Relationship between Oral Health Knowledge, Attitude, and Practice Towards Dentures Demand and Sociodemographic Factors in Pre-Elderly and Elderly

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Abstract

The possibility of tooth loss may increase as we get older. Missing teeth in the posterior area will reduce the number of occlusal support zones and cause changes in the masticatory function. These changes may impact general health and affect the quality of life, leading to a person needing some form of denture care. How the need for care turns into a person's demand is influenced by factors such as knowledge, attitude, and practice.

This study aimed to analyze the relationship between oral health knowledge, attitude, and practice towards denture demand in the pre-elderly and elderly associated with sociodemographic factors. A cross-sectional study with saturation sampling was conducted on 82 subjects over 45 who attended community service at the public health center on Panggang Island, Kepulauan Seribu. An oral examination was performed to determine the number of remaining occlusal support zones (Eichner classification). Oral health knowledge, attitude, and practice questionnaire, followed by a denture demand sheet, were given to assess their level of oral health knowledge, attitude, practice, and demand for denture treatment. Sociodemographic data (age, gender, education, and economic status) were also collected in this study. Data were analyzed using the Chi-Square test. Statistical significance was set at $p<0.05$. This study found that oral health knowledge gave a statistically significant difference in denture demand ($p = 0.000$), economic status ($p = 0.015$), and the number of occlusal support zones ($p = 0.022$). A statistically significant difference was also seen between oral health practice and education level ($p = 0.033$).

In conclusion, oral health knowledge has a relationship with denture demand, economic status, and the number of occlusal support zones. Moreover, oral health practice is related to education level, and oral health attitude and practice do not affect denture demand.

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Introduction

The population of pre-elderly and elderly tends to increase every year.[1,2] Based on the Statistical Data in 2017, the percentage of the pre-elderly (aged 45 - 59 years) population in Indonesia is 16.65%, increased to 16.91% in 2018 and 17.82% in 2021.[2,3,4] Likewise, the percentage of the elderly (≥ 60 years) population in Indonesia in 2017 was 8.97% and increased in 2018 to 9.27% and continue to grow to 10.82% in 2021.[2,3,4] Dental and oral health problems that often occur in pre-elderly and elderly are growing in dental caries and periodontal disease resulting in tooth loss.[5–7] The average tooth loss in the 45 - 54 year age group was 3.2; for group 55 - 64 years was 5.9; and for 65 years and over was 10.1. It can be concluded that tooth loss in the pre-elderly and elderly in Indonesia was relatively high.[8]

Meanwhile, the unreplaced missing tooth directly impacts the ability to chew one's food, affecting nutrient intake and food choices. Thus, it significantly affects general health and can affect one's quality of life.[9] Given these effects, tooth loss must be immediately replaced with dentures to restore the function of mastication, phonetics, and aesthetics.[10,11] In 2018, the percentage of denture installation in the 45 - 54 age group was 2.5%, 55 - 64 years was 3.8%,

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and 65 years and above s 4.1%. Whereas in 2018, the percentage of teeth lost due to extraction or tooth fell out in the 45-54 age group was 23.6%, 55 - 64 years by 29%, and 65 years and over by 30.6%.[8] This shows that not every person who has lost teeth will replace missing teeth with a denture. Replacing tooth loss with a denture is influenced by the desire of individuals to get treatment, which is known as the need and demand for dental and oral health.[13]

A need for denture treatment will become a demand if there are factors that influence it. According to Narby (2007), these factors are called "Gatekeeping 1," which includes dental and oral health problems, quality of life, psychological factors, health understanding (attitudes, values, and practices), social structure factors, and demographics.[13] Theory regarding the demand for health services, developed initially by Andersen in 1968, mentioned three factors that can influence a person to request health services; the driving factor (predisposing), the ability factor (enabling), and the need factor (need). Predisposing factors include health understanding, which consists of knowledge, attitude, and practice regarding health and health services.[14]

This study was performed to determine whether Andersen's (1968) theory of the demand for health services, predisposing factors consisting of knowledge, attitudes, and practice, also applies and relates to the demand for dentures. In addition, a further assessment was conducted to determine whether sociodemographic characteristics (age, gender, education level, and economic level) and the number of occlusal support zones (*Eichner* classification) affect the relationship between oral health knowledge, attitudes, and practice with denture demand.

Materials and methods

The study was conducted on the pre-elderly (aged 45 - 59 years) and elderly (≥ 60 years) population on Pramuka and Panggang Island who came to a social service event at Pulau Panggang Health Center, Kepulauan Seribu. Subjects in this *cross-sectional* analytic study were collected using the *saturation sampling* technique, which takes all members of the population who have the criteria established as research samples. Someone over 45 years old (pre-elderly and elderly) and able to communicate was included. This study has received ethical clearance from the Ethical Review Committee of the Faculty of Dentistry, Universitas Indonesia, with number *79/Ethical Approval/FKGUI/VIII/2019.*

Only the subject agreed to participate and signed the informed consent in data collection. Oral cavity screening was performed to determine the number of occlusal support zones based on the Eichner classification. [15] In this study, subjects were classified into six groups: A, B1, B2, B3, B4, and C. Group A has four occlusal support zones; group B1 has three occlusal support zones; group B2 has two occlusal support zones, group B3 have one occlusal support zones, group B4 have 0 occlusal support zones but have anterior contact. Group C has no occlusal support zones and anterior contact.

Subjects were required to fill out the data sheets to collect sociodemographic data (age, gender, education, and economic level) and continued with knowledge, attitudes, and practices of oral health and denture demand sheets.[16,17] The oral health knowledge questionnaire consists of 13 questions describing knowledge of dental and oral health in general and measuring knowledge of dental and oral health in elderly subjects. It was a multiple-choice questionnaire, and each has a Likert scale value, that is 0 (Very High), 1 (High), 2 (Moderate), 3 (Low), and 4 (Very Low). The Likert scale is added up; if the score is 0 - 20, the level of knowledge of oral health is high, and if the score is ≥ 21, the level of knowledge of oral health is low.[16] The oral health attitude and practice questionnaires have four multiple-choice questions, each describing the attitude and practice of oral health. Each answer to the questions has a Likert scale value, with 1 (the correct answer), 2 (the correct Answer), and 3 (the wrong answer). The Likert scale is added up; if the score is < 7.2, the level of oral health attitude and practice is poor, 7.2 - 9.6 is fair, and > 9.6 is good.[17] To measure the demand for dentures, a question sheet was made assessing the subject's desire, whether to replace the missing teeth with dentures and where the subject would make the dentures.

Statistical Analysis

The statistical analysis was performed using the SPSS software, version 23. Data were processed for univariate data analysis to see the

frequency distribution and the percentage of each variable from the subject population and then, followed by a bivariate analysis using a categorical comparative analysis test of unpaired more than two groups, the Chi-Square test to see the relationship between variables. A Continuity Correction test was used to determine the correlation between oral health knowledge and denture demand. Meanwhile, A Kruskal-Wallis test was applied to analyze the correlation between oral health attitude and practice with denture demand. Statistical significance was set at $p < 0.05$.

Results

There were 82 subjects aged ≥ 45 years who participated in the study. The frequency distribution is shown in table 1.

VARIABLES	N(%)
Age (years)	
• Pre-Elderly (45-59)	49 (59.8%)
• Elderly (≥60)	33 (40.2%)
Gender	
• Male	9 (11%)
• Female	73 (89%)
Education Level	
• High (University)	2 (2.4%)
• Middle (Senior High School)	12 (14.6%)
• Basic (Junior High, Elementary School, or no school)	68 (82.9%)
Economic Level	
• 5th Quintile (Rp.1.601.516 - Rp. 5.000.000)	17 (20.7%)
• 4th Quintile (Rp. 896.065 - Rp. 1.601.516)	16 (19.5%)
• 3rd Quintile (Rp. 538.095 - Rp. 896.065)	16 (19.5%)
• 2nd Quintile (Rp. 270.050 - Rp. 538.095)	16 (19.5%)
• 1st Quintile (Rp. 87.719 - Rp. 270.050)	17 (20.7%)
Oral Health Knowledge	
• High	55 (67.1%)
• Low	27 (32.9%)
Oral Health Attitude	
• Good	65 (79.3%)
• Fair	15 (18.3%)
• Poor	2 (2.4%)
Oral Health Practice	
• Good	65 (79.3%)
• Fair	13 (15.9%)
• Poor	4 (4.9%)
Tooth Loss	
• Yes	81 (98.8%)
• No	1 (1.2%)
***Eichner Classification* (Number of Occlusal Support Zone) (n=81)**	
• A (4 occlusal support zones)	13 (16%)
• B1 (3 occlusal support zones)	10 (12.3%)
• B2 (2 Occlusal Support Zones)	13 (16%)
• B3 (1 Occlusal Support Zones)	15 (18.5%)
• B4 (0 Occlusal Support Zone but Anterior Contact)	14 (17.3%)
• C (0 Occlusal Support Zone and No anterior contact)	16 (19.8%)
Denture Demand	
• Available	46 (56.1%)
• Not Available	36 (43.9%)

Table 1. Frequency Distribution of Subjects.

Most participants were female, with a basic educational level as the majority (82.9%). Most subjects (98.8% had tooth loss even though 67.1 % were considered to have high oral health knowledge, 79.3 % had good oral health attitudes, and 79.3 % performed good oral health practice (Table 1). To determine the relationship among sociodemographic characteristics (age, gender, education level, and economic level) with oral health knowledge, attitude, and practice, a bivariate analysis was performed. This study found that respondent's economic level has a statistically significant relationship with oral health knowledge ($p < 0.05$), and education level also has a statistically significant relationship with oral health practice knowledge ($p < 0.05$) (Table 2).

A significant difference between oral health knowledge and denture demand ($p < 0.05$) was also found when the bivariate analysis was also conducted between independent variables (sociodemographic characteristics, number of occlusal support zones, oral health knowledge, attitude, and practice) with dependent variables (denture demand) (Table 3). Lastly, analysis between oral health knowledge, attitude, and practice with the number of occlusal support zones, showed a significant difference between oral health knowledge and the number of occlusal support zones ($p < 0.05$) (Table 4).

Discussion

This study indicates that Andersen's (1968) theory regarding the *Behavioral Model of Health Services Use* can also be applied to denture demand. The theory states that the predisposing factor to health services utilization includes knowledge related to health and health services.[14] In this study, the number of subjects with high knowledge about oral health and demand for dentures (70.9%) was greater than the number of subjects with low oral health knowledge and had a demand for dentures (25.9%). A statistically significant relationship was found between oral health knowledge and denture demand ($p < 0.05$) in pre-elderly and elderly subjects; the result is most likely to occur because most of the subjects have high oral health knowledge (67.1%). Increased knowledge about oral health will make one understand the impact of tooth loss if not replaced, so one will have a demand for dentures. In addition, most of

the subjects in this study have a classification of *Eichner* class B and C. Tooth loss in the support zones can decrease mastication function.[18,19]

This decrease in mastication function will ultimately encourage a person to seek denture treatment. As reflected in the results of this study, the demand for dentures in subjects with *Eichner* class B and C classifications is higher than in subjects with class A *Eichner* classification. This result is also supported by Suresh and Sharma's (2010) results, who found that one of the main reasons someone feels they need dentures is to support mastication.[20]

Low education is often associated with poor oral health; one of the parameters of oral health is the number of tooth loss.[21] The results of this study showed that most subjects with a low level of education (82.9%) possess Eichner class B and C classification (0 - 3 occlusion support zones), suggesting low education affects oral health. Al-Darwish (2016) states that increasing knowledge about risk factors for oral diseases and oral health shows better practices in maintaining oral health.[22] Subjects with lower education levels are more likely to have a higher risk of tooth loss, which can be prevented by increasing knowledge of oral health; thus, the subjects may change to improve their practice to maintain oral health.

This study found no significant relationship between the attitudes and practices of oral health with denture demand ($p \geq 0.05$) in pre-elderly and elderly subjects. This result indicates that Andersen's (1968) theory statements that attitudes and practices can affect the utilization of health services can not be applied to denture demand.[14] This study result may have been likely caused by the overly general nature of the information unearthed by the attitude and practice questionnaire for oral health. In the oral health attitude and practice questionnaire, there is no specific question about the attitude and practice of a person towards the loss of his teeth. The questionnaire only contains questions about the attitudes and practices of oral health in general; therefore, it does not direct the subject to the situation and conditions of tooth loss that renders to demand for dentures.

Furthermore, oral health attitudes and practices are considered preventive measures for maintaining oral health. In contrast, demand for dentures is deemed a curative action or form of tooth loss treatment resulting from poor oral health. Thus, having a denture demand requires a long process starting from performing efforts to maintain oral health until inevitable tooth loss occurs. Therefore, assessing the relationship between oral health attitudes and practices with denture demand may not be suitably performed in a one-time assessment; instead, it is more appropriate to be accomplished by the *cohort* study method.

An important factor influencing low denture demand in this study is the population subjects' low income. Individuals with higher levels of education, more established jobs, and higher incomes have lower barriers to denture demand than individuals with less established jobs, lower incomes, and lower levels of education.[13] Low income will likely prevent an individual from spending money on denture costs. Low-income individuals also tend to have lower health service demands and spend less on general dental care than higher-income individuals.[13]

The cost of denture care is considered the most hindering factor in turning the need to become a demand for dentures.[21] It is likely that some people will think and feel the price of denture treatment is not economical and relatively expensive. Therefore, most people may prefer to use their money for more essential needs, such as food and other daily necessities, their children's education, and future savings. In addition, there is also possible fear of using a denture in the subject's mind because a foreign object is inserted into the oral cavity. One may also feel anxious because of worrying that his daily activities may be disrupted by having nausea or difficulty speaking after wearing a denture.[23]

This study showed a statically significant relationship between economic level and oral health knowledge ($p < 0.05$). The ability to pay for health care costs may affect someone's oral health knowledge. Individuals with higher incomes may have been able to come often to seek dental health services. Conversely, individuals with lower economic status will tend to delay going to the dentist because the costs of treatment hinder these individuals.[24] The more often an individual visits the dentist, the more likely the individual gets an education about dental and oral health knowledge from the dentist. Dentists are among the best sources of information in dental and oral health knowledge.

An earlier study found that dental and oral health education from dentists was effective in increasing oral health knowledge and individual dental and oral hygiene status.[25]

The level of education was also found to have a statistically significant relationship with oral health practice ($p < 005$) in this study. This finding is consistent with the Rasouli-Ghahroudi et al.(2016) study , which also found a significant relationship between the level of education and oral health practice.[26] The existence of a meaningful relationship between the level of education with oral health practice in this study is likely to occur because individuals who have a high level of education usually have high oral health knowledge as well. Proposing that individuals with more knowledge will tend to maintain their oral health practice. A person's education level correlates with the use of toothbrushes and toothpaste in cleaning teeth.[27] Moreover, another finding in the previous study revealed a positive correlation between high levels of education and cleaning teeth twice a day with fluoride toothpaste.[28]

This study found there is a significant relationship between oral health knowledge with the number of occlusal support zones (*Eichner* classification) ($p < 0.05$). Analysis between these two variables has never been performed before. Tooth loss is one of the parameters for poor oral health.[21] Individuals who have low oral health knowledge tend to have poor attitudes and practices in maintaining oral health, so the chances are that oral health conditions are also poor.[29] Research conducted by Khalid et al. (2019) states that poor oral health knowledge contributes greatly to the prevalence of dental caries in men and women.[30] While Caries and periodontal disease were found to be the leading cause of tooth loss.[6] The higher the likelihood of caries, the higher the possibility of losing teeth due to being pulled out. Accordingly, Khalid et al. (2019) study support the results of this study where oral health knowledge can contribute to the amount of tooth loss which can lead to the loss of several occlusal support zones *(Eichner* classification*).*[30]

Apart from the variables above, no significant relationships were found between the other variables. The unequal distribution of the number of subjects on data distribution may have caused this. The limitation of this study is that the attitude and practice of the oral health questionnaire used do not provide a 'picture' of knowledge about the impact of tooth loss that can lead to demand for dentures.

Conclusions

Oral health knowledge has a relationship with denture demand, economic level, and the number of occlusal support zones. Moreover, oral health practice has a relationship with education level, while oral health attitude and practice do not have a relationship to denture demand.

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Declaration of Interest

The authors report no conflict of interest.

Variables	Oral Health Knowledge			Oral Health Attitude				Oral Health Practice			
	High	Low	P	Good	Fair	Poor	P	Good	Fair	Poor	P
Age (Years)											
Pre-Elderly (45 - 59)	34 (69.4%)	15 (30.6%)	0.761	41 (83.7%)	8 (16.3%)	0 (0%)	0.195	41 (83.7%)	8 (16.3%)	0 (0%)	0.195
Elderly (≥ 60)	21 (63.6%)	12 (36.4%)		24 (72.7%)	7 (21.2%)	2 (6.1%)		24 (72.7%)	7 (21.2%)	2 (6.1%)	
Gender											
Male	5 (55.6%)	4 (44.4%)	0.468	8 (88.9%)	1 (11.1%)	0 (0%)	0.442	8 (88.9%)	1 (11.1%)	0 (0%)	0.442
Female	5 (55.6%)	4 (44.4%)	0.468	57 (78.1%)	14 (19.2%)	2 (2.7%)		57 (78.1%)	14 (19.2%)	2 (2.7%)	
Education Level											
High (University)	1 (50%)	1 (50%)	0.138	1 (50%)	1 (50%)	0 (0%)	0.582	0 (0%)	2 (100%)	0 (0%)	0.033*
Middle (Senior High School)	11 (91.7%)	1 (8.3%)		10 (83.3%)	2 (16.7%)	0 (0%)		10 (83.3%)	2 (16.7%)	0 (0%)	
Basic (Junior High, Elementary School, or not school)	43 (63.2%)	25 (36.8%)		54 (79.4%)	12 (17.6%)	2 (2.9%)		55 (80.9%)	9 (13.2%)	4 (5.9%)	
Economic Level											
5th Quintile (Rp.1.601.516 - Rp. 5.000.000)	10 (58.8%)	7 (41.2%)	0.015*	15 (88.2%)	2 (11.8%)	0 (0%)	0.243	15 (88.2%)	2 (11.8%)	0 (0%)	0,724
4th Quintile (Rp. 896.065 - Rp. 1.601.516)	15 (93.8%)	1 (6.3%)		11 (68.8%)	4 (25%)	1 (6.3%)		12 (75%)	4 (25%)	0 (0%)	
3rd Quintile (Rp. 538.095 - Rp. 896.065)	9 (56.3%)	7 (43.8%)		12 (75%)	3 (18.8%)	1 (6.3%)		11 (68.8%)	4 (25%)	1 (6.3%)	
2nd Quintile (Rp 270.050 - Rp. 538.095)	7 (43.8%)	9 (56.3%)		11 (68.8%)	5 (31.3%)	0 (0%)		13 (81.3%)	2 (12.5%)	1 (6.3%)	
1st Quintile (Rp. 87.719 - Rp. 270.050)	14 (82.4%)	3 (17.6%)		16 (94.1%)	1 (5.9%)	0 (0%)		14 (82.4%)	1 (5.9%)	2 (11.8%)	

Table 2. Bivariate Analysis between Sociodemographic Data towards Oral Health Knowledge, Attitude, and Practice.

Variables	Denture Demand		
	Yes	No	P
Age (Years)			
Pre-Elderly (45 - 59)	26 (53.1%)	23 (46.9%)	0.654
Elderly (≥ 60)	20 (60.6%)	13 (39.4%)	
Gender			
Male	6 (66.7%)	3 (33.3%)	0.724
Female	40 (54.8%)	33 (45.2%)	
Education Level			
High (University)	1 (50%)	1 (50%)	0.882
Middle (Senior High School)	6 (50%)	6 (50%)	
Basic (Junior High, Elementary School, or not school)	39 (57.4%)	29 (42.6%)	
Economic Level			
5th Quintile (Rp.1.601.516 - Rp. 5.000.000)	10 (58.8%)	7 (41.2%)	0.248
4th Quintile (Rp. 896.065 - Rp. 1.601.516)	9 (56.3%)	7 (43.8%)	
3rd Quintile (Rp. 538.095 - Rp. 896.065)	8 (50%)	8 (50%)	
2nd Quintile (Rp. 270.050 - Rp. 538.095)	6 (37.5%)	10 (62.5%)	
1st Quintile (Rp. 87.719 - Rp. 270.050)	13 (76.5%)	4 (23.5%)	
***Eichner Classification* (Occlusal Support Zones)**			
A (4 occlusal support zones)	4 (30.8%)	9 (69.2%)	0.129
B1 (3 occlusal support zones)	5 (50%)	5 (50%)	
B2 (2 occlusal support zones)	7 (53.8%)	6 (46.2%)	
B3 (1 occlusal support zones)	12 (80%)	3 (20%)	
B4 (0 occlusal support zone but anterior contact)	10 (71.4%)	4 (28.6%)	
C (0 occlusal support zone and no anterior contact)	8 (50%)	8 (50%)	
Oral Health Knowledge			
High	39 (70.9%)	16 (29.1%)	0.000*
Low	7 (25.9%)	20 (74.1%)	
Oral Health Attitude			
Good	38 (58.5%)	27 (41.5%)	0.197
Fair	6 (40%)	9 (60%)	
Poor	2 (100%)	0 (0%)	
Oral Health Practice			
Good	36 (55.4%)	29 (44.6%)	0.736
Fair	7 (53.8%)	6 (46.2%)	
Poor	3 (75%)	1 (25%)	

Table 3. Bivariate Analysis between Sociodemographic Data, Number of Occlusal Support Zones, Oral Health Knowledge, Attitude, and Practice towards Denture Demand.
* : P value <0.05, there is a significant relationship.

Variables	*Eichner* Classification (Occlusal Support Zones) n(%)						*P*
	A	B1	B2	B3	B4	C	
Oral Health Knowledge							
High	11 (20.4%)	7 (13%)	10 (18.5%)	11 (20.4%)	7 (13%)	8 (14.8%)	0.022*
Low	2 (7.4%)	3 (11.1%)	3 (11.1%)	4 (14.8%)	7 (25.9%)	8 (29.6%)	
Oral Health Attitude							
Good	11 (16.9%)	9 (13.8%)	12 (185%)	11 (16.9%)	12 (18.5%)	10 (15.4%)	0.202
Fair	2 (14.3%)	1 (7.1%)	1 (7.1%)	3 (21.4%)	2 (14.3%)	5 (35.7%)	
Poor	0 (0%)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	1 (50%)	
Oral Health Practice							
Good	12 (18.5%)	9 (13.8%)	11 (16.9%)	11 (16.9%)	11 (16.9%)	11 (16.9%)	0.058
Fair	1 (8.3%)	1 (8.3%)	2 (16.7%)	3 (25%)	3 (25%)	2 (16.7%)	
Poor	0 (0%)	0 (0%)	0 (0%)	1 (25%)	0 (0%)	3 (75%)	

Table 4. Bivariate Analysis between Oral Health Knowledge, Attitude, and Practice towards the Number of Occlusal Support Zones.
* : P value <0.05, there is a significant relationship.

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