Relationship between depression and agitation in nursing home residents

Abstract – Nursing staff and social workers independently rated the manifestations of agitation and depression in 408 nursing home residents. The role of dementia was also investigated. The relationship between agitation (3 factors: aggressive, physically nonaggressive, and verbally agitated) and depression (2 factors: social functioning and depressed affect) was examined. While residents who manifested either aggressive behavior (e.g., hitting, cursing) or physically nonaggressive behaviors (e.g., general restlessness, pacing) tended to be more cognitively impaired, aggressive behaviors were negatively related to the social functioning aspect of depression, and physically nonaggressive behaviors were not related to either aspect of depression. Verbally agitated individuals were more cognitively intact and displayed depressed affect. It is conceivable that depressed affect was perceived only in verbally agitated residents since these persons were able to communicate their depression to caregivers. This result raises questions concerning the meaningfulness of depression measurements in noncommunicative residents.

Clinicians often refer to elderly persons under their care as “agitated”. However, agitation is not a diagnosis, but rather, a descriptive term pertaining to a group of behavioral signs and symptoms. Agitation has been defined as: socially inappropriate verbal, vocal, or motor activity that is not judged by an outside observer to result directly from the needs or confusion of the agitated individual (1). Empirical studies concerning agitation in impaired elderly persons are scarce; however, research into this area is just beginning to emerge (2–7). Three distinct syndromes of agitation have recently been identified in elderly nursing home residents (3). The first syndrome, aggressive agitation, includes behaviors such as hitting, kicking, grabbing, scratching, and cursing. The second, physically nonaggressive agitation, consists of behaviors such as pacing, general restlessness, inappropriate robing or disrobing, and repetitious mannerisms. The last syndrome, verbally agitated behavior, includes screaming, complaining, negativism, and constant yet unwarranted requests for attention.

Agitation has been examined relative to other psychological variables, such as cognitive functioning (4, 6). Cohen-Mansfield & Marx (8) determined the nature of the relationship between type of agitation and level of cognitive functioning in nursing home residents. Dementia was strongly associated with aggressive and physically nonaggressive manifestations of agitation, but was not related to verbal agitation. Instead, verbally agitated residents tended to be more cognitively intact. While there is no denying that cognitive impairment is related to agitation, it is possible that another co-variate – depression – is involved in this relationship. This hypothesis is based on clinical impressions. In fact, agitation is included as a symptom of depression in several instruments used with elderly persons. For example, ‘Psychomotor Agitation’ appears as an item in Zung’s Depression Status Inventory (9) as well as in the DSM-III-R criteria for Major Depressive Episode (10), and ‘Mild Agitation’ is included in Hamilton’s depression scale (11). Furthermore, depression in the aged is often mistaken for cognitive decline. The syndrome of “depressive pseudodementia”, which includes passive refusal to respond appropriately to a mental status test, can result in a diagnosis of dementia rather than in a diagnosis pertaining to depression (12). While it is reasonable to suggest that there is a link between agitation and depression, this issue has received no empirical attention.

Assessment of depression in the elderly is complex because neither the concept of depression in old age
nor its definition are clearly established. The DSM-III criteria for major depressive disorder may be inappropriate for elderly persons, since these were developed and validated in a nongeriatric population [13]. Additionally, both the measurement and interpretation of depression in nursing home residents are difficult since the majority of the population presents varying levels of physical and/or cognitive impairment. For the purposes of the present study, the Depression Rating Scale was devised specifically for use with frail, cognitively impaired nursing home residents.

This paper examines the dimensions of depression found in nursing home residents and how these relate to the three syndromes of agitation. The influence of the presence of dementia on these relationships is also investigated.

Method

Participants

A total of 408 residents of a 550-bed long-term care facility participated in this study. Ninety-two of the study participants were male and 316 were female. The age range was 70–99 years of age (mean age = 85 years).

Informed consent was obtained for all residents. For those residents who were unable to provide informed consent (as judged by a member of the nursing staff who was well acquainted with the resident), a close relative was contacted and asked to provide consent. Details of the protocol employed for subject recruitment can be found elsewhere [14].

Assessments

Measurement of agitation. The Cohen-Mansfield Agitation Inventory (CMAI) is a nurses' rating questionnaire (2–3). The CMAI consists of 29 agitated behaviors, each rated on a 7-point scale of frequency ("1" indicates that the resident never engages in the specific agitated behavior, and "7" that the resident manifests the behavior on the average of several times an hour). Inter-rater agreement rates were calculated for each behavior on the CMAI, and averaged 0.92 for one group of 16 residents, 0.92 for a second group of 23 residents, and 0.88 for a third group of 31 residents (3). A full description of this instrument is available elsewhere (3).

The dependent measures were the three factors of agitation (as defined by factor analysis, See 3) – aggressive behavior, physically nonaggressive behavior, and verbally agitated behavior – as well as a measurement of the total number of agitated behaviors manifested at least once a week.

Measurement of depression. Existing assessments of depression were not appropriate for the purposes of the present study. Most assessments used with elderly persons require patient participation in either structured interviews or in filling out a questionnaire (9, 15–17), which is not feasible for individuals with severe cognitive impairment (i.e., roughly 50% of our population). Some instruments were inappropriate because they incorporate items dealing primarily with mood (15–16) or favor somatic complaints associated with depression (11). Since a large proportion of the study participants lacked the communication skills to respond to a questionnaire and a uniform measure of both affective and somatic aspects of depression was sought for all residents, it was necessary to devise a caregivers' rating instrument. A 9-item rating questionnaire, based on the DSM-III-R criteria for depression, was developed. Specific items were:

Sad mood. Two test items tapped the participant's mood in terms of the frequency and intensity of sadness or depression – as seen by sad face, sad voice, sad mood, slumped body, sad looking, crying or verbalizations of sadness. Both items were rated on a 7-point scale: from 1 (never) to 7 (a few times an hour) for frequency; from 1 (not present) to 7 (extremely severe) for intensity.

Social functioning: ability to communicate and quality/frequency of communications. Not only the frequency and quality of communications but also the participant's ability to communicate were measured, since many of the residents were cognitively impaired and could not communicate at all. The item that measured the resident's ability to communicate was based on the Crichton Geriatric Behavioral Rating Scale (18) and was rated from 1 (no effective contact) to 7 (always clear and retains information).

Two other items were included. The first measured frequency of social interaction with other residents, family, and visitors, and was rated on a 7-point scale from 1 (never) to 7 (a few times an hour). The second item measured the quality of the participant's social interactions from 1 (always very negative, abusive, or angry) to 7 (always positive and warm).

Activity level. Activity level was tapped by two test items. The first measured how frequently the resident participated in activities that were meaningful for the resident's level of functioning (e.g., reading or an organized activity; wandering or inappropriate activities were not included), and was rated on a 7-point scale from 1 (never) to 7 (a few times an hour). The second examined changes that occurred in activity level over the last month, and was rated on a 7-point scale from 1 (significant decrease) to 7 (significant increase).

Appetite. The resident's appetite was measured
using a 7-point scale that considered excessive appetite as well as loss of appetite (from 1 (never has any appetite) to 7 (usually eats much more than should eat)).

Sleep. The number of hours of sleep during the day, evening, and night nursing shifts was recorded. The total amount of sleep over a 24-h period was determined by adding the number of hours on each shift.

To document inter-rater reliability of this assessment, two daytime charge nurses independently completed the 9-item depression questionnaire for 31 residents. Inter-rater agreement rates (with a 0- or 1-point discrepancy) were calculated for the nine items, and averaged 0.73.

Diagnosis of dementia
Medical records of the residents were abstracted, and diagnoses of dementia were verified by the attending physician. A positive diagnosis of dementia included: primary degenerative dementia of the Alzheimer's type, multi-infarct dementia (i.e., vascular disease), and senile dementia of other types. 222 of the residents (54.4%) were diagnosed as suffering from dementia, and 186 residents (45.6%) were not.

Procedure
For agitation assessments, residents were independently rated by their unit's charge nurse from each of the three nursing shifts (day, evening, and night). As to the depression assessment, items concerning sad mood, social functioning, and activity level were independently rated by the unit's daytime charge nurses and by the unit's social workers who were familiar with the participants. As the social workers were not familiar with the participants' appetite or sleep habits, these items were rated only by nursing staff. Nursing staff from all three shifts supplied the number of hours that each resident slept during their shift. A research assistant was present when nursing staff completed their ratings in order to explain and clarify all assessment instruments. To obtain a consistent picture of each participant, all staff members completed ratings for each unit within a specific 2-week period.

All data were entered onto an IBM PC/AT computer and analyses were performed using SPSS/PC+ software.

Results
Relationships between ratings by nursing staff and social workers for items on the depression questionnaire were examined by calculating Pearson correlation coefficients. Although all ratings were performed during the day shift, there was no assumption that raters would agree, since nursing staff and social workers typically interact with residents at different times and in different situations. In all cases, however, the test statistics were significant at the 0.001 level, with correlation coefficients between 0.29 and 0.73. Since the relationships were positive and statistically significant, mean values were calculated and used for subsequent analyses.

The relationships between items assessing components of depression and the three dimensions of agitation as well as the total number of agitated behaviors were examined by calculating Pearson correlation coefficients (see Table 1). Twenty-one of the 36 correlation coefficients reached statistical significance at or above the 0.05 level. (Had these variables been independent, only two statistically significant relationships would have been expected to occur by chance alone.)

Aggressive behavior. Increases of this type of agitation related significantly to poor ability to communicate, infrequent social interactions, poor quality of social interactions, and a low activity level (see Table 1).

Physically nonaggressive behavior. Increases of this type of agitation correlated with a poor ability to communicate. In addition, increases of physically nonaggressive behaviors were significantly related to increased appetite and to fewer hours of sleep (see Table 1).

Verbally agitated behavior. Increases of verbally agitated behavior were positively correlated with the frequency and severity of sad moods and with the resident’s ability to communicate. Verbally agitated behavior was associated with poor quality of social interactions and a decrease in activity level. In addition, fewer hours of sleep correlated significantly with increases of verbally agitated behavior (Table 1).

Total number of agitated behaviors correlated negatively with the resident’s ability to communicate, frequency and quality of social interactions, activity level, changes in activity level, and total hours of sleep. Total number of agitated behaviors correlated positively with intensity of sad mood and with appetite (Table 1).

To determine whether or not the 9 depression items co-varied within this elderly population, an intercorrelation matrix was derived. Twenty-six of the 36 correlations reached statistical significance at or above the 0.05 level (note: had these variables been independent, only 2 would be expected to reach significance by chance alone), demonstrating that some of these variables are related and that examination of their factor structure is warranted.

Factor analysis was performed using the generalized least squares approach. The factor solutions
Table 1. Correlations between "depression" variables and agitation

<table>
<thead>
<tr>
<th></th>
<th>Aggressive behavior</th>
<th>Physically nonaggressive behavior</th>
<th>Verbally agitated behavior</th>
<th>Total number of agitated behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to communicate</td>
<td>-0.27**</td>
<td>-0.31**</td>
<td>0.19**</td>
<td>-0.34**</td>
</tr>
<tr>
<td>Frequency of social interactions</td>
<td>-0.15**</td>
<td>0.09</td>
<td>-0.00</td>
<td>-0.11</td>
</tr>
<tr>
<td>Quality of social interactions</td>
<td>-0.18**</td>
<td>0.05</td>
<td>-0.03*</td>
<td>-0.14**</td>
</tr>
<tr>
<td>Activity level</td>
<td>-0.11*</td>
<td>0.00</td>
<td>-0.01*</td>
<td>-0.11**</td>
</tr>
<tr>
<td>Change in activity level*</td>
<td>-0.09</td>
<td>-0.01</td>
<td>-0.11*</td>
<td>-0.14**</td>
</tr>
<tr>
<td>Frequency of sad mood</td>
<td>-0.03</td>
<td>-0.07</td>
<td>0.25**</td>
<td>0.07</td>
</tr>
<tr>
<td>Intensity of sad mood</td>
<td>-0.02</td>
<td>-0.04</td>
<td>0.29**</td>
<td>0.11*</td>
</tr>
<tr>
<td>Appetite</td>
<td>0.01</td>
<td>0.22**</td>
<td>-0.01*</td>
<td>0.13**</td>
</tr>
<tr>
<td>Total hours of sleep</td>
<td>-0.01</td>
<td>-0.21**</td>
<td>-0.18**</td>
<td>-0.20**</td>
</tr>
</tbody>
</table>

* p<0.05. ** p<0.01.
* Rated from 1 (significant decrease in activity level) to 7 (significant increase).

were rotated using the varimax method. Two factors were obtained which explained 42.3% of the variance (see Table 2). Variables with loadings of at least 0.35 on each factor were:

**Factor 1** – ability to communicate, frequency of social interactions, quality of social interactions, activity level

**Factor 2** – frequency of sad mood, intensity of sad mood

The first factor was labelled ‘Social Functioning’. Factor 2 was named ‘Depressed Affect’ since it identified behaviors relating to sad mood. The two items concerning somatic aspects of depression – sleep and appetite – were noticeably absent from the resultant factor structure.

To examine how the two factors of depression, the presence of dementia, age, sex, or a combination of these variables accounted for the variance in agitated behaviors, multiple regression equations were estimated for each measure of agitation using stepwise selection. The results of the regressions are presented in Table 3. The total number of agitated behaviors was positively related to depressed affect and negatively related to social functioning. Additionally, the total number of agitated behaviors was positively related to dementia and negatively related to age. Thus, both dementia and depression explain agitation, which occurs particularly in the younger (i.e., 70-85 years of age) nursing home residents. The syndromes of agitation were differentially related to dementia and depression. Manifestations of aggressive agitation were explained by the presence of dementia and by decreased social functioning. In addition, this dimension of agitation was negatively related to sex, indicating that males displayed more aggressive behaviors than did females. Physically nonaggressive agitation was positively related to dementia and negatively related to age, but was not linked to either factor of depression. Verbally agitated behavior was explained by the presence of depressed affect only.

**Discussion**

The results of this study demonstrate that agitation, depression, and dementia co-occur in nursing home residents. In general, the “younger” residents who presented dementia, displayed depressed affect, and lacked social functioning skills, tended to manifest the greatest total number of agitated behaviors. However, the level of cognitive functioning as well as the manner in which depression was expressed tended to differ across the three different types of agitated behaviors. Residents who manifested aggressive behaviors and those who exhibited physically nonaggressive behaviors tended to present severe cognitive impairment; however, aggressive behaviors were also associated with a decrease in social functioning. Verbally agitated residents tended to be more cognitively intact and displayed depressed affect. Thus, verbally agitated residents were able to communicate their depressed moods (i.e., manifested in the form of complaining or negativism) to nursing staff and social workers. It is possible that since residents who manifested aggressive and physically nonaggressive agitation were...
Table 3. Beta weights and total $R^2$ for the agitation measures

<table>
<thead>
<tr>
<th></th>
<th>Total number of agitated behaviors</th>
<th>Aggressive behavior</th>
<th>Physically nonaggressive behavior</th>
<th>Verbally agitated behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis of dementia</td>
<td>0.23</td>
<td>0.10*</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>Depressed affect</td>
<td>0.08*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social functioning</td>
<td>-0.24</td>
<td>-0.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.11</td>
<td></td>
<td>-0.15</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>-</td>
<td>-0.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total $R^2$</td>
<td>0.18</td>
<td>0.09</td>
<td>0.14</td>
<td>0.05</td>
</tr>
</tbody>
</table>

* $p = 0.06$.
* $p = 0.08$.

All other variables are significant at $p < 0.05$.

more cognitively impaired and unable to communicate effectively with staff, it was more difficult for caregivers to perceive variations of mood in these residents.

This raises an important question for geriatric research. How does one determine sad mood in the cognitively impaired elderly? In the present study, ratings of sad mood were based on the perceptions of nursing staff and social workers. While the perceptions may not have been accurate for some residents with severe cognitive impairment, this methodology was selected because self-report of depression cannot be elicited from cognitively impaired residents. To address this issue, studies which include further validity measurements of the Depression Rating Scale are planned.

Another result of this study concerns the nature of depression in elderly persons. While both social functioning and depressed affect emerged as dimensions of depression through the use of factor analysis, two variables — appetite and sleep — did not load on either factor of depression. This finding is similar to that of YeSavage et al. (15) who demonstrated that items dealing with psychological aspects of depression were better indicators of depression in the elderly than were items dealing with somatic aspects of depression. While we do not deny that changes in appetite and sleep are related to depression, we suggest that these variables are more closely associated with “health” and reflect physiologic changes and the accompanying medical problems of nursing home residents. A similar suggestion has been made in regard to community-dwelling elderly persons (19).

Physically nonaggressive residents slept fewer hours and had good appetites (see Table 1). In fact, the appetites of these residents tended to be above average, presumably due to their need for more energy to continuously perform behaviors such as aimless pacing or general restlessness. These results are parsimonious with our previous finding that physically nonaggressive individuals are generally the least physically ill residents of the nursing home population (20). While verbally agitated behaviors were related to fewer hours of sleep, aggressive behaviors were not related to either somatic variable.

In conclusion, this paper provides a description of the relationship among agitation, depression, and dementia in nursing home residents. Aggressive manifestations of agitation were associated with impaired social functioning, which was related to impaired cognitive functioning. While physically nonaggressive agitation was also related to cognitive decline, these behaviors were not associated with either factor of depression. Verbally agitated individuals, who were more cognitively intact, were perceived to suffer from depressed affect. Additionally, verbally agitated and physically nonaggressive residents slept fewer hours, and the latter were perceived as having good appetites. Whereas this study utilized the perceptions of nursing staff in the assessment of depression in nursing home residents, future studies are needed to investigate alternative methods for better understanding affect in cognitively impaired older people.

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References

6. JACKSON ME, DRUGOVICH ML, STERNBERG J, FRETWELL M, SPECTOR W. The role of resident characteristics and social support in the presentation of disruptive behaviors in the nursing home. Gerontologist 1987; 27 (special issue): 33A.