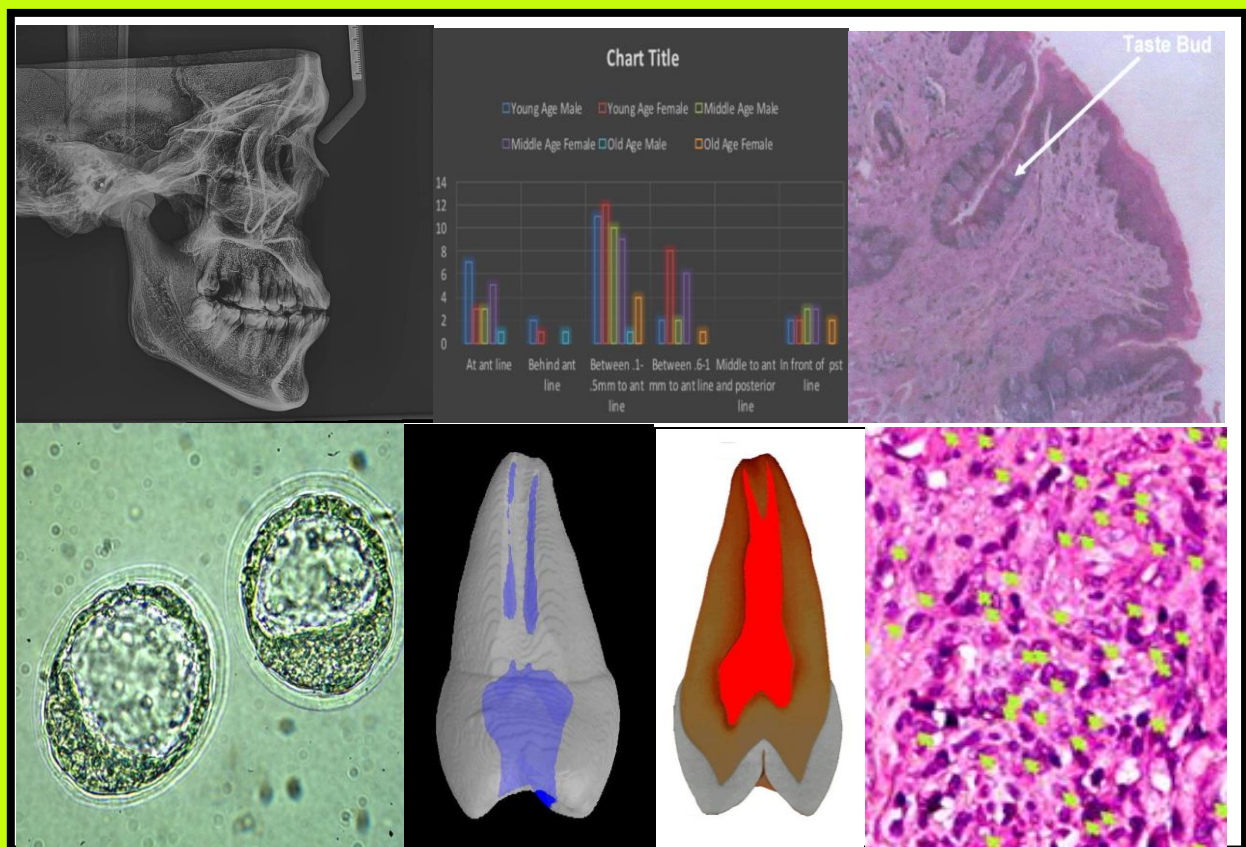


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The Oral Health of Elderly Residents in a State Institution in Jakarta: A Preliminary Study

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Abstract

The government is obliged to guarantee the availability of health care facilities and assistance for elderly individuals. There have been only a few studies of oral lesions in the elderly in Indonesia. To describe the oral health status of elderly residents of state institution in Jakarta.

Participants were recruited via the consecutive sampling method. Of 220 elderly residents, 49 met the inclusion criteria. Socio-demographic data and medical histories were obtained from the medical records of the institution. All the patients underwent a clinical oral examination, which included Oral Hygiene Index-Simplified (OHI-S), Mucosal Plaque Index (MPI), and Salivary Flow Rate (SFR) measurements. The participants were also questioned about their oral habits, and any oral lesions were recorded.

The prevalence of oral lesions was 55.1% (n=27), with only 20.24% (n=10) of elderly residents lesion free. The most common oral lesion was melanin pigmentation. None of the residents had severe pathological lesions, such as a malignancy or deep infection.

This study found the most elderly subjects in the state institution was in poor oral health, implying that the government's aim to promote the well-being of elderly population has not been achieved.

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Introduction

One aim of the Sustainable Developmental Goals 2030 of the United Nations is to ensure healthy lives and promote the well-being of all people at all ages, including the elderly.¹ The Indonesian government's commitment to this goal is stated in the Ministry of Health regulation, which obliges the government to guarantee the availability of health care facilities and assistance to elderly individuals. Health problems due to natural degenerative processes are a common problem among the elderly.²⁻⁴ Based on Riskesdas 2013, a report by the Ministry of Health on basic health research, the most prevalent diseases in the elderly were noninfectious diseases, such as

hypertension, osteoarthritis, dental-mouth problems, chronic obstructive pulmonary disease, and diabetes mellitus. State institutions for the elderly should be places of empowerment and maintenance of health and serve as an indicator of the oral health of the elderly population as a whole, especially elderly individuals with degenerative diseases. Such institutions are also specifically intended to enable resocialization of abandoned elderly individuals, allowing them to live a reasonably independent life. The government's duty includes the provision of health services and referrals to local primary care centers to ensure the oral health of residents in such institutions.^{5,6}

Several studies in various countries have examined the oral health status and prevalence of systemic disease in elderly populations. According to many of these studies, the oral health status of the elderly is poor, illustrating that this is a widespread problem. Socio-demographic factors influence the prevalence, clinical patterns, and onset rates of oral diseases.⁷⁻⁹

Several studies have examined the epidemiology of oral mucosal diseases among

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the institutionalized elderly in Jakarta. Sarsito et al (1997) reported that of 347 elderly residents in six government residential care homes and five private care homes in Jakarta, 60.5% had at least one oral mucosal disease, and 70.9% had at least one systemic disease, highlighting the need for appropriate oral and dental services for elderly individuals.¹⁰ Anggraini et al (2011) in a study of 87 elderly individuals in a state institution (Tresna Werdha Budi Mulia 03) in Ciracas, East Jakarta reported that 92% of residents had at least one oral lesion and that 37.9% had systemic diseases.¹¹

The purpose of this study was to describe the oral health and systemic health status of elderly individuals in a government institution, Tresna Werdha Budi Mulia 04, Cengkareng, West Jakarta, Indonesia. The findings can help shed light on the epidemiology of oral lesions among elderly individuals in Indonesia and help identify risk factors for oral lesions. This study can also serve as a baseline for future studies aimed at identifying ways of improving the oral health of the general population in Indonesia, especially the elderly.

Materials and methods

The study population of Tresna Werdha Budi Mulia 04 consisted of 220 elderly residents. This was a cross-sectional study in which participants were recruited via consecutive sampling. The inclusion criteria were aged more than 60 years and voluntary participation in the study. The exclusion criteria were aged over 60 years with a mental disorder or an incapacitating illness. Of the 220 subjects, 49 met the inclusion criteria. This study was approved by the Ethical Committee of the Faculty of Dentistry, Universitas Indonesia, Jakarta. Informed consent was obtained from all the elderly individuals who participated in the study.

Socio-demographic data and medical histories were obtained from the medical records of the institution. All the subjects participants underwent a clinical oral examination according to standard procedures by experienced dentists. The dentists examined each patient and recorded the following: Oral Hygiene Index-Simplified (OHI-S); Decayed, Missing, Filled-Teeth (DMF-T) index; Papilla Bleeding Index (PBI), Mucosal Plaque Index (MPI), salivary pH of unstimulated salivary flow rate (SFR), and

stimulated SFR, as well as oral habits and dental condition. All the measurements were performed according to standard guidelines¹²⁻¹⁴. The clinical diagnosis of oral mucosa lesions was made by calibrated examiners in accordance with the Clinical Classification for the Diagnosis and Grouping of Oral Mucosa Lesions. Oral mucosal lesions were classified as a white, red, or pigmented; ulcerative or vesiculobulbous; or oral soft tissue enlargements.¹⁵ For documentation, color photographs were taken of all the lesions with a digital camera.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows 22.0 version.

Results

Table 1 shows the socio-demographic data on the elderly subjects. Of the 220 elderly residents, 49 met the inclusion criteria and were included in the study. Females were more common than men, with a ratio of 3:1. The mean age $\pm$ SD was 70.49 ± 7.5 years old. The participants were categorized into three groups according to age: young elderly (aged 60–69 years, 42.9%), mid-old (aged 70–79 years, 38.3%), and oldest-old (older than 80 years, 18.4%).

Socio-demographic		N	Percentage (%)
Sex	Male	11	22.4
	Female	38	77.6
Age	60–69 (young elderly)	21	42.9
	70–79 (mid-old)	19	38.8
	≥ 80 (oldest-old)	9	18.4
	No formal	39	79.6
Education	Primary	7	14.3
	Secondary	1	2
	High	1	2
	University	1	2
Occupation	Unemployed	23	46.9
	Informal	24	49
	Formal	2	4.1
Race	Malayan Mongoloid	47	95.9
	Asiatic Mongoloid	1	2
	Caucasian	1	2

Table 1. Socio-demographic data on the elderly subjects.

Most of the elderly subjects had no formal education or had dropped out of school (79.6%), and were jobless (46.9%) or had informal jobs (49%), such as scavengers, beggars, homeless, drivers, servants, traders, and farmers, before they become residents of the institution. With regard to racial classification, the majority of the participants were Malayan Mongoloid (95.9%), with only a few Asiatic Mongoloid and Caucasian

(4%) subjects.¹⁶

Most of the subjects had systemic diseases (87.8%), with only 6 (12.2%) never having received a diagnosis of a systemic disease (Table 2). Others had been diagnosed with flu, coughs, urticaria, or pharyngitis. According to the medical records, none of the participants had a history of heart disease, although some had been prescribed antiarrhythmics and calcium antagonists.

Oral hygiene and habits	Frequency	n	Percentage
Teeth brushing	Less than once a day	8	16.3
	Once a day	3	6.1
	Twice a day	30	61.2
	Three times a day	7	14.3
	More than three times a day	1	2
Tongue brushing	No	32	65.3
	Yes	17	34.7
Mouthwash	No	45	91.8
	Yes	4	8.2
Flossing	No	49	100
	Yes	0	0
Dental treatment	Never	34	69.4
	Ever	15	30.6
Denture wearing	Ever	46	93.3
	No	3	6.1
Smoking	Yes	33	67.3
	Never	16	32.7
Drinking alcohol	Ever	47	95.9
	Never	2	4.1

Table 2. Prevalence of systemic disease and drug use among the elderly.

Almost half of the subjects (44.49%) were taking no type of medication, and 27 (55.1%) were using multiple medications for a systemic disease. The most common medication used was nonsteroidal anti-inflammatory drugs. Three subjects had been prescribed antituberculosis agents, although they had not been diagnosed with tuberculosis.

Oral hygiene and habits	Frequency	n	Percentage
Teeth brushing	Less than once a day	8	16.3
	Once a day	3	6.1
	Twice a day	30	61.2
	Three times a day	7	14.3
	More than three times a day	1	2
Tongue brushing	No	32	65.3
	Yes	17	34.7
Mouthwash	No	45	91.8
	Yes	4	8.2
Flossing	No	49	100
	Yes	0	0
Dental treatment	Never	34	69.4
	Ever	15	30.6
Denture wearing	Ever	46	93.3
	No	3	6.1
Smoking	Yes	33	67.3
	Never	16	32.7
Drinking alcohol	Ever	47	95.9
	Never	2	4.1
Betel chewing	Ever	47	95.9
	Never	2	4.1
Snacking	Ever	11	22.4
	Never	9	18.4
	Seldom	29	59.2

Table 3. Oral hygiene and habits of the elderly.

In terms of oral hygiene habits, 61.2% brushed their teeth twice a day, but only 17%

brushed their tongue, and only 8.2% used a mouthwash. None of the participants ever flossed. Only 30.6% of the study group had visited a dentist in the past, although not regularly. The remainder had never visited a dentist. Only 6.1% wore dentures supplied by a dentist. For the rest of the subjects, most had edentulous ridges and had not received replacements for missing teeth (Table 3).

Variable	N	Minimum	Maximum	Mean	SD
OHI-S	49	0	6	3.12	1.939
DMF-T	49	0	32	18.67	9.965
PBI	49	0	3	1.028	0.977
MPI	49	2	4	2.55	0.765
pH saliva unstimulated	41	6	7	6.29	0.461
pH saliva stimulated	45	7	8	7.00	0.798

*OHI-S: Oral Hygiene Index-Simplified
DMF-T: Decay, Missing, Filled-Teeth
PBI: Papillary Bleeding Index
MPI: Mucosal Plaque Index

Table 4. OHI-S, DMF-T, PBI, and MPI, and salivary pH of the elderly.

Regarding poor lifestyle habits, 32.7% of subjects smoked, 4.1% drank alcohol, and 2% chewed betel. Of note, 77.6% of subjects reported snacking between meals.

Category	n	Percentage
OHI-S		
Poor (Score: 3.1-6)	28	57.1
Fair (Score: 1.2-3)	11	22.4
None (Score: -)	9	18.4
Good (Score: 0-1.2)	1	2
DMF-T		
Very high (Score: >24-32)	18	36.7
High (Score: >16-24)	12	24.5
Fair (Score: >8-16)	8	16.3
Low (Score: 0-8)	7	14.3
None (Score: -)	4	8.2
PBI		
Good (Score: 0-1.3)	28	57.1
Fair (Score: 1.4-2.7)	9	18.4
None (Score: -)	8	16.3
Poor (Score: 2.8-4)	4	8.2
MPI		
Good (Score: 2-4)	49	100

Table 5. Category of OHI-S, DMF-T, PBI, and MPI.

The mean (SD) score for the OHI-S index, DMF-T, PBI, and MPI (Table 4) was 3.12 ± 1.939 (poor oral hygiene), 18.67 ± 9.965 (a high risk of caries), 1.028 ± 0.977 (good oral health), and

2.55 ± 0.765 (good condition of oral mucosa), respectively. Oral hygiene could not be examined in 18% of cases because the subjects were edentulous (Table 5). In the study, in the DMF-T category, 36% of the study population was classified as very high, which means that most of the subjects had lost their teeth, had a high prevalence of caries, and had many missing teeth. The oral status of 57% of the subjects was good according to the PBI, indicating that less than half of the study population had gingival and periodontal problems. The oral mucosal status of all the participants was good according to the MPI result obtained in this study.

The pH of unstimulated saliva was moderate, with a mean ± SD of 6.29 ± 0.461, and the pH of stimulated saliva was normal, with a mean (± SD) of 7.00 ± 0.798. In tests of unstimulated saliva in 41 participants, the minimum pH for unstimulated saliva was 6 (acid), and the maximum was 7 (neutral). In tests of stimulated saliva in 45 participants, the minimum pH for stimulated saliva was 7 (neutral), and the maximum pH was 8 (alkaline). The difference between the number of tests of unstimulated and stimulated saliva was due to three subjects not being able to produce saliva while chewing a wax film.

Salivary flow rate	n	Minimum	Maximum	Mean	Hyposalivation	Percentage
			(ml/min)		(n)	
Unstimulated	41	0.05	2.5	0.7732	4	8.2
Stimulated	45	0.1	8.5	2.3478	10	20.4

Table 6. Salivary flow rate of the elderly.

According to the data shown in Table 6, only 4 (8.2%) participants were classified as having hyposalivation based on the production of unstimulated saliva, and 10 (20.4%) participants were classified as having hyposalivation based on the production of stimulated saliva. Four elderly participants were unable to follow instructions and complained of a feeling of discomfort. Thus, the SFR was measured in only 45 of the 49 subjects. In the SFR test, unstimulated saliva production of less than 0.1 ml/min and less than 0.7 ml/min for stimulated saliva were denoted as hyposalivation and maximum score denoted the highest volume of saliva production. The prevalence of oral lesions in the study population was 55.1%. Normal variation was present in 42.1% of participants, and only 20.34% of the study population was lesion free (Table.7) The most common oral

manifestations were fissures of the tongue and oral varices. The most common oral lesions were melanin pigmentation and gingivitis (Fig. 1). No severe pathological lesions, such as malignancies or deep infections, were found.

Oral manifestation	n	Lesion	Percentage
Normal variation	25		42.1
Tongue fissure		12	
Varices		7	
Torus palatine		5	
Linea alba buccalis		1	
Red and pigmented lesions	19		36.7
Melanin pigmentation		11	
Smoker's melanosis		3	
Petechiae		3	
Anemia		1	
Angular cheilitis		1	
Oral soft tissue enlargement	8		16.3
Gingivitis		10	
Gingival abscess		6	
Fibroma		2	
Epulis		1	
Ranula		1	
White lesion	7		12.2
Frictional keratosis		5	
Ulcerative and vesicobulbous lesions	2		4.1
Aphthous-like ulcer		1	
Recurrent stomatitis aphthous		1	
Lesion free	10		20.24
Total		81	

Table 7. Prevalence of oral manifestations.

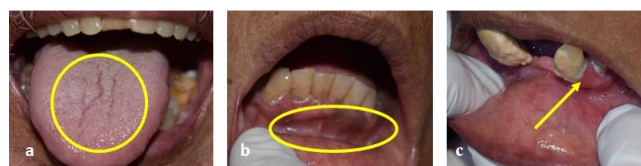


Figure 1. Most common normal variations and oral lesions in the elderly. (a) fissured tongue, (b) melanin pigmentation, and (c) gingivitis.

Discussion

Studies of oral lesions and systemic diseases among the elderly are important, given the increasing number of elderly in Jakarta today. In the present study, the small number of males compared to females was due to lower numbers of male residents in the institution. The lower number of females may be explained by them having a longer life expectancy than males.⁶

The mean (± SD) age was 70.49 ± 7.5, which is considered in the category of mid-old, but nearly 50% of the residents were classified as young elderly (42.9%). Most of the elderly residents in the government institution were from a low socio-economic background and included displaced individuals and jobless who were been cared for by the government. According to Koeber, most Indonesians were categorized as

Malayan Mongoloid.¹⁶ This study confirmed this finding, with 95.9% of the study population classified as Malayan Mongoloid, followed by Chinese, including Asiatic Mongoloid (2%), and Caucasians (2%).

As shown by the medical records, none of the elderly residents had a diagnosis of heart disease or tuberculosis. Nevertheless, four elderly residents were taking antiarrhythmics, one was taking a calcium antagonist, and three were taking antituberculosis agents. Two elderly residents were taking iron supplements, despite the absence of any laboratory report of a diagnosis of anemia. Only one elderly resident had oral manifestations indicative of anemia. Data from the medical records showed that drugs had been prescribed based on clinical symptoms, with no diagnostic tests, such as electrocardiograms, laboratory reports, sputum analysis, or x-ray examinations, conducted to support the clinical diagnosis and draw a definitive diagnosis. The latter was likely due to the high costs of such tests.

As shown by the results of the DMF-T index, the oral health of many of the participants fell into the "high" category. This finding was surprising, as 61.2% of the subjects stated that they brushed their teeth twice a day. The result could possibly be explained by the fact that most of these subjects had dementia. Alternatively, they may have been ashamed to admit that they neglected brushing their teeth as part of their daily routines. Agus et al (2011) in a previous study of the influence of oral hygiene practices on the oral health status of elderly residents in a state institution reported that most of the subjects were aware of the need to brush their teeth but that the time of brushing and frequency were inappropriate. This study also reported that oral hygiene habits, including the time and frequency of tooth brushing, significantly affected the health of periodontal tissue.¹⁷

In this study, more than half the subjects reported snacking between meal times and never receiving dental treatment, and almost none of the study population had dentures to replace their missing teeth. As most of the subjects were from a low socioeconomic background and had little formal education, it is highly likely that they had no access to oral health information and could not afford dental treatment.^{18,19}

A previous study reported that both unstimulated and stimulated SFRs were lower in

older adults than in younger adults.¹⁴ In this study, only 20.4% of subjects were categorized as having hyposalivation based on the stimulated SFR, and 55.1% of subjects were receiving medication. However, this study did not explore the relation between SFR and medication use. The measurement of saliva consisted of measurements of the SFR and unstimulated and stimulated salivary pH. Variation in the time of saliva collection can contribute to variability between studies. Low salivary flow or hyposalivation leads to drying of oral mucosa, inefficient food bolus formation and transport, demineralization of dentition, mucosal ulcerations, altered oral flora, impaired taste and smell sensations, and discomfort while eating.

The prevalence of oral lesions in this study (55.1%) was similar to that reported in a study conducted in Chile (53%), whereas it was higher than that found in studies conducted in Brazil (21.55%) and Malaysia (10.8%) and lower than that found in a study in Yemen (77.1%). However, denture wearing in the Chilean study was higher (65%) than in this study (6.1%). The most common lesions were associated with denture stomatitis and irritative hyperplasia.^{9,20-22} In the studies conducted in China and Yemen the most common oral manifestation was fissured tongue. In a study in Cambodia, a fissured tongue was the second most common oral manifestation. However these results were obtained from studies which includes elderly, young adults, and children subjects.^{13,16,17} In the present study, the most common lesion in the elderly was melanin pigmentation 22.45% ($n=11$). This finding was expected due to the ethnic predisposition of the Mongoloid race to more melanin pigment than Caucasians. The pigmentation could also have been due to smoking, although this was unlikely.^{23,20}

The present study has a number of limitations. Of the 220 residents, only 49 (22.3%) met the inclusion criteria and were included in the study. The other 171 (77.7%) elderly residents were excluded for various reasons, such as severe illness resulting in complete incapacitation, mental disorders, and aged younger than 60 years old. As only a small number of elderly took part in this preliminary study, the data may not represent the elderly in Jakarta. This study also has several other limitations, such as the elderly subjects were easily exhausted, so the examination was conducted in short duration and

absence of repeated examinations which might affect data collection.

This was a preliminary study. Further studies will involve data collection from all government institutions for the elderly in Jakarta. The analysis of this larger data set will provide a better picture of the oral health profile of institutionalized elderly residents. A national-level survey of the oral health of elderly individuals living in the community is recommended, in addition to the development of oral health education and dental health care provisions for the aged in the community. Finally, the residents with oral lesions were advised to seek the services of a dentist.

Conclusions

This study found the most elderly subjects in the state institution was in poor oral health, implying that the government's aim to promote the well-being of elderly population has not been achieved. This study may become one of the foundation for the government to establish oral health promotion programs and in the long term, to improve the quality of life of elderly population.

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Declaration of Interest

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Status Pengusul : Penulis Pertama

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