

# A review of the aetiology and management of vocal behaviour in dementia

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## Abstract

Vocal behaviour is a common form of agitation displayed by people with dementia. It refers to excessive screaming, abusive language, moaning, perseveration, and repetitive and inappropriate requests. The authors provide a literature review on this form of challenging behaviour, focusing on the aetiological factors and the available treatment options. Emphasis is put on a biopsychosocial approach. The aim of this article is to increase awareness of the condition in elderly nursing residences and hospitals, and to encourage best evidence-based practice.

## Key words

Vocal behaviour; dementia; behavioural interventions; agitation; person-centred care

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## Introduction

Dementia is an acquired syndrome of decline in memory and at least one other cognitive domain, such as language, visuospatial, or executive function, that is sufficient to interfere with social or occupational function in an alert person.<sup>1</sup> Traditionally, cognitive problems have been the main focus of interest in treatment and research for people with dementia. However, non-cognitive symptoms, mainly agitation, aggression, mood disorders, psychosis, sexual disinhibition, eating difficulties and vocal behaviours, are now increasingly recognized. These have been grouped together under the umbrella term "behavioural and psychological symptoms of dementia" (BPSD) by the International Psychogeriatric Association. These symptoms are a common reason for institutionalization of people with dementia.<sup>2</sup>

Vocal behaviour (VB) is a common form of agitation displayed by people with dementia. It includes screaming, abusive language, moaning, perseveration, and repetitive and inappropriate requests. Thus, VB describes vocalisations that are out of the ordinary and creating stress within the caring environment and as a result may justify intervention.

VB is prevalent in both community and institutional settings. Studies have shown that it may occur in as much as 11-30% of nursing home residents<sup>3-6</sup> and this may prove challenging for caregivers and nursing home staff, causing severe emotional strain with feelings of powerlessness, frustration, anxiety, anger, and a distancing from the patient.<sup>7</sup> For other nursing home residents, VB can trigger anxiety and agitation. The aim of this article is to systematically review the literature to identify the different types of VB, underlying causal factors as well as the available treatment options, focusing on person-centred care.<sup>8</sup>

## Typology

The first study to characterize VB was the one carried out by Ryan *et al.* (1988).<sup>5</sup> Based on a survey of 400 residents by 122 nursing staff, Ryan *et al.* developed a system with six classes of VB: (1) noise-making which appears purposeless and perseverative; (2) noise-making which is a response to the environment; (3) noise-making which elicits a response from the environment; (4) 'chatterbox' noise-making; (5) noise-making due to deafness; and (6) other noise-making. This system represented a major advance, in particular by highlighting the diversity of the problems characterized as

abnormal vocalisations. It has, however, been criticized for omitting data regarding the type of sound produced, and for not identifying possible triggers for the behaviour.<sup>9</sup> Cohen-Mansfield and Werner (1997)<sup>9</sup> have subsequently published a more exhaustive dimensional system referred to as the 'typology of vocalisations' (TOV). The TOV was developed specifically to assist in deciphering the meaning of VB and to correlate its attributes with treatment effectiveness. It included four dimensions: (1) type of sound; (2) purpose of sound, including response to the environment; (3) timing, including frequency and pattern of occurrence; (4) level of disruptiveness (Table 1). Cohen-Mansfield and Werner<sup>9</sup> concluded that non-verbal behaviours were not related to any of the variables studied in the typology (i.e. demographic characteristics, cognitive impairment and ability to perform activities of daily living (ADLs)), reflecting the difficulty in attributing meaning to these behaviours. Verbal behaviours, however, can be further characterized according to their purpose or the need they fulfil and are related to the cognitive functioning of the participants. As the cognitive abilities of the elderly residents deteriorated, their VB became less verbal and seemed less related to specific needs or purposes.

#### Nonverbal vs verbal behaviour

In a similar study conducted by Sloane *et al.*<sup>6</sup>, subjects who primarily made nonverbal noises were compared with those whose predominant expressions were words. It was found that hearing impairment, severe cognitive impairment, and greater dependency in activities of daily living characterized the persons with nonverbal behaviour, with loudness being associated with more severe cognitive impairment (OR 4.90,  $p=0.001$ ). In addition, subjects exhibiting pronounced vocal behaviour had a high probability of mortality within six months (23.4%).

#### Timing of VB

Verbal behaviours which express self-stimulation tend to be manifested on a constant basis, while verbal behaviours which reflect a specific need or purpose tend to display a specific

**Table 1:** Typology of vocalisation  
(Adapted from Cohen-Mansfield & Werner, 1997)<sup>4</sup>

#### 1. Type of sound:

**a) Verbal:** loud talk, singing, chattering or mumbling, yelling.

**b) Non-verbal:** groaning or grunting, howling, sighing.

**2. Meaning/reason/content:** pain, complaints, requests for attention, hallucinations, ADL requests, environmental discomfort, self-stimulation, cursing, verbal aggression, no discernible meaning

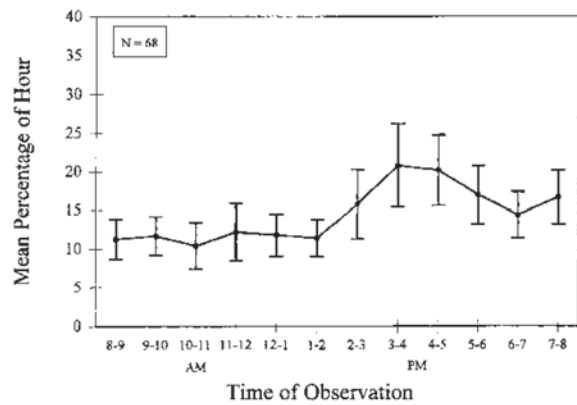
**3. Timing:** constant, random, apparent pattern

**4. Level of disruptiveness**

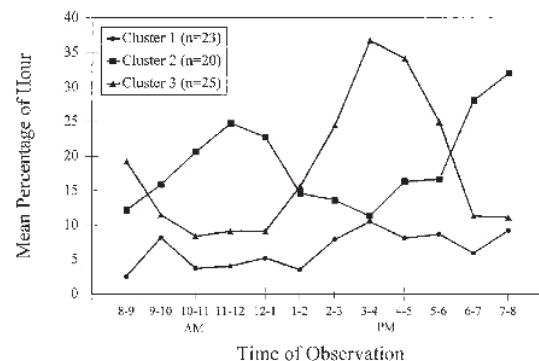
pattern, usually associated with the performance of ADLs or the presence of physical pain.<sup>9</sup>

Burgio *et al.*<sup>10</sup> showed that there is increasing VB during evening hours (Figure 1). Use of an exploratory cluster analysis suggested three distinct temporal patterns of VB (Figure 2). Cluster 1 showed a relatively constant pattern of low rate disruptive vocalisation (DV). Clusters 2 and 3 showed cyclic trends. Peaks in DV were observed during noontime and in the evening for Cluster 2. Cluster 3 showed peaks in DV in the early morning hours and late afternoon. Univariate analysis indicated that cognitive status was the only factor that differed significantly among clusters, with members of Cluster 1 (constant low rate DV) manifesting higher cognitive status scores than Clusters 2 and 3. A step-wise discriminant function analysis also showed cognitive status to be the only statistically significant predictor of cluster membership. Ultimately, the authors concluded that in spite of obtaining three distinct temporal patterns of DV, these patterns are all generally supportive of 'sundowning.'

**Figure 1:** Mean percentage of hourly blocks of observation during which disruptive vocalisation was recorded (n=68). The vertical lines denote standard deviation (Reproduced from Burgio *et al.*, 2001)<sup>10</sup>



**Figure 2:** Mean percentage of hourly blocks of observation during which disruptive vocalisation was recorded for residents in Cluster 1 (n=23), Cluster 2 (n=20), and Cluster 3 (n=25) (Reproduced from Burgio *et al.*, 2001)<sup>10</sup>



Sundowning has been defined as an increased frequency of agitation in the late afternoon and evening hours. Consequently, environmental/behavioural interventions would be most efficacious if used during periods preceding or leading up to episodes of disruptive behaviours.

## **Aetiology**

As with other behavioural disturbances, VB has been associated with multiple causal factors in the literature and individual cases may have a number of interacting factors.<sup>11</sup> These factors can be broadly divided into four categories: physical illness, psychiatric illness, environment, and personality.

### **1. Physical illness**

Patients who display VB are likely to have difficulties with mobility, continence or functional abilities.<sup>6,7</sup> Unmet physical needs, such as for provision of food or drink, or assistance with toileting, require careful consideration. VB is seen more frequently in patients with advanced dementia and it is postulated that the noise making could be attributed to the advancing damage to the frontal lobe or interruption of the complex subcortical circuits. The most important physical issue in relation to sustained noisiness is likely to be undiagnosed or untreated pain.<sup>12</sup> Cariaga *et al.*<sup>3</sup> reported that complaint of pain or request for medication by residents with inappropriate vocalisation was more likely to be ignored than in controls.

### **2. Psychiatric illness**

Depressive features have been found to be more prevalent in nursing home patients with VB. Draper *et al.*,<sup>7</sup> in a controlled study using the Cornell Scale for Depression in Dementia, found 75% of 22 subjects compared to 8% of controls scored above the threshold for depression. In a similar study conducted by Dwyer & Byrne<sup>13</sup> using three depression-in-dementia scales, it was concluded that depressive symptoms are associated with inappropriate vocalisation and may have an aetiological role in the generation of VB in elderly nursing home residents.

Anxiety may play a part in the development of VB as the patient struggles to understand where they are and what is happening to them, particularly when there is a background of severe memory problems.<sup>14</sup>

In a small number of patients with VB, inappropriate vocalisation may result from psychosis and this requires careful assessment and consideration of vocal content as well as previous illnesses. It is interesting to note that in a study of 10,000 nursing home patients, 202 were found to have been treated with antipsychotic medication while exhibiting specified symptoms; either behavioural (hitting, screaming, pacing) or psychiatric (hallucinations, paranoia, delusions).<sup>15</sup> Out of this sample

of 202 patients, there was a diagnosis of schizophrenia in 32 and of organic psychosis in 19.

## **3. Environment**

### **i) Overstimulation**

Environmental factors such as the level of noise, temperature or level of stimulation are generally of relevance in those diagnosed with VB. Overstimulation at bathing or toileting times may leave a person with dementia unable to understand why their privacy is being violated in such a way, they feel stressed and frightened and cry out in an effort to communicate this.<sup>14</sup> Equally the concept of 'sundowning' has long been associated with that time of the evening when visitors come and go, nursing shifts change and patients become agitated. Staff can address such over-stimulation and make efforts to reduce the level of noise and activity. However, sundowning has also been associated with decrease in stimulation after dark and diminished environmental cues which render the patient more insecure and may thus cause disruptive behaviour. Such understimulation should thus also be addressed.

### **ii) Understimulation**

Understimulation plays an important role in VB, particularly in the isolated patient who may also have visual or auditory impairments and who becomes bored and cries out in a form of self-stimulation. Inappropriate vocalisation has been found to be associated with poor quality of social networks, sensory impairments, reduced participation in activities and solitude.<sup>16</sup> In addition, intermittently providing attention to residents while they are vocally disruptive and ignoring them when they are not can aggravate the behaviour. Indeed, some "disruptive" vocalisation can be considered an adaptive response, for example, when a resident needs to be taken to the bathroom, calls out repeatedly, and staff is not immediately available. Thus, appropriate caregiver attention can reduce the frequency or duration of vocalisations.<sup>17</sup>

## **4. Personality**

Behavioural symptoms can be interpreted in terms of reflecting an exacerbation of existing personality traits or pre-morbid coping strategies. This can often focus attention on what information is missing concerning how an individual might have previously responded to stress or loss. Past events in the patients' lives also play an important role. For example, they may be reliving war experiences or abusive relationships and an interview with family members could shed some light on this.<sup>17</sup>

It is interesting to note that the clinical characteristics of VB in residents referred for specialist treatment are similar to those described in epidemiological studies.<sup>7</sup> VB was associated with other disturbed behaviours, depression, anxiety, advanced dementia, functional impairment, communication difficulties, use of psychotropic medication, social isolation, and emotional distress in the nursing staff. Reasons for referral may relate more to the stress experienced by nursing home staff in managing VB than to specific attributes of the VB itself.

## Management

There is very limited evidence that any particular intervention is effective in the treatment of VB. Many cases of VB are highly idiosyncratic and need tailor-made approaches.<sup>11</sup> In addition, VB includes a range of behaviours so it is likely that a range of therapies will be required. Thus, empirical treatment can be divided into two broad categories: psychosocial interventions and symptomatic pharmacotherapy.

### 1. Psychosocial interventions

Numerous psychosocial interventions have been used to treat VB. The types of intervention trialed should be guided by assessment of the behaviour, and of the patient and their environment in order to identify Antecedents and Consequences (ABC analysis). The efficacy of psychosocial interventions lies in being person-centred forms of care whereby the focus is on the individual rather than the condition. Lindgren and Hallberg<sup>18</sup> found that VB decreased when a nursing treatment plan (focused on reversing sensory deprivation, social isolation, disorientation, altered capacity to express needs, reflux discomfort and pain) was followed. Effective leadership, regular supervision of and support to the caregivers are necessary to reduce VB in nursing home residents.<sup>19</sup> In addition, comprehensive behaviour management and communication skills training of nursing assistants lowered the incidence of agitated episodes including VB during personal care. McMinn & Draper<sup>16</sup> provide an evidence-based guideline for the management of VB whereby psychosocial interventions should address three important factors in the causation of VB.

#### i) Discomfort or suffering

Treatment of any discomfort or suffering should be fundamental in any care plan. A thorough physical examination is necessary<sup>4</sup> and this should include looking for non-verbal signs such as tears, grimacing or splinting a limb<sup>3</sup> that may suggest the patient is in pain. One should also try to ask the patient to point to

the pain. Factors to consider include repositioning as well as attending to discomfort, example from cold or catheterisation.<sup>16</sup>

#### ii) Sensory deprivation and social isolation

Varied efforts have been designed. The use of video-tapes of family members has been examined in several studies. Reductions were observed to be greater when the tapes were playing and when they were associated with affection and not concerning current events.<sup>16</sup> Music also plays a role in reducing VB.<sup>2</sup> In addition, talking to the resident about the weather or about family and reading to the resident is more effective for those who are less cognitively impaired. Talking about the past, the resident's hobbies, holidays, food, and family are associated with decreases in VB.

#### iii) Operant learning

Behaviour therapy is based on operant learning and assumes that the person with dementia still has sufficient cognitive capacity to learn. Operant treatments of VB are potentially useful where there is an absence of positive consequences (usually no interactions with staff) following appropriate behaviour (quietness) and the presence of positive consequences (interactions with staff) following inappropriate behaviour (VB). Operant treatments thus involve avoiding excess attention to VB, reinforcing adaptive or quiet behaviour by contingent attention and conversation, keeping in mind that this behavioural approach must be consistent across all carers. Such contingent reinforcement can be recommended on the basis of numerous case series.

A few general interventions for VB in patients with dementia are outlined in Table 2.

**Table 2:** General interventions for VB in persons with dementia (Adapted from McMinn & Draper, 2005)<sup>16</sup>

#### General Interventions

1. Remain calm, unhurried approach
2. Use warm reassuring voice
3. Emphasize non-verbal communications and eye contact
4. Explain procedures/happenings
5. Avoid expression of judgemental thoughts and feelings
6. Reduce meaningless excessive stimuli e.g. noise, TV, high traffic areas
7. Relieve immediate discomforts
8. Provide orientation cues
9. Provide meaningful activity

## 2. Symptomatic pharmacotherapy

A necessary prerequisite to pharmacotherapy is to define the target problem as precisely as possible and also the desired outcome, having delineated what level of side effects might be seen as 'acceptable.' A partial response (such as the patient sleeping at night and the difficult behaviour being confined to daylight hours) may, for instance, be all that is feasible. Medication would probably be best used in conjunction with behavioural interventions, but as cognitive function declines behavioural treatments may become even harder to implement. The various types of medications used in VB are outlined below.

### i) Selective Serotonin Reuptake

#### Inhibitors (SSRIs)

Decreased serotonin levels may play an important role in dementia, contributing not only to depression but also to reduced impulse control and the development of VB.<sup>13</sup> Serotonergic treatment would therefore seem a 'rationally empirical' option. A compelling body of evidence is slowly being compiled suggesting the successful use of SSRIs, at times even when depression is not suspected.

### ii) Anticonvulsants

Anticonvulsants, such as carbamazepine, have been considered helpful in treating agitation, including VB, in patients with dementia, though concerns remain about its tolerability and risk of drug interactions. Sodium valproate was considered a potentially safer and effective anticonvulsant. However, a recent review suggested that low dose sodium valproate is ineffective and higher doses result in unacceptable side effects.<sup>14</sup>

### iii) Antipsychotics

Neuroleptic medications are often used as first-line treatment for VB despite the modest evidence of efficacy from clinical trials. In addition, the typical antipsychotics bring with them a number of problems including extrapyramidal side effects, anticholinergic effects, hypotension and sedation. A comparison between the newer 'atypical' antipsychotics such as risperidone or olanzapine and haloperidol showed some reduction in agitation (including screaming) but side effect profiles varied considerably.<sup>15</sup> Risperidone proved to be the most effective and to have a more favourable safety profile prior to the recent evidence suggesting a 3-fold increase in cerebrovascular adverse events. Olanzapine also showed a 2-fold increase in mortality in dementia patients, despite promising evidence from trials and case reports. The newest anti-psychotic in the UK, aripiprazole, has also been

trailed with some success in demented patients with behavioural problems but again has shown an increase in cerebrovascular events.<sup>14</sup>

A study carried out by Fossey *et al.*<sup>20</sup> showed a significant reduction in the proportion of patients taking neuroleptics in residential homes (referred to as 'intervention homes') where staff was trained in the delivery of person-centred care and skills development in training and supervision. No significant differences were found in the levels of agitated or disruptive behaviour between intervention and control homes, thus showing that promotion of person-centred care and good practice in the management of patients with dementia with behavioural symptoms provide an effective alternative to neuroleptics.

### iv) Anxiolytics

Although no research-based evidence exists to support the supposition it is possible to justify a trial of an anxiolytic in terms of interpreting the symptoms as an anxiety equivalent, and even potential dependence may be an acceptable risk in chronic severe cases.<sup>14</sup> The problem of frank sedation, however, must be avoided as a patient may stop shouting out merely because they are too drowsy to find the energy to do so. Sedation of the patient would lead to increased risk of falls as well as poor quality of life.

It follows that drug therapy needs to be particularly rigorously monitored, and possibly protocolised, when the context is empirical and the use technically 'off licence' in a patient unable to give meaningful consent. Thus, discussion with relatives about risks and benefits of any treatment is vital before beginning medication.

## Conclusion

VB is a heterogeneous entity which is often very difficult to treat. A biopsychosocial assessment provided by a multidisciplinary team is necessary to identify the different aetiologies involved in each individual case. When a multifactorial aetiology applies, it is ideal to test the hypothesis in succession until a solution or combination of solutions are found, giving primary consideration to the patient's physical health and any relevant psychiatric syndromes before embarking on any more complex treatment options. However when the variables contributing to VB interact, or when there are acute medical or psychiatric factors, this may be clinically difficult. Thus, interventions might need to be introduced simultaneously rather than in succession and often require the combination of biopsychosocial strategies tailored to the individual case. A series of interventions should be planned on the assumption that each case is idiosyncratic. It is worth noting the move towards more person-centred forms of care where greater attempts are made to understand the individual's experience of dementia and to employ strategies to

improve the person's quality of life. Finally, one has to recognize the significant impact that the staff's attitude has on the subject exhibiting VB. Increased emotional distress in nursing staff caring for patients with inappropriate vocalisation has been noted.<sup>7</sup> Consequently, medical, nursing and other supportive staff should be given access to educational seminars detailing psychiatric disorders in old age and therapeutic approaches to care, as well as support from a trained psychiatric nurse to deal with behaviourally challenging individuals, thus resulting in a significant improvement in patient behaviour, mental and physical health.

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