

# Self-reported prevalence and severity of xerostomia and its related conditions in individuals attending hospital for general health examinations

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**Abstract.** The aim of this study was to investigate the prevalence, severity, and relationships between xerostomia and its related symptoms in individuals who attended hospital for general health examinations. Participants included 883 men and 618 women aged between 30 and 60 years. History of symptoms during the previous 6 months, current symptoms, and severity of current symptoms were evaluated using a questionnaire that included questions about xerostomia, burning mouth, taste disturbance, and oral malodor. The prevalence of xerostomia and its related symptoms was 60.2%; the prevalence of oral malodor was 52.3%, xerostomia 33.0%, burning mouth 13.6%, and taste disturbance 12.5%. Men in their 30s and women in their 60s showed significantly higher prevalence and greater severity of xerostomia, burning mouth, and taste disturbance compared with their counterparts. The prevalence of xerostomia, burning mouth, and taste disturbance, and the severity of xerostomia increased significantly with age in women. The prevalence and severity of these four symptoms were significantly related and the association was the highest between burning mouth and taste disturbance. In conclusion, xerostomia and its related symptoms were highly prevalent at all ages. The prevalence and severity of these symptoms were closely related.

Keywords: xerostomia; burning mouth; taste disturbance; oral malodor; prevalence.

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## Introduction

With the advent of an ageing society, the number of patients with xerostomia and its related conditions is increasing rapidly. As

a result, treatment demand in dental clinics is changing and will change even more rapidly in the near future.

Burning mouth, taste disturbance, and oral malodor are related to xerostomia.<sup>1–4</sup>

A decrease in salivation affects taste function and increases the severities of oral mucosal burning pain and malodor. These symptoms share the same or related etiologies, and therefore can be present

together in the same patient.<sup>1</sup> Patients with multiple diagnoses may experience greater severity of symptoms than patients with a single diagnosis.<sup>5</sup> Therefore, in order to prepare for increasing treatment needs, information regarding the prevalence, severity, and relationships of xerostomia and its related conditions is needed.

Most studies regarding the prevalence of xerostomia have been performed in elderly residents and elderly hospitalized or institutionalized persons; in these studies, the prevalence has ranged from 17.0% to 62.9%.<sup>6</sup> Studies involving adults of all ages have reported xerostomia to be a common condition at all ages with a prevalence ranging from 7.0% to 34.2%.<sup>3,7-12</sup> These previous studies have shown that the prevalence of xerostomia increases with age<sup>3,4,7,9,12</sup> and that xerostomia is more common in women than in men.<sup>4,7-9</sup>

Burning mouth is a common symptom among middle-aged and elderly women who attend dental clinics. This distressing sensation results from a complex interaction among local, systemic, and/or psychogenic factors.<sup>1</sup> When no local or systemic factors are found upon clinical and laboratory examinations, a diagnosis of burning mouth syndrome is suggested. According to criteria used in previous studies, the prevalence of burning mouth in the general population is highly variable, ranging from 0.7% to 14.8%.<sup>13-16</sup>

Data concerning taste disturbance also usually come from patients in chemosensory clinics or patients with certain types of diseases or conditions, and not from the general population. The prevalence of taste disturbance in the general population was found to be 0.93–8.3% in studies using questionnaires.<sup>2,17</sup> In studies using examination-based measures, the prevalence increased to 5.3–20%.<sup>18,19</sup> Taste disturbance was found to increase with age, and a gender difference was not apparent.<sup>17-19</sup>

Oral malodor is one of several very common symptoms in the general population, with a reported prevalence rate between 15% and 32%, mainly depending on the type of evaluation method used.<sup>20-24</sup> Reports on prevalence according to age and gender have not been consistent.<sup>20,21,23</sup>

Most available information on the prevalence of xerostomia and its related conditions concerns specific age or gender groups, or groups with specific diseases or conditions. Information about the prevalence in adults of all ages is limited and information about the relationships between xerostomia and its related conditions is sparse. The purpose of the present study was to investigate the prevalence,

severity, and relationships between xerostomia and its related conditions in adults of all ages who attended hospital for general health examinations.

## Materials and methods

### Participants

Participants were recruited consecutively from individuals between the ages of 30 and 60 years who attended the Healthcare System Gangnam Center, Seoul National University Hospital for health status examinations between April 2010 and July 2010. The total number of participants was 1501 (883 men and 618 women). This study was undertaken with the understanding and written consent of each subject, and the research protocol was approved by the Institutional Review Board.

### Questionnaire

History, prevalence, and severity of xerostomia and its related symptoms were

evaluated using a questionnaire (Fig. 1). The questionnaire included questions on xerostomia, burning mouth, taste disturbance, and oral malodor. Items on history of symptoms during the past 6 months, current symptoms, and severity of current symptoms (if symptoms were currently present) were included in the questionnaire. The response to history or presence of symptoms was binary (yes or no). The severity of symptoms was measured using a numerical analogue scale (NAS, 0–10, with 10 meaning the worst possible).

### Statistics

The Kolmogorov–Smirnov normality test was applied to the data. Because the data were not normally distributed, non-parametric tests were used for the analyses. The  $\chi^2$  test and Mann–Whitney *U*-test were used to determine gender differences. The  $\chi^2$  test and Jonckheere–Terpstra test were used to determine differences between age groups. The  $\chi^2$  test and logistic regression analysis were

1-1. Have you ever felt any discomfort due to dryness of the mouth more than once during the past 6 months?	Yes No
1-2. Do you ever feel any discomfort due to dryness of the mouth these days?	Yes No
1-3. If the answer was yes for question 1-2, how severe is it? 0 1 2 3 4 5 6 7 8 9 10 No discomfort Most imaginable	
2-1. Have you ever felt any discomfort due to burning sensation of the tongue or other part of the mouth more than once during the past 6 months?	Yes No
2-2. Do you ever feel any discomfort due to burning sensation of the tongue or other part of the mouth these days?	Yes No
2-3. If the answer was yes for question 2-2, how severe is it? 0 1 2 3 4 5 6 7 8 9 10 No discomfort Most imaginable	
3-1. Have you ever felt any discomfort due to abnormal taste sensation of the mouth more than once during the past 6 months?	Yes No
3-2. Do you ever feel any discomfort due to abnormal taste sensation of the mouth these days?	Yes No
3-3. If the answer was yes for question 3-2, how severe is it? 0 1 2 3 4 5 6 7 8 9 10 No discomfort Most imaginable	
4-1. Have you ever felt any discomfort due to oral malodor more than once during the past 6 months?	Yes No
4-2. Do you ever feel any discomfort due to oral malodor these days?	Yes No
4-3. If the answer was yes for question 4-2, how severe is it? 0 1 2 3 4 5 6 7 8 9 10 No discomfort Most imaginable	

Fig. 1. Questionnaire.

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