

# DISCOMFORT AND AGITATION IN OLDER ADULTS WITH DEMENTIA OF THE ALZHEIMER'S TYPE

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# **Abstract**

## **Background**

A majority of patients with dementia present behavioral and psychological symptoms, such as agitation, which may increase their suffering, be difficult to manage by caregivers, and precipitate institutionalization. Although internal factors, such as discomfort, may be associated with agitation in patients with dementia, little research has examined this question. The goal of this study is to document the relationship between discomfort and agitation in older adults suffering from dementia of the Alzheimer's type. It differs from previous research in that this relationship is examined for different subtypes of agitation .

## **Methods**

Forty-nine participants were recruited from long-term care facilities. Discomfort, agitation, and additional descriptive variables were measured by staff members who were well acquainted with the participants or obtained from the residents' medical file or care plan.

## **Results**

Hierarchical multiple regression analyses controlling for participants' characteristics (sex, severity of dementia, and disability) show that discomfort explains a significant share of the variance in overall agitation ( $p < 0.001$ ), non aggressive physical behavior ( $p < 0.01$ ) and verbally agitated behavior ( $p < 0.001$ ). No significant relationship is observed between discomfort and aggressive behavior.

## **Conclusions**

Our findings provide further evidence of the association between discomfort and agitation in persons with dementia and reveal that this association is particularly strong for verbally agitated behavior and non aggressive physical behavior.

## Background

Dementia is not an inevitable consequence of ageing but the risk of this disorder increases sharply with advancing age and its prevalence is expected to increase dramatically over the coming decades [1]. Dementia features an alteration of memory and at least one other cognitive disorder such as aphasia, agnosia, apraxia or a disturbance in executive functioning [2]. Various etiologies are related to dementia, such as strokes, head trauma, Parkinson's disease, and substance abuse. Yet Alzheimer's disease is considered the most widespread form of all senile dementias, representing more than half of all cases [3]. The onset of dementia of the Alzheimer's type (DAT) is gradual and involves continuing cognitive decline [2].

In addition to cognitive symptoms, persons with dementia often present behavioral and psychological symptoms which may increase their suffering, be difficult to manage by caregivers, and precipitate institutionalization [4]. Behavioral symptoms of dementia include wandering, screaming, and hitting, while psychological symptoms include hallucinations, delusion, and depression. Between 50 and 90% of dementia patients present with behavioral or psychological symptoms [5]. The term "agitation" is often used in reference to behavioral symptoms associated with dementia [6]. Agitation has been defined as any inappropriate verbal, vocal or motor activity which, according to an outside observer, does not result directly from the needs or the confusion of the agitated person [7]. Behavior which constitutes agitation can be broadly classified as aggressive vs non-aggressive and physical vs verbal [8]. A factor analysis of a measure of agitation used with nursing home residents produced three factors which make it possible to distinguish various forms of agitation [9]: aggressive behavior (AB, e.g., hitting), non-aggressive physical

behavior (NAPB, e.g., pacing), and verbally agitated behavior (VAB, e.g., complaining).

The specific determinants of agitation remain unclear [6]. Predisposing factors may include gender, personality, poor health, functional impairment of activities of daily living, as well as cognitive and neurological deterioration [10, 11]. Other factors may precipitate the occurrence of agitation and include the characteristics of the physical and social environment (e.g., too much noise, not enough social interaction) as well as physical needs such as hunger, thirst, and discomfort. Some of these variables, such as sex, the severity of cognitive impairment and the level of dependence in performing activities of daily living, are well documented in the literature in terms of their relationship with different types of agitation. For example, males are more likely to be aggressive than females, NAPB is more likely to be manifested by persons who are more cognitively impaired, and VAB tends to be exhibited by persons who are more functionally impaired [8]. Other variables, such as hunger and light intensity, may be associated with agitation but this association remains hypothetical [12-14].

Several studies have examined environmental or contextual determinants of agitation [15, 16]. Considerably less attention has been devoted to internal states which may also trigger difficult behaviors. Discomfort, which is defined as a negative emotional or physical state subject to variation in response to internal or environmental conditions [17], may act as an internal factor which precipitates the occurrence of agitation [10, 12]. Persons suffering from dementia may behave in ways that are disruptive to those around them but which, for these patients, serve to communicate the discomfort they feel. For example, a patient suffering from moderate dementia and who gradually becomes aphasic may revert to shouting, emit

odd noises, become unruly or hit those around him to let them know he feels pain during dressing and bathing. Various studies have shown the importance of discomfort in persons suffering from dementia [18-20] and a majority of patients must deal with a painful chronic or acute ailments such as cancer, depression, cardiovascular disease and musculo-skeletal disorders [21].

To our knowledge, only one study, by Buffum et al. [18], has directly demonstrated the relationship between discomfort and agitation in persons with dementia. However, the authors considered agitation as a single construct without considering its subtypes (i.e., AB, NAPB and VAB). Given that the importance of the relationship between different factors varies according to these subtypes, [8, 11, 12], discomfort may be more strongly related to certain subtypes of agitation than others. In their review of the literature, Cohen-Mansfield and Deutsch [8] indicated that all subtypes of agitation may be associated with discomfort. However, the available evidence strongly suggests this association in the case of VAB whereas the reasons for both AB (e.g.: cognitive impairment, personality style, unsuccessful communication with caregivers) and NPAB (e.g.: need for exercise or stimulation, performing previous roles) appear more diversified.

The goal of this study is to document the relationship between discomfort and agitation in older adults suffering from DAT. It differs from previous research in this area in that this relationship is examined for different subtypes of agitation. The following hypotheses were tested: (a) the frequency of overall agitation is related positively to the degree of discomfort, and (b) the degree of discomfort is related positively to frequency of VAB. To ensure more accurate results, sex, the severity of dementia and disability in performing activities of daily living, three variables whose

relationship with agitation is well documented in the literature [8], were measured for control purposes.

## Methods

### Participants

A sample made up of older adults residing in long-term care facilities was recruited for this study. The criteria were (a) being at least 65 years old, (2) having been diagnosed with DAT, as documented by the medical file, and (3) having been living in the same facility for at least three months. Potential participant suffering from delirium or any form of psychosis were excluded. Fifty-five participants were initially recruited but data could not be collected for six of them because a respondent was not available during the data collection period. The final sample therefore included 49 participants.

### Measures

**Descriptive variables.** The following information was drawn from the participant's medical file and care plan: date of birth, sex, date of admittance to the facility, medical conditions, analgesics taken on a daily basis, as well as diagnosis and type of dementia. Nursing staff members, who filled out questionnaires for participants, were also asked to provide descriptive information (gender, years of education, and years of experience working with older adults).

**Severity of dementia.** The level of cognitive impairment was measured using the Functional Assessment Staging (FAST) developed by Reisberg and colleagues [22]. The scale comprises seven stages measuring function loss associated with cognitive deterioration [23]. Each participant was therefore given a score between 1 and 7 where 1 refers to a normal cognitive function and 7 to severe dementia with

very severe cognitive impairment. The validity of the FAST and its interrater reliability were demonstrated previously [24].

**Disability.** The level of disability in performing activities of daily living (ADL) was measured using a subscale of the Functional Autonomy Measurement System (SMAF) [25, 26]. This ADL subscale helps measure the level of impairment for five activities (feeding, washing, dressing, personal hygiene and using the bathroom), as well as urinary and fecal incontinence. Each item is evaluated using a four-point Likert-type scale where 0 indicates that the person is autonomous while -3 denotes dependency. The scale's psychometric qualities, including concurrent validity and interrater reliability, have been demonstrated [25-27].

**Agitation.** Agitation was evaluated using the Cohen-Mansfield Agitation Inventory (CMAI) [9, 17]. The frequency of all 29 items of the CMAI is evaluated using a Likert-type scale and scores given for each item ranges from 1 ("never") to 7 ("several times per hour"). For each participant, an overall agitation (OA) score as well as a score for each one of the three factors of the CMAI (AB, NAPB, and VAB) was calculated by summing across items.

**Discomfort.** The Discomfort Scale for patients with Dementia of the Alzheimer Type (DS-DAT) [17] is composed of nine behavioral indicators of discomfort determined following interviews with caregivers working with persons suffering from DAT. Thus, the authors of the scale gave particular attention to content validity by identifying the kinds of behavior most frequently associated with a sign of discomfort in this population. Each item comes with a list of observable forms of behavior which helps evaluators observe and record the signs of discomfort as objectively as possible. This tool makes it possible to evaluate the frequency (from 0 to  $\geq 3$ ), intensity (high or low) and duration (long or short) of the nine indicators

associated with discomfort, as perceived by the observer, in the course of an observation period usually lasting five minutes. The level of discomfort is then derived from the value attributed to these three components. Each of the nine items is evaluated independently on a scale from 0 (“no observed discomfort”) to 3 (“high level of observed discomfort”). The psychometric properties of the scale, including interrater reliability, have been verified [17].

## **Procedure**

Members of the day shift nursing staff (nurses and nursing assistants) on the participants’ units were asked to collaborate to this study. A group meeting was called with the principal investigator (ICP) to explain the study to the staff, to obtain their consent, and to provide them with information so that they would be able to identify residents matching the study criteria based on each resident’s file. The staff members were also given a presentation to demonstrate how to complete each of the scales used in the study.

The DS-DAT, the CMAI, the ADL subscale of the SMAF and the FAST were completed by the nursing staff member most familiar with each participant. They were given two weeks to complete and return all scales. The principal investigator could be contacted during this period to answer questions or provide additional information regarding the procedure.

The study protocol was reviewed and approved by the local Research Ethics Committee.

## **Results**

Data analysis was performed using SPSS software, version 11.0 for Windows.

Participant characteristics are shown in Table 1. It should be noted that the sample was mostly comprised of women and that the majority of participants had a medical condition. In addition, nearly 60% of participants took an analgesic on a daily basis, which suggests that they experienced chronic pain. Finally, most participants were rated in the three last stages of the FAST which indicates that the cognitive functioning of most participants was highly impaired. A total of 13 nursing staff members agreed to collaborate to the study. These volunteers, all women, had on average 15 years of education and 22 years of experience working with older adults. Table 2 shows the Pearson correlation coefficients ( $r$ ) between each score of agitation, discomfort, and the remaining descriptive variables. Sex was coded as follows: men = 1 and women = 2. Positive and significant correlation coefficients are observed between discomfort and each of the following agitation scores: OA, NAPB and VAB. No other correlation coefficient was significant.

Hierarchical multiple regression analyses were next performed to specify the relationship between discomfort and each agitation score while statistically controlling for sex, severity of dementia and disability in performing ADL. For each analysis, these three last variables were introduced in a first block of the regression, followed by the level of discomfort at the next step. As shown in Tables 3 to 5, discomfort contributed significantly to the prediction of the variance of OA, NAPB and VAB, beyond the participants' other characteristics that were statistically controlled in each regression equation. The variance of the different agitation scores specifically attributable to discomfort varied between 18% and 30%. Further, standardized beta coefficients show that only discomfort carried significant weight in the regression equation for OA, NAPB and VAB.

## Discussion

The purpose of this study was to document the relationship between discomfort and the various types of agitation in older adults suffering from DAT. Our results show a positive and significant relationship between the level of discomfort and overall agitation. This confirms results obtained previously by Buffum and colleagues [18]. However, our results further demonstrate that the relationship with discomfort varies according to the type of agitation. As predicted, we found that discomfort is associated both positively and significantly with VAB. Furthermore, our results show a positive and significant relationship with NAPB while the relationship between discomfort and AB is weak and non significant.

Various authors contend that discomfort acts as an internal factor which precipitates the occurrence of agitation [10, 12]. VAB possibly acts as a means of communicating the patient's discomfort [8, 28]. Matteau and colleagues [28] have found that patients that display VAB also present more language difficulties. Through behaviors such as complaining and screaming, patients may attempt to attract their caregivers' attention in the hope that they will provide them some relief. The relationship between discomfort and NAPB was unexpected and is less clear. It is possible that several types of disruptive behavior related to this type of agitation, such as wandering and pacing, result from the discomfort experienced by the patient. For example, a patient suffering from DAT who feels sad and depressed because he or she is homesick may attempt to leave his residential facility in order to reduce this discomfort [8].

Algase and colleagues [12] have suggested that behavioral problems associated with dementia result from unmet needs which the patient expresses using his remaining abilities. Given our results, the need for comfort appears as one such need.

From a practical point of view, the occurrence of agitation deserves particular attention on the part of caregivers since it may communicate discomfort. Identifying and treating the cause of this discomfort may help reduce agitation. Kovach and colleagues [29] have recently reported findings which support this assertion. In their study, nursing home residents with dementia were treated using the Serial Trial Intervention which selects an appropriate treatment based on physical and affective needs assessments. Compared to a control group, the treated group had less discomfort and more frequently had behavioral symptoms return to baseline. Barton and colleagues [30] have suggested a similar hierarchical approach to the management of inappropriate vocalization.

Two limitations to the generalization of our findings are the relatively small sample size and the fact that the data was compiled only during the day shift. Some authors have indicated that the different types of agitation occur at different periods of the day [31, 32]. It is unclear whether the same factors are equally important contributors to agitation at different periods of the day. Another limitation is that the measure of discomfort we used is not specific as to the nature and origin of this experience. Discomfort is a broad concept referring to a negative emotional or physical state. Various conditions, including pain, distress, depression, loneliness, lack of stimulation, and lack of sleep can contribute to discomfort. Identifying which of these sources of discomfort play a role in agitation is essential for selecting appropriate treatment. Future studies, therefore, should identify the determinants of discomfort that are related to agitation in dementia patients and compare findings across different periods of the day.

Dementia creates a paradoxical context in which patients are more vulnerable to various sources of discomfort while, at the same time, being less able to modify these

by themselves or to communicate their discomfort directly to their caregivers. Further understanding of the internal determinants of behavioral symptoms in dementia will ultimately lead to finer assessment and more effective treatment of patients.

## **Conclusions**

Our findings provide further evidence of the association between discomfort and agitation in persons with dementia and reveal that this association is particularly strong for VAB and NAPB.

## **Competing interests**

The authors declare that they have no competing interests.

## **Authors' contributions**

ICP conceived and carried out the study and drafted the manuscript. PL contributed to the conception of the study and helped to draft the manuscript. Both authors read and approved the final manuscript.

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## Tables

**Table 1 - Participant Characteristics**

| Characteristics                           | Percentage | <i>M</i> | Range     | <i>SD</i> |
|---|------------|----------|-----------|-----------|
| Sex                                       |            |          |           |           |
| Male                                      | 10.2%      |          |           |           |
| Female                                    | 89.8%      |          |           |           |
| Age (years)                               |            | 82.70    | 67 - 98   | 7.81      |
| Duration of institutionalization (months) |            | 38.70    | 3 - 198   | 37.99     |
| Number of medical conditions              |            | 5.20     | 1 - 13    | 2.59      |
| Daily administration of an analgesic      | 57.2%      |          |           |           |
| Stage of dementia                         |            |          |           |           |
| 1   | 0.0%       |          |           |           |
| 2   | 0.0%       |          |           |           |
| 3   | 4.1%       |          |           |           |
| 4   | 2.0%       |          |           |           |
| 5   | 16.3%      |          |           |           |
| 6   | 53.1%      |          |           |           |
| 7   | 24.5%      |          |           |           |
| Disability in performing ADL              |            | - 15.48  | -21 to -1 | 5.83      |
| Agitation                                 |            |          |           |           |
| OA  |            | 41.53    | 29 - 90   | 14.18     |
| AB  |            | 7.24     | 6 - 18    | 2.47      |
| NAPB                                      |            | 10.06    | 6 - 29    | 5.55      |
| VAB                                       |            | 10.76    | 6 - 32    | 6.14      |
| Discomfort                                |            | 4.20     | 0 - 14    | 3.56      |

ADL=Activities of daily living; OA=Overall agitation; AB=Aggressive behavior; NAPB= Non aggressive physical behavior; VAB=Verbally agitated behavior.

**Table 2 - Correlation Coefficients Between Agitation Scores, Discomfort and the Other Descriptive Variables**

|      | Sex   | Severity of dementia | Disability in performing ADL | Level of discomfort |
|------|-------|----------------------|------------------------------|---------------------|
| OA   | -0.25 | -0.00                | 0.04                         | 0.56**              |
| AB   | -0.08 | .014                 | -0.16                        | 0.23                |
| NAPB | -0.28 | -0.10                | 0.06                         | 0.47*               |
| VAB  | -0.24 | -0.13                | 0.21                         | 0.54**              |

ADL=Activities of daily living; OA=Overall agitation; AB=Aggressive behavior; NAPB= Non aggressive physical behavior; VAB=Verbally agitated behavior.

\* $p < 0.01$

\*\* $p < 0.001$

**Table 3 - Summary of Hierarchical Multiple Regression Analysis for Overall Agitation**

| Variable             | <i>B</i> | <i>SE B</i> | $\beta$ |
|----------------------|----------|-------------|---------|
| Step 1               |          |             |         |
| Sex                  | -11.28   | 6.79        | -0.24   |
| Severity of dementia | .61      | 3.63        | 0.04    |
| Disability (ADL)     | 0.09     | 0.59        | 0.04    |
| Step 2               |          |             |         |
| Sex                  | -4.17    | 6.01        | -0.09   |
| Severity of dementia | .94      | 3.09        | 0.06    |
| Disability (ADL)     | .40      | 0.50        | 0.17    |
| Level of discomfort  | 2.20     | 0.52        | 0.55**  |

ADL=Activities of daily living;  $R^2$  for Step 1 = 0.06,  $F(3,45) = 0.98$  (n.s.);  $\Delta R^2$  for Step 2 = 0.28,  $F(1,44) = 18.21$  ( $p < 0.001$ );  $R^2$  Total = 0.34,  $F(4,44) = 5.57$  ( $p < 0.001$ ).

\*\* $p < 0.001$

**Table 4 - Summary of Hierarchical Multiple Regression Analysis for Non Aggressive Physical Behavior**

| Variable             | <i>B</i> | <i>SE B</i> | $\beta$ |
|----------------------|----------|-------------|---------|
| Step 1               |          |             |         |
| Sex                  | -5.25    | 2.61        | -0.29   |
| Severity of dementia | -1.25    | 1.40        | -0.21   |
| Disability (ADL)     | -0.14    | 0.23        | -0.15   |
| Step 2               |          |             |         |
| Sex                  | -3.00    | 2.46        | -0.17   |
| Severity of dementia | -1.14    | 1.27        | -0.19   |
| Disability (ADL)     | -0.04    | 0.21        | -0.05   |
| Level of discomfort  | 0.70     | 0.21        | 0.45*   |

ADL=Activities of daily living;  $R^2$  for Step 1 = 0.09,  $F(3,45) = 1.55$  (n.s.);  $\Delta R^2$  for Step 2 = 0.18,  $F(1,44) = 10.89$  ( $p < 0.01$ );  $R^2$  Total = 0.28,  $F(4,44) = 4.14$  ( $p < 0.01$ ).

\* $p < 0.01$

**Table 5 - Summary of Hierarchical Multiple Regression Analysis for Verbally Agitated Behavior**

| Variable             | <i>B</i> | <i>SE B</i> | $\beta$ |
|----------------------|----------|-------------|---------|
| Step 1               |          |             |         |
| Sex                  | -4.17    | 2.90        | -0.21   |
| Severity of dementia | 0.42     | 1.55        | 0.06    |
| Disability (ADL)     | 0.24     | 0.25        | 0.23    |
| Step 2               |          |             |         |
| Sex                  | -0.98    | 2.51        | -0.05   |
| Severity of dementia | 0.57     | 1.29        | 0.09    |
| Disability (ADL)     | 0.38     | 0.21        | 0.36    |
| Level of discomfort  | 0.99     | 0.22        | 0.57**  |

ADL=Activities of daily living;  $R^2$  for Step 1 = 0.09,  $F(3,45) = 1.45$  (n.s.);  $\Delta R^2$  for Step 2 = 0.30,  $F(1,44) = 21.04$  ( $p < 0.001$ );  $R^2$  Total = 0.38,  $F(4,44) = 6.83$  ( $p < 0.001$ ).

\*\* $p < 0.001$