

## Original Research Article

# Investigation of medicines with potential xerostomic effect used in institutionalized elderly

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## Abstract

**Introduction:** Several factors affect the salivary flow and cause xerostomia, i.e. aging, diets, radiation, various pathologies and the use of drugs. **Objective:** This study aimed to investigate drugs with potential xerostomic effect in institutionalized elderly patients. **Material and methods:** 235 elderly were investigated, of both sexes, of which 123 were women (52.3%) and 112 (47.7%) were men. In addition to the gender and age, the use of medications containing side effects of xerostomia/dry mouth/ hyposalivation or hyposialia was investigated. Such drugs were separated according to their medical area of expertise: Cardiology, Gastroenterology, Allergy, Neurology and pulmonology. **Results:** When investigated the amount of drugs used for female patients, it was observed that 83 (67.5%) used up to five drugs, 35 (28.4%) between 6 and 10 and medicines, and 5 (4.1%) more than 10 drugs. When analyzed the amount of drugs used for male patients, it was observed that 88(78.6%) used up to five drugs, 17 (15.2%) were between 6 and 10 7 medicines, and (6.2%) more than 10 drugs. By analyzing the drugs with xerostomic potential, we found 354 medicines. Among these, 181 (51.1%) were used in Neurology, 45 (12.7%) had been prescribed in Cardiology, 33 (9.2%) were used drugs for allergic conditions, 80 (22.3%) were prescribed in gastroenterology and 15 (4.3%) in pulmonology. **Conclusion:** It can be concluded that many medications used to treat institutionalized elderly had xerostomic potential effect, notably those used in Neurology. Polypharmacy is also present, especially in the older age group.

## Introduction

Aging is a biological and psychological phenomenon that affects the family and social level. It is a process in which there is gradual and unavoidable loss of organ function, generating changes in various human systems. Aging is a physiological process that involves all living things and is connected to the loss of skills, the way of life in the past, genetics, and emotional and psychological changes. Cardiovascular, metabolic, respiratory, digestive, neurological, psychological and musculoskeletal changes are perceived over time with aging and stressed [18].

Oral changes and several changes in the digestive system are also part of the whole aging process. In the oral cavity can be observed tooth loss, periodontal disease and reducing the number of taste buds on the tongue papillae, causing changes in taste (dysgeusia) and feeling of dry mouth (xerostomia), decrease (hyposalivation) or absence (asialia) saliva production, which can also occur due to degeneration of the salivary glands or by use of drugs, causing problems of swallowing and digesting food, caries and halitosis (bad breath) [20].

Saliva is one of the most important liquid produced in our organism responsible for various functions. It is produced mainly by the major salivary glands (parotid, submandibular and sublingual) and to a lesser extent by the minor salivary glands, which are scattered throughout the oral cavity, in regions such as lips, palate and oral mucosa [3].

Several factors affect the salivary flow, decreasing it. And among them, aging, diets, radiation use, various diseases and the use of medicinal products with xerostomic potential are highlighted. Possible changes in the gland itself due to obstructions, tumors, autoimmune reactions, radiation, diabetes *mellitus* type 1; and poor nutrition in essential nutrients contributes to decreased salivary flow [8].

A broad group of drugs can cause dry mouth and are cited by the literature, i.e.: anticholinergics, tricyclic antidepressants, antihistamines, benzodiazepines and beta-blockers. Medicines used to treat and control the most varied psychiatric and neurological disorders are among the ones that produce more xerostomic effects [11].

Over recent years an increase in drug acquisition has been seen here in Brazil. Thus, one should also consider that older people are the category that consumes more drugs. Accordingly, it is necessary to use measures for rational use of drug therapy [1].

Within this context, the therapeutic following-up of elderly patients should take place taking into account effects that worsen the quality of life, among which the decrease in salivary flow and sensation of dry mouth stands out. The aim of this study was to identify which prescription drugs for institutionalized elderly can cause xerostomia, dry mouth and / or hyposaliva as an adverse reaction.

## Methodology

This was a quantitative, cross-sectional and retrospective study that investigated the medical records of 235 elderly at a long-term care facility in the city of Fortaleza, Ceará. We analyzed 1.410 prescriptions occurred at the first six months of 2013. In each chart, the gender, age and amount of used drugs were collected. Those drugs that contain in the inserts the description of the following side effects: xerostomia, dry mouth, hyposalivation or hyposaliva were selected. Also, the drugs were divided according to their medical area of expertise: Cardiology, Gastroenterology, Allergy, Neurology and Pulmonology. The elderly who did not use any medication were excluded from this study.

The data were tabulated and descriptive statistics were performed using a Microsoft Excel® software. The results of the study were described in tables and graphs. This study was submitted and approved by the Ethics Committee in Research of the University of Fortaleza (Unifor), under protocol 435/09.

## Results

Two hundred and thirty-five elderly, of both genders, were investigated: 123 females (52.3%) and 112 males (47.7%). Among females, the age range was between 60 and 99 years, mean  $78.4 \pm 8.8$  years. Among males, age range was between 60 and 94 years, mean  $73.5 \pm 8.0$  years.

When investigated the amount of drugs used for female patients, it was observed that 83 (67.5%) used up to five drugs, 35 (28.4%) used between 6 and 10 and medicines, and 5 (4.1%) took more than 10 drugs. When analyzed the amount of drugs used for male patients, it was observed that 88 (78.6%) used up to five drugs, 17 (15.2%) between 6 and 10, 7 (6.2%) more than 10 medicines. The relationship between the quantity of drugs and sex when using Chi-square test showed statistically significant difference, with  $p = 0.05$ , between men and women taking 6 to 10 drugs (table I).

**Table I** - Use of medicines compared with gender

Amount of drugs	Women	Male	Significance
Up to 5	83 (67.5%)	88 (78,6%)	p-value < 0,05
6 to 10	35 (28.4%)	17 (15.2%)	
More than 10	5 (4.1%)	7 (6.2%)	

By observing the average number of drugs used by elderly men, and dividing this figure by age, it became clear that between 70-79 years and 90-99 years, there is a greater average use of medicines. Among women, the highest number of drugs used was between 90-99 years, followed by the age group between 60-69 years. It can be seen that the older age group had the highest average in both groups and men make use of a greater amount of medicines (table II). By using the same age and comparing with the amount of drug used, taking into consideration the groups (up to 5; 6 to 10; more than 10), no statistically significant difference was observed ( $p < 0.05$ ) when applying the chi-square test (table III).

**Table II** - Average use of drugs of according to age

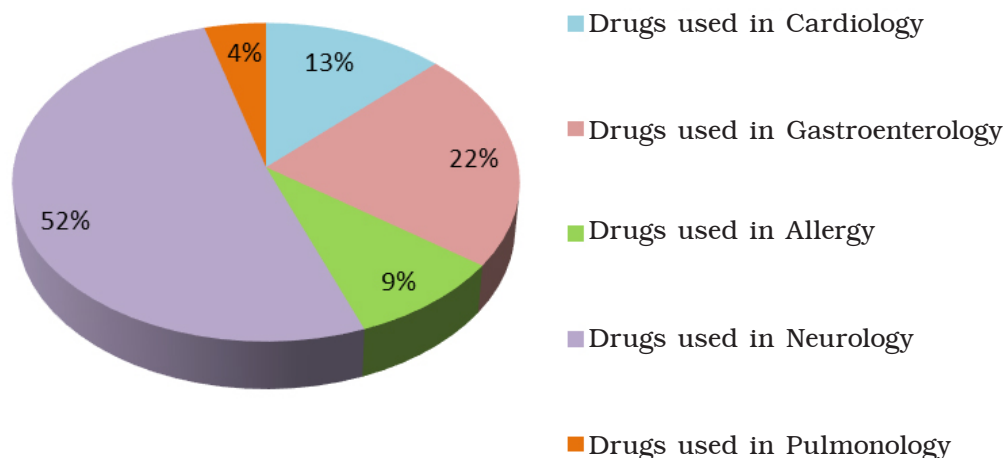
Age group	Male	Female
60-69	4.1±3.1	4.2±3.4
70-79	4.9±3.3	3.6±3.2
80-89	4.6±2.6	3.0±3.0
90-99	5.3±4.0	7.7±2.2
Total	4.6±3.0	3.8±3.3

**Table III** - Use of drugs compared to age

Amount of drugs	60-69 years	70-79 years	80-89 years
Up to 5	46	65	60
6 to 10	12	20	20
More than 10	4	5	4

p-value < 0,969

By investigating the medicines with xerostomic potential, 354 medicines were found. Among the investigated drugs, 181 (51, 1%) were used in Neurology, 45 (12.7%) had been prescribed in Cardiology, 33 (9.2%) were used in Allergy, 80 (22.3%) were prescribed in Gastroenterology, and 15 (4.3%) in Pulmonology (figure 1).



**Figure 1** - Distribution of medical prescriptions with their respective medical specialties

## Discussion

It is common to find older people with many prescriptions and even those performing self-medication indiscriminately [5]. The organic decline suffered physiologically can lead to different disorders in various systems, allowing the group to be susceptible to polypharmacy [17]. Although it was not the objective of this study to evaluate the salivary flow, it is very likely that most of the elderly living in institution has a xerostomia.

The adverse drug reaction (ADR) is a drug response unintentionally, occurring in normally used dose. Suspicion of ADR corresponds sometimes to the negative outcomes associated with medication [21].

In this study there was a great use of drugs with a higher number of elderly aged 90-99 years. The presence of polypharmacy in the elderly is significant in the attention to geriatric patient. Iatrogenesis may be present in geriatrics and should always be investigated on patient consultation. The prevalence of polypharmacy can be described as the use of more than 5 medications per patient [3 1]. This fact is present the findings of this research may open room for undesirable reactions.

The elderly participate in a group more intensely susceptible to side effects of the drugs, which can increase the aggressiveness of existing pathologies. Thus it would be more consistent good management of drugs used in drug therapy for them [6]. This management applies to those investigated in this study, particularly those that make use of polypharmacy. Using the number of specialties and therapies, it can be seen, as a result, problems of pharmacotherapy, such as adverse drug reactions (ADRs), the interactions, misuse, inadequate treatment and the intensity of pathological processes [9].

During aging, the reduction in hepatic and renal activities generally, highlighting the reduction of biotransformation and elimination of drugs, which increases the possibility of adverse reactions and toxicity [16]. With aging, the activities of these processor sets are reduced, resulting in increased half-life medications pass through this mechanism. Renal excretion is also reduced with age, due to thickening of the interstitial connective tissue, membrane thickening and a reduction in glomerular filtration [12].

In this study, when separated by medical specialties, the drugs used in cardiology were at third place in prescription among those with potential xerostomic effect. In this study, when separated by medical specialties, the drugs used in cardiology

were at third place in prescription among those with potential xerostomic effect. Among the cardiologic medicines, the antiarrhythmic, antagonists of calcium channels, central vasodilators, anti-thrombotic and thrombolytic agents, in addition to the drugs used in the treatment of shock, have xerostomia as their adverse reactions [2]. A broad class of these medicines reduces the cardiovascular risk in the elderly and in most cases, the association of drugs with different mechanisms of action is required [15].

Among the drugs used in the Gastroenterology, the second highest percentage of this study prescriptions that have occurred among the elderly evaluated, it was found that the anti-diarrheal, anti-emetics, the anti-ulcer and laxatives [2] can decrease salivary flow. It should be noted that morphine and other opioids decrease the function of gastrointestinal tract, decreasing the absorption of fluids [14].

Reduced intestinal motility is associated with generalized muscle atony, generated by aging because over time the walls of the stomach become weaker due to reduced muscle strength. There is incidence of laxative use due to lack of information or the lack of clarification of constipation [7].

In the Neurology drug prescriptions, the main group of drugs with established xerostomic effect in literature and found in this investigation, substances such as antiepileptics, antimigraine, painkillers, muscle relaxant anxiolytic, hypnotics, antidepressives, antipsychotics [2] have been widely used. Such substances have anticholinergic and antimuscarinic actions. The neurotransmitter acetylcholine can act on the two receptors, muscarinic and cholinergic, with an emphasis on cholinergic, acting on the parasympathetic system and generating a reversibly or irreversibly lock on the release of saliva glands [19]. The use of large amount of psychotropic should be dynamically traced in patients within the Beer-Fick criteria.

According to Coimbra [4], the cause of xerostomia often is not directly linked to aging or diseases associated with this, but the prolonged use of certain medications, including the anticholinergics, tricyclic antidepressants and the anti-hypertensive, highlighting the diuretics.

The antidepressant medications are the target of intense study in the scientific community, and research findings collaborate to the perception of undesirable effects, as it adds theory of Functional loss of activity adrenergic of the cholinergic receptors present in the glands of the oral cavity by promoting events such as hyposalivation (dry mouth) and xerophthalmia [10].

In a comparative research on institutionalized elderly, the similarity between the results of both the drugs used and the involved specialties is highlighted. The highest percentage was for drugs acting on the cardiovascular system, followed by psychotropic and drugs used in gastrointestinal problems [13].

The oral cavity is a major tool for social interaction, through speech, and the physiological comfort, through feeding. The lack of good conditions can significantly affect the quality of life of the elderly.

## Conclusion

It can be concluded that many medications used to treat institutionalized elderly have potential xerostomic effect, especially those used in Neurology. The polypharmacy is also present, especially in the older age group. Thus, this study suggests a re-evaluation of various drugs used in the elderly, to provide a more comfortable life.

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