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## Original Study

## Use of Anticholinergic Drugs and its Relationship With Psychological Well-Being and Mortality in Long-Term Care Facilities in Helsinki

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## A B S T R A C T

*Keywords:*Anticholinergic drug  
aged  
psychological well-being  
mortality*Objectives:* To assess the burden of drugs with anticholinergic properties (DAPs) and associated factors in long-term care facilities and to explore how psychological well-being and mortality are associated with the use of DAPs.*Design:* Cross-sectional study and 1-year follow-up of all-cause mortality.*Setting and Participants:* All 4449 older people (>65 years of age) living in nursing homes and assisted living facilities in Helsinki in 2011 were recruited. After refusals and excluding residents with severe dementia, 2432 participants remained.*Measurements:* Data on demographics, drug use, and medical history were collected by trained nurses using a structured assessment. Psychological well-being (PWB) of participants was assessed by 6 questions resulting in a validated PWB score (range 0–1). Mortality data were retrieved from central registers. The total number of anticholinergic drugs was determined according to the Anticholinergic Risk Scale.*Results:* Of the participants, 51% used at least 1 DAP. DAP users were younger and had better cognition than nonusers. There was a linear relationship between the number of DAPs used and poorer PWB. A similar trend was present between the number of DAPs and poorer PWB both among those with and without depression and among those with and without functional dependency. No difference in mortality existed between DAP users and nonusers.*Conclusions:* Despite DAP users being younger and having better cognition, they had poorer PWB. Clinicians should carefully consider the potential benefits and harm when prescribing DAPs to older people.

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Polypharmacy is common among older adults in nursing homes.<sup>1</sup> Nursing home residents have a high number of comorbidities that need to be appropriately managed. The treatment must alleviate symptoms and provide sufficient palliative care to achieve good quality of life (QOL). Drugs with anticholinergic properties (DAPs) are mainly considered inappropriate medications for older persons and,

thus, to be avoided.<sup>2,3</sup> However, they are used for a large number of conditions, mainly to manage symptoms.<sup>4</sup> The prevalence of anticholinergic drug use in nursing home populations varies between 10.5% and 77% depending on the various definitions and scales used for DAPs as well as the different populations.<sup>5–7</sup>

Anticholinergic drugs are considered to be potentially harmful because of adverse effects on both the peripheral and central nervous systems.<sup>8</sup> Adverse effects include, for example, constipation, dryness of mouth, dry eyes, and tachycardia<sup>3</sup> as well as dizziness, potentially leading to falls.<sup>9</sup> Frail older people are particularly vulnerable to central adverse effects such as dizziness, sedation, and cognitive decline.<sup>10</sup> Numerous studies have explored whether the burden of using several DAPs leads to worse outcomes than more moderate use of DAPs.<sup>11</sup> The cognitive side effects seem to be more significant with a

This study was supported by the City of Helsinki and the Sohlberg Foundation. The funding sources had no role in the design or conduct of the study; in the collection, analysis, or interpretation of the data; or in the preparation, review, or approval of the manuscript.

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<https://doi.org/10.1016/j.jamda.2017.11.013>

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higher burden of DAPs irrespective of the DAP scale used.<sup>11</sup> Studies exploring the association of DAPs with mortality have shown controversial findings.<sup>9</sup> To our knowledge, only a few studies have examined the relationship between the use of DAPs and QOL. Although 1 study found an association between use of DAPs and psychological well-being (PWB),<sup>12</sup> another found no such association.<sup>13</sup>

The objective of this study was to investigate the use of DAPs among residents in long-term care facilities and associated factors, particularly PWB and mortality. We especially wanted to clarify the relationships between a higher number of DAPs and participants' characteristics, PWB, and mortality.

## Methods

The current study is part of a larger study<sup>14,15</sup> investigating older people's (>65 years of age) nutritional status and associated factors in all long-term care facilities. In 2011, cross-sectional data were collected for all older persons living in institutional care, both assisted living facilities, and nursing homes in Helsinki (n = 4449). Assisted living facilities are similar to traditional nursing homes with respect to providing 24-hour nursing care but have a more home-like environment. Assisted living facilities also include group homes for patients with dementia. Of participants, 1097 were excluded because of dementia and not having a close proxy to give informed consent or patient refusal. In addition, we excluded residents with severe dementia [Clinical Dementia Rating (CDR) 3] to include only those able to respond to PWB. So, finally, 2432 participants remained. Informed consent was obtained from each participant and in case of significant cognitive decline (CDR 2) from their closest proxy. This study was approved by the Helsinki University Central Hospital Ethics Committee.

In each unit, a trained nurse assessed the resident's status by retrieving background data from medical records on demographic factors, active diagnoses (chronic conditions and acute illnesses), and medication, and carried out the assessments and interviews according to a structured questionnaire. Each resident was assessed over the course of 1 day, and all data concerning medication use was a point prevalence on the same day.

Nutritional status was assessed by the Mini-Nutritional Assessment.<sup>16</sup> The Mini-Nutritional Assessment includes questions concerning nutritional status and general health status. A total score of less than 17 points indicates malnutrition, 17–23.5 points a risk for malnutrition, and over 23.5 points normal nutritional status, with the maximum score being 30 points. Cognitive function was evaluated by the CDR scale "memory" item (0–0.5, no or possible memory problems; 1, mild problems; 2–3, moderate or severe problems), which is a validated method to assess the stage of dementia.<sup>17</sup> Resident's ability to move was assessed by the question "Is the resident able to move inside?" (1 = yes, 2 = no, needs a stick or a walker, 3 = no, needs another person's aid, 4 = no, can't walk at all). Those in groups 1 and 2 were considered to move independently. Dependence in activities of daily living (ADL) was assessed by a 4-point scale according to CDR "personal care" item (1 = totally independent; 2 = needs prompting, 3 = requires assistance in dressing, personal hygiene, and keeping of personal belongings, 4 = requires much help with personal care; often incontinent).<sup>17</sup> Those in groups 3 and 4 were considered to be dependent on help from other people. All active diagnoses retrieved from medical records were taken into account when constructing the Charlson comorbidity index, which is a method to evaluate the number and severity of comorbid conditions.<sup>18</sup>

The use of medications was retrieved from medical records during the assessment day. Residents were considered to be a regular drug user if their medical charts indicated a regular sequence for its dosage. All drugs were classified according to the Anatomical

Therapeutic Chemical Classification System (World Health Organization Collaborating Center for Drug Statistics Methodology).<sup>19</sup> All DAPs used by the participants were listed and classified according to the Anticholinergic Risk Scale (ARS), which is a list of commonly prescribed medications with anticholinergic potential.<sup>3</sup> We calculated the total number of DAPs used, and the participants were divided into 4 groups based on usage: group 0 (G0, using no DAPs) (n = 1191), group 1 (G1, using 1 DAP) (n = 682), group 2 (G2, using 2 DAPs) (n = 313), and group 3 (G3, using 3 or more DAPs) (n = 246). Some typical symptoms in older people, such as dry mouth and constipation, were also assessed for they are known to be common peripheral side-effects of DAPs.<sup>20</sup>

PWB was evaluated by asking the residents the following 6 questions: (1) "Are you satisfied with your life? (yes/no); (2) "Do you have zest for life?" (yes/no); (3) "Do you feel needed?" (yes/no); (4) "Do you have plans for the future?" (yes/no); (5) "Do you suffer from loneliness?" (seldom or never/sometimes/often or always); and (6) "Do you feel depressed?" (seldom or never/sometimes/often or always). The PWB score was created from these questions and counted as follows: 0 points ("no" in questions 1–4, "often or always" in questions 5–6), 0.5 point ("sometimes" in questions 5–6), and 1 point ("yes" in questions 1–4, "never or seldom" in questions 5–6), and the total number of points was then divided by the number of questions answered. Thus, the range of PWB scale is from 0 to 1. These questions have been used since 1989 in several studies<sup>21–23</sup> and their validity is established. Each question shows good reliability,<sup>22</sup> significant prognostic validity,<sup>21</sup> and good concurrent validity with The World Health Organization Quality of Life (WHOQOL)-Bref.<sup>24</sup> Residents' subjective health (self-rated health) was evaluated with the question "How do you rate your current health status?" (1 = healthy, 2 = quite healthy, 3 = unhealthy, and 4 = very unhealthy). Those answering "healthy" and "quite healthy" were considered as having good self-rated health.

Mortality was retrieved from central registers over a 1-year follow-up.

Statistical significance for the hypothesis of linearity across categories of anticholinergic properties groups were evaluated using generalized linear models (eg, analysis of variance and logistic models) with appropriate distribution and link function. Models included age and sex as covariates. In the case of violation of assumptions (eg, non-normality), a bootstrap-type method was used (10 000 replications) to estimate standard error. The normality of variables was evaluated by the Shapiro-Wilk W test. All analyses were performed using STATA v 15.0 (StataCorp, College Station, TX).

## Results

A total of 1241 patients (51%) were DAP users (groups G1–G3), and 1191 patients (49%) were not using any DAPs (group G0). The DAP users were significantly younger than the nonusers (*P* for trend <.001). Those using multiple DAPs were less often widowed. The nonusers had more often moderate cognitive impairment graded by CDR memory scale (35%) than the DAP users. The corresponding figures in G1, G2, and G3 were 33%, 29%, and 24%, respectively (*P* for trend .007). No significant differences existed between groups with respect to sex distributions, education, nutritional state, or dependency in ADL personal care or ability to walk inside (Table 1).

The groups differed from each other in self-rated health. In G3, only 53% of participants considered their subjective health as good. For G0, G1, and G2, the figures were 66%, 65%, and 68%, respectively (*P* for trend .016). Those not using DAPs had a significantly higher Charlson comorbidity index (2.4) than those using DAPs (*P* for trend .006). Of nonusers, 64% suffered from dementia, whereas in DAP users dementia was slightly more common in G1 (68%) and prevalence of dementia decreased in G2 (63%) and G3 (46%) (*P* for trend 0.011). DAP

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