

Factors Contributing to Oral Health Service Use by the Elderly in Payakumbuh City, West Sumatra

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Abstract

High elderly population in Indonesia might increase oral health problems, contributing to systemic disease. Comprehensive and complete oral health services involving promotive, preventive, curative, and rehabilitative services would improve oral and dental health statuses of the elderly. The current study evaluated factors contributing to oral health service utilization for elderly in elderly *posyandu*, Payakumbuh City through a cross-sectional study design using a purposive sampling method.

Normative need data for 291 elderly individuals was obtained by screening the dental and oral health statuses, while data regarding predisposing, supporting, perceived need factors, and oral health service utilization were obtained by completing a questionnaire through an interview.

The average age of the subjects was 65.91 years, sex proportion was 20.3% male and 79.7% female, and average DMFT was 22.6 with a 17.8 MT value. The percentages of oral health service utilization and healthcare insurance card holders were 19.6% and 87.6%, respectively, and the logistic regression result was double on six modeling with an R-square value of 0.380.

Factors contributing to oral health service utilization for the elderly were age, educational status, systemic disease history, and socioeconomic status. The four variables on the modeling were able to predict 38% of oral health service variations for the elderly.

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Introduction

Indonesia is the largest archipelago in the world, with a population of 252,124,458.¹ The population above the age of 60 years in Indonesia was 23,660,882 in 2017 (9.03%) and is expected to reach 27.09 million (11.3%) by the year 2020 and 48.20 (15.77%) million by 2035. Indonesia ranks fifth in the world regarding elderly population. The number of the elderly is the highest in Indonesia's largest province, Area Yogyakarta (13.81%).¹

As people age, they are more likely to experience physical, spiritual, social, and economic problems. Aging leads to fundamental health problems due to degenerative processes.² With increasing age, the decline in organ function occurs, causing the slowing of nerve conductivity,

a reduced ability to breathe, reduced levels of activity in the body,³ and a decrease in the oral health.

Declining oral health reduces the quality of life by affecting eating, comfort, looks, and social abilities. The parameters of declining oral health include periodontal disease, tooth loss, and lack of oral hygiene.⁴ On the basis of basic health research (Riskesdas) performed in 2013, common diseases in the elderly include hypertension, osteoarthritis, oral health problems, chronic obstructive pulmonary disease (COPD), and diabetes mellitus (DM).²

Poor oral health is a crucial public health issue worldwide.⁵ On the basis of the results of the 2007 Riskesdas study, 1.8% of people in the age group of 45-54 years have lost teeth, 5.9% in the age group of 55-64 years, and 17.6% in the age group of >65 years.⁶ DMF-T in the age group of 55-64 years is 12.3, and the DMF-T above 65 years of age is 18.9 with the number of missing teeth due to tooth cavities, being a maximum of 17 teeth. It can be concluded that the average person >65 years of age in Indonesia suffers a

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loss of teeth due to dental cavities was by 17 teeth per person.² Other oral health problems in the elderly include the high prevalence of subject edentulous without dentures; this situation demonstrates a lack of knowledge of the utilization of dentures. The Education Act needs to improve knowledge regarding the wearing of dentures, which will improve the patient's attitude toward dental care and encourage the use of dentures in the elderly.⁷

The routine use of oral health services is highly recommended for maintaining healthy teeth and good oral hygiene. Limited access to care is one of the barriers to the utilization of oral health care in the elderly.^{8,9} Other factors influencing the utilization of oral health services include social support,¹⁰ according to the Andersen Models of health services utilization is necessity to identify predisposing factors and characteristics affecting utilization of oral health services.¹¹ This study aimed to investigate the factors influencing the utilization of oral health services as well as understand the appropriate intervention for these factors.

Materials and methods

The research design used was a cross-sectional approach. The independent factors examined included predisposing factors, factor endowments, and need factors. The dependent factor was the utilization of oral health care services by the elderly. Research was conducted in March–April 2018 at *posyandu* elderly, Payakumbuh. The community's population is aged 60 years and above and lives in Payakumbuh and attends the elderly *posyandu*. A total of 291 elderly people agreed to participate in this study.

Instruments in this research in the form of sheets check clinical oral health the elderly in modification of tooth WHO¹⁴ and examination sheets using a questionnaire, which consists of six questions of personal identity that used to be the data factors predisposing, modified from the National Socio-Economic Survey 2012¹⁵ questionnaire consisting of age, gender, marital status, education level, and history of systemic disease. Six questions were present of factor endowments. Questions 1 and 3 were based on the demographics of Payakumbuh and mileage to the clinics; questions 2, 4, 5, and 6 concerned perceived need based on the theory of

Andersen.¹³ Questions on health care utilization were adapted from a questionnaire of adult oral health by the WHO.¹⁴

Sampling, starting from the selection of the research taken place in five districts in Payakumbuh, conducted the draw for the *posyandu* elderly using the website randomizer.org. The whole subject that meets the criteria of research and came to the 10 selected elderly *posyandu* conducted a clinical examination of oral health as well as the filling of the questionnaire. The sampling method used a purposive sampling from the subject who came on a day of research and met the sampling criteria.

Results

Test reliability and validity of the questionnaire

For obtaining objective research data, a questionnaire should be tested for validity and reliability. Validity and reliability of the questionnaire were tested on 5%-10% of the total sample¹⁶ using 25 subjects. The validity test was performed to see how far a gauge measured. To find out the validity of the instrument to be used, the test is performed with the correlation between the score of each dimension with a total score of the questionnaire.

Correlation (Pearson Product Moment Correlation test) was analyzed and interpreted using software computer statistic program by comparing the results of the calculation "r" and "r" count table. To see r table is to look at the section of the line N-2, where N is the number of subjects on the test questionnaire. The number of subjects on test validity and reliability of this questionnaire a number of 25 people, thus N-2 = 23. For the level of significance of 5%, the r table was 0.323. For any inquiries conducted a comparison of r and r count table. When r count > r table, then the question can be considered valid.¹⁶ With r-counts larger than 0.323, the questionnaires were considered valid.

An intra-observer reliability test was used to assess the consistency of the results of the examination. A Bland-Altman¹⁷ test was performed by comparing the results of checks on two different times on the subject of at least 10% of the total sample. Results achieved the level of intraobserver reliability had a p-value greater than 0.05 and limits of agreement between -5 and 5 meaning the observer was competent.

Variable		N	%
Predisposing Factors			
Age	Young Elderly 60-69 years old	217	74.6
	Middle-aged 70-79 years	62	21.3
	Elderly > 80 years old	12	4.1
Gender	Women	232	79.7
	Man	59	20.3
Work	Work	72	24.7
	Does not work	219	75.3
Level of Education	Did not finish primary education	102	35.1
	Graduated from primary school or equivalent	127	43.6
	Graduated from junior high school / equivalent	11	3.8
	Graduate High School / Equal	48	16.5
	Graduated Diploma / Bachelor Degree	3	1.0
Marital status	Married	173	59.5
	Widow widower	118	40.5
History of Systemic Disease	No systemic disease	213	73.2
	Have systemic disease	78	26.8
Enabling factors			
Ownership of Health Financing Guarantee	There is no	36	12.4
	There is	255	87.6
Type of Health Financing	There is no	36	12.4
	Askes Pensioners	37	12.7
	Askes independently	32	11.0
	Askes PBI	186	63.9
Socioeconomic status	High	105	36.1
	Low	186	63.9
Travel time to dental and oral health facilities	> 15 minutes	162	55.7
	<15 minutes	129	44.3
Easy access to dental and oral health facilities	Difficult to achieve	145	49.8
	Easy to reach	146	50.2
How to get elderly to dental and oral health facilities	Requires a vehicle	210	72.2
	Just walk	81	27.8
Knowledge of dental and oral health services is needed	Do not know	256	88
	Knowing	35	12
Distributed Frequency Factor Perceive Need			
Frequency Distribution of Perceived Need Factor	No	221	75.9
	Yes	70	24.1
Normative Need Factor			
Edentulous	The subject is edentulous	24	8.2
	Subject has teeth	267	91.8
The subject of edentulous using artificial teeth	Using artificial teeth	22	91.6
	Not using turquoise teeth	2	8.4
Gingival bleeding	There is no bleeding	80	27.5
	Bleeding score 1	211	72.5
Pocket Score	No pocket	106	36.4
	Pocket 4-5mm	156	53.6
	Pocket > 6mm	29	10.0
Denture	Not using artificial teeth	200	72.7
	Using artificial teeth	75	27.3
	Do not need Denture	16	5.5
Oral mucosal lesions	No lesions	225	77.3
	Other lesions	66	22.7
Needs immediate treatment	No maintenance needed	0	0
	Need care, not immediately	273	93.8
	Immediately need care	18	6.2

Table 1. Frequency Distribution of Independent Factors.

Table 1 describes the frequency distribution of independent factors, including to predisposing factors, enabling factors, distributed frequency factor, normative need factors. The distribution of respondents age 60-69-year old were 217 (74.6%), while the women respondent was 232 (79.7 %), and 72 respondents (24.7%) were still as an informal worker such as farmer, trader, and all variant activities to fulfill daily needs. The almost 240 (82.3%) respondent was have low education. The marital status of respondent was 173 (59.5%) married, and 213 (73.2%) respondents were have systemic disease.

Almost 255 (87.6%) respondent have health financing guarantee and 36 (12.4%) respondent did not have health financing guarantee. Social economy status of 186 (63.9%) respondents were low, the number 162 (55.7%) respondents have travel time to to get dental health facility > 15 minutes, while 146 (50.2%) respondent find it easy to reach dental health facility services. Almost 256 (88%) of respondents does not now about dental treatment need.

The respondent who were have gingival bleeding score 1 was 211 (72.5%), while 185 (63.6%) respondents were have pockes 4-5 mm. From 275 respondents who were need dental prothese, but only 75 respondent use dental prothese, while 200(72.7 %) respondent did not use dental prothese.

Table 2 describes the frequency distribution based on *normative* factors *need* (DMF-T and RDF S), The average of DMF-T was 22.66 teeth, including to *missing teeth* score was 17,8 teeth per respondent, the Filling Root Surfaces (RDF-S) was 24.33 root surface with the average of dental root caries surface score was 6,5 root caries surface per respondent were 211(72.5%).

	N	(average)	SD	Min-max	95% CI
DMF-T	291	22.66	8,244	0-32	21,77-23,23
RDF-S	291	24.33	8,365	0-32	23,44-25,34

Table 2. Frequency Distribution Based on Normative Factors Need (DMF-T and RDF S).

Table 3 describes the distribution of the Utilization of Oral Health Services, which is

80.4% of respondents do not utilize oral health services in Payakumbuh, only 19.6% of respondents utilize oral health services in Payakumbuh.

Variable	N	%
Utilizing dental and oral health services in the last 12 months	57	19.6
Not taking advantage of dental and oral health services in the last 12 months	234	80.4

Table 3. Distribution of the Utilization of Oral Health Services.

Variable	Significant p-value < 0.05
Predisposing Factors	
1. Age	0.0
2. Gender	0.348
3. Work	0.182
4. Level of education	0.000 *
5. Marital status	0.002 *
6. History of Systemic Disease	0.078
Supporting factors	
7. Ownership of Health Financing Guarantee	0.982
8. Socioeconomics	0.000 *
9. Travel time to dental and oral health facilities	0.204
10. Easy access to dental and oral health facilities	0.000 *
11. Knowledge of dental and oral health services is needed	0.001 *
Needs Care Factor (Need)	
12. Perceived Need	0.429
13. DMF-T	0.912
14. RDF-S	0.066
15. Bleeding Gingiva	0.825
16. Pocket	0.951
17. Use of prothesa	0.236
18. Attitude	0.005*

Table 4. The Relationship of Predisposing Factors and Enabling Factors with the Utilization of Oral Health Care in the Elderly.

Table 4 indicates that the relationship between Predisposing Factors and Enabling Factors with the Utilization of Oral Health Care in the Elderly, the correlation between variable predisposing factor and utilization dental health services of respondent was education level, marital status and systemic disease were analyzed used *Chi-Square*, the result indicates there was a significant correlation ($p < 0.05$) between age, education level and marital status. While the correlation between enabling factors and utilization of dental health services by elderly were analyzed by *Chi-Square* was significant (p value < 0.05). The correlation between *perceived need* including to gingival bleeding, pocket, dental protheses and *evaluated need including to DMF-T, RDF-S* oral mucosal lesion were analyzed by *Chi-Square*, the result was indicated a significant correlation ($p < 0.05$). While the correlation between attitude of respondents and dental protheses use was significant too ($p < 0.05$).

Table 5 describes the result of multiple regression model, there was 7 modelling in multivariate double regression logistic analysis to get the factors which contributing to utilization of dental health services of elderly in Payakumbuh. The result of multivariate analysis of 11 variables which contributing to the utilization of dental health services was age, level education, systemic disease, and social economic status. In Table 5 shows that the most of dominant variable was age of elderly more than 63 year old which is perform to utilize dental health services base on value of OR was 2.9 times (2.942) compare to elderly age 60-62 year old with R-square 0,380 this mean those of 4 variables in the model able to predicted 38% of variation of dental health utilization of elderly.

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value
Predisposing factors												
Age	3,087	0.006	3.232	0.003	3,065	0.003	3.130	0.002	2,082	0.002	2.942	0.003
Work												
Does not work	0.534	0.121	0.519	0.098	0.518	0.098	0.523	0.101	0.499	0.075	0.482	0.061
Work	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs
Level of education												
Low	0.288	0.003	0.281	0.002	0.286	0.002	0.283	0.002	0.246	0.000	0.238	0.000
High	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs
Marital status												
Widow widower	0.860	0.727										
Married	Rfs	Rfs										
A history of systemic disease												
Have systemic disease	0.403	0.063	0.404	0.063	0.377	0.037	0.367	0.032	0.361	0.029	0.345	0.023
No systemic disease	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs
Supporting factors												
Socioeconomic status												
Low	0.126	0.000	0.126	0.000	0.131	0.000	0.133	0.000	0.122	0.000	0.122	0.000
High	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs
Travel time to place of dental health service of mouth and mouth												
> 15 minutes	1.565	0.260	1.614	0.218	1.564	0.243	1.521	0.271	1.327	0.390		
<15 minutes	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs		
Easy access to health facilities												
Difficult	0.168	0.263	0.612	0.251	0.645	0.288	0.642	0.281				
Easy	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs				
Knowledge of health services required												
No knowledge	1.284	0.650	1.302	0.632								
Have knowledge	Rfs	Rfs	Rfs	Rfs								
Normative Need Factor												
Use of denture												
Not using artificial teeth	1.426	0.612	1.452	0.385	1.403	0.423						
Using artificial teeth	Rfs	Rfs	Rfs	Rfs	Rfs	Rfs						

Rfs = Rfs

* p<0.0001

Table 5. Multiregression Logistics Model.

Discussion

The factors limiting the utilization of oral health service by the elderly:

Predisposing factors

Age

Dye et al. (2007) showed a meaningful relationship between age and the utilization of oral health services. Among adults of all ages, persons aged >65 years tend to visit professional dental health professional personnel on a regular basis.¹⁸ We found that persons over 63 years of age used oral health services more than seniors between the ages of 60-62 years (OR = 2.942).

Educational Status

The education of subjects in this study was divided into low and high. the subject of the research not completed primary education, completed primary education and secondary education is low and categorized first and who graduated from high school and colleges of higher education are categorized. The majority of the subject (82.3%) had low levels of education, the research results of this large difference may be caused by the difference in the characteristics of the subject in each place of research. A meaningful relation exists between the level of education and the utilization of oral health services by the elderly. This is in accordance with the results by Lee et al. (2014) who report that the status of education related to dental health services utilization of elderly¹⁹; research results also correspond to the research undertaken by Lau et al. (2009); they show that there is a significant influence among decision subject of education in utilizing health service.⁹

Ramirez et al. (2011) stated that the elderly with higher education allows to performing utilization of oral healthcare.²⁰ Schulz (2015) found that the elderly with higher education have a 2.1 OR compared to the elderly who have a low level of education to use oral healthcare.²⁰

A History of Systemic Disease

On the systemic disease history from 291 subjects, by as much as 213 (73.2%) do not have systemic diseases such as coronary heart disease, hypertension, stroke, diabetes mellitus and lung cancer. Whereas the results of the basic health research (Riskesdas) in the year 2013 showed most diseases in elderly, especially

is a disease not contagious among other hypertension, osteoarthritis, oral health problems, COPD and DM.² It is in accordance with the results of research Lee et al. (2014) that a history of systemic diseases associated with the utilization of services the dental health of the elderly, in which the elderly without utilizing more systemic diseases oral health services compared with systemic diseases of the elderly.¹⁹ The report by Ramirez et al. (2011) also stated that elderly people with better health conditions and without any disturbance activity due to illness allow to performing the utilization of oral healthcare in a better way.²⁰

Enabling factors

Availability of Financing Health Guarantee

As many as 255 (87.6%) subjects had the assurance of having financing guarantee health, and 36 (12.4%) subjects did not have guaranteed health financing. Of the subjects that had guaranteed health financing, as much as 186 (72.9%) were participants of **PBI** (Recipient Contribution), which is a population with low socioeconomic status, of the subject MATTER who are not participants utilizing teeth and mouth health services 171 (91.9%), whereas the guaranteed financing of health is a protection so that the individual has health maintenance and protection benefits and can meet the needs of basic health by utilizing health services. There is no meaningful relationship ownership guarantees health financing with the utilization of oral health service for the elderly. This finding is in accordance with the research in Thailand (2008) about the guarantee of health financing in bulk which covered government, where Universal Coverage program has been started in the year 2001 and examined in the year 2008 show results turned towards the utilization of health services.²¹ This finding is not in accordance with the results of research by Lee et al. (2014) that the ownership of health coverage related to dental health services utilization of elderly, where the elderly who have guaranteed healthcare make better use of oral health services than the elderly without guaranteed healthcare.¹⁹

Socioeconomic Status

A total of 186 (63.9%) subjects with low socioeconomic status categories were obtained health insurance from the government. We found

a meaningful relationship between the socioeconomic status and the utilization of oral health service of the elderly, it is in accordance with the research of Lee et al. (2014) that socioeconomic status relates to dental health service utilization by the elderly.¹⁹ This also conforms with research in Thailand (2008), the low socioeconomic status effect the utilization in 2001, the reports studies in 2008 indicated that the results remain unchanged regarding the utilization of oral health services, which were low and influenced by other factors such as low education level.²¹

Access to Oral Health Facilities

As many as 162 (55.7%) subjects had >15 minutes of travel time to the oral health facilities, and 146 (50.2%) subjects felt they had easy access to oral health services. There is a meaningful relationship between the ease of access to the utilization of oral health services. These findings are in accordance with the findings by Lee et al. (2014).¹⁹

Factors need

Factors of Perceived Need

The results of this study showed that of 291 subjects, as many as 221 (75.9%) assume they have no need of oral health care. There is no meaningful relationship between perceived need and the utilization of oral health services. This research does not fit with the theory of Andersen stating that perceived needs are associated with the utilization of oral health care.¹²

Normative Factors Need

The results showed that the elderly had a mean DMF-T of 22.7 teeth with the largest *missing* proportions of 17.8 gears per subject and *Decayed Filled Root Surfaces (RDF-S)* 24.4 root surface with average root caries 24.4 dental caries per subject. The data showed a DM.7 22.7 (incl. High category according to WHO) score¹⁴ dominated by an average tooth loss component of 17.8 gears per individual, higher than DMF-T according to Riskesdas data of 18.9 for age group <65 years old.² The number of elderly caries experiences in Payakumbuh is similar to that of the elderly in developed countries, one is York in 2009, in which Ahluwalia et al. founded that the average DMF-T with an average of score MT was 19.9 MT, almost average score MT was high 14.5 teeth.²⁰

Of 291 subjects, 16 did not require dentures. Of the 275 subjects who needed dentures, as many as 200 (72.7%) subjects do not use dentures. Losing teeth not only lowers the efficiency of mastication but also cause other health problems.⁵ Some reasons that the subjects gave for not using teeth included high cost, feeling that they did not need dentures, and a low knowledge of the needs of the Ministry of Dental Health.

Conclusions

Of the 10 variables entered into the modeling to look at the contribution to the utilization of oral health care elderly in Payakumbuh final results on the modeling variables are age, history of systemic disease, the level of education and socioeconomic status. With final results of the R-square value of 0.380, meaning all four variables in this study were able to predict 38% variation in the utilization of oral health service by the elderly.

Limitations of the study

This study describes the use of oral health services by the elderly *posyandu* and does not include elderly residing at home, those who never visited the *posyandu*, or elderly who visited other health facilities.

Declaration of Interest

The authors report no conflict of interest and would like to thank to the Directorate of Research and Higher Education Republic Indonesia and the government of prefecture of Payakumbuh city.

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