

## Oral Dryness of Elderly Patients with Dementia

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### Abstract

The number of elderly patients suffering from dementia is rising steadily, and oral dryness is regarded as an oral abnormality normally found in those patients. The disease affects their oral health status, as well.

To explore studies concerning oral dryness of elderly patients with dementia from Pubmed (Medline), Web of Science, Cochrane Library, EMBASE and CINAHL, and evaluate quality of articles written by two authors independently.

The search contributed to 48 articles from Pubmed (Medline), 10 from Web of Science, 4 from Cochrane Library, 77 from EMBASE and 16 from CINAHL. The analysis, though, was carried out for 11 articles concerning oral dryness of elderly patients with dementia.

Oral dryness is usually found among elderly patients with dementia. However, the issue has rarely been studied, so there should be more research to provide knowledge for more effective management of the patients.

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### Introduction

Dementia is a physical abnormality frequently found in many elderly patients. At present, there are up to 50 million people suffering from the disease worldwide.<sup>1</sup> 5.2% of the people older than 60 years of age are having dementia<sup>2</sup> and it is expected that number of the patients will double every 20 years.<sup>1</sup>

Oral health is regarded as an important factor for concern for patients with dementia because, the healthier oral condition is, the better the patients' life quality will become. Without any oral diseases, patients can eat well and gain a lot of food nutrients.<sup>3-4</sup> Among patients with dementia is found oral dryness due to some medication used for treatment<sup>5-6</sup> and physical changes from old age. The change of salivary gland, for instance, results from withered cells of the gland grouped as acinar cells or ductal cell, hence saliva with more ratio of mucous.<sup>7</sup> Oral dryness will directly affect oral health status of

the patients, resulting in rapid tooth decay, worsened periodical disease and more chances of tooth loss. Besides, it also has a negative impact on food tasting, eating, mastication and swallowing.<sup>8</sup>

### Materials and methods

We have searched for studies concerning oral dryness of elderly patients with dementia via electronic systems and database, namely Pubmed (Medline), Web of Science, Cochrane Library, EMBASE and CINAHL. Keywords used for the search included "dementia" or "Alzheimer Disease", "aged" and "xerostomia". The Medical Subject Headings in Medline were isolated or in different combinations using different Boolean operators.

The concerned search limited itself to the study on elderly people (older than 60 years of age), which was publicized in English from January, 1990, to December, 2018. Quality of the work was evaluated by two authors who read full articles likely to relate to the topic and assessed them independently. The technical processing the quality was checked by checklists reported by Straus et al.<sup>9</sup>

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## Results

The Medical Subject Headings during the search process found 155 articles, 48 of which were from Pubmed (Medline), 10 from Web of Science, 4 from Cochrane Library, 77 from EMBASE and 16 from CINAHL. Any articles found repeatedly in different sources were sorted out. Then, they were screened according to titles and abstracts before 2 authors read them thoroughly and independently. Finally, 11 articles relating to the topic concerned are shown in Table 1 below:

| Authors                                | Design          | Mean age                         | Study group   | assessment   |
|--|-----------------|----------------------------------|---|--|
| Chapman & Shaw, 1991 <sup>10</sup>     | Cross-sectional | 74.9                             | 85 Alzheimer  | salivary flow rate   |
| Chu CH et al., 2015 <sup>11</sup>      | Case-control    | 79.8±7.4<br>79.8±7.4             | 59 dementia<br>59 control                               | salivary flow rate   |
| Fedele et al., 1993 <sup>12</sup>      | RCT             | 71                               | 1 Alzheimer   | salivary flow rate   |
| Gil-Montoya et al., 2016 <sup>13</sup> | Cross-sectional | 77.3±7.3                         | 200 mild cognitive impairment & dementia<br>156 control | Use of questionnaires, 4 clinical signs of oral dryness and polypharmacy     |
| Kossioni et al., 2013 <sup>14</sup>    | Cross-sectional | 76.3±7.1                         | 23 dementia   | Use of questionnaires to evaluate xerostomia                                 |
| Leal et al., 2010 <sup>15</sup>        | Case-control    | 69.6±5.9<br>68.3±8.3             | 20 mild dementia<br>20 control                          | salivary flow rate   |
| Lexomboon et al., 2018 <sup>16</sup>   | Cohort          | 78.4±8                           | 10,621 dementia   | Incidence of tooth extractions, restoration and dental preventive procedures |
| Ship, 1992 <sup>17</sup>               | Cross-sectional | 68.2±9.3<br>64.1±8.2             | 41 Alzheimer<br>49 control                              | Measure salivary flow rate   |
| Ship & Puckett 1994 <sup>18</sup>      | Cohort          | 64±9<br>65±12                    | 21 Alzheimer<br>21 control                              | Measure salivary flow rate   |
| Ship et al., 1990 <sup>19</sup>        | Case-control    | 68±10<br>70±10                   | 28 Alzheimer<br>35 control                              | Measure salivary flow rate   |
| Warren et al., 1997 <sup>20</sup>      | Case-control    | 81.6±6.9<br>81.4±7.3<br>80.3±6.8 | 45 Alzheimer<br>52 other dementia<br>133 control        | Clinician assessment   |

**Table 1.** Characteristics of Included Studies.

### Oral dryness of elderly patients with dementia

Oral dryness is caused by a reduced rate of saliva production due to abnormal function of salivary gland, resulting in xerostomia and/or a clinical sign of oral dryness. Both symptoms differ from each other owing to the fact that the former belongs to patients' subjective symptoms in which they think their mouth is dry whereas the latter can be diagnosed in the mouth or an objective symptom. However, the xerostomia and the clinical sign of oral dryness may not always be interrelated.

According to the study of Kossioni et al. in 2003, evaluation of xerostomia among older mentally ill patients as well as those with

dementia used the same question: "Does your mouth feel dry?". If an answer is 'yes' or 'sometimes', it is assumed that patients have the xerostomia. It was found that oral abnormality among dementia patients could be felt by the patients themselves. According to the questionnaire, 45% of answers were the xerostomia.<sup>14</sup> The study of Warren et al. found of the clinical sign of oral dryness in dementia patients of other types that are not an Alzheimer. It is 22% more than Alzheimer's disease, which is of 9.1%, and no dementia, which is of 8.4%.<sup>20</sup> Several studies found that patients with no dementia had higher rate of unstimulated salivary flow than those with dementia.<sup>10-11,15</sup> Moreover, some studies showed that patients with no dementia had more stimulated submandibular flow than patients with Alzheimer's disease.<sup>10</sup> This corresponds to the study of Ship et al. in 1990 and Ship in 1992, which found that the salivary flow rate from the submandibular gland among Alzheimer patients was lower than the controlled group with significant implication. However, there was no difference concerning the salivary flow rate produced by the parotid gland.<sup>17,19</sup> The study of Ship et al. in 1990 and Ship and Puckett in 1994 found that, although patients did not receive medication for other physical diseases or underwent other treatment besides dementia, the salivary flow rate became lower than the controlled group. This indicates that the lower salivary flow rate was resulted from dementia or treatment of dementia itself.<sup>18-19</sup>

It has long been believed that decrease of salivary flow occurs due to age and malfunction of the salivary gland. Some studies supported that certain medication resulted in decrease of saliva production with significant implication. Such decrease of salivary flow may occur because of autonomic nervous system or directly result from acinar cells of the salivary gland. Antihypertensives and antidepressants are medication that can interrupt saliva production. Besides, oral dryness is related to other factors like worry and stress, as well.<sup>15</sup> A study carried out among patients of cognitive impairment or dementia by Gil-Montoya et al. in 2016 included a question: "During the past 2 weeks, have you at any time felt your mouth to be dry?", along with analyzing 4 clinical characteristics, namely 1. depapillated and/or dry mucosa 2. mirror sticking to the buccal mucosa 3. scant, thick, and filamentous saliva and 4. dry floor of mouth. Also,

evaluation on polypharmacy by the same patients pointed out that 70% of old people with cognitive impairment or dementia taking part in the research had xerostomia. Anticholinesterases and Memantine caused the symptom without depending on use of other drugs.<sup>13</sup> The result corresponds to the study of Fedele et al. in 1993 which found that the use of drug to treat Alzheimer patients affected stimulated parotid flow and unstimulated parotid flow.<sup>12</sup> Moreover, there was a study showing that the rate of buffering capacity was higher among people without dementia who depended on drug use than those with dementia who did not depend on drug. This results in the pH balance in the mouth as well as remineralization to prevent tooth decay.<sup>15</sup> Also, relations between xerostomic medication and increasing risk to tooth extraction among dementia patients were found.<sup>16</sup>

## Discussion

The above-mentioned systematic literature review indicated that many dementia patients suffered from oral dryness because of drug use<sup>13,15</sup> and physical changes due to old age.<sup>7</sup> Those having dementia are mostly the senior and the side effect of medication occurs easily because drugs can be more effective than decreasing serum albumin. Also, the half-life of medication in the blood of the senior is of a high rate since the kidney functions poorly and metabolism becomes slow, hence an impact on medication eradication out of the body.<sup>21</sup> Reduced amount of saliva therefore affects oral health status, such as mastication problems, food swallowing, oral mucosa, dental caries, periodontal disease and more chances to tooth loss. There is research finding that number of teeth left in the mouth affect cognitive function of patients. That is, if patients still have teeth to chew food, dementia can be prevented or its severe effect will be slowed down.<sup>22</sup> Following studies carried out among animals, chewing appropriately hard food will affect spatial memory better.<sup>23</sup> Also, a study found that having better oral health condition will result in good cognitive function of patients.<sup>24</sup> Thus, dentists and medical personnel who take care of such patients should be interested in this issue and follow up on evaluation of oral health status and oral dryness of patients apart from dementia on a regular basis to slow down severe effects of dementia.

Doing so will enable patients to enjoy good eating habits without any problems on oral diseases and maintain good quality of life as long as possible.

Assessment of oral dryness condition among dementia patients can be done in several ways, depending on existing materials, skills of evaluators and each patient's suitability. The questionnaire used to assess xerostomia can highlight single or multiple questions. According to the literature review, studies carried out among dementia patients used a short single question with simple language to prevent patient's confusion and promote less time to complete the questionnaire.<sup>13-14</sup> Xerostomia and clinical signs of oral dryness may not be interrelated, so they should be evaluated in pair. However, patients with severe dementia can not give information on their subjective symptom, hence inability to evaluate their own xerostomia. In this case, clinical diagnoses which include assessment of clinical signs of oral dryness or measuring salivary flow rate. Furthermore, clinical assessment to assess some clinical signs of oral dryness features complicated and time-consuming methods. It requires a lot of cooperation from patients and may be impossible for those with severe dementia.

## Conclusions

Oral dryness can often be found among elderly patients with dementia. It affects their oral health status and can be found more frequently when patients develop increasing dementia condition. However, studies on this topic are rare, so more research should be done in order that knowledge gained is used to improve management for dementia patients effectively in the near future.

## Declaration of Interest

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