

# The curvy side of dementia: The impact of gender on prevalence and caregiving

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## Educational aims

- To provide an overview on the relationship between gender and dementia prevalence
- To highlight physiological specific gender differences in dementia, particularly in Alzheimer's disease
- To determine the role of the female gender in dementia caregiving

## Key words

Dementia, Alzheimer's disease, gender, caregiving

## Abstract

**Dementia, the most common form of which is Alzheimer's disease, is a mental illness characterised by progressive deterioration of cognitive function. Various studies indicate that significant gender differences exist in dementia prevalence and caregiving with women being the most negatively affected. Biological variations in hormonal regulation and immune response can lead to changes in cognitive function. Depression, which is more prevalent in females, is also associated with a higher risk of developing dementia. The majority of caregivers of individuals with dementia are women, the latter experiencing more psychological burden than men. This highlights the importance of more research in gender-specific issues relating to caring for individuals with dementia in order to develop interventions aimed at improving the quality of life through bettering dementia management and care.**

## Introduction: the dementia epidemic

Dementia is a group of brain disorders characterised by significant neurodegeneration leading to progressive loss of cognitive function. It is the most common neurological disorder in old age contributing to 11.9 years lived with disability in individuals aged 60 years and over.<sup>1</sup> Alzheimer's disease (AD) is the most common form of dementia accounting for 60-70% of the cases. Other forms include vascular dementia (VaD), Lewy-body dementia (LBD), fronto-temporal dementia (FTD) and dementia secondary to disease.

Age remains the most important non-modifiable risk factor in developing dementia. Although it is possible to develop dementia early on in life, the risk increases exponentially with age. Women are most likely to develop AD and having a first degree relative with the condition increases the risk slightly compared to absent family history. Cardiovascular morbidities such as high blood pressure, hypercholesterolaemia, diabetes and obesity are major risk factors, as is stroke. Conversely, active engagement in mental, physical and social activities may delay the onset of the most common forms of dementia.

Symptoms are mainly characterised by a decline in recent memory, faulty judgment, confusion and loss of communication. With disease progression, memory decline worsens whereas language, attention, and executive functions become gradually impaired with patients losing the ability to perform activities of daily living such as dressing, washing and eating. At the end stage, dementia becomes so debilitating that the patients become mute, incontinent and unable to walk, with the consequence of becoming bedridden and prone to illness and infection.

Currently, there are 45 million people with dementia worldwide, with the majority

being women. This figure is projected to almost double every twenty years reaching 76 million in 2030 and 136 million in 2050.<sup>2</sup> The global societal costs of dementia are enormous as the total estimated worldwide expenditure for the year 2010 was estimated to be €30 billion, equivalent to 1% of the world's Gross Domestic Product.<sup>2</sup> The latest prevalence estimates for Malta indicated that, in 2010, there were 5,198 individuals with dementia. This figure will reach 13,000 in 2050, equivalent to 3.3% (1.16% males, 2.14% females) of the total population.<sup>3</sup> This will invariably put greater demands on the national health and social systems leading to significant socio-economic consequences as more people will reach out for public-funded services.

### Dementia: gender differences

Age and gender are predominant risk factors in AD, the most common form of dementia. In general, women have greater life expectancies than men. Whether this contributes directly to a higher risk of developing AD is still debatable due to the uncertainty of what would have happened, in terms of neuropathology, if men survived to later ages.<sup>4</sup>

Research studies into the role of sex hormones and cognitive status have indicated that oestrogen may play an important role in dementia, particularly AD. Oestrogen has been reported to have beneficial effects on the brain, possibly acting as a protective factor in AD via its ability to promote the growth, survival and activity of cholinergic neurons.<sup>5,6,7</sup> However, the use of hormone replacement therapy (HRT) to protect cognitive decline in ageing has produced inconsistent results in observational studies. This may be partly due to the timing of commencing HRT, with the greatest protective effect in AD observed if therapy is initiated early in menopause.<sup>8</sup> Interestingly, such beneficial effects were only observed with the use of oestrogen as oestrogen-progesterone combination therapy was found to have detrimental effects on verbal memory.<sup>9,10</sup>

An emerging risk factor in dementia is depression. The greater the frequency and severity of depressive symptoms, the greater are the risks.<sup>11</sup> On average, women have higher rates of depression than men. Depression is also linked to cardiovascular disease, the latter a significant risk factor for stroke.<sup>12</sup> The manner with which depression

### Key points

- Alzheimer's disease, the most common form of dementia, is more likely to be present in women. Symptoms include loss of recent memory, impaired communication skills, confusion and inability to perform activities of daily living.
- Oestrogen-replacement therapy can act as a protective factor against dementia if started early on in menopause. Oestrogen-progesterone combination therapy has been found to have no effect on lowering the risk of cognitive decline.
- Women are more likely to experience the burden of dementia care. They are also at a greater risk of developing depression, the latter an important risk factor in dementia.

affects the brain is still unclear. Post-mortem analysis of depressed patients has shown reduced hippocampal volume,<sup>13</sup> a brain area important for memory formation. Animal models of depression reported reduced neural plasticity and a reduction in neurogenesis that was reversed on the administration of antidepressant drugs.<sup>14</sup> Other important gender-related changes in AD and other related dementias such as Lewy-body dementia (LBD) include neuroinflammatory events. For example, the levels of hyaluronic acid, a molecule involved in the regulation of the inflammatory process, is higher in males with AD and LBD compared to female patients.<sup>15</sup>

The relationship between gender differences and AD pharmacotherapy has not yet been clearly established although animal studies have produced a substantial amount of evidence to support the hypothesis that sex may influence the response to acetylcholinesterase inhibitors (AChEIs), a class of drugs recommended to improve the cognitive symptoms in mild-to-moderate AD. In particular, testosterone may play an important role in producing the observed differences by its influence on the entry of AChEIs into the brain.<sup>16</sup> Women are also more likely to respond to treatment with donepezil and rivastigmine, leading to less cognitive decline.<sup>17</sup> In general, women with dementia are at a greater risk of being exposed to side-effects originating from drug-drug interactions as they are more subjected to polypharmacy compared to men.<sup>18</sup>

### Caregiving: a woman's world

Although the proportion of male caregivers is increasing, caregiving in dementia has traditionally been considered as an activity reserved for women. Caregiving, although rated as a positive experience for some, is normally associated with burden and psychological morbidity characterised

by financial hardship, ill-health and social isolation.<sup>19</sup> Although individuals with dementia require a high level of care, especially in the late stages of the condition, the majority of them live in the community. The largest proportion of caregivers is made up of spouses or children, mostly females.<sup>20</sup> The motivations behind caregiving may be various and include a sense of duty, social pressure, greed, love, reciprocity, guilt and religious contentment.<sup>21</sup> Dementia caregiving is also time-consuming with a quarter of caregivers spending more than 11 hours per week providing informal support such as assisting with activities of daily living.<sup>20</sup> It is therefore not surprising that caregivers experience mental health issues such as anxiety, stress and depression.<sup>22</sup> Financial costs are high and add to the burden of care. On average, an individual with dementia costs €22,000 per year in European member countries, of which 56% are costs of informal care.<sup>23</sup>

A number of studies suggest that gender-specific differences exist in the provision of dementia caregiving. Women approach caregiving differently and experience more stress and use more services than men.<sup>24</sup> On average, wives continue to provide care for longer and husbands with dementia receive significantly more hours of care than wives with dementia do from their husbands.<sup>25</sup> Males experience fewer burdens in taking care of their wives with dementia, irrespective of the disease progression, even though male caregivers have higher levels of comorbidities.<sup>26</sup> The latter may be due to the fact that gender differences exist in the way caregiving roles and coping strategies are perceived.<sup>27</sup>

The organisation of dementia caregiving in Malta was recently evaluated by Innes and colleagues.<sup>28</sup> In the absence of

formal community services, families have developed innovative rotating care patterns to accommodate individual family member's social and working lives. As with other countries, women are expected to provide most of the hands-on delivery of care with men participating only in decision taking. To meet the demands of their family lives and sole caregivers of a parent with dementia, women often have to give up their work. Although creative solutions in providing care for a relative with dementia are often found, rotation of care contributes to a situation where dementia caregiving is marginalised and dislocated from community life.<sup>28</sup>

In conclusion, important gender differences exist across various aspects of dementia. More research is needed focusing on the biological differences between the two sexes that has an impact on dementia onset and progression. Furthermore, more data is necessary on the effect of caregiving on men and women in order to design and develop tailor-made services that enhances the quality of life of patients and caregivers alike.

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