"Friendship" Interactions and Expression of Agitation Among Residents of a Dementia Care Unit

Six-Month Observational Data

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"Friendships" (ongoing interpersonal interactions) and agitated behavior were studied among 59 residents of a dementia special care unit; most residents had mild to moderate cognitive impairment. Behavior scan data were recorded by trained observers over six months. Three scans per hour were conducted, seven days a week, between 9 a.m. and 9 p.m., producing more than 17,000 observations. A marginal model for binary longitudinal data was developed to associate covariates with repeated observations of agitation, the dependent variable; generalized estimating equations were used to estimate regression parameters. Friendship behavior was significantly associated with (less) observed agitation in this group of dementia residents, controlling for additional variables expected to predict agitation. Opportunity for self-initiated interpersonal engagement may contribute significantly to the well-being of moderately impaired dementia residents. Repeated over-time assessments are important in understanding factors related to expression of problem behaviors in this population.

Problem behaviors, both physical and verbal, are common among persons with dementing illness. These behaviors are often referred to as expressions of agitation. Nursing home units that are dedicated to

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caring for persons with dementia seek to provide an environment in which problem behaviors can be reduced and successfully managed. This includes providing not only a physical environment that is calming and reassuring but also a specialized programming and staff training that are oriented to the special needs of persons with dementia. Dedicated dementia care units with these goals are widely termed special care units (SCUs).

Several studies have indicated that residents' participation in structured programs and activities does help to allay the expression of problem behaviors. Structured programs often involve relatively large groups (e.g., all the residents who are present in a common area when the activity is scheduled). Mistretta and Kee (1997) identified caregiving strategies that nursing staff in dedicated dementia units found successful in reducing agitation and gaining residents' cooperation.

As an alternative to large-group activities, Martichuski, Bell, and Bradshaw (1996) demonstrated that providing activities for small groups of six to eight SCU residents was associated with a decrease in expression of negative affect and an increase in residents' voluntary association with other residents. Cohen-Mansfield and Werner (1997) found that one-to-one social interactions between trained assistants and residents significantly reduced expression of verbally disruptive behavior. These data suggest that dementia residents' opportunity for involvement in interpersonal relationships with others is associated with diminished expression of problem behaviors.

This study provides another look at the relation between dementia residents' opportunity for social interaction and their expression of problem behaviors. The context of our investigation is the naturally occurring daily activity observed in the public spaces of an SCU. We control for the effect of structured program involvement and focus on residents' observed ongoing "friendship" interactions with other

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individuals in relation to expression of agitated behaviors by these same residents.

Agitation is a behavioral phenomenon for which one-point-in-time ratings provide limited information. Dementia residents of nursing homes have been found to vary their expression of problem behaviors over time, dropping some behaviors and adding other behaviors; these changes are likely to be obscured in aggregated data. Thus, Wagner, Teri, and Off-Rainey (1995) called for studies that can help to identify both intra- and interindividual factors that predict the presence or absence of behavior problems in SCU residents over time.

In this article, dementia residents' expression of agitation is investigated using behavior scan data recorded by observers over a six-month time period. This data collection method yielded thousands of repeated, nonindependent observations. We analyzed these data using the generalized estimating equation (GEE) approach (Zeger and Liang 1986).

INDEPENDENT VARIABLE: FRIENDSHIP

The positive features of nursing facility residents' social behavior have received relatively little attention (Mor et al. 1995). A few published case studies describe interpersonal relationships observed in nursing homes that seem consistent with the concept of extended friendship relationships (e.g., Lichtenberg and Strzepek 1990). In this study, we define an ongoing friendship relationship as the continued interaction of specified individuals over an extended time period. Friends were individuals who were observed to be sitting or walking with, touching, or involved in "conversation" with a specified other resident for the majority of the observation period.

AGITATION AND DEMENTIA

Management of problem behaviors is an important challenge in the care of persons with dementia. These behaviors are referred to in the literature as behavioral disorders (e.g., Miller, Snowdon, and Vaughan 1995), behavior problems (e.g., Wagner et al. 1995), behavioral disturbances (Teri et al. 1989), disruptive behaviors (Spector and Jackson 1994), and, quite often, *agitation*. Agitation denotes inappropriate

verbal, vocal, or motor activity that is not explained by needs or confusion alone (Cohen-Mansfield 1989). Cohen-Mansfield and her colleagues have investigated the potential association of a large number of variables with agitation among nursing home residents, especially residents who have dementing illnesses.

Two demographic variables that may be related to expression of agitation are gender and age. Women seem to be less likely than men to exhibit agitation (Teri et al. 1989; Spector and Jackson 1994). The likelihood of agitated behavior may increase with age (Swearer et al. 1988). However, in a multivariate analysis, Spector and Jackson (1994) did not find a relationship between age and disruptive behaviors. They suggest that older persons may exhibit more disruptive behaviors not because they are older but because there is a relationship between increasing age and more severe cognitive impairment.

Increasing level of cognitive impairment has been shown in a number of studies to be associated with the expression of agitation (Cohen-Mansfield 1988; Swearer et al. 1988; Cohen-Mansfield and Marx 1990; Spector and Jackson 1994). However, Teri et al. (1989) reported that level of cognitive ability was largely unrelated to level of behavioral disturbance in a sample of community-residing persons with Alzheimer's disease. It is possible that agitated behaviors occur more infrequently among persons who are least cognitively impaired and persons who are most cognitively impaired. Cohen-Mansfield (1988) has suggested that agitation is perhaps highest among persons with moderate impairment.

Use of psychotropic medications (Cohen-Mansfield 1986), falling (Marx, Cohen-Mansfield, and Werner 1990), impairment in performing activities of daily living (Spector and Jackson 1994), and sleep difficulty (Cohen-Mansfield and Marx 1990) are additional variables that have been identified as associated with an increased likelihood of agitated behaviors among persons with dementia. These factors themselves tend to be interrelated, however, as Cohen-Mansfield (1986) has noted, and often are found to increase as level of cognitive impairment increases (e.g., Bliwise et al. 1995). Similarly, observed increases in agitation among cognitively impaired persons in the late afternoon and evening, the so-called sundowning phenomenon, may be associated with presence of sleep difficulty among these individuals (Vitiello, Bliwise, and Prinz 1992).

Finally, as noted above, social engagement and involvement in activities may be associated with decreased expression of agitation (Carey and Hansen 1986; Mor et al. 1995). Lawton, Van Haitsma, and Klapper (1996) found greater expression of positive affect among dementia residents who participated in activities and who were considered to be extraverts by their family members. Their observational data, collected over a four-week period in a dementia SCU, suggested that the search for enhancement of positive quality of life through engagement might be worthwhile. At the same time, they cautioned that day-to-day observation of dementia residents' behavior and affect is likely to identify individualized patterns that may differ markedly.

We are interested in the potential relationship between dementia residents' involvement in friendship relationships and their expression of agitation. We include as covariates in the analysis residents' gender, age, and cognitive status; a sleep problem index; the time of day at which the resident was being observed; and whether the resident was participating in a structured program at the time of the observation.

Method

RESEARCH SITE

The SCU that served as our research site is located in an intermediate care facility (ICF) where six floors are devoted to resident care. The SCU is housed on the facility's two middle care floors. Although it is located on two separate floors of the building, the SCU is considered a single program. The usual census on each of the two SCU floors was 35 to 40 residents.

Modified physical environments, unit/program admission and discharge criteria, specially trained staff, and dementia-specific programming are emphasized as desired qualities of dementia-special care (e.g., Berg et al. 1991; Holmes, Teresi, and Monaco 1992; U.S. Congress 1992). However, SCUs vary on these dimensions, and few SCUs simultaneously display all of the desired features. The SCU we studied was not physically different in design from the remainder of the ICF in which it was located. Residents admitted to the SCU had cognitive impairment, defined as some form of irreversible dementia,

and were judged to be able to benefit from the unit's psychosocial program; when residents could no longer benefit from this program, a recommendation was made for their discharge from the unit. The SCU was most distinct from the rest of the facility in having higher staffing, staff trained in management of dementia residents, and greater emphasis on supportive care in its programming (for details, see Wimberley and Kutner 1994).

STUDY POPULATION

A total of 86 residents were observed in the SCU during the study period. Residents with the smallest number of total observations (the lowest decile) were deleted from further analysis, leaving a potential study population of 76. The analysis reported in this article is based on observations of 59 residents for whom measures were available of cognitive status and the other covariates of interest. Cognitive status was the variable that was most problematic in data collection for this study; some family members gave permission for a resident to be included in the study but did not want the resident to undergo cognitive status testing. The 59 residents for whom data are analyzed in this article did not differ significantly in gender, age, education, or length of residence from the other residents of the SCU.

DATA COLLECTION

Human ethnology was the source of our observational data. A checklist was developed to capture data on the diurnal cycle of six categories of behavior. These categories, listed across the top of the scan sheet, included residents' (1) location (day room, nurses' station, hall, dining room), (2) asleep or awake state, (3) activity (sitting, standing, walking, watching TV, in a program, etc.), (4) alone (physically separate from other residents by four to five feet) or in a "group" (within four to five feet of other residents), (5) contact (hitting, pushing, touching), and (6) agitation. Details about the definition of agitation in this study are given below in the description of variables and measures.

Resident names were listed vertically down the scan sheet, with a separate sheet for each of the two SCU floors. The first task for the

observers was to learn to recognize all residents. Observers systematically surveyed each resident who was in view, beginning with residents closest to the observer. Interrater reliability of behavioral observations via the ethogram was assessed twice during the data collection cycle. As measured by the kappa coefficient of agreement (Cohen 1960), interrater reliability for most of the behavior categories rated by the four trained graduate student observers was .80 or higher.

Scans were conducted every day of the week for six months, between the hours of 9 a.m. and 9 p.m. Three scans per hour were conducted, each lasting three to five minutes. Observers were instructed to begin the first scan at the top of the hour, the second scan at 25 minutes after the hour, and the third scan at 50 minutes after the hour. The order of observation was the day room, hall/nurses' station, and dining room, unless there was a scheduled meal, in which case the order was reversed. Thus, observations always began in the most heavily populated location.

The physical design of the SCU floors facilitated these observation methods. Standing at the intersection of the halls, the observer could view the day room, the nurses' station, and the length of each hallway. Access to the dining room was located near the hall intersection. Thus, the observer could view almost all the public areas simultaneously.

Ad libitum notes, similar to ethnographic field notes, were made between scans to record specific behaviors, conversations, and interactions. These notes included specific conversations between individuals, the observer's interpretation of particular behaviors and their stimulus, and general notes to provide a richer picture of the context. Ad libitum notes were a source of information about resident friendship interactions, in addition to behaviors recorded via the ethogram. Both group scan and ad libitum notes are data collection methods developed by primatologists for the study of large populations of identified participants (Altmann 1974; Altmann and Altmann 1977).

In addition to the independent variable (friendship) and the dependent variable (agitation), the behavior scan data recorded whether the resident was involved in a structured program and the time of day at which observations were made. Other covariates were measured by nurse informant assessments completed by a nursing assistant on each SCU floor who was very familiar with all residents on that floor, and

by cognitive status assessments administered by trained psychology graduate students.

VARIABLES AND MEASURES

Residents categorized as exhibiting friendship behavior in this study were individuals observed to be in close proximity to another resident—sitting or walking with, touching, or talking with that resident—during 75% or more of the data collection period. The friendship categorization was determined by consensus among the graduate student observers based on their behavior scan observations and their ad libitum notes (for details, see Stavisky et al. 1998). Most of the observed friendships were between same-sex individuals.

To assess the validity of the observers' categorization, we provided the SCU social worker with a list of the names of the 59 individuals included in our analysis and asked her to indicate which of these individuals she regarded as exhibiting friendship behavior using our definition of maintaining continued interaction with a specified other individual over the time period of our data collection. The social worker independently named as friends 17 of the 18 residents whom the students had categorized as friends.

In addition, nurse informant assessments provided evidence of convergent validity for the categorization of residents as friends/nonfriends. Using the Multidimensional Observation Scale for Elderly Subjects (MOSES) (Helmes, Csapo, and Short 1987), nurse informants' mean rating for residents who are categorized in our study as friends was significantly lower on a six-item withdrawal index (4.9, $SD = 1.5$) than was the mean rating they gave to nonfriend residents (6.6, $SD = 2.4$) ($p = .0068$). On a 7-point semantic differential scale anchored by *a social person* and *a loner* (Feldt and Ryden 1992), nurse informants' mean rating of residents who were categorized in this study as friends was significantly closer to the end of the scale labeled "a social person" (3.8, $SD = 1.5$) than was the mean rating they gave to nonfriend residents (5.2, $SD = 2.1$) ($p = .0171$).

Observers were trained to record agitation on the ethogram when a resident exhibited disruptive, uncomfortable, "inappropriate" modes of behavior such as pacing, yelling, repetitive questioning, or

repetitive actions/behaviors. For the agitation ratings, the kappa coefficient of agreement was .76. The nature of the agitation was specified by simultaneous behavior ratings recorded by the observers in the "activity" and "contact" categories of the ethogram. Degrees of agitation exhibited were recorded as mild, moderate, or extreme. However, the frequency of agitated behaviors was not high in this SCU, and agitation is treated as a binary variable (present/not present) in the analysis reported in this article.

An agitation index was derived for each resident in the study group, defined as the percentage of agitation ratings in that resident's total observations. There was a significant correlation ($r = .52$, $p < .0001$) between the agitation index and resident total scores on the Cohen Mansfield Agitation Inventory (Cohen-Mansfield, Marx, and Rosenthal 1989), an instrument completed at a single point in time by a nurse informant. The association of these two measures provided evidence of convergent validity for the agitation observations recorded on the ethograms.

Two time dependent covariates from the behavior scan data are included in our analysis: time of day and program involvement. The time of day measure allows us to compare observations made between 9 a.m. and 3 p.m. and observations made between 4 p.m. and 9 p.m. (omitting the often disruptive 3- to 4-p.m. shift change interval). The 4 p.m. to 9 p.m. time period captures an interval during which a phenomenon of increased agitation popularly referred to as sundowning is often thought to occur (Vitiello et al. 1992). Program involvement refers to an organized activity such as a sing-along, group exercise, and so on; it does not include observations made during meals, which were recorded separately.

Time independent covariates included in our analysis are gender, age, nocturnal sleep patterns, and cognitive impairment level. The nocturnal sleep patterns index is constructed from four sleep problem items contained in the INCARE instrument (Gurland et al. 1977; Holmes et al. 1990). Scores on the sleep patterns index range from 0 (*no sleep problems*) to 4 (*presence of sleep problems as measured by all four items*).

Residents' cognitive status was directly assessed by trained psychology graduate students using the Mattis Dementia Rating Scale (MDRS) (Mattis 1988). The MDRS evaluates a respondent's

attention, initiation and perseverance, construction, conceptualization, and memory. The lower the respondent's total score, the higher the level of cognitive impairment. A prorated MDRS scoring method was adopted by the steering committee for the National Institute on Aging SCU initiative (National Institute on Aging Coordinating Center 1993).

Scores below 130 on the MDRS indicate cognitive impairment (Shay et al. 1991). All residents included in our study population were cognitively impaired by this criterion. Following the MDRS cut points suggested by Shay et al. (1991), residents of the SCU whom we studied can be categorized as follows: 23.9% scored 101 and above (mild dementia), 29.5% scored 76 to 100 (moderate dementia), 17.0% scored 51 to 75 (moderate to severe dementia), and 29.6% scored 50 or below (severe dementia). Thus, more than half of our sample demonstrated mild to moderate impairment as assessed by the MDRS.

STATISTICAL ANALYSIS

A total of 17,034 behavior observations from the daily behavior scans were recorded for the 59 SCU residents who are included in this analysis. Agitation was the binary dependent variable of interest. The objective of the analysis was to describe the marginal expectation of the outcome variable, the probability of expressed agitation, as a function of covariates while accounting for the correlation among the repeated observations for a given subject. Thus, a marginal model for binary longitudinal data was developed to associate covariates with repeated observations of the dependent variable. Generalized estimating equations (GEE) were used to estimate regression parameters and establish which covariates were independently associated with agitation.

Results

Table 1 summarizes the proportion of positive responses for each variable in our analysis over all observations and subjects. Within the study group, 18 residents were observed to be in ongoing friendship

TABLE 1
Frequencies for Dichotomous Variables
Averaged Over All Times and Subjects

Variable	*Frequency of Response*
Residents' agitation (observed)	0.09
In a friendship relationship	0.30
Gender (0 = female, 1 = male)	0.29
Age (0 = <80, 1 = 80+)	0.60
Mattis Dementia Rating Scale score (0 = 76+, 1 = <76 [low score = more impaired])	0.47
Sleep patterns index (0 = no problems, 1 = one to four problems)	0.23
Special care unit program involvement (observed)	0.02
Time of day (0 = 9 a.m. to 3 p.m., 1 = 4 p.m. to 9 p.m.)	0.42

relationships. Residents categorized as friends did not differ significantly from the remainder of the study group ($n = 41$) in terms of gender, age, average MDRS score, or experience of sleep problems (Table 2).

Among residents categorized as friends, agitation represented 3.6% of the total behavior observations recorded on the ethograms; among residents who were not categorized as friends, agitation represented 12.5% of the total behavior observations recorded on the ethograms.

GEE ANALYSIS

In a univariable GEE analysis, friendship was associated with a reduced risk of observed agitation in our sample of SCU dementia residents (odds ratio [OR] = 0.26, 95% confidence interval [CI] 0.22-0.31) (see Table 3). Moreover, in a multivariable model, controlling for the effects of residents' gender, age, dementia severity, sleep problems, SCU program involvement, and time of day, friendship remained associated with a reduced risk of observed agitation (OR = 0.37, 95% CI 0.31-0.45) (see Table 4). Although the effect of friendship involvement was a little less strong in the second GEE analysis, it remained significantly associated with a reduced risk of agitation as recorded by observers over a six-month interval.

TABLE 2
Resident Sociodemographic and Health Status Characteristics by Friend/Nonfriend Status

Characteristic	*Friends (n = 18)*	*Nonfriends (n = 41)*
Percentage male	33	27
Mean age (years)	81.0 (4.9)	80.4 (6.9)
Mean Mattis Dementia Rating Scale score (low score = more impaired)	76.8 (25.3)	69.3 (29.1)
Percentage with sleep problems	6	15

NOTE: Standard deviations in parentheses.

For most of the other covariables included in our model, similar associations with observed agitation were evident in the univariable and multivariable analyses. The exceptions were that age became nonsignificant in the multivariate analysis, whereas gender became significant. As noted above, findings have varied with regard to the relationship between age and agitation among persons with dementia, and age may not be a useful predictor when individuals' cognitive status level is controlled.

The interaction of gender and other covariates was examined. Gender did interact significantly with selected variables (e.g., sleep problems). However, adjusting for these interactions did not modify the significant association of friendship involvement with observed agitation.

Finally, our data show an interesting pattern with regard to individuals' cognitive impairment scores as measured by the MDRS. As would be expected, higher cognitive status scores (101 and above), relative to the lowest cognitive status scores (<50), reduce the risk of observed agitation. Cognitive status scores of 51 to 75, the range that seems to approximate moderate to severe dementia (Shay et al. 1991), significantly *increase* the risk of observed agitation relative to lower cognitive status scores. These findings appear consistent with Cohen-Mansfield's (1988) suggestion that rates of agitated behavior may be highest among persons characterized by moderate cognitive impairment.

TABLE 3
Summary of Generalized Estimating Equation Univariable Analyses: Association of Predictor Variables With Dementia Residents' Observed Agitation

Variable	*Odds Ratio*	*95% Confidence Interval*	p
Friend relationship	0.26	0.22-0.31	.0001
Gender	1.02	0.85-1.21	.8720
Age	0.98	0.96-0.99	.0001
Mattis Dementia Rating Scale score			
51-75 vs. ≤50	1.01	0.85-1.20	.9127
76-100 vs. ≤50	0.44	0.36-0.54	<.0001
101+ vs. ≤50	0.18	0.13-0.24	<.0001
Sleep problems	1.63	1.55-1.72	<.0001
Program involvement	0.19	0.09-0.38	.0001
Time of day	1.63	1.27-2.08	.0005

Discussion

The total amount of agitated behavior recorded by observers in our study was a relatively small proportion of the total behavior observations. This may have been a function of the general cognitive status of residents in this intermediate care setting and/or the behavior management success of this particular SCU. An important criterion for a resident's discharge from the unit was the staff's perspective that the resident was failing to benefit from the psychosocial program, and residents who demonstrated repeated disruptive behavior tended to leave the unit. At the same time, any instances of agitation, whether self-exhibited or observed, may be very disturbing to individual residents and staff.

Our observational data, collected over six months, indicate that agitated behavior is less likely to be observed among dementia residents who are involved in ongoing friendship relationships. It is possible that friendships provide an anchor in the daily flow of life that is experienced by dementia residents. Although we defined a friendship as a continued relationship with another resident, meaningful social engagement among institutionalized dementia residents might also be facilitated by establishing a bond with a particular staff member or by involvement in a repeated activity such as pet therapy.

TABLE 4
Summary of Generalized Estimating Equation Multivariable Analyses: Association of Predictor Variables With Dementia Residents' Observed Agitation

Variable	*Odds Ratio*	*95% Confidence Interval*	p
Friend relationship	0.37	0.31-0.45	<.0001
Gender	0.78	0.65-0.93	.0050
Age	1.01	1.00-1.02	.0788
Mattis Dementia Rating Scale score			
51-75 vs. ≤50	1.34	1.12-1.59	.0011
76-100 vs. ≥50	0.51	0.42-0.63	<.0001
101+ vs. ≥50	0.32	0.24-0.43	<.0001
Sleep problems	1.52	1.44-1.61	<.0001
Program involvement	0.27	0.13-0.55	.0003
Time of day	1.28	1.11-1.47	.0007

An alternate explanation of the friendship-agitation relationship discussed in this article is that agitated individuals are less likely to be chosen as friends by other dementia residents, and that agitation predicts friendship involvement rather than vice versa. However, in four observed friendship pairs, there was an opportunity to compare individual residents' expression of agitated behaviors during their involvement in the relationship and their expression of agitated behavior when the friendship partner left the unit. In these cases, increased frequency of agitated behavior was observed when the friendship interaction ended, which does suggest that dementia residents' involvement in friendships tends to be "protective" with respect to emergence of agitated behavior (Stavisky et al. 1998).

Our data did not indicate that friends were necessarily more likely to display positive affect. Ratings of residents by nurse informants on the seven-item MOSES depression index (a single-point-in-time rating) did not indicate a statistically significant difference ($p = .09$) between friends and nonfriends in our study group, although nurse informant ratings of depression in residents categorized as friends did indicate less observed evidence of depressive affect. The relationship between agitated behaviors and depression, and changes in this relationship over time, appear to be complex (Cohen-Mansfield and Marx 1988). Moreover, if friendship relationships break up or change

significantly over time, dementia residents—like the general population—may be at increased risk of feelings of emotional distress (Stavisky et al. 1998).

Improved understanding of problem behaviors, or agitation, in a nursing home has many practical ramifications, which helps to explain the emphasis on this topic in the gerontology literature. Positive dimensions of nursing facility residents' social behavior and quality of life also deserve careful study (Albert et al. 1996; Lawton et al. 1996; Russell 1996). Recently, researchers have begun to explore the concept of quality of life among dementia residents of nursing homes. Their premise is that persons with dementia live in an experiential world about which little is known (Albert et al. 1996).

Russell (1996:1400) points out that "researchers who have interacted with persons with advanced dementia over a prolonged time frame have described the thoughtful, protective, emotional, sensitive, and empathetic interactions evidenced by these individuals." Many long-term caregivers would agree that persons with dementia can participate in such interactions. The concept of friendship relationships among dementia residents of a nursing home is consistent with this perspective.

New insights about patterns of behavior are emerging from studies that follow dementia residents over an extended period of time (e.g., Cohen-Mansfield and Werner 1998; Wagner et al. 1995). Longitudinal studies, using "ethnomethodological approaches" (Russell 1996), can provide information about the meaning that relationships such as observed friendships have within a person's life space. Berg et al. (1991:1234) recognized early that outcome measurement in the SCU context can benefit from "recording naturally occurring behaviors and using simultaneous observations by trained individuals from multiple disciplines." McCann et al. (1997) compared staff ratings and direct observations of behavior in nursing home residents with Alzheimer's disease and found a higher rate of detection by direct observation. Longitudinal, repeated observational data pose challenges for data analysis, but the GEE approach is a useful tool. Collaboration between ethnomethodologists and quantitative researchers provides a valuable paradigm for understanding the experiential world of persons with dementia.

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