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INTEGRATIVE REVIEW: PERSISTENT VOCALIZATIONS AMONG NURSING HOME RESIDENTS WITH DEMENTIA

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Abstract

Background—Nursing home (NH) residents with dementia, commonly exhibit persistent vocalizations (PVs), otherwise known in the literature as disruptive or problematic vocalizations. Having a better understanding of PVs and the research completed to date on this phenomenon is important to guide further research and clinical practice in NHs. This integrative review examines the current literature on the phenomenon of PVs among NH residents with dementia.

Methods—We conducted a search in the PubMed, Scopus, Ovid Medline and CINAHL databases for articles published in English. Articles were included if the focus was specifically on research involving vocal behaviors of older adults with dementia residing in NHs.

Results—Our literature search revealed eight research articles that met the inclusion criteria. These studies were published in 2011 or earlier and involved small sample sizes. Seven of these studies were descriptive, with only one non-pharmacological intervention study for PVs exhibited by NH residents with dementia. These studies were vastly different in their labeling, definitions, and categorization of the PVs as well as methods of measuring PVs.

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Description of Authors' Role: J. Sefcik designed the study, completed the systematic review, and wrote the paper. M. Ersek and P. Cacchione supervised the systematic review and assisted with writing the paper. S. Harnett assisted with the systematic review and with writing the paper.

Conclusion—The heterogeneity of the evidence limits the ability to make recommendations for practice. Given the paucity of research on this phenomenon; recommendations for additional research are given.

Keywords

Integrative Review; Persistent Vocalizations; Behavioral Symptom of Dementia; Nursing Home Residents; Older Adults

Introduction

Over 46 million people globally are living with dementia, and the number is projected to increase to 131.5 million by 2050 (Prince *et al.*, 2015). Nearly all those diagnosed with dementia will exhibit behavioral symptoms of dementia (Selbæk *et al.*, 2014; Wetzels *et al.*, 2010). A common behavioral symptom of dementia is persistent vocalizations (PVs), otherwise commonly known as disruptive or problematic vocalizations (Beck *et al.*, 2011; Beck and Vogelpohl, 1999; Matteau *et al.*, 2003; Palese *et al.*, 2009). However, there is currently no consensus on what to call these vocal behaviors and how to define them. We came to a consensus on a name and definition of PVs based on our previous understanding of the literature and practice experience for this paper (Sefcik, 2017). Defined here, PVs are vocal sounds, persistent verbalizations, or inappropriate use of words that are upsetting to persons exhibiting them or to others in the environment, including family members, other residents and care providers. Prevalence rates of agitated or aggressive behaviors which include vocal behaviors have been reported as high as 82% among older adults with dementia (Zuidema, Koopmans, & Verhey, 2007). With approximately 876,600 U.S. NH residents with dementia (Alzheimer's Association, 2016; Harris-Kojetin *et al.*, 2016), these rates indicate that approximately 719,000 NH residents may exhibit PVs.

While not all aberrant vocal noises are bothersome, many PVs can be disturbing and stressful to others within proximity of the vocalizations (Cohen-Mansfield and Werner, 1997b; Sloane *et al.*, 1999). For NH residents with PVs there can be negative effects such as physical exhaustion and placement in isolation to facilitate a more peaceful environment (Barton *et al.*, 2005). In addition, PVs from one resident can cause reactive vocalizations in other residents (Dwyer and Byrne, 2000). When one or multiple residents are exhibiting PVs, it makes for a noisy, stressful NH environment for everyone, including employees, other residents, families, and other visitors (Bourbonnais and Ducharme, 2010). Proper prevention and management of PVs is important to improve residents' quality of life (Buhr and White, 2006) and reduce caregiver stress and stress to others in the same NH environment (Edberg *et al.*, 1995).

Many experts believe that PVs serve a communicative purpose and are an indication of an unmet need (Algase *et al.*, 1996; Draper *et al.*, 2000; Matteau *et al.*, 2003). The possible meaning behind PVs varies widely and can range from physical needs such as experiencing pain or needing to use the bathroom; psychological needs such as need for attention or attempts to self-stimulate/soothe; or environmental discomforts due to uncomfortable

temperatures, or overstimulation from noise or crowds (Algase *et al.*, 1996; Beck *et al.*, 2011; Cohen-Mansfield and Werner, 1997b).

NH staff must be vigilant to determine the meaning behind observed PVs (Clavel, 1999). Based on the underlying meaning of the behavior, strategies to prevent or reduce PVs can be developed (Algase *et al.*, 1996; Clavel, 1999; Cohen-Mansfield and Werner, 1997b). However, Kolanowski and colleagues (2010) reported that NH staff members expressed that they were poorly equipped to deal with behavioral and psychological symptoms of dementia (BPSD). Participants in the focus groups emphasized their lack of education to understand BPSD and insecurity intervening with nonpharmacological approaches. Nursing staff communicated that when they implemented non-pharmacological interventions it is through trial and error, rather than research-based interventions. Nursing staff also had the perception that pharmacological interventions were efficient and reliable to promote a calm NH environment.

Pharmacological interventions are often prescribed to manage PVs, although this is discouraged because there are negative consequences such as over-sedation, worsening of cognitive function, risks of adverse effects, including stroke and death, and efficacy is modest at best (Harding and Peel, 2013; Maher *et al.*, 2011; Preuss *et al.*, 2016; Seitz *et al.*, 2013). Due to these concerns, experts recommend non-pharmacological interventions as the first line of treatment for all behavioral symptoms of dementia including PVs (American Geriatrics Society and American Association for Geriatric Psychiatry, 2003).

There is extensive literature on behaviors exhibited by persons with dementia including intervention study reports; however, the majority of the publications do not differentiate PVs from other behaviors (Beck *et al.*, 2011). The research on behavioral and psychological symptoms of dementia (BPSD) and neuropsychiatric symptoms (NPS) cluster behavioral symptoms together, particularly into aggressive or agitated behavior categories (Kales *et al.*, 2015; Kolanowski *et al.*, 2017; Livingston *et al.*, 2014; van der Linde *et al.*, 2014). When PVs are included in aggressive or agitated categories it is difficult to extract pertinent information specific to vocal behaviors. Additionally, some studies on BPSD and NPS include participants from settings other than NHs such as community-dwelling older adults with dementia. This makes it difficult to have a thorough understanding of the characteristics and correlates of PVs exhibited by NH residents with dementia and evaluate effective non-pharmacological interventions for this specific population.

Research related specifically to PVs exhibited by NH residents is important since this behavioral symptom may have distinct correlates and arise from needs which differ from other behavioral symptoms such as physical aggression and wandering (Beck *et al.*, 1998; Beck and Vogelpohl, 1999). Having a better understanding of PVs can improve ability to provide tailored care to NH residents (van der Geer *et al.*, 2009). It is essential to learn how NH staff can minimize PVs and improve outcomes for all involved including the residents themselves exhibiting PVs.

Therefore, this paper has a two-fold purpose. First, to determine if information learned from the literature can inform practice in NHs. Second, to gain an understanding of the research

completed to date on this phenomenon is essential to delineate next steps for investigation. Thus, the aim of this integrative review paper is to examine and report on the available published research focused specifically on NH residents with dementia who exhibit PVs. We had three objectives. To identify:

1. how PVs were labeled, defined and classified.
2. tools used to measure PVs.
3. interventions used to manage PVs.

Methods

Search strategy

We conducted a search on January 24, 2017 in the PubMed, Scopus, Ovid Medline and CINAHL databases for articles published in English. Search terms included “dementia” combined with “vocal behaviors”, “vocally disruptive behaviors”, “disruptive vocalizations”, “problematic vocalizations”, “persistent vocalizations”, “verbal aggression”, “verbal agitation”, “vocally aggressive”, “verbal non-aggression”, or “vocally agitated”. Search terms were informed from previous work by two of the authors (Sefcik and Cacchione, 2015). There is no current inclusive list of all the different types of vocalizations (Randall and Clissett, 2016), therefore we used these overarching terms.

Articles focused specifically on research involving vocal behaviors of older adults with dementia residing in NHs were included. Article exclusion criteria included: (a) reviews of the literature including systematic reviews; (b) case reports (due to generalizability concerns); (c) had three or less participants (due to being like a case report); (d) focused on medication use; (e) were in a setting other than a NH; (f) looked at a combination of behavioral and psychological symptoms of dementia; and (g) included any participants in the sample who did not have a diagnosis of dementia. There were no limits placed around the dates of publication.

Data analysis

An integrative review method was selected since it was anticipated that diverse studies, including experimental and non-experimental, would be identified (Whittemore and Knafl, 2005). Recommendations from Whittemore and Knafl (2005) guided the data analysis stage. We extracted and analyzed data by the following topics: a) authors and study year, b) study location, c) study design, d) term and definition used to describe vocal behavior, e) research aim, f) site and sample characteristics, g) measurement tools, and h) results. A constant comparison technique was used to explore patterns and themes across the studies (Whittemore and Knafl, 2005). We present our findings by the objectives of our paper.

Findings

Study selection and characteristics

The search yielded 365 non-duplicate articles. The first author and third author screened articles based on titles, abstracts and full texts. Many articles (n=357) were not included

because of the exclusion criteria. The result was eight articles that satisfied the inclusion criteria. See figure 1 for a flow diagram of the article selection process. Of the eight articles included in this review one was an intervention study and the remainder were descriptive studies (n=7). Of the descriptive studies, one was qualitative in nature and took a critical ethnography approach to understand “screams” of NH residents with dementia (Bourbonnais and Ducharme, 2010). No mixed-methods studies were identified. Publication of these papers occurred between 1999 and 2011. Six studies occurred in North America (4 in the U.S. and 2 in Canada) and two in Europe. The number of NHs involved as research sites per study ranged from 1 to 17. See Table 1 for details on the eight studies.

Participant Characteristics

Participant characteristics are presented in Table 1. Sample sizes of NH residents with dementia who exhibited PVs ranged from 7 to 138. Three of the eight papers reported on the participants’ specific type of dementia and Alzheimer’s dementia was found to be the most common (Bédard et al., n = 14 out of 26; Cohen-Mansfield et al., n = 16 out of 26; Matteau et al., n = 45 out of 66). Tools used to report on level of cognition varied across studies and indicated that participants had moderate to severe cognitive impairment. The mean age across all studies ranged from 80.9 to 86.6 years old. Seven studies reported more female than male participants, and one study (Palese et al.) did not report gender. Race was not reported in the six studies. Details on race in the other two studies were limited with percentages provided on one race only (Beck & Vogelpol, 13.2% Black; Beck et al., 2011, 93.5% White).

Labels, Definitions, and Categories of PVs

Based on our assessment of these papers, there was distinct heterogeneity in the terms and definitions used. The ways to categorize PVs also varied widely and tended to depend on the researchers’ focus, such as verbal agitation (Bédard *et al.*, 2011) and screams (Bourbonnais and Ducharme, 2010).

The literature contained numerous terms to express the phenomenon of PVs. These included disruptive vocalizations (Matteau *et al.*, 2003; Palese *et al.*, 2009), problematic vocalizations (Beck *et al.*, 2011; Beck and Vogelpohl, 1999), verbal agitation (Bédard *et al.*, 2011), and verbal and vocal agitation (van der Geer *et al.*, 2009). One paper used three different terms: disruptive vocalizations, vocally disruptive behaviors, and vocal and verbal disruptive behaviors (VDB) (Cohen-Mansfield *et al.*, 2003). Bourbonnais and Ducharme (2010) chose to refer to the vocalizations they were investigating as “screams.” Their rationale stated as to avoid preconceived meaning to the behavior. The terms disruptive vocalizations and problematic vocalizations appeared in two papers each, with the other terms being unique among the other papers.

Table 1 contains explicit definitions that the authors chose to use in their papers. Not all authors provided explicit definitions. In some cases, examples of types of PVs were given (e.g. curse loudly, call for help, shouting, screaming). There was no standardized definition or consistent citation given for how the authors were defining the phenomenon they were investigating.

When assessing categories of PVs used across the studies, we found that half of the studies focused specifically on agitation. Bourbonnais and Ducharme (2010) included in their paper a table on modulation criteria for the meanings of screams that had the categories of agitated and not agitated when screaming. Beck and Vogelpohl (1999) had categories of aggressive and agitated vocalizations, and Beck et al. (2011) had categories of aggressive and nonaggressive categories. One study did not include any classification terms for the “disruptive vocalizations” they set out to describe (Palese et al., 2009).

The paper by Bourbonnais and Ducharme (2010) was unique from the others as it focused on one type of PV, screaming. The authors developed categories and subcategories for screaming which they derived from their study defined as a critical ethnography using methods of a conventional ethnography with the addition of reflective inquiry aimed at changing culture. The authors described seven categories where the participants with dementia used screams to communicate: dissatisfaction, satisfaction, pain, emotions, physical needs, desire to modify environment, and enigmatic (family and formal caregivers were not able to decipher the meaning of a person’s screams). Subcategories were developed for emotions (screaming expressed fear or anxiety, frustration and solitude) and physical needs (screams communicated needs such as feeling too hot or cold, wanting a position change, or having to eliminate).

Measurement Tools Used

Measurement tools used to gather data on residents with PVs varied by study. The most frequently used tool to capture PVs was the verbal categories listed within the Cohen-Mansfield Agitation Inventory (CMAI) (Beck *et al.*, 2011; Bédard *et al.*, 2011; Matteau *et al.*, 2003). Out of 29 behaviors within the CMAI, eight categories represented vocal behaviors: cursing, constant unwarranted request for attention or help, repetitive sentences/questions, making strange noises (including inappropriate laughter, unwarranted crying or weeping), screaming, complaining, negativism, and making verbal sexual advances. Depending upon the study, the CMAI was completed either retrospectively by a nursing assistant or research assistant or in real time by a research assistant. Some studies included the CMAI with others tools to measure PVs. One study, Beck and colleagues’ (2011), included video recording participants for seven 20-minute periods on two nonconsecutive days. Researchers logged the rates of PVs per minute from the video recordings. PVs were defined by the verbally agitated items in the CMAI as well as items from the Verbal Behavior Scale (VBS) (Beck *et al.*, 1998; Beck *et al.*, 2011).

Beck and Vogelpohl (1999) tested the Need-driven Dementia-compromised Behavior model with data collected from NH residents with PVs. The measures included the 45-item Disruptive Behavior Scale from which they focused on the aggressive vocal behaviors (screams/yells, uses hostile/accusatory language toward others, makes threats implying physical harm to others, makes threats imply physical harm to self) and the agitated vocal behaviors (repeats phrase(s)/word(s), talks constantly, makes repetitious noises) from the scale (Beck *et al.*, 1997).

Other studies used unique methods to measure PVs. Cohen-Mansfield and colleagues (2003) audio recorded PVs and completed sonographic evaluation of the tapes and evaluated the

acoustic structures of the sound files. Palese and colleagues (2009) requested that nurses' keep structured diary recordings for the strategies they implemented for managing PVs and the duration of each PV episode. The study by van der Geer and colleagues used individual semi-structured interviews with NH staff to learn about the nature and intensity of PVs observed.

Bourbonnais and Ducharme (2010) developed their own observational tool to observe screaming which was based on their review of the literature. This tool focused on characteristics of the screams (intensity, type, and duration), elements of the social and physical environment, and general observations of the NH's functioning. Additionally, they developed an individual semi-structured interview guide used with family and formal caregivers that included questions about screams.

Additional tools used to gather data on participants also varied widely across studies (see Table 1). The majority of these tools were subjective observational scales. Additionally, data about the participants came primarily from interviews with staff or from medical records. The exception was Beck and colleague's (1999) study, which incorporated the use of an actigraph to collect sleep data on participants and used an indoor humidity gauge thermometer to record ratings of NH environmental temperatures and humidity levels.

Interventions to Manage PVs

In relation to interventions for PVs, one study focused on eliciting from 22 nurses' techniques they used to manage the vocal behavior and their own evaluation of effectiveness (Palese et al., 2009). There was only one study identified that administered an intervention for PVs and evaluated effectiveness (Bédard *et al.*, 2011). These two studies are markedly different, with the only similarity being emotional attention given to the residents exhibiting PVs as an intervention.

For Palese and colleagues study (2009), nurses recorded observed disruptive vocalizations (DVs) and interventions they used within a weeklong diary as well as participated in individual discussions with researchers. Analysis identified four categories of strategies used by nurses to manage DVs. These included: 1) a single strategy such as an emotional intervention (speaking or touching the patient) or a physical intervention (managing a specific need), 2) multiple strategies which included emotional and physical interventions one or more times, 3) pharmacological strategies, and 4) no intervention (due to no time/excessive workload or exhausted all other possible strategies). Nurses felt more satisfied when they used multiple strategies to intervene when residents with dementia were exhibiting DVs. Loneliness (30.6%) and discomfort (such as incorrect posture or constipation) (23.8%) were identified by nurses' observations as the top reasons they believed residents were exhibiting DVs. In some cases, the nurses were unable to hypothesize a cause (9.4%) and these DV episodes lasted longer in duration than when the nurses could not identify a cause.

The only intervention study identified was a pilot focused specifically on 26 NH residents with verbal agitation (VA) (Bédard *et al.*, 2011). A trained research therapist administered a 30-minute one-on-one intervention that included the components of comfort, attention and

stimulation. The comfort component lasted longer than the other two components because the therapist needed to correct sources of discomfort (e.g., thirst, inadequate room temperature, uncomfortable position). After the comfort component, attention (conversation topics) and stimulation (e.g. listening to music, looking at a magazine, smelling spices) were divided among the remaining time of the 30-minute session. Just over half of the participants (54%) had behavioral improvement during the intervention (at least a 50% reduction of VA). Among the treatment characteristics, those who received the longer attention component had a better treatment response than a longer sensory stimulation component. Immediately following the intervention, VA returned to baseline levels. These findings confirmed the researchers' hypothesis that VA would be significantly lower when participants were exposed to the intervention compared to when they were not exposed.

Discussion

This integrative review set out to examine and report on the available published research focused specifically on NH residents with dementia who exhibit PVs. The identification of only eight studies demonstrates that examining PVs solely, without being included in studies with other behavioral symptoms of dementia, is an understudied area of research. Additionally, the studies were dated from 2011 or earlier, providing evidence that in the last few years there has been a lack of attention to this individual behavioral symptom known to have negative effects to not only those exhibiting the behavior but those in the immediate environment exposed to the PVs (Barton *et al.*, 2005; Bourbonnais and Ducharme, 2010; Dwyer and Byrne, 2000; Sloane *et al.*, 1999). The distinct level of heterogeneity among the eight papers makes it difficult to draw a clear understanding of the phenomenon. Additionally, the descriptive studies were cross-sectional and exploratory, many with small sample sizes resulting in preliminary findings, which were by nature inconclusive and difficult to generalize to larger populations.

This integrative review demonstrates that there was a lack of consistency with labeling, defining, and categorizing aberrant vocal behaviors exhibited by NH residents with dementia. Due to the inconsistency of labeling PVs and the lack of a standard definition or standardized classification system, in this review we found that researchers developed their own specific focus, such as verbal agitation or screams. This lack of definition, categorization and variation in labeling PVs makes it difficult to compare study findings, make a substantial evaluation of the literature, and advance the science.

Additionally, half of the papers reviewed used the terms disruptive vocalizations and problematic vocalizations. These terms reflect the clinician/researcher view, and not the persons with dementia perspective or recognize that the person may be displaying their behavior as a way to communicate an unmet need (Algase *et al.*, 1996). From our viewpoint, these terms demonstrate a negative connotation and attitude toward the older adult rather than a less judgmental undertone related to observation of the exhibited behavior. Therefore, we suggest the nonjudgmental term of 'persistent vocalizations' to describe the vocal behaviors exhibited by persons with dementia (Sefcik, 2017).

However, to develop a consensus label, definition, and categorical system to describe the observable characteristics of PVs, we recommend further research that includes obtaining interdisciplinary expert opinion. Work done by Cummings and colleagues (2015) to develop a provisional consensus definition of agitation involved a combination of electronic, face-to-face, and survey-based strategies with experts to develop a consensus definition. A similar process could be advantageous for developing a consensus definition of PVs. Validation of a consensus definition through further research would then be required.

In terms of tools used to gather information on PVs, we identified heterogeneity among measurement tools across the studies. Subjective observational scales were primarily used to record characteristics of PVs such as type and frequency. Three of the eight studies focused specifically on agitated PVs and used the CMAI. This was the most used tool across studies. Beck and colleagues' (2011) study was the only one to incorporate the use of actigraphy to collection sleep data on participants. No other studies collected any physiological biomarkers on participants. Due to the subjectivity involved with raters completing tools like the CMAI, some researchers have been testing devices such as actigraphs to objectively and quantifiably measure BPSD such as apathy and aberrant motor behavior (Kuhlmei *et al.*, 2013; Valembois *et al.*, 2015). There have also been recent developments of sensors (wearables, computer vision, and multi-modal sensing) to detect agitation and aggression in persons with dementia that could be potentially useful in alerting caregivers to intervene (Khan *et al.*, 2018).

Future research could build on this work and include the development and testing of sensors that could detect precursor changes or indicators of a forthcoming PV episode in people with dementia. NH staff could intervene prior to the escalation if receiving alerts ahead of time. However, first, a better understanding of the underlying mechanisms of PVs and any physiological changes that occur within a person is needed. Therefore, we recommend the incorporation of physiological biomarker measurement (e.g. heart rates, respiration rates, oxygen saturation rates, temperatures) into future studies that focus on NH residents with dementia and PVs to help elucidate what is happening with a person before they start exhibiting a PV episode.

The NDB model guided the research in the two Beck studies (2011 (1999). The intervention study paper by Bédard and colleagues (2011) briefly mentioned the model in the introduction of the paper and discussion section in relation to needing assessments of unmet needs, although did not tie the study to the model. The NDB model is a widely recognized framework that posits that PVs, generally considered disruptive by caregivers, are actually the best way that a person with dementia can communicate their unmet needs (Algase *et al.*, 1996; Beck *et al.*, 2011). More research investigating the background and proximal factors including environmental factors that contribute to PVs as described in the model is essential (Beck *et al.*, 2011).

Of note is that theory did not drive most of the PVs studies in this review. It is important to recognize that there are other models to help minimize stress and agitation in persons with dementia that were not used to inform study design in these eight papers and could be considered for use in future studies (Sefcik and Cacchione, 2015). These include the

Progressively Lowered Stress Threshold (PLST) model (Hall and Buckwalter, 1987; Smith *et al.*, 2004) and the Treatment Routes for Exploring Agitation model (TREA) (Cohen-Mansfield, 2000).

Emotional interventions such as speaking to and providing attention to the older adults with dementia and PVs were the only similarity between Bédard and colleague's study implementing an intervention and Palese and colleague's study asking nurses to document what interventions they employed for PVs. This evidence however is limited and insufficient to offer intervention recommendations for NH settings. Bédard *et al.*'s (2011) non-pharmacological intervention focused on comfort, attention and stimulation, was able to decrease VA by 50% during the intervention. Replication of the intervention in larger sample sizes is needed to provide stronger evidence regarding the intervention's effectiveness. Findings also showed that the VA returned to baseline levels following the intervention. Therefore, future research should aim to evaluate whether providing longer durations of interventions or shorter periods of time with more frequent dosages is more effective at minimizing PVs (Bédard *et al.*, 2011).

Overall, this review has highlighted that there is a lack of available evidence for effective, lasting non-pharmacological interventions specifically focused for PVs exhibited by NH residents. This reinforces the critical need for more research. Our findings are consistent with Randall and Clissett's (2016) in that there is insufficient evidence on non-pharmacological interventions for PVs to make recommendations for practice.

This review may have limitations inherent in investigating a phenomenon without a consensus term or definition to search. It is possible that relevant research was not identified due to studies using other terms to describe PVs, not in our search terms. However, in an attempt to reduce this possibility we used terms previously identified from the literature when updating an evidence-based practice guideline related to non-pharmacologic management of agitated behaviors in persons with dementia (Sefcik and Cacchione, 2015). Appraising the robust literature on BPSD as whole to extract what is pertinent to PVs was beyond the scope of this review. We recommend this as next steps.

Based on the small sample sizes in the studies included in this review, it is clear this is a complex phenomenon to study. Needed are larger multi-site studies with larger numbers of heterogeneous participants to gain a better understanding the phenomenon of PVs among NH residents with dementia. This includes longitudinal studies that map the progression of PVs over time (Lai, 1999). More research is needed to determine underlying causes of PVs, particularly in cases of advanced dementia and staff members have difficulty determining unmet needs. Incorporating physiological biomarkers into data collection could aid in identifying physiological changes occurring in a person with dementia prior to PV episodes. Information learned can help develop technology to detect forthcoming PV episodes and NH staff can intervene to potentially minimize the episode.

Conclusion

PVs exhibited by NH residents with dementia are a significant problem for the residents exhibiting PVs and other NH residents, NH staff, and family members in the immediate environment. This integrative review reveals that there is currently little research specifically focused on NH residents with dementia and PVs. Papers examined in this integrative review exposed that inconsistent terms, definitions, and categories were present across the research. There was also little data on effective non-pharmacological interventions for this unique population. PVs exhibited by NH residents with dementia is an underdeveloped area of research. Future research in this area will have a positive impact on the quality of care delivered to all residents in NHs. Additionally, future research in this area can advance science to identify and test person-centered interventions to make residents exhibiting PVs more comfortable, reduce caregiver stress and ease NH visitors' feelings of distress.

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Figure 1.
Flow diagram of article selection.

Table 1

Results of Integrative Review

Author, Year, Type of Study and Country	Label for PVs, Definitions, and Categories	Aims/Research Questions	Site and Sample	Tools Used to Measure PVs	Additional Tools Used	Results Based on Aims/Research Questions
Beck & Vogelwohl 1999 Descriptive Study – Longitudinal USA	Problematic Vocalizations No explicit definition: examples given were scream, curse loudly, cry for help, or display other vocal behaviors that negatively affect other residents, staff, or visitors Aggressive and Agitated Categories	To examine the ways in which factors from the Need-driven Dementia-compromised Behavior model related to PVs.	Nursing Homes N = 3 N = 97 Age = mean 82.5 (range = 65 – 101, SD = 7.1) Cognition = Mini Mental State Examination – 7.77 (SD = 5.98) ^a Gender = 63.3% Female Race = 13.2% Black Type of dementia = Not Specified	45 item Disruptive Behavior Scale (behaviors categorized into 3 groups: aggressive physical, nonaggressive physical, and problematic vocal behaviors) – staff documented biweekly for 2 consecutive days the number of hours per day and evening shifts that each behavior occurred for 18 months	<ul style="list-style-type: none"> • Demographic data • Katz adl scale • Mini Mental State Examination • Multidimensional Observational Scale for Elderly Subjects – Depression Subscale 	Nearly half (48%) of the all the behaviors exhibited by the participants were vocal behaviors and behaviors tended to be consistent over the 18 month study period. Screaming and yelling were most frequent, and correlated positively with aggressive physical behaviors such as scratching, hitting, and pinching. Residents who isolated themselves exhibited less screaming. Aggressive vocal behaviors were associated with being a man, having disordered sleep patterns and a negative affect. Agitated vocal behaviors were associated with being cognitively impaired and having disordered sleep patterns.
Beck et al. 2011 Descriptive Study – Cross-sectional USA	Problematic Vocalizations No explicit definition: examples given were nonaggressive behaviors such as continuous talking and complaining and aggressive behaviors such as screaming and abusive language Aggressive and Nonaggressive Categories	To examine the relative contributions to PV variables derived from the Need-driven Dementia-compromised Behavior model. Research questions: 1 What background variables best predict which persons with dementia will display PVs? 2 What proximal variables best identify the conditions under which PVs occur? 3 In combination, what background and proximal variables are most closely associated with occurrences of PVs? 4 Do these combined background and proximal variables differ for	Nursing Homes N = 17 N = 138 (approximately half had a history of PVs) Age = mean 85.3 (SD = 7.0) Cognition = Mini Mental State Examination – 6.60 (SD = 5.21) ^a Gender = 74.6% Female Race = 93.5% White Type of dementia = Not Specified	History of PVs from MDS 2.0 and reports from staff or family Videotaped participants for seven 20-min periods on two nonconsecutive days – the recorded rates of PVs per minute as defined by the Verbal Behavior Scale and the Cohen-Mansfield Agitation Inventory	<ul style="list-style-type: none"> • Actigraph on wrist • Background data from interviews and chart reviews • Behavioral Response to Stress Scale • Cumulative Illness Rating Scale for Geriatrics • Indoor humidity gauge thermometer • Mini Mental State Examination • MDS 2.0 – motor ability • Neuroticism Extroversion 	The background factors of female gender and positive history of agreeableness was associated with an increase in PVs. The proximal factors of positive and negative affect (emoting) were associated with PVs. Nonaggressive PVs were associated with agreeableness and conscientiousness, positive affect, and discomfort (Verbal Behavior Scale as dependent variable). Aggressive PVs were associated with general health state, age, and negative and positive affect (Verbal Behavior Scale as dependent variable). Background factors of gender, agreeableness, general health state and age, and proximal factors of affect and discomfort remained predictors when the verbally agitated (nonaggressive) section of

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Bédard et al. 2011 Intervention Study – single group repeated measures Canada	Verbal Agitation (VA) “Refers to a verbal activity or repetitive vocalization that is disruptive or inappropriate in the context in which it takes place. It includes screaming, repetitive verbalizations, demands for constant attention, repeated complaints, moaning, muttering as well as threats.” Agitation is the focus (no classification)	<p>nonaggressive and aggressive PVs?</p> <p>Main objectives:</p> <p>1 Identify the proportion of persons with dementia who demonstrate significant behavioral improvements with a need-based intervention to reduce VA.</p> <p>2 To further evaluate the effectiveness of this type of intervention in terms of</p> <p>a. its' impact on the frequency and duration of VA</p> <p>b. whether the effects of the intervention continue immediately after it is stopped</p> <p>c. the patient and treatment characteristics associated with treatment response.</p> <p>Hypothesis: VA is significantly lower when participants are exposed to the</p>	<p>Nursing Homes N = 6 N = 26 Age = mean 84.54 (range 67 – 100; SD = 8.73) Cognition = Dementia Rating Scale 32.83 (SD = 32.48)^b Gender = 16 women and 10 men Race = Not Specified Type of dementia = Alzheimer's n = 14 Mixed n = 6 Vascular n = 2 Lewy bodies n = 1 Other n = 3</p>	<p>Recorded occurrence, frequency, and duration of VA for 30 min by Research Assistant (RA) with handheld computer (VA behaviors from the French version of the Cohen-Mansfield Agitation Inventory – swearing and verbal aggression, constant demands for attention, repetition of phrases or questions, making strange noises, screaming, moaning, negativity and verbal sexual advances) Typology of vocalizations to</p>	<ul style="list-style-type: none"> • Openness Five Factor Inventory • Observable Displays of Affect Scale • Physiological Need State Assessment (investigator developed instrument) - looked at hunger, thirst, pain and the need for elimination • Video observations • Charlson Comorbidity Index • Dementia Rating Scale-2 • Dysphoria scale of the Neuropsychiatric Inventory – Nursing Home Version • Functional Autonomy Measurement System • Intervention checklist (3 components of the treatment: attention, comfort and stimulation) and tracking of additional interventions reported by caregivers and nursing staff's actions during the observation period 	<p>the Cohen-Mansfield Agitation Inventory was the dependent variable.</p> <p>VA frequency was reduced by 14% and duration was reduced by 40% during the intervention phase compared to baseline. During the intervention, more than half of participants (54%) showed significant behavioral improvement in the duration of VA. VA duration returned to similar baseline immediately after the intervention. Participants who showed greater improvement with the treatment were men, those with types of dementia other than Alzheimer's, having higher levels of cognition, being more independent in activities of daily living, more frequent request for help, and those who received the attention component for a longer. Less responsive to the treatment: those who had a longer sensory stimulation component, more disruptive VA (moaning or senseless speech).</p>

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Bourbonnais & Ducharme 2010 Descriptive Study – Qualitative Canada	Screams No explicit definition given Term scream was used in this paper “to avoid ascribing any preconceived meaning to the behavior”. Participants recruited if they were observed to manifest vocal behaviors that did not seem appropriate in their context Agitated or not agitated when screaming categories	To explore the meaning of screams in older persons living with dementia and their influencing factors.	Nursing Home = 1 N = 7 (7 triads composed of an older person, a family member, and one or two formal caregivers – total of 23 people) Age = mean 81 (range 72 – 94) Cognition = 1 mild, 4 moderate, 2 severe Gender = 4 female, 3 male Race = Not Specified Type of dementia = Not Specified	classify; a) type, b) meaning, reason, and content, c) time distribution, and d) disruptiveness completed by RA (Cohen-Mansfield & Werner, 1997)	<ul style="list-style-type: none"> Participant's level of engagement Sociodemographic data 	Major themes and subthemes; Meaning of Screams: a) Living Between Two Worlds; Vulnerability, Suffering and Loss of Meaning; b) Modulations in the Meanings of Screams: When the End Explains the Means; c) Singularity of the Meanings of Screams Factors Influencing the Meaning of Screams: a) Stability and Flexibility in the Nursing Care Organization; Conditions influencing the Meanings of Screams; b) The Home Environment of An Older Person is Also the Home of Other Older Persons, as well as a Work Environment; Reciprocal Effects on the Meanings of Screams; c) Learning the Unique Language of Each Older Person and Its Influence on the Interpretation of the Meanings of Screams; d) “Being With” Older Persons by Respecting Their Personality, Wishes and Needs; Repercussions on the Meaning of Screams; e) Shifts in Power Relations within the Triad (To Relinquish, to Impose, or to Be Imposed Upon) and its Outcomes for the Meanings of Screams; f) Feelings of Powerlessness and Guilt: A Shared Experience for Family and Formal Caregivers Derived from the Meanings of Screams
Cohen-Mansfield et al. 2003	Disruptive Vocalizations/ Vocally	The aims of the study were to: 1) characterize the sounds emitted during VDB by NH residents and 2) to investigate whether the properties of VDB	Nursing Homes = Number Not Specified N = 26	Direct observations of participants for 2 weeks by	<ul style="list-style-type: none"> Brief Cognitive Rating Scale 	Verbally agitated vocalizations were characterized by relatively short duration – mean 1.355

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Descriptive Study – Correlational USA	Disruptive Behaviors/Vocal and Verbal Disruptive Behaviors (VDB) No explicit definition; examples given were shouting, or screaming, or howling that is loud, shrill, or piercing Categories according to the Typology of Vocalizations (Cohen-Mansfield & Werner, 1997) Agitation	correlate with a) characteristics of the older person emitting the sound and b) characteristics of the sounds emitted by the person as perceived by research assistants.	Age = 86.3 (SE = 1.3) Cognition = Brief Cognitive Rating Scale – mean 5.7 ^c Gender = 81% female (n = 21) Race = Not Specified Type of dementia = Alzheimer's = 16 Vascular = 5 Other = 5	Screaming Behavioral Mapping Instrument by RA for type and frequency of VDB – includes 9 types: shouting, screaming or howling, constant requests for attention, repeating words, complaining or inappropriate verbal, cursing, verbal aggression, nonsense talk, hallucinations, and other disruptive verbal behaviors, such as growling and singing Sonographic evaluation and acoustic analysis of recordings of PVs Typology of Vocalization rating quality of sound and disruptiveness by RA – categories included: groan, yell, shriek, mumble, loud song, sigh, loud talk, chatter, howl, disruptive talk, inappropriate verbal and other	<ul style="list-style-type: none"> Demographic and background information Medical information from chart review Physical Self-Maintenance Scale of Lawton and Brody 	seconds(s) (range = 0.275s – 3.722s). A positive correlation was found between acoustic parameters and medical diagnosis/disease states (not including dementia diagnosis). Those diagnosed with probable Alzheimer's disease had longer sequences of vocalizations than those with other types of dementia. Positive correlations were found between disturbing vocalizations (yelling and howling) and higher levels of several parameters of the fundamental frequency from the acoustic analysis. Results were generally inconclusive.
Matteau et al. 2003 Descriptive Study – Correlational	Disruptive Vocalizations "DV" refers primarily to verbal or vocal	To explore the relationship between language deterioration and manifestations of DVs in persons suffering from dementia who are living in NHs. More precisely, this study attempted to examine	Nursing Homes = 6 N = 59 Age = PLS = mean 83.9	CMAI vocalization subset items – 8 items: cursing or verbal	<ul style="list-style-type: none"> Depression – from medical record Functional Autonomy 	Altered Language Skills (ALS) group produced DVs at a significantly greater frequency than the Preserved Language Skills (PLS) group. ALS group emitted a

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Canada	behaviors that are repetitive, disturbing, or inappropriate according to the situations in which they occur. (Cohen-Mansfield, Werner, & Rosenthal, 1989). DV can take various forms such as complaining, yelling, swearing, growling, repeatedly asking questions, and constantly requesting attention (Cohen-Mansfield & Werner, 1994), and these can be of an aggressive or nonaggressive nature (Cohen-Mansfield, Werner, Watson, & Pasis, 1995). The content of DV can also be characterized as either mostly verbal and nonverbal (Sloane et al., 1999), "Agitation	differences in frequency of DV and in total number of distinct forms of DV manifested between patients with mild language deficits (preserved language skills – PLS) and patients with severely altered language skills (ALS).	(SD = 5.42) ALS = mean 80.9 (SD = 8.75) Cognition = Functional Assessment Staging PLS = Level 3 = 3, Level 4 = 38, Level 5 = 34, Level 6 = 22, Level 7 = 3 ALS = Level 4 = 10, Level 5 = 20, Level 6 = 43, Level 7 = 27 ^d Gender = PLS = 72% women ALS = 80% women Race = Not Specified Types of dementia = PLS Alzheimer's = 45 Vascular = 21 Mixed = 20 Unspecified = 14 ALS Alzheimer's = 53 Vascular = 17 Mixed = 17 Unspecified = 13	aggression, complaining, constant requests for attention, negativism, repetitive sentences or questions or repeating phrases, screaming, making strange noises, and sexual advances	Measurement System • Functional Linguistic Communication Inventory • Sleep disorders and pain – from medical record	significantly greater number of distinct DV forms than the PLS group.
Palesse et al. 2009 Descriptive Study – Observational Italy	Disruptive Vocalizations "The term disruptive vocalizations includes all types of	Aims of the study: 1 To describe the exposure by time of nurses working in nursing homes to dementia patients' DV and the types of DV during their daily shift work	Nursing Homes = 5 N = 39 Age = mean 86.6 (range 71 – 97, SD = 6.1)	Nurses (n=22) kept a structured diary recording the strategies that they used for managing the observed PV and	• Barthel's index score (Activities of Daily Living)	Each nurse was involved in DV management for about 100 minutes per shift (14.4 minutes for an average of 7 times per shift). Types of DVs observed in order of frequency: Call for help, Moaning/groaning, nonsensical phrases,

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	disturbing or unacceptable vocal expression: repetitive vocalization, verbal or nonverbal noises, presented as inappropriate language, repeated and insistent demands, repeated calling out, shouting, complaining, or moaning that does not pertain to their circumstances or environment (McMinn & Draper, 2005). ¹⁷ No classification	<p>2 To describe the nurses' interventions used to manage DV in their daily practice</p> <p>3 To discover the effectiveness of these interventions during the DV episode and the nurses' perceptions of their effectiveness</p> <p>4 To describe the determining factors for nurse intervention in DV</p>	Cognition = Mini Mental State Examination – mean 1.5 (range 0 – 14, SD = 3.4) ^d Gender = Not Specified Race = Not Specified Type of dementia = Not Specified	the duration of each episode.		<p>expressing needs, speaking or muttering to himself or herself, singing, and screaming/yelling. Three different interventions used:</p> <p>1 Single strategy (a. speaking to or touching the patient (emotional intervention); b. managing a specific need: mobilization, hygiene, nutrition, hydration, or urinary or fecal elimination (physical intervention))</p> <p>2 Multiple strategies – combining emotional and physical intervention (e.g., speaking to patient, touching them, and mobilizing them)</p> <p>3 Pharmacological strategies (analgesics, tranquilizers or sedatives) Additionally – No intervention was delivered when the nurses had no time or excessive workload or when they had exhausted all other possible strategies</p> <p>Nurses perceived their intervention as being satisfactory in 344 (57%) episodes of DV and unsatisfactory with 260 (43%) episodes. When nurses used multiple strategies, they felt more satisfied than when using a single strategy or pharmacological intervention. The following patient types were more likely to be cared for using multiple strategies: A. those who moaned/groaned, B. those who stayed in their rooms, C. those</p>

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van der Geer et al. 2009 Descriptive Study The Netherlands	Verbal and vocal agitation (VVA) "Residents who show irritability, make lewd remarks, swear and show verbal aggression, demand for attention continuously and excessively, repeat sentences or question, make unusual noises, shout, scream and shriek, complain and show negativity (Cohen-Mansfield and Werner, 1997; Vink, 2000)." Agitation	<p>1 What is the current supply of music, both nonspecific and tailored, to patients with dementia and verbal and vocal agitation living in Dutch nursing homes during various care activities?</p> <p>2 Are the musical preferences of the residents known and are these preferences taken into account when determining the kind of music to be played?</p>	Nursing Homes = 17 N = 37 (NH physicians and care providers) N = 51 residents were discussed Age = 84.5 (range 58–99) Cognition = Global Deterioration Scale (GDS) – Phase 4 = 2; Phase 5 = 8, Phase 6 = 29, Phase 7 = 12 Gender = 12 male (24%) and 39 female (76%) Race = Not Specified Type of dementia = Not Specified	In person interviews with a semi-structured survey with NH physician and staff members.	N/A	<p>institutionalized for more than 3 years, D. those with a MMSE score >2, and E. those who nurses hypothesized were lonely.</p> <p>Music was offered primarily during the midmorning coffee and the afternoon tea and did not often correspond with the residents' preferences as it was geared to the group. Respondents knew 80% of the residents' music preferences. For 24 cases musical preferences were reported in the residents' record.</p>

^aMini Mental State Examination range 0 – 30 (0–10 indicates severe impairment; 25–30 questionably significant, mild deficits);

^bDementia Rating Scale-2 range 0 – 86 (0 indicating mild; 86 indicating severe);

^cBrief Cognitive Rating Scale – range 1 – 7 (1 indicates no cognitive decline present; 7 indicating complete cognitive deterioration);

^dFunctional Assessment Staging (FAST) – range 0 – 7 (0 indicates normal function and 7 indicates severely demented state);

^eGlobal Deterioration Scale – range 1 – 7 (1 indicating no cognitive decline; 7 indicating severe dementia)