The Effect of the Implementation of the Education on the Knowledge and Status of Dental Cleanliness in Elderly in Darul Imarah Aceh Besar District, Indonesia

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Abstract

BACKGROUND: Oral health problems are ones that must be considered by the elderly. Dental and oral health in the elderly is essential and closely related to general health. Overcoming this problem needs necessary to optimize the elderly's ability to maintain dental and oral hygiene by providing information and skills.

AIM: The purpose of this study is to analyze the effect of self-empowerment-based education packages on knowledge and oral hygiene of the elderly in the Darul Imarah district of Aceh Besar.

METHODS: This study's design was a quasi-experimental design with a pretest-posttest design with control group design. This research is located in the village of Darul Imarah District, Aceh Besar. A sample of 80 older adults who were divided into two groups. Each group numbered 40 people. The criteria for this sampling were inclusion and exclusion criteria. Data analysis used univariable, bivariable, and multivariate using paired samples test and independent t-test.

RESULTS: The results showed a difference in mean knowledge from post-test I to post-test II (P = 0.002). The results of the multivariate analysis of the knowledge, attitude, and behavior variables on the maintenance of dental and oral hygiene had a significant effect on the periodontal health status of pre-elderly (p = 0.001). The statistical test results showed that there was an effect of self-empowerment-based education on the knowledge of the elderly, p = 0.001. The results showed that there was no difference in knowledge in the control group in the post-test I and post-test 2 with a value of p = 0.72, and there was a difference in knowledge in the intervention group in the post-test I and post-test 2 with a value of p = 0.002. There were differences in dental and oral hygiene in the control group, and there were differences in dental and oral hygiene after being given the intervention with a value of p = 0.003.

CONCLUSION: There is a significant effect of providing a self-empowerment-based education package to the elderly on the level of knowledge and oral hygiene status of the elderly in Darul Imarah District, Aceh Besar (p <0.05).

Introduction

Increasing the number of older adults is an indicator of development success and a challenge in development. Oral health has received global attention because it is closely related to general health and quality of life [1]. Over the age of 65 has more than doubled the world's total population during the period 1996–2020. In 2020, Indonesia's estimated elderly population will reach 28.8 million or 11.34%, with a UHH of around 71.1 years [2]. It is estimated that the population aged 65 or over and 80 or over will increase to 29.2 and 39%, respectively, by 2050 [3]. As the number of older adults in Indonesia increases, the attention that must be paid to this group will also be even more significant. The elderly are very dependent on care, declining health, and less attention [4]. Epidemiological data regarding the oral health of the elderly are scarce or absent [5].

Aging is a complex biological phenomenon that results from the interaction between genetic and environmental factors. This process can directly or indirectly increase the risk of developing the disease [6]. As the global population increases, health services for the elderly have been further developed to improve their health and quality of life [7], [8]. The increasing number of the elderly requires serious handling because they naturally experience physical, biological, and mental decline. Aging is a complex biological phenomenon that results from the interaction between genetic and environmental factors. This process can directly or indirectly increase the risk of developing the disease [6]. Nutrient deficiency represents a potential health threat to the entire elderly population [9]. Dental and oral health in the elderly is essential because it is closely related to general health. Oral health problems affect appearance, quality of life: and nutritional intake [10].

Oral health is one that must be considered. Overcome this problem needs necessary to optimize the ability of the elderly in maintaining oral hygiene through the provision of information and skills. Moreover, they are controlling risk through mastication.

The number of people aged in the elderly category in the District of Darul Imarah amounted to 80 people. Based on the examination results on ten older people, the average dental and oral hygiene status were 5.6 with a wrong category, and empowerment needs to be done to maintain dental and oral hygiene for the elderly. This study aimed to analyze the effect of the self-empowerment package on the level of knowledge and dental and oral hygiene status in the elderly in Darul Imarah district, Aceh Besar, Indonesia.

Methods

This study used a quasi-experimental design with a pretest-posttest design with a control group design. This research was conducted in Darul Imarah District, Aceh Besar District. Subjects in this study were the elderly, namely 135 people, while those aged 60–70 years totaled 80 people. The research subjects were divided into two treatment groups: (1) The treatment group (I) was elderly people who lived in Kandang Village, Tingkeum Village, and Daroy Kameu Village, totaling 40 people, given dental health education based on self-empowerment and (2) The control group (II) is the elderly who live in Lheu Blang Village, Lamsiteh Village, and Lambung Village, totaling 40 people, who were not given intervention. The instrument for dental and oral hygiene checks used diagnostic sets, and the Oral Hygiene Index-Simplified (OHIS) index for the elderly is divided into two groups. Confounding factors for each group were determined, namely, gender, age, and education level. The analysis of the results of this study used: (1) Paired samples t-test, to determine the differences in increasing knowledge and oral hygiene status in the intervention group and the control group, namely from pre-test to post-test I, post-test I to post-test II, and pre-test to post-test II, (2). The independent t-test is to determine the difference in the increase in the two groups, and (3). Multivariate using the manova test.

Results

Characteristics of research subjects

The characteristics of research subjects in this study include age, gender, and education

Based on Table 1, the most dominant respondents' age was 60–61 years in the intervention group, 45% in the control group, 30%. The female sex is prevalent, both in the intervention group and the control group. While the education level in the intervention group, 52.5% had an elementary level of education,

Table 1: Distribution of respondents by age, gender, and education in Groups I and II

Characteristic respondent	Group I		Group II	
Age	n	%	n	%
60–61	18	45	12	30
62–63	8	20	10	25
64–65	8	20	7	17.5
66–67	1	2.5	8	20
68–69	2	5	2	5
70–71	3	7.5	1	2.5
Total	40	45	12	30
Gender				
Male	8	20	3	7.5
Female	32	80	37	92.5
Total	40	100	40	100
Education				
BS	21	52.5	9	22.5
JHS	15	37.5	19	47.5
SHS	4	10	12	30
Total	40	100	40	100

47.5% had a junior high school education level in the control group.

Univariate analysis

The univariate analysis in this study included: (1) Knowledge and status of dental and oral hygiene before treatment (pre-test) and after treatment (post-test I and post-test II).

Based on Table 2, the results of knowledge in the intervention group are 55% in the low category, while the control group is 57.5% in the high class. While respondents in the intervention group's oral hygiene status, 52.5% had a lousy category of dental and oral hygiene, while 62.5% of the control group was in the wrong class.

Table 2: Distribution of respondents based on knowledge, and dental and oral hygiene status in groups I and II before treatment

Pre-test	Group I		Group II	
Knowledge	n	%	n	%
High	18	45	23	57.5
Low	22	55	17	42.5
Total	40	100	40	100
Status OHIS				
Good	0	0	1	2.5
Middle	19	47.5	14	35
Bad	21	52.5	25	62.5
Total	40	100	40	100

Based on Table 3, the results of knowledge in the intervention group are 55% in the high category, while the control group is 65% in the low category. While the dental and oral hygiene status of respondents in the intervention group, 57.5% had a lousy category of dental and oral hygiene, while 52.5% of the control group was in the moderate category.

Table 3: Distribution of respondents based on knowledge, and dental and oral hygiene status in groups I and II after treatment

Post-test	Groups I		Groups II	
Knowledge	n	%	n	%
High	22	55	14	35
Low	18	45	26	65
Total	40	100	40	100
Status OHIS				
Good	0	0	0	0
Medium	17	42.5	21	52.5
bad	23	57.5	19	47.5
Total	40	100	40	100

Testing prerequisite analysis

Data analysis in this study used parametric statistics with t-test techniques (paired t-test), t-test (independent t-test), and MANOVA test. This study's data normality test used the Kolmogorov–Smirnov Z test and the F test (Levene's test for equality of variances). Tests were carried out with computer software, Statistic Program for the Social Science (SPSS) version 16. The results of the normality and homogeneity test are as follows:

The results of testing with the Kolmogorov–Smirnov Z test, and Levene's test for equality of variances, were all significant at the 5% significance level ($p > 0.05$), which means that the data in this study were normally distributed and homogeneous (Table 4).

Table 4: Analysis of Results Normality and Homogeneity Tests of Data Distribution at Group I and Group II

Data distribution variable	Kolmogorov–Smirnov		Conclusion
	Z	p (sig.)	
Knowledge	1.346	0.053	Normal
Cleanness of teeth and mouth	1.190	0.118	Normal
	Levene's test for equality of variance		
	F. hit	p (sig.)	
Knowledge	0.221	0.639	Homogen
Cleanness of teeth and mouth	1.312	0.254	Homogen

Analysis (paired sample t-test)

The results of the analysis of the mean increase in knowledge and oral hygiene status of respondents from pre-test to post-test I, from post-test I to post-test II, and from pre-test to post-test II in treatment groups I and II, as follows.

The results showed no difference in knowledge in the control group in the post-test I and post-test 2 with a value of $p = 0.72$, and there was a difference in knowledge in the intervention group in the post-test I and post-test 2 with a value of $p = 0.002$. Based on the results of the study, it was found that there were differences in oral hygiene in the control group, and there were differences in dental and oral hygiene after being given the intervention with a value of $p = 0.003$. There was a difference in the mean knowledge from post-test post-test I to post-test post-test II ($p = 0.002$). There was a difference in this status from pre-test to post-test 1 ($p = 0.003$). Whereas in group II, there was no difference in the mean knowledge from pre-test to post-test I and from post-test I to post-test II (Table 5).

Table 5: Analysis of Mean Knowledge and Status of Respondents' Oral and Dental Hygiene from Pre-test to Post-test I, and from Post-test I to Post-test II, in the Treatment Group and the Control Group

Variable	Group I			Group II		
Knowledge	Average ± SD	CI	P	Average ± SD	CI	P
Pre-test	6.28 ± 0.78	0.15–0.31	0.35	5.78 ± 1.31	0.15–0.31	0.35
Post-test 1	6.55 ± 0.59			5.68 ± 1.6		
Post-test 1	6.55 ± 0.59	0.84–3.28	0.002*	5.68 ± 1.31	0.50–0.35	0.72
Post-test 2	6.03 ± 1.00			5.75 ± 0.70		
Status OHIS						
Pre-test	3.77 ± 1.14	0.11–0.52	0.003*	3.68 ± 0.99	0.06–0.47	0.01*
Post-test 1	3.45 ± 0.80			3.60 ± 0.76		
Post-test 1	3.45 ± 0.80	0.02–0.19	0.11	3.45 ± 0.80	0.41–0.09	0.03*
Post-test 2	3.37 ± 0.65			3.37 ± 0.63		

Analysis (independent t-test)

Based on Table 6 shows that there are differences in the level of knowledge and status of dental and oral hygiene after self-empowerment-based education in the elderly ($p < 0.05$). Statistically, it can be seen that there is an effect of the education package on the dental and oral hygiene status of the elderly $p < 0.05$, but practically the OHIS value of the elderly from post 1 to post 2 is not much different.

Table 6: Average knowledge and status of respondents teeth and oral hygiene before and after being given self-empowerment-based education to the elderly in the Darul Imarah district of Aceh Besar

Variable	Average±SD	CI	p
Education knowledge	5.73±1.15	0.80 −0.29	0.001*
	6.28±0.83		
Education-status OHIS	3.77±0.83	0.02–0.46	0.03*
	3.53±0.89		

Multivariate analysis

In this study, the MANOVA test was used to determine the effect of self-empowerment based education on the elderly on knowledge and status of oral and dental hygiene. The homogeneity test results with the levels test of equality of error variances in the knowledge group and this status were the same as the value of $p > 0.05$. Based on the results of the multivariate significance test, the F value of education at Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root has a value of $p = 0.001$, and this indicates that there is an effect of self-empowerment-based education in the elderly on knowledge and status of oral and dental hygiene. Then, the results of the MANOVA test are as follows:

Based on Table 7, it shows that statistically, education has more influence on knowledge, $p < 0.05$.

Table 7: The effect of self-empowerment-based education on the knowledge and status of respondents' dental and oral hygiene in the elderly community in the Darul Imarah district of Aceh Besar

Variable	F	Sig.
Education		
Pillai's Trace	10.4	0.001*
Wilks' Lambda		
Hotelling's Trace		
Roy's Largest Root		
Knowledge	17.8	0.001*
Status OHIS	4.64	0.03*

Discussion

The results showed a significant effect of giving a self-empowerment-based educational package to the elderly on the level of knowledge and status of dental and oral hygiene ($p < 0.05$). Based on multivariate analysis, the knowledge, attitude, and behavior variables toward maintaining dental and oral hygiene had a significant

effect on pre-elderly people's periodontal health status (p = 0.001). That there were differences in the level of knowledge and dental and oral hygiene status after self-empowerment-based education in the elderly (p < 0.05). The education provided to the elderly can provide knowledge about the importance of maintaining oral health and the risks experienced if oral health is ignored. The Oral Health Education Program is closely related to the awareness and income of elderly families [11]. It is hoped that the awareness arising from the elderly can foster a tendency to manifest it in action so that the elderly can independently maintain dental and oral health, which will significantly affect the quality of life of the elderly. Oral health education programs targeting caregivers may be an effective strategy for improving oral hygiene [12]. Oral health is now considered to be as important as general health, with growing evidence showing a link between systemic health and major diseases such as cardiovascular disease, diabetes, obesity, arthritis, mild cognitive impairment, and even cancer [13], [14]. Attitudes and actions to maintain oral hygiene can also affect a person's behavior toward oral hygiene. Some elderly have good knowledge about the importance of oral hygiene but have low oral hygiene status. it may be due to a person's negative attitude in absorbing knowledge obtained but not applying it in daily actions and behavior. Improving nurses' oral health attitudes need dental education and training programs to be given high priority [15]. The results showed no difference in knowledge in the control group in the post-test I and post-test 2 with a value of p = 0.72, and there was a difference in knowledge. There was a difference in knowledge In the post-test intervention group, I and post-test 2 with a value of p = 0.002. Researchers assume that the elderly's knowledge increases because the elderly have gained knowledge and interest that has arisen so that there is a desire to seek additional information about oral health from various sources. Poor oral health and impaired cognition negatively impact health and cognitive decline through specific biological mechanisms. Daily oral hygiene is critical to prevent oral diseases such as caries or periodontal disease [16]. Poor oral health and cognitive impairment suggest that cognitive decline can negatively impact oral health and that poor oral health can lead to cognitive decline through specific biological mechanisms [17]. As a result, a decrease in oral health conditions in the elderly, such as dental caries and periodontal disease, is expected [18]. In the intervention activity, the elderly is also provided with a manual for maintaining oral dental health that the elderly can review the information that has been given. Statistically, it can be seen that there is an effect of the education package on the dental and oral hygiene status of the elderly p < 0.05, but practically the OHIS value of the elderly from post 1 to post 2 is not much different. The elderly have bad habits in maintaining oral and dental hygiene, such as inappropriate frequency and time of brushing their teeth, incorrect brushing techniques. Lack of attention to oral care is a hidden health hazard because dental awareness and oral health are considered important for general health and quality of life [19]. The statistical test results showed that there was an effect of self-empowerment-based education on the knowledge of the elderly, p = 0.001. The author assumes that this happens because the elderly have received oral health maintenance information from the interventions given in education about oral health. Education is provided to increase the elderly's knowledge so that it is hoped that it can be manifested independently in their daily behavior. Family support plays a critical role in encouraging the interest or willingness of the elderly in maintaining dental and oral health. Family can be a strong motivator for the elderly to accompany, remind, and guide the elderly if they forget to brush their teeth, and help overcome all the elderly's problems.

Conclusion

There is a significant effect of providing self-empowerment-based education packages to the elderly on the level of knowledge and dental and oral hygiene status.

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