.9	160	65
2.0–2.9	65	26
3.0–4.0	21	9
attachment to others		
1.0–1.9	110	44
2.0–2.9	63	26
3.0–4.0	73	30
Insomnia		
frequent	17	7
sometimes	35	14
rare	64	26
none	130	53

NM scale = Nishimura mental state scale.

N-ADL scale = Nishimura activities of daily living scale.

QOL-D = quality of life questionnaire for dementia.

scores (OR = 2.66), insomnia (OR = 3.09), and higher scores of restlessness (OR = 3.67), positive affect (OR = 2.42), and attachment to others (OR = 1.65) in QOL-D. Using a Nagelkerke R² estimate (as ordinal regression does not contain a direct R² equivalent), this model explained a significant 53.4% of the variance in wandering ($\chi^2 = 433.456$, $p < 0.001$).

Wandering prevalence rates (percentage of “frequent” and “sometimes” groups) by level of cognitive impairment on the NM scale were 16.6% (4/24) for mild, 28.0% (19/68) for moderate, and

40.9% (63/154) for severe dementia. Wandering prevalence rates by level of insomnia were 21.5% (28/130) for patients without insomnia, 39.1% (25/64) for patients with rare insomnia, 57.1% (20/35) for patients with occasional insomnia, and 76.5% (13/17) for patients with frequent insomnia.

Scatolia – relationship with age, insomnia, NM scale, N-ADL scale, and QOL-D

Table 5 displays the results of the ordinal regression analysis for scatolia. Three variables were significantly associated with wandering: lower NM scale scores (OR = 0.30), insomnia (OR = 2.04), and higher scores of negative affect & actions (OR = 3.67) in QOL-D. Using a Nagelkerke R² estimate, this model explained a significant 32.0% of the variance in scatolia ($\chi^2 = 306.516$, $p < 0.001$).

Prevalence rates of scatolia (percentage of “frequent” and “sometimes” groups) by level of cognitive impairment on the NM scale were 4.2% (1/24) for mild, 4.4% (3/68) for moderate, and 12.3% (19/154) for severe dementia. Prevalence rates of scatolia by level of insomnia were 5.4% (7/130) for patients without insomnia, 6.3% (4/64) for patients with rare insomnia, 17.1% (6/35) for patients with occasional insomnia, and 35.1% (6/17) for patients with frequent insomnia.

Discussion

Wandering – frequency, disease difference, sex difference, cognitive function, ADL, and other clinical features

In nursing homes in the U.S.A., wanderers constituted 11% of over 8,000 residents (Kiely *et al.*, 2000) or 23% of over 6,000 residents (Riter and Fries, 1992). In a review article, Algase argued that wanderers constituted 31% (unweighted mean) of the population in institutionalized samples encompassing over 7,000 residents, most of whom had dementia (Algase, 1999). Aimless walking in patients with dementia was found in 21% in the U.K. (Hope *et al.*, 1997) and 16% in Japan (Karasawa *et al.*, 1988). Among patients with AD, the frequencies of wanderers were reported to be 19% in the U.K. (Burns *et al.*, 1990) and 34% in Taiwan (Hwang *et al.*, 1997). In our study, if we regard the “frequent” and “sometimes” groups as wanderers, the positive rate was 35% (frequent, 23% and sometimes, 12%).

Data from a sample of 1312 patients revealed that wanderers constituted 26% of AD patients and 18% of those with vascular dementia (Cooper and Mungas, 1993). For both diagnoses, rates were low (12% and 9%) in the early stages and higher

Table 3. Frequency of wandering and scatolia (N = 246)

	WANDERING, N(%)				SCATOLIA, N(%)			
	FREQUENT	SOMETIMES	RARE	NONE	FREQUENT	SOMETIMES	RARE	NONE
Total	56 (23)	30 (12)	35 (14)	125 (51)	4 (2)	19 (8)	38 (15)	185 (75)
male	18 (23)	11 (14)	13 (16)	38 (47)	2 (3)	7 (9)	17 (21)	54 (67)
female	38 (23)	19 (11)	22 (13)	87 (53)	1 (2)	12 (7)	21 (13)	131 (78)
AD	29 (26)	12 (11)	17 (15)	55 (48)	1 (1)	5 (4)	21 (19)	86 (76)
VaD	17 (24)	8 (11)	9 (13)	37 (52)	1 (1)	8 (11)	12 (17)	50 (71)
Mixed	3 (9)	7 (20)	4 (11)	21 (60)	1 (3)	1 (3)	3 (9)	30 (86)
Others	7 (26)	3 (11)	5 (19)	12 (44)	1 (4)	5 (19)	2 (7)	19 (70)
GHSF	49 (48)	10 (10)	7 (7)	36 (35)	81 (79)	14 (14)	6 (6)	1 (1)
Hospital	52 (53)	16 (16)	18 (18)	13 (13)	71 (72)	15 (15)	10 (10)	3 (3)
Nursing home	15 (57)	2 (8)	3 (12)	6 (23)	19 (69)	7 (27)	1 (4)	0 (0)
Home	9 (47)	7 (37)	2 (11)	1 (5)	15 (78)	2 (11)	2 (11)	0 (0)

AD = Alzheimer disease; VaD = vascular dementia; Mixed = mixed dementia; GHSF = geriatric health services facility.

Table 4. Summary of regression analysis of wandering (N = 246)

VARIABLE	WALD	p	OD	95% CI
Age	0.330	0.565	0.99	0.95, 1.03
NM scale	28.008	0.000	0.18	0.10, 0.34
N-ADL scale	22.987	0.000	2.66	1.78, 3.96
QOL-D				
positive affect	8.571	0.003	2.42	1.34, 4.36
negative affect & actions	0.686	0.407	0.84	0.54, 1.28
ability to communicate	3.585	0.058	0.58	0.33, 1.02
restlessness	20.551	0.000	3.67	2.09, 6.45
attachment to others	4.454	0.035	1.65	1.04, 2.62
spontaneity & activity	0.756	0.384	0.74	0.37, 1.47
Insomnia	41.362	0.000	3.09	2.19, 4.35

NM scale = Nishimura mental state scale.

N-ADL scale = Nishimura activities of daily living scale.

QOL-D = quality of life questionnaire for dementia.

Table 5. Summary of regression analysis of smearing feces (N = 246)

VARIABLE	WALD	p	OD	95% CI
Age	2.536	0.111	0.96	0.92, 1.01
NM scale	10.406	0.001	0.30	0.15, 0.63
N-ADL scale	1.267	0.260	1.26	0.84, 1.90
QOL-D				
positive affect	0.000	0.987	1.01	0.52, 1.96
negative affect & actions	19.483	0.000	2.88	1.80, 4.61
ability to communicate	0.003	0.959	1.02	0.54, 1.89
restlessness	0.577	0.447	0.80	0.44, 1.43
attachment to others	0.136	0.712	1.11	0.64, 1.91
spontaneity & activity	0.988	0.320	1.51	0.67, 3.43
Insomnia	16.990	0.000	2.04	1.45, 2.86

NM scale = Nishimura mental state scale.

N-ADL scale = Nishimura activities of daily living scale.

QOL-D = quality of life questionnaire for dementia.

(37% and 28%) as each disease progressed to the later stages. In this study, there were no statistically significant differences among the different dementia types in the frequencies of wandering. We suppose that not a few patients with VaD, as well as patients with AD, suffer from wandering in geropsychiatric wards and care units in Japan. In previous reports, wanderers and non-wanderers did not differ by gender or age (Algase, 1999). In this study also, we did not find any significant sex and age differences in the frequency of wandering.

Wanderers' scores on global measures of cognitive performance have been reported to be significantly lower than scores of non-wanderers (Algase, 1992; 1999; Burns *et al.*, 1990; Logsdon *et al.*, 1998). Studies reveal increasing proportions of wanderers among subjects at each level of dementia ranging from 0 to 18% (mean = 8.0%) among mild dementia, 3–26% (mean = 13.6%) among moderate dementia, and 0–67% (mean = 29.5%) among severe dementia (Ballard *et al.*, 1991; Cooper and Mungus, 1993; Reisberg *et al.*, 1996; Algase, 1999). In this study, wandering prevalence rates by level of cognitive impairment were 16.6% for mild, 28.0% for moderate, and 40.9% for severe dementia. Moreover, ordinal regression analysis revealed that cognitive impairment was significantly associated with wandering. Our data are consistent with previous findings and suggest that the close relationship between wandering and severe cognitive dysfunction is transcultural.

Preserved ADL was reported to be a positive predictor for some kinds of wandering (Song *et al.*, 2008). Ability to wander was important resident characteristics associated with development of wandering (Kiely *et al.*, 2000). Our results are consistent with previous findings, and suggest that relatively preserved ADL was closely associated with wandering behavior.

QOL has recently been recognized as the central purpose of health care. However, a relationship between wandering and QOL has not been reported. In this study, we found a close relationship of wandering to restlessness, positive affect and attachment to others. From a psychosocial perspective, wandering behavior is conceptualized as the expression of needs (Algase, 1999; Lai and Arthur, 2003), and supposed to be a means of alleviating loneliness and separation (Rader *et al.*, 1985). As patients become increasingly confused about their environment, they seek something or someone that is familiar (Rader *et al.*, 1985; Lai and Arthur, 2003). Wandering is, therefore, seen as a natural outcome of this searching process for a place of safety and familiarity. A psychological state seeking to alleviate loneliness and separation might be associated with high scores of restlessness,

positive affect and attachment to others in QOL-D.

Circadian rhythm disturbances, particularly sleep disturbances, have also been investigated as a basis for wandering (Algase, 1999; Klein *et al.*, 1999; Yang *et al.*, 1999). In our study, insomnia had an intimate relationship with wandering.

Scatolia – frequency, disease difference, sex difference, cognitive function, ADL, and other clinical features

Compared to wandering behavior, scatolia has not received much attention, and there is little published information on this behavior in adults. Of 94 patients with Alzheimer's disease in one study, only one patient showed scatolia (Nagaratnam *et al.*, 2001). In our study, the prevalence rate of scatolia was 10%. Our data are based not on a community-wide sample but consist mainly of inpatients on geropsychiatric wards or care units. Therefore, the prevalence of scatolia was more frequent than previously reported.

Constipation is said to be the major cause of scatolia in dementia, and this ceased when the constipation was relieved (Begg and McDonald, 1989). We did not investigate the frequency of constipation, so we cannot discuss the validity of the theory, but we did observe that severe cognitive dysfunction and negative affect and actions were intimately related to the occurrence of scatolia. Mason argued that when a patient was angry, hostile and belligerent, the smearing of feces might be an act of passive retribution (Mason, 1996). Negative affect in patients with dementia might contribute to scatolia. From clinical observation, scatolia often occurs when people with dementia are trying to clean themselves up after an accident, and the feces get everywhere. This is not inconsistent with constipation.

It is reported that the frequency of smearing feces was higher at night than during the day (Begg and McDonald, 1989). In our report, insomnia was intimately related to scatolia, suggesting that disturbance of circadian rhythm might contribute to the occurrence of scatolia. Fewer staff on duty to supervise at night, however, might affect the relationship between scatolia and insomnia.

Limitations of this study

The main methodological problem in this study is the sample selection. Our data are based not on a community-wide sample but mainly of inpatients on geropsychiatric wards or in care units. This might elevate the percentage of problematic behaviors in this study. Secondly, in many cases, the cause of dementia was diagnosed on the basis of

clinical symptoms, simple psychometric tests, and computed tomography without SPECT or PET. Therefore, the accuracy of the clinical diagnoses may be somewhat limited. Thirdly, the reliability of the NM scale and N-ADL scale when completed by family members was unknown. Moreover, recall bias for a previous month was no doubt high. These factors might affect the results.

Conflict of interest

None.

Description of authors' roles

Toshie Ata was involved in data analysis and wrote the paper. Seishi Terada designed the study, analyzed the data and wrote the paper with Toshie Ata. Osamu Yokota, Yoshikatsu Fujisawa and Ken Sasaki collected data. Takeshi Ishihara helped with data analysis. Shigetoshi Kuroda supervised the study design, participated in data analysis and assisted with writing the paper.

Acknowledgments

This work was supported by grants from the Japanese Ministry of Education, Culture, Sports, Science and Technology, and the Zikei Institute of Psychiatry.

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