Introduction

Dementia is common in older adults in the United States (US); approximately 7.9 million people are living with dementia, of whom 3.95 million carry a diagnosis of at least one dementia type.\textsuperscript{1,2} However, data from 2 large databases indicate that more than half of individuals with dementia had mixed neuropathologies.\textsuperscript{4}

The most common type of dementia is Alzheimer’s disease (AD) dementia. It accounts for approximately 69.6% of dementia and about 5.5 million people in the US.\textsuperscript{1,3,5}

Vascular dementia is the next most common, accounting for about 20% of dementia and about 1.6 million US individuals.\textsuperscript{1,2} Other types of dementia are estimated to have the following prevalence in the US: dementia with Lewy bodies (DLB), approximately 5.4% of dementia (\textasciitilde430,000 people);\textsuperscript{1,6-8} Parkinson’s disease (PD) dementia, approximately 4% of dementia (\textasciitilde320,000 people);\textsuperscript{7,8} and frontotemporal dementia, approximately 1% of dementia (\textasciitilde80,000 people).\textsuperscript{1}

According to the 2015 National Health and Aging Trends Study, the prevalence of dementia increases with age, although some individuals experience symptom onset at a younger age.\textsuperscript{9} Moreover, as the US population ages, the number of people with dementia is expected to grow.\textsuperscript{9}

Dementia involves more than cognition

Neuropsychiatric symptoms are common among people with dementia, and their onset can occur at various times in the course of the illness.\textsuperscript{10-12} Among 209 people with dementia living in long-term care facilities (mean age, 83 years), 79% have one or more clinically significant neuropsychiatric symptom, and 97% of community-dwelling adults aged \textasciitilde65 years with dementia (N=408) have one or more neuropsychiatric symptom.\textsuperscript{10,11}

Neuropsychiatric symptoms are a common feature across the dementias and include delusions, hallucinations, agitation/aggression, depression, apathy, elation, anxiety, disinhibition, irritability, and aberrant motor behavior.\textsuperscript{10}

Psychiatric symptoms can occur months, and even years, before the diagnosis of dementia. A study examining 100 individuals with AD specifically found social withdrawal occurred an average of 33 months before diagnosis and was the earliest recognizable psychiatric symptom observed (Figure 1).\textsuperscript{12}
Prevalence of Delusions and Hallucinations

A **delusion** is defined as a false, fixed belief despite evidence to the contrary. A **hallucination**, in contrast, is defined as a perception-like experience that occurs without an external stimulus and is sensory in nature.

Although the specific nature of delusions and hallucinations may vary between individual patients and across dementia types, a study of 124 people aged ≥65 years diagnosed with mild or moderate dementia of any type showed that some of the most common delusions were delusions of reference, theft or possessions being hidden, and strangers in the house, also known as phantom boarder delusion (frequency: >20% to 25%). Hallucinations documented in this population were second-person auditory hallucinations, visual hallucinations of animals or insects, and visual hallucinations of relatives in the house (frequency: >5% to 20%).

Approximately 2.4 million people in the US have dementia-related psychosis (ie, experience delusions and hallucinations), with varying prevalence rates across the dementias (Table 1).

**Delusions and hallucinations in people with dementia occur episodically and may persist.**

Research on 124 community-dwelling older adults found that of those with dementia, most experienced symptoms of psychosis 2 to 6 times per week. In a study among 181 people with AD, symptoms of psychosis were episodic, meaning that they tended to come and go over time, such that cross-sectional observation of the frequency of symptoms (12% to 25%) at any visit tended to underestimate the 1-year prevalence rate in this population (36%).

Delusions and hallucinations may be persistent and increase over time in some individuals with dementia. A systematic review of 59 studies reporting behavioral and psychological...
symptoms of dementia found that although the persistence of psychotic symptoms beyond 3 months was mostly below 30%, in some studies delusions persisted beyond 3 months in 0% to 82% of patients, and hallucinations persisted for that period in 0% to 52% of patients. In another study of 408 community-dwelling adults aged ≥65 years, the proportion with newly identified dementia who experienced delusions or hallucinations approximately doubled over a 5-year period. The point prevalence of delusions increased from 18% at baseline to 34% to 38% during the last 3 follow-up visits. Approximately 60% of patients experienced delusions at some point during the 5-year period. The point prevalence of hallucinations increased from 10% at baseline to 19% to 24% at all subsequent visits, with an overall 5-year period prevalence of approximately 40%.

**Delusions and hallucinations in dementia may be associated with aggression**

In people with dementia, the association between symptoms of delusions and hallucinations and episodes of aggression is complex. Some studies have found that delusions and—to a lesser degree—hallucinations may be associated with aggression in dementia. A study of 270 outpatients with probable AD (of whom, 227 had delusions or hallucinations) who were followed for 12 months reported that the presence of delusions increased the relative risk of physical aggression 2.8-fold after controlling for dementia severity and previous episodes of aggression (relative risk [RR], 2.8; 95% confidence interval [CI], 1.3-4.3; P=0.009). However, hallucinations did not increase the relative risk of physical aggression in this study (RR, 1.2; 95% CI, 0.3-2.7; P=0.653).

In a cross-sectional study of 103,344 nursing home residents aged ≥60 years with dementia, 7120 (6.9%) were reported to have been aggressive in the week prior to their annual health assessment; of those, 1002 people had delusions or hallucinations. The presence of delusions was associated with a 2-fold increased odds of physical aggression (odds ratio [OR], 2.0; 99% CI, 1.7-2.4), and hallucinations were associated with a 1.4-fold increased odds of physical aggression (OR, 1.4; 99% CI, 1.1-1.8) after adjusting for potential confounders (eg, age, gender, severity of cognitive impairment). Depression had the highest odds of physical aggression in this study (OR, 3.3; 99% CI, 3.0-3.6).

In another cross-sectional study of 1155 people diagnosed with probable AD (of whom, 468 had delusions or hallucinations), psychosis increased the odds of physical or verbal aggression in people with moderate (OR, 2.35; 95% CI, 1.78-3.06) or severe (OR, 11.1; 95% CI, 8.4-14.4) stages of AD.

**Conclusions**

Delusions and hallucinations are prevalent across the dementias, and the onset of these and other neuropsychiatric symptoms can occur at various times in the course of the illness. Symptoms of dementia-related psychosis occur episodically, and the nature and duration of episodes vary between patients and across dementia types. Delusions and hallucinations may be associated with the risk of aggression in some patients with dementia, although more research is needed to better understand the potential relationship.

<table>
<thead>
<tr>
<th>No. of People in US With Dementia</th>
<th>Overall Psychosis Prevalence</th>
<th>Delusions Prevalence</th>
<th>Hallucinations Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s Disease Dementia</td>
<td>~5.5 million</td>
<td>30%</td>
<td>10%-39%</td>
</tr>
<tr>
<td>Vascular Dementia</td>
<td>~1.6 million</td>
<td>15%</td>
<td>14%-27%</td>
</tr>
<tr>
<td>Dementia With Lewy Bodies</td>
<td>~430,000</td>
<td>75%</td>
<td>40%-57%</td>
</tr>
<tr>
<td>Parkinson’s Disease Dementia</td>
<td>~320,000</td>
<td>50%</td>
<td>28%-50%</td>
</tr>
<tr>
<td>Frontotemporal Dementia</td>
<td>~80,000</td>
<td>10%</td>
<td>2.3%-6%</td>
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</tbody>
</table>

~2.4 million people in the US have dementia-related psychosis