

# Elopement among community-dwelling older adults with dementia

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## ABSTRACT

**Background:** Adverse consequences following elopement among older people with dementia have been widely reported but the phenomenon of elopement has been under-researched. This study aimed to examine patterns of elopement incidents, search processes and subsequent prevention strategies and to explore factors that predict elopement among community-dwellers with dementia.

**Methods:** Twenty subjects with a recent history of elopement and 25 subjects without any history of elopement completed the study. Their cognitive status, dementia severity and behavioral manifestations were evaluated. Family informants were interviewed to gather data on demographic characteristics, clinical conditions, caring patterns, lifestyle, history of elopement, and information about any elopement incidents.

**Results:** Two-thirds of subjects had moderate severity of dementia (Clinical Dementia Rating  $\geq 2$ ). The elopers did not differ from the non-elopers in demographics, caring arrangements, clinical conditions or lifestyle patterns. Eighty percent of eloped subjects had a prior history of elopement. Logistic regression analyses suggested that manifestation of behavioral symptoms predicted elopement (OR = 1.410). Analysis of the 68 elopement incidents revealed that the vast majority of family caregivers failed to recognize any emotional/behavioral clues prior to elopement. Immediate and multiple search strategies were adopted, with eloped subjects mostly found near the point last seen. Yet, subsequent preventive strategies adopted were largely conventional.

**Conclusion:** Although elopement is difficult to predict, there is a need to enhance and sensitize caregivers' understanding of elopement as related to dementia and more effective preventive strategies. Public education on dementia could also serve to engage lay people more effectively in the search process of eloped persons with dementia.

**Key words:** dementia, elopement, wandering, Chinese elderly, caregiver education

## Introduction

Elopement – leaving one's dwelling unescorted – among older persons with dementia not only creates stress for the family but also puts eloping persons at risk through getting lost or injured, primarily because of their impaired judgment and problem-solving ability. Previous studies report that chronic wanderers are more likely to elope and/or wander away (Ballard *et al.*, 1991; Aud, 2004).

The distinction between elopement and wandering has never been straightforward. Wandering is characterized as an excessive ambulatory

behavior initiated by a cognitively impaired and disoriented individual, possibly to fulfill a particular need (Thomas, 1995). Several possible reasons such as cognitive impairment, agitation, spatial disorientation, reactions to environmental stress, past lifestyle patterns and unmet personal needs have been proposed to explain wandering (Algase 1999; Hope *et al.*, 2001; Aud, 2004). To a certain extent, wandering within a safe environment is considered beneficial as it engages individuals with dementia in some form of physical activities for exercising and is possibly stress-alleviating (Cohen-Mansfield *et al.*, 1991; Coltharp *et al.*, 1996). Nonetheless, wandering away from a safe place – elopement – and getting lost are considered dangerous for cognitively impaired older adults.

Although chronic wanderers and those who manifest exit-seeking behaviors and elopement

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attempts are more likely to elope, the act of elopement is mostly unpredictable (Rowe and Glover, 2001; Lucero, 2002). A desire to go home or to a particular place, an urge to leave the current environment and its stressors, and persistent walking are some possible reasons for elopement (McShane *et al.*, 1998a; Detweiler *et al.*, 2002; Algase *et al.*, 2004). Conceptually, elopement can be considered as an aspect of wandering or as an outcome of it (Algase *et al.*, 2004).

Previous safe return studies have identified three characteristics of elopement patterns among individuals with dementia: (1) elopers do not travel far and can be found within one mile from the point last seen, (2) elopers seldom leave clues, cry out for help or respond to shouts, and (3) elopers are often found a short distance from the road if they are not seen on the road (Koester and Stooksbury, 1995; Rowe and Glover, 2001). Immediate and comprehensive search within the first 24 hours is critical because the chances of survival decrease on account of impaired knowledge and skills about personal safety. Previous studies report that one-fifth of eloped individuals were at risk of traffic accidents (McShane *et al.*, 1998b) and about one-third of elopement incidents resulted in injuries related to falls and hypothermia (Aud, 2004). Additionally, caregivers experience psychological distress and anxiety in cases of elopement (Rowe and Glover, 2001).

Restricted mobility, a locked-door policy and institutionalization are some forceful preventive strategies adopted following elopement incidents (Hope *et al.*, 1998; Armstrong, 2000). Nonetheless, negative consequences associated with these strategies – for example, increased falls, agitation and disruptive behaviors, and excessive disability – have been reported (Maas, 1988; Algase *et al.*, 2003). Moreover, these strategies greatly undermine a person's dignity and right to autonomy. Hence, family caregivers are faced with the tension between safety precautions and respecting autonomy. Other strategies such as walking programs, wandering path (Holmberg, 1997; Detweiler *et al.*, 2002) and environmental modifications (Coltharp *et al.*, 1996; Price *et al.*, 2001) are less intrusive but require additional supervision and physical resources. Strategies incorporating information and communication technologies, such as electronic tracking devices, may facilitate the search and rescue process (McShane *et al.*, 1998b; Miskelly, 2005) but ethical considerations regarding personal privacy remain controversial (Hughes and Louw, 2002).

While elopement is acknowledged as dangerous among individuals with dementia, the current understanding of elopement among community-

dwellers with dementia is limited. Most previous studies on elopement were conducted in long-term care settings (Detweiler *et al.*, 2002; Aud, 2004). Compared to long-term care settings, the levels of security and manpower resources are generally lower in community/home dwellings, thus making prevention and search increasingly challenging. Little is also known about whether individuals with dementia who elope possess characteristics (e.g. demographics, clinical profiles and lifestyle patterns) that are distinct from those who do not elope. This study aimed to elucidate the phenomenon of elopement occurring in community-dwelling settings. Specific objectives of this study were to examine the pattern and occurrence of elopement incidents, the process of searching and subsequent prevention strategies, and to explore whether demographic characteristics, clinical factors and lifestyle patterns predict elopement among community-dwellers with dementia.

## Methods

### Subjects

Two groups of older individuals with dementia, one with a recent incident of elopement and the other without any history of elopement, were recruited to the study. Inclusion criteria common to both groups were: aged 60 years and/or above, diagnosed as suffering from dementia, independent ambulation with or without aids, community-dwelling, and having a family informant who agreed to be interviewed. Potential subjects were excluded if they had a history of major neurological disorders such as stroke and Parkinson's disease and psychiatric disorders such as mood disorders and psychosis. One selection criterion specific to the eloped group was a recent record of elopement over the previous three months. Both groups of subjects were recruited from three community agencies providing services to elderly people. In addition, subjects of the eloped group were recruited from the Missing Person Unit of the Hong Kong Police Force.

All study subjects and their family informants participated voluntarily in the study. Informed consent was obtained from the family informants. Ethics approval was obtained from the Human Subjects Ethics Committee of The Hong Kong Polytechnic University.

### Instruments

The global mental state and severity of dementia of the study subjects were evaluated using the Chinese version of the Mini-mental State Examination (CMMSE; Chiu *et al.*, 1998) and

the Clinical Dementia Rating scale (CDR; Morris, 1993), respectively. The CMMSE measures global cognitive performance of older people in areas of orientation, memory, calculation, language and comprehension, and visual spatial function. Its score ranges from 0 to 30, with higher scores indicating better global cognitive status. Satisfactory psychometric properties and education-adjusted cut-off scores were established for CMMSE (Chiu *et al.*, 1998). The CDR evaluates the severity of impairment in six domains: memory, orientation, judgment and problem solving, community affairs, home and hobbies, and personal care. Each domain is rated on a five-point scale indicating the levels of impairment (0 = none, 0.5 = questionable, 1 = mild, 2 = moderate, and 3 = severe). An overall CDR score is derived from the subscores of the six domains based on the scoring rules (Morris, 1993).

The Chinese validated version of Cohen-Mansfield Agitation Inventory (C-CMAI; Lai and Chung, 2008) was used to assess the nature and frequency of behaviors. Consisting of 23 items, the C-CMAI (community version) evaluates agitated behaviors in two broad categories: verbal (aggressive and non-aggressive) and physical (aggressive and non-aggressive). Each item is rated on a frequency scale ranging from 1 (never) to 7 (several times per hour). Satisfactory psychometric properties including a content validity index of 0.86, an inter-rater reliability of 0.819 ( $\kappa$  statistics), and a Cronbach's  $\alpha$  of 0.83 were established for C-CMAI (Lai and Chung, 2008).

A questionnaire was used to collect information regarding demographic characteristics, medical history, caring pattern, lifestyle, and history of elopement, if any, of the study subjects. Demographic variables included age, sex, education, and past occupation. Medical history included year of dementia onset and presence of other chronic diseases. Caring pattern variables included number of primary caregivers and use of community-based services. Lifestyle variables included frequency, hours and types of outdoor activities, wake-up time and bed-time. Elopement history included the number of missing incidents occurring prior to the study (only for the eloped group). Demographic characteristics of family informants included age, sex, education, kin relationship and marital status.

Regarding the elopement incidents, family informants of the eloped group were interviewed using a questionnaire. Questions about the antecedents included behavioral clues prior to elopement, whether the study subjects were alone or with the others when they got lost, and the place last seen. Questions about the search process and strategies included how the elopement incidents were noticed, how the search process

was conducted and by whom, who discovered the eloped individual, the duration of the search, and the condition of the eloped individual when found. Family informants were also asked about the strategies they used to prevent future elopement incidents.

### Procedures

Upon receiving referrals from the community agencies and the police force, a research assistant contacted the families, explained the study objectives and obtained consent for participation. Study subjects of the consenting families were screened for eligibility. For subjects fulfilling the inclusion criteria, a data collection session was then arranged and conducted either in subjects' homes or at the referring agency. During the session, subjects' cognitive status and dementia severity were evaluated. Family informants were interviewed with regard to the demographic characteristics, lifestyle, caring patterns, and the elopement incidents (only for the eloped group). The average length of the data collection session was two hours. Telephone follow-up was undertaken where clarifications were needed.

### Data analysis

Descriptive statistics were used to summarize the demographic characteristics of the eloped subjects and non-eloped subjects, the nature and patterns of elopement, and the search and preventive strategies adopted. Independent-samples *t* test, Pearson  $\chi^2$  test, and Mann-Whitney *U* test were used as appropriate to compare demographic characteristics, caring arrangements, lifestyles, medical history, and cognitive status of elopers and non-elopers. Logistic regression analysis, using block design, was performed to predict elopement from caring and lifestyle variables (numbers of caregivers, use of community services, and frequency of out-of-home activities) and clinical variables (years of dementia diagnosis, cognitive status, agitated behaviors). Demographic variables including age, gender, marital status and past employment were controlled for the regression analysis. Data were analyzed using SPSS 17.0 for Windows, and the level of significance for all statistical tests was set at 0.05.

### Results

Thirty-one eloped cases and 41 non-eloped cases were referred to the research team. Of these, 11 eloped cases and 16 non-eloped cases failed to meet the selection criteria ( $n=19$ ), could not

be contacted ( $n=5$ ), and refused to participate ( $n=3$ ). Consequently, 20 eloped subjects and 25 subjects without a history of elopement completed the study.

The mean age of all subjects was 77 years ( $SD=8.04$ ) and the mean years since diagnosis was 2.5 ( $SD=1.73$ ). Two-thirds of the study subjects ( $n=30$ ) were female. Demographically, the eloped subjects did not significantly differ from the non-eloped ones in age, gender distribution, educational level, and marital status (Table 1). The two groups, however, differed in their previous occupation ( $\chi^2=6.89$ ,  $p=0.032$ ). Significantly more subjects in the non-eloper group performed non-skilled jobs, such as construction site workers and factory workers, than in the eloper group. Regarding the clinical profiles, the two groups did not differ significantly in CDR score (dementia severity), MMSE score (global cognitive status), CMAI score (manifestation of agitated behaviors) and the presence of comorbid diseases (Table 1).

Regarding the caring patterns, the two groups did not differ significantly in the number of primary caregivers and the use of community care services (Table 1). Overall, the subjects had an average of two primary family caregivers, whose mean age was 52.0 years ( $SD=13.03$ ). The majority of caregivers were female (60%), married (70%), adult children (75%), and with secondary education (65%). In addition to family caregiving, about two-thirds of the subjects used community services such as day-care services and meals-on-wheel services.

When lifestyle patterns were examined, again the two groups did not differ significantly in wake-up time, bed-time, and frequency, length and types of outdoor activities (Table 1). A vast majority of the subjects (92%) had out-of-home activities more than twice a week. Popular out-of-home activities included morning tea and/or lunch (39%) and strolling in parks (25%). Most out-of-home activities were carried out in the neighborhood (52%) and accompanied by family caregivers (69%).

### Predictors of elopement

Logistic regression analysis was performed to predict elopement from demographic variables, clinical variables, caring and lifestyle variables. Demographic variables (age, gender, marital status, past employment) were entered into the regression model as the first block; caring and lifestyle variables (number of caregivers, user of community service, frequency of out-of-home activities) as the second block, and clinical variables (years of diagnosis, MMSE, CMAI) as the last block. The final regression model showed that only the CMAI total

score was a significant predictor of elopement. The adjusted odds ratios for agitated behavior was 1.410 ( $p=0.042$ ). The demographic variables, caring and lifestyle variables and clinical variables other than CMAI were not significant factors predicting for elopement.

### Occurrence and patterns of elopement incidents

Eighty percent of the eloped subjects ( $n=16$ ) had a history of elopement prior to this study. The mean number of previous elopement incidents was 3.6 ( $SD=4.48$ ), with a range from 1 to 21. Elopement incidents occurred more often in afternoons (45%) and mornings (31%). Regarding how the elopement incident occurred, two main patterns were identified: (1) subjects left home alone and unnoticed (68%); and (2) subjects left their family caregivers and got lost during out-of-home activities (32%). Only one subject showed obvious emotional and/or behavioral symptoms prior to elopement. This subject presented delusional behavior and thought that someone asked her out for meals.

Among the 68 reported elopement incidents, the places from which the subjects eloped unnoticed were home (62%), markets (38%), restaurants (31%), and shopping malls (26%). Only in less than 10% of the elopement incidents could the eloped return home by themselves. In most incidents, the elopers were found by family caregivers (51%), the police (21%), security guards of housing estates or shopping malls (12%), and good Samaritans (including taxi and minibus drivers) (6%). Two-thirds of the elopers were found close to the point last seen or within the same district, while one-third were found further away in another district. All eloped subjects were found and/or returned home by themselves within one and a half days (mean duration 6 hours) and did not suffer from any major injuries. According to family informants, very limited information could be obtained from the elopers regarding where they had been and what they had done while they were lost.

### Search process and subsequent preventive strategies

All family informants reported that an immediate search was conducted as soon as their relative with dementia was found to be missing. Multiple search strategies were used. A majority of caregivers searched for the eloper in nearby environments (85%). In addition, some caregivers sought the assistance from other family members (50%) and housing estate or shopping mall patrol staff (20%) to strengthen the search process. In cases where the eloped individual had a cell phone, caregivers made

**Table 1.** Demographics, clinical profile, caring and lifestyle patterns of elopers and non-elopees

	ELOPER (n = 20)	NON-ELOPER (n = 25)
<b>Demographics</b>		
Mean age (SD)	76.5 (7.72)	76.8 (8.44)
Sex (n)		
Female	14	16
Marital status (n)		
Married	8	12
Widowed/Others	12	13
Education (n)		
Nil	5	11
Primary	10	10
Secondary and/or above	5	4
Past employment (n)		
Non-skilled jobs	5	16
Skilled/administrative jobs	6	3
Home-maker	9	6
<b>Clinical profile</b>		
Mean years of dementia diagnosis (SD)	2.5 (1.98)	2.5 (1.53)
Mean MMSE (SD)	11.1 (8.68)	11.7 (4.54)
CDR score (n)		
1	7	11
≥2	13	14
CMAI (SD)		
Total score	35.5 (21.22)	27.1 (17.76)
Physically non-aggressive	18.8 (13.72)	13.4 (10.45)
Physically aggressive	2.3 (3.52)	1.6 (2.58)
Verbally non-aggressive	9.8 (6.86)	8.9 (6.28)
Verbally aggressive	4.7 (4.06)	3.2 (3.70)
Presence of co-morbid disease (n)	11	17
<b>Caring pattern</b>		
Number of primary caregivers (SD)	1.5 (0.76)	1.7 (1.22)
Relationship of caregiver with subject (n)		
Spouse	13	11
Children/in-law	7	11
Others	NA	3
User of community services (n)		
Yes	11	15
<b>Lifestyle pattern</b>		
Get-up time (%)		
Before 7 am	42	44
After 7 am	58	56
Bed time (%)		
Before 9 pm	26	20
After 9 pm	74	80
Outdoor activity (%)		
Meals	42	36
Strolling in parks	26	24
Grocery shopping	21	21
Visiting family/friends	11	6
Proximity of outdoor activity (%)		
Neighborhood	55	48
Same/other districts	15	16
Missing data	30	36

CDR = Clinical Dementia rating score; CMAI = Cohen-Mansfield Agitation Inventory; MMSE = Mini-mental State Examination.

contact and tried to locate him/her. A successful search using cell phones was reported by two family informants.

In cases where searches of the neighborhood and likely places were not successful within the first few hours, more than half of the family informants (65%) reported the elopement incident to the police. Informants pointed out that the police could conduct a more extensive search in case the eloper had used public transport. Two other strategies used for a more extensive search were (1) to solicit assistance from taxi and/or mini-bus companies who asked their drivers to watch out for people wandering aimlessly on streets, and (2) to put up 'lost' posters around the neighborhood.

All family informants said they introduced some sorts of preventive strategies to avoid future occurrence of elopement. Commonly used strategies were to provide the eloped individuals with identification bracelets/necklaces (75%), to keep a watchful eye on eloped individuals at home and during every out-of-home activity (60%), to lock the door to prevent eloped individuals from leaving the home (50%) and to use some environmental modification strategies such as installing complicated locks and alarms (35%). Other reported strategies included giving the eloped individual a cell phone, using physical restraint at home, arranging for the eloped individuals to attend day-care programs, and hiring a maid to look after the eloped individual. Nonetheless, family informants noted that some strategies were not practical (e.g. difficulty in operating cell phones) while some would provoke undesirable consequences (e.g. becoming agitated and restless when putting on physical restraints). Interestingly, 20% of family informants still allowed their eloped relatives to go out on their own because they did not want to stop them doing what they wanted. Only one family informant declared that she would consider placing her mother in long-term care.

## Discussion

One notable finding that concurs with previous studies is that repeated elopers are at higher risk of elopement (Aud, 2004; Wick and Zanni, 2006). Nonetheless, the finding that 80% of elopers had a prior history of elopement should be interpreted with caution because of a selective recruitment methodology. Apart from a history of elopement, the elopers and the non-elopers do not differ significantly in terms of demographic characteristics (except past employment), clinical profile, caregiving and lifestyle patterns. The similarity between the profiles of the two groups highlights the unpredictability of elopement and getting lost

(McShane *et al.*, 1998b; Rowe and Glover, 2001; Rowe, 2003). Findings of the regression analyses further suggest that demographics (including past employment), caring and lifestyle patterns, comorbidity and cognitive status do not predict elopement. The only variable that may possibly predict elopement is the manifestation of behavioral symptoms, primarily physically non-aggressive behaviors such as pacing, aimless wandering and constant searching (Rolland *et al.*, 2007). Demented individuals presenting with behavioral symptoms such as having had agitated or angry encounters with caregivers are more likely to elope than those who have not (Rowe and Glover, 2001).

Nonetheless, only one family informant reported recognizing the behavioral clues (delusional thought) presented by her mother before the elopement incident. It is apparent that many family caregivers are not attuned to the behavioral/emotional clues such as repeatedly looking out of windows and doors, testing locked doors, putting on a coat, or removing a coat from places next to exits that may hint of an intention to elope (Aud, 2004). Thus, caregivers may fail to take timely actions to prevent the occurrence of elopement. The two elopement patterns identified in this study – leaving home alone and unnoticed and wandering away when accompanied on out-of-home activities – raises a question about caregivers' knowledge of elopement and unattended wandering. Undeniably, most family caregivers acknowledge the importance of providing round-the-clock watchful supervision to their relatives with dementia. However, they have to attend to other family chores and responsibilities, which may give their relative an opportunity to leave the house unnoticed (Aud, 2004). Similarly, even when individuals with dementia are being accompanied on out-of-home activities, they are still at risk of wandering away and getting lost during the brief periods when caregivers attend to other matters such as paying for groceries. Caregivers of ambulatory individuals with dementia who wander are reported to experience much greater burden than those of non-ambulatory demented individuals (Miyamoto *et al.*, 2002).

Although the literature reported that institutional placement was one of the consequences following elopement (McShane *et al.*, 1998a), only one family informant in this study planned to place her eloped family member with dementia in long-term care. This suggests that most family caregivers are keen to keep their relatives at home as long as possible. Hence, being able to maintain a safe lifestyle while remaining in the community is a high priority among family caregivers. Given that maintaining a vigilant watch round the clock is not always feasible while also being mentally and physically exhausting (Gaugler *et al.*, 2005), family caregivers need to be

taught about the possible antecedents and behavioral/emotional clues for elopement and more effective precautionary measures against elopement.

This study suggests that most preventive strategies adopted by family caregivers are conventional and conservative – such as providing identification bracelet/necklaces, locking doors and keeping a watchful eye on the individuals with dementia. A lack of effective measures to prevent elopement among those individuals with a history of elopement has been identified as one of the possible reasons for the repeated occurrence of elopement incidents (Aud, 2004). More proactive strategies, such as adapting the home environment (e.g. installing complicated lock/door alarms and camouflaging the door to make unattended exit less feasible) should be introduced to family caregivers. Moreover, advances in information and communication technologies have made the use of cell phones and less intrusive tracking devices suitable for finding missing persons. In this study, caregivers simply used cell phones as a communication tool to ask the missing person where he/she was. This, of course, was of limited use if the person with dementia could not communicate. Miskelly (2005) used mobile phones enabled with global positioning system (GPS) technology as a tracking device and reported its reliability and accuracy to locate missing persons. Family caregivers have also been receptive to the use of tracking devices to enhance personal safety of their loved ones (Landau *et al.*, 2009).

Regarding the elopement incidents, the study findings support previous studies that eloped individuals do not travel far (Rowe and Glover, 2001). A vast majority of the elopers are found by caregivers and others such as the police, security guards and good Samaritans (including lay people, taxi drivers and minibus drivers). It is apparent that the good Samaritans and security guards represent a useful search and rescue resource (Aud, 2004). To better tap into this resource, there is a need to enhance the public's knowledge of dementia and related behavioral manifestations including wandering and elopement.

There are three inherent study limitations that warrant caution when interpreting the findings. First, the study sample was small, thus limiting the representativeness and generalization of the study findings to other groups of community-dwelling older individuals with and without cognitive impairment. The eloped subjects recruited to the study were referred from community centers and by the police. This selective recruitment method might have led to an over-estimation of the getting lost behaviors among the elopers. Additionally, the use of a cross-sectional design in this study meant that such behaviors cannot be studied

over the natural course of the disease. It is recommended that future studies use a prospective and longitudinal methodology to minimize selection bias (Scarmeas *et al.*, 2007; Savva *et al.*, 2009). Second, the behavioral symptoms reported in this study mostly represented the dimension of agitation and aggression. Future studies are suggested to perform a comprehensive evaluation with regards to behavioral and psychological symptoms to further elucidate the phenomenon of elopement with regards to behavioral and emotional manifestation. Third, this study would have been further enhanced if a home visit was carried out to examine whether possible environmental factors (e.g. unlocked doors, poor surveillance) contributed to the elopement incidents.

Despite the limitations, the present study adds knowledge to the elopement literature, particularly in relation to community-dwellers with dementia. Family caregivers assume a primary role as guardian angels upholding the safety of their loved ones with dementia at home and in the community. Caregiver education is therefore deemed necessary to enhance caregivers' understanding of the phenomenon of elopement and to increase their sensitivity towards possible behavioral and emotional clues for elopement/wandering. Additionally, family caregivers should be taught about effective measures to prevent unaccompanied wandering and elopement. On a similar note, promoting public knowledge and awareness on wandering and elopement in older individuals with cognitive impairment has an added value of sensitizing this enormous source of informal manpower to expedite the search and recovery process.

### **Conflict of interest**

None.

### **Description of authors' roles**

J.C.C. Chung was involved in the design of the study, data analysis, and writing of the paper. C.K.Y. Lai designed the study, supervised data collection, data management and data analysis, and was involved in writing the paper.

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## References

- Algase, D. L.** (1999). Wandering: a dementia-compromised behavior. *Journal of Gerontological Nursing*, 25, 46–51.
- Algase, D. L., Beel-Bates, C. and Beattie, E.** (2003). Wandering in long-term care. *Annals of Long-Term Care*, 11, 33–39.
- Algase, D. L., Son, G. R., Beattie, E., Song, J. A., Leitsch, S. and Yao, L.** (2004). The interrelatedness of wandering and wayfinding in a community sample of persons with dementia. *Dementia and Geriatric Cognitive Disorders*, 17, 231–239.
- Armstrong, M.** (2000). Factors affecting the decision to place a relative with dementia into residential care. *Nursing Standard*, 14, 33–37.
- Aud, M. A.** (2004). Dangerous wandering: elopements of older adults with dementia from long-term care facilities. *American Journal of Alzheimer's Disease and Other Dementias*, 19, 361–368.
- Ballard, C. G., Mohan, R. N. C., Bannister, C., Handy, S. and Patel, A.** (1991). Wandering in dementia sufferers. *International Journal of Geriatric Psychiatry*, 6, 611–614.
- Chiu, H. F. K. et al.** (1998). Prevalence of dementia in Chinese elderly in Hong Kong. *Neurology*, 50, 1002–1009.
- Cohen-Mansfield, J., Werner, P., Marx, M. S. and Freedman, L.** (1991). Two studies of pacing in the nursing home. *Journal of Gerontology*, 46, M77–M83.
- Coltharp, W., Richie, M. F. and Kaas, M. J.** (1996). Wandering. *Journal of Gerontological Nursing*, 22, 5–10.
- Detweiler, M. B., Trinkle, D. B. and Anderson, M. S.** (2002). Wander gardens: expanding the dementia treatment environment. *Annals of Long-Term Care*, 10, 68–74.
- Gaugler, J. E., Kane, R. L., Kane, R. A. and Newcomer, R.** (2005). Unmet care needs and key outcomes in dementia. *Journal of the American Geriatrics Society*, 53, 2098–2105.
- Holmberg, S. K.** (1997). Evaluation of a clinical intervention for wanderers on a geriatric nursing unit. *Archives of Psychiatric Nursing*, 11, 21–28.
- Hope, T., Keene, J., Gedling, K., Fairburn, C. G. and Jacoby, R.** (1998). Predictors of institutionalization for people with dementia living at home with a carer. *International Journal of Geriatric Psychiatry*, 13, 682–690.
- Hope, T., Keene, J., McShane, R. H., Fairburn, C. G., Gedling, K. and Jacoby, R.** (2001). Wandering in dementia: a longitudinal study. *International Psychogeriatrics*, 13, 137–147.
- Hughes, J. C. and Louw, S. J.** (2002). Electronic tagging of people with dementia who wander: ethical considerations are possibly more important than practical benefits. *BMJ*, 325, 847–848.
- Koester, R. and Stooksbury, D.** (1995). Behavioral profile of possible Alzheimer's disease patients in Virginia search and rescue incidents. *Wilderness and Environmental Medicine*, 6, 34–43.
- Lai, C. K. Y. and Chung, S. F.** (2008). The Chinese version of the Cohen-Mansfield Agitation Inventory. In V. Lou and K. W. Boey (eds.), *Handbook of Measures for the Chinese Elderly* (pp. 92–101). Hong Kong: The Sau Po Center on Ageing, University of Hong Kong.
- Landau, R., Werner, S., Auslander, G. K., Shoval, N. and Heinik, J.** (2009). Attitudes of family and professional care-givers towards the use of GPS for tracking patients with dementia: an exploratory study. *British Journal of Social Work*, 39, 670–692.
- Lucero, M.** (2002). Intervention strategies for exit-seeking wandering behavior in dementia residents. *Alzheimer's Disease and Other Dementias*, 17, 277–280.
- Maas, M.** (1988). Management of patients with Alzheimer's disease in long-term care facilities. *Nursing Clinics of North America*, 23, 57–68.
- McShane, R., Gedling, K., Keene, J., Fairburn, C., Jacoby, R. and Hope, T.** (1998a). Getting lost in dementia: a longitudinal study of a behavioral symptom. *International Psychogeriatrics*, 10, 253–260.
- McShane, R., Gedling, K., Kenward, B., Kenward, R., Hope, T. and Jacoby, R.** (1998b). The feasibility of electronic tracking devices in dementia: a telephone survey and case series. *International Journal of Geriatric Psychiatry*, 13, 556–563.
- Miskelly, F.** (2005). Electronic tracking of patients with dementia and wandering using mobile phone technology. *Age and Ageing*, 34, 497–518.
- Miyamoto, Y., Ito, H., Otsuka, T. and Kurita, H.** (2002). Caregiver burden in mobile and non-mobile demented patients: a comparative study. *International Journal of Geriatric Psychiatry*, 17, 765–773.
- Morris, J. C.** (1993). The Clinical Dementia Rating: current version and scoring rules. *Neurology*, 43, 2412–2414.
- Price, J. D., Hermans, D. G. and Grimley-Evans, J.** (2001). Subjective barriers to prevent wandering of cognitively impaired people. *Cochrane Database of Systematic Reviews*, 1, CD001932. doi: 10.1002/14651858.CD001932.
- Rolland, Y. et al. and the REAL.FR Group** (2007). Wandering behavior and Alzheimer disease: the REAL.FR prospective study. *Alzheimer Disease and Associated Disorders*, 21, 31–38.
- Rowe, M. A.** (2003). People with dementia who become lost: preventing injuries and death. *American Journal of Nursing*, 103, 32–39.
- Rowe, M. A. and Glover, J. C.** (2001). Antecedents, descriptions and consequences of wandering in cognitively-impaired adults and the Safe Return (SR) program. *American Journal of Alzheimer's Disease and Other Dementias*, 16, 344–352.
- Savva, G. M., Zaccari, J., Matthew, F. E., Davidson, J. E., McKeith, I. and Brayne, C.** (2009). Prevalence, correlates and course of behavioural and psychological symptoms of dementia in the population. *British Journal of Psychiatry*, 194, 212–219.
- Scarmeas, N. et al.** (2007). Disruptive behavior as a predictor in Alzheimer disease. *Archives of Neurology*, 64, 1755–1761.
- Thomas, D. W.** (1995). Wandering: a proposed definition. *Journal of Gerontological Nursing*, 21, 35–41.
- Wick, J. Y. and Zanni, G. R.** (2006). Aimless excursions: wandering in the elderly. *Consultant Pharmacist*, 21, 608–612, 615–618.