

Card Scoring As Prognosis Tool Elderly Quality of Life in the city of Bengkulu

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Abstract- *Improvement quantity elderly (elderly) should be balanced with an increase in the quality of life. In addition to long life, the elderly are expected to have a good quality of life, stay healthy, productive, and independent. The quality of life of the elderly should be an essential concern for health professionals because it can be a reference for the success of an action, intervention, or therapy. There must be a system that is used to detect early life quality of the elderly that can be used to provide primary health care measures for the elderly. The study aims to identify card scoring based on individual characteristics, psychological well-being, social welfare and environmental welfare as a prognostic quality of life for the elderly. Types of research case control with 108 elderly samples at the Kuala Lempuing Health Center in Bengkulu city, was taken by simple random sampling technique. Data collection uses the WHOQOL-BREF Instrument questionnaire. Data analysis using Chi-square test and multiple logistic regression. The Hosmer and Lemeshow test are used to see the quality of the model from the calibration aspect. The results of the analysis showed that there was no difference between observed and expected with a value of $p = 0.93 > 0.05$. Regression equation (5.468 and 2.492) total_score is obtained. ROC analysis is used to determine the quality of discrimination. The results of the discrimination score of the scoring model in this study were strong ($p = 0.972$, 95% CI, 0.944-0.999). The prognosis of the quality of life of the elderly can be determined based on card scoring (environmental welfare, psychological well-being, and physical factors).*

Keywords - *The quality of life, elderly, scoring prognosis.*

I. INTRODUCTION

Older adults aged 65 years and over worldwide in 2016 totaled 617 million (National Institutes of Health, 2016). The proportion of older adults in the world is estimated at 22% or around 2 billion by 2020; around 80% of older adults live in developing countries. The average life expectancy in countries in the Southeast Asian region is 70 years while life expectancy in Indonesia itself is quite high at 71 years. The population in 11 WHO member countries in the Southeast Asian region over the age of 60 are 142 million and is expected to continue to increase threefold in 2050. Indonesia is fourth, after China, India, Japan. Based on the 2014 National Socio-Economic Survey (Susenas) data, the number of older adults in Indonesia reached 20.24 million, equivalent to 8.03 percent of the entire Indonesian population in 2014. The number of senior women currently reaches

10.77 million older adults who are more than the number of senior men amounting to 9.47 million elderly [1].

National development in various fields has improved the quality of health and the socio-economic conditions of society in general. Life expectancy (*life expectancy*) in Indonesia has increased markedly. Since 2004 - 2015 shows an increase in Life Expectancy in Indonesia from 68.6 years to 70.8 years and is estimated in 2030-2035 Life Expectancy in Indonesia will reach 72.2 years [3]. It is far better than the life expectancy of the previous three or four decades, which is under 60 years. Increasing life expectancy has increased the number of older adults (elderly) and changed the structure of the Indonesian population [1].

Increasing the quantity of the elderly should be balanced with an increase in the quality of life. Quality of life includes how the elderly assess and measure from various aspects of their lives, including emotional feelings in facing life problems, disposition, sense of fulfillment and life satisfaction, satisfaction in terms of work and personal relationships [4]. Besides being long-lived, the elderly are expected to have a good quality of life, stay healthy, productive, and independent so that it does not become a burden for the family and the government and can be a useful state asset.

The increasing number of elderly and life expectancy has a significant impact on public health. In the elderly, a person will experience changes in terms of physical, cognitive, and psychosocial life [5]. Most older adults complain of shortness of breath, weakness, fatigue, and stiff joints [6]. Old age, loneliness, less prosperous socioeconomic, and the emergence of degenerative diseases such as cancer, heart disease, rheumatism, and cataracts cause productivity to decline and affect social life. About 10% of parents over the age of 65 and 50% of those aged over 85 years will experience cognitive impairment [7].

The quality of life of the elderly should be an essential concern for health professionals because it can be a reference for the success of an action, intervention, or therapy. Besides, data on quality of life can also be preliminary data for consideration in formulating intervention or appropriate action for the elderly. According to the Bengkulu City Health Office, the elderly in the City of Bengkulu in 2016 totaled 16,004 people. Based on the results of a survey of 10 older adults in the Lempuing Health Center area. It was found that 40% of older adults with the low quality of life and from interviews with health center staff

were known to have never measured the quality of life of the elderly and no system was used to detect early life quality of the elderly. In connection with this, a system is needed to predict the quality of life of the elderly so that health programs can be anticipated and implemented for the elderly.

II. METHOD

This type of research uses a case-control study design. Variables studied included gender, education, employment history, partner status, chronic illness, physical welfare, psychological well-being, social welfare and environmental welfare in the past year as the output prognosis on the quality of life of the elderly.

This study uses an unpaired case-control study design [9] which involved as many as 108 respondents consisting of 54 case groups and 54 control groups collected according to inclusion and exclusion criteria to be determined as research subjects. Inclusion criteria (1) Aged ≥ 58 years; (2) For the case group, the elderly with low quality of life-based on assessment using WHOQOL-BREF Instruments (7) and the control group were the elderly with good quality of life; (3) Recorded at the Elderly Posyandu in the work area of Kuala Lempuing Health Center, Bengkulu City; (4) Living with family; (5) Willing to participate in research by signing *informed consent*. Exclusion criteria **are** communication disorders and memory that are determined based on interviews.

Data collection techniques used questionnaires to measure the characteristics of the elderly, physical welfare, psychological well-being, social welfare and environmental welfare and the quality of life of the elderly by using the WHOQOL-BREF instrument. Univariate analysis, using bivariate test *Chi-square* at significance level α 5%, multivariate using *multiple logistic regression test*, with steps (1) Selecting variables that will enter multivariate analysis, namely variables that in the bivariate analysis have a value p less than 0.25; (2) Making various models with multivariate analysis. Multivariate analysis used is a logistic regression with method *backward stepwise*; (3) Choose a prognostic model. After the multivariate analysis is obtained, several alternative models. To find out the quality of each model based on statistics (calibration and discrimination). Calibration is said to be good if the value p in the calibration test (*Hosmer and Lemeshow*) is higher than 0.05. Discrimination is said to be good if the AUC value is greater or equal to the expected AUC value; (4) Model simulation. After determining the best model, simulating the use of the model in daily practice is done; (5) Determining the cut-off point of the probability that the respondent has a good and bad quality prognosis, by finding and determining the optimal point between sensitivity and specificity through the use of graphs *line* (lines).

III. RESULTS

Characteristics of Respondents which included 54 respondents in the case group and 54 respondents in the control group can be seen in the following table:

TABLE 1. DISTRIBUTION OF RESPONDENTS BASED ON GENDER, EMPLOYMENT HISTORY, EDUCATION, AND PARTNER STATUS

No	Characteristics	Case		Control		Number	
		n	%	n	%	N	%
1.	Type Gender						
	male	20	37	20	37	40	37
	Female	34	63	34	63	68	63
2.	Education						
	<High School	38	70.4	41	75.9	79	73.1
	\geq High School	16	29.6	13	24.1	29	26.9
3.	Employment History						
	Not Working	31	57.4	34	63	65	60.2
	Work	23	42.6	20	37	43	39.8
4.	Status of Spouse						
	Has Died	27	50	21	38.9	40	44.4
	Still Life	27	50	33	61.1	68	55.6
	Total	54	100	54	100	108	100

TABLE 2. DISTRIBUTION OF RESPONDENTS BASED ON QUALITY OF LIFE, CHRONIC DISEASE, AND WELFARE

Characteristics	Case		Control		Number	
	N	%	n	%	n	%
Chronic Disease						
Suffering from chronic diseases	44	81.5	44	81.5	88	81.5
Not Suffering from chronic diseases	10	18.5	10	18.5	20	18.5
Physical well-being						
enough	49	90.7	18	33.3	67	62
Good	5	9.3	36	66.6	41	8
Psychological well-being						
less stable	43	79.6	19	35.2	62	57.4
Stable	11	20.4	35	64.8	46	42.6
Social Welfare						
Active	39	Disability 72,2	12	22,2	51	47,2
Active	15	27,8	42	77,8	57	52,8
Environmental welfare						
Inadequate	49	90.7	6	11.1	55	50.9
Adequate	5	9.3	48	88.9	53	49.1
Total	54	100	54	100	108	100

Bivariate analysis conducted to find out the relationship between characteristics, chronic diseases and the welfare of the elderly with the quality of life of the elderly. The statistical test used is *chi-square* (X^2) with a significance level (α) of 5%.

TABLE 3. SUMMARY OF BIVARIATE ANALYSIS RELATED TO THE QUALITY OF LIFE FOR ELDERLY

Variables	<i>p-value</i>	OR	95% CI
Gender			
Male	1	1.00	0.45 - 2.18
Female			
Education			
<High School	0.66	0.75	0.32 - 1.77

≥ High School			
Employment History			
Not Working	0.69	0.79	0.36 - 1, 71
Work			
States spouse			
Deceased	0,73-	1.57	0.333.37
Living			
chronic Diseases			
Suffering from chronic diseases	1	1.00	0.37 - 2.64
Not suffering from chronic diseases			
Physical welfare*			
enough	0.001	19.6	6.65 - 57.72
Good			
Psychological wellbeing *			
Less stable	0.001	7.2	3.02 - 17.12
Stable			
Social welfare*			
Active	0.001	9.1	3.79 - 21.83
Inactive			
Environmental welfare*			
Inadequate	0.001	78.4	22.42 - 274.13
Adequate			

Description: * = Candidate variable ($p < 0.25$)

From analyst results, four variables have a value of $p < 0.25$, namely physical welfare, psychological well-being, social welfare, and environmental well-being so that they can be included in the multivariate model. Other variables cannot be statistically included in the multivariate model because it has a value of $p > 0.25$. These variables are gender, education, employment history, partner status, and chronic diseases.

Physical welfare variables, psychological well-being, and environmental welfare have a significant relationship with the quality of life of the elderly at the Kuala Lempuing Health Center in Bengkulu city. Of these three variables, the dominant variable is environmental welfare because it has the value of Exp. B is the largest delivered by variables that have a value of $p < 0.05$.

TABLE 4. THE FINAL VARIABLE MODEL THAT HAS A PROGNOSTIC VALUE ON THE QUALITY OF LIFE FOR ELDERLY

Variables	Coefficient (β)	p-Value	OR	95%.CI
Physical Welfare	4.054	0.001	57.60	5.76 to 575.70
psychological Welfare	2.227	0.009	9.27	1.74 to 49.36
environmental Welfare	5.102	0.000	164.27	17.39 to 1551.24
Constants	-6351			

then performed a simulation probability to predict the probability of output and create a scoring model. The scoring model is made by doing a logistic regression analysis where the variables entered into the analysis are only the total score

variable. Furthermore, the Hosmer and Lemeshow test were carried out to see the quality of the model from the calibration aspect. This test principle is comparing observed with expected. The model is well calibrated if there is no difference between observed and expected. The results of the analysis showed that there was no difference between observed with expected with a value of $p = 0.93$. The results of the analysis show that this variable provides information that the Skore_Total variable is a variable that is meaningful as a predictor. Regression equations obtained are: $-5,468 + 2,492x \text{ total_skore}$.

The next step is a ROC analysis to determine the quality of discrimination. The result of the discrimination score in the scoring model is 0.972 (CI; 95%: 0.944-0.999). This value indicates that the value of discrimination is strong. Next, the subject probability calculation is carried out.

TABLE 5. PROBABILITY SUBJECT EXPERIENCING A QUALITY OF LIFE LOW

a Score Seniors ^a	Constants	coefficient	$y = -5,468 + 2,492x \text{ total_skore}$	$\exp(-y)$	$p = \frac{1}{1 + \exp(-y)}$
0	-5,468	2,492	-5,468	236,986	0.004
1	-5,468	2,492	-2,976	0,049-5,468-0,484	
2		2,492	19,609	1,623	0.381
3	-5,468	2,492	2,008	0.134	0.882
4	-5,468	2,492	4.5	0.011	0.989

From this result, we can arrange to score to predict the quality of life of the elderly. Variables included in scoring are physical factors, psychological well-being, and environmental welfare.

TABLE 6. SCORING ELDERLY QUALITY OF LIFE

No		Yes	No	Score Elderly
1	Are elderly people having physical factors (including physical health, mobility, and degrees of freedom from injuries and accidents) that are good	0	1	
2	Does the elderly have psychological well-being (ability to gain self-confidence, ways overcome anxiety and the emergence of positive behavior) that is stable	0	1	
3	Is the elderly have Environmental Welfare (a relationship that is owned by the elderly with a source owned by a community) that is adequate	0	2	

Based on the total score on scoring the quality of life of the elderly, then the probability of the experiencing elderly quality of life the low are as follows:

TABLE 7. A PROBABILITY OF THE ELDERLY EXPERIENCING LOW QUALITY OF LIFE LOW

Score of	ProbabilityQuality of Life Prognosis
0	0.4
1	4.9
2	38.1
3	88.2
4	98.9

IV. DISCUSSION

The prognosis of the quality of life of the elderly can be determined based on scoring. A score of 4 means that 98.9 percent is more likely that the elderly will experience a low quality of life in the future. Conditions that play a role in determining the prognosis of the quality of life of the elderly are environmental welfare, psychological well-being, and physical factors. More than a portion (50.9%) of elderly environmental welfare is inadequate. The results of scoring calculations if the elderly do not have good environmental well-being then get a prognosis score 2. The environment is a condition that is around humans and affects human life. Individuals live in an environment called a place of residence, so that the quality of life is related to where the environment in which the individual lives [11]. An excellent place to live can create a peaceful, peaceful and pleasant atmosphere for the residents so that residents can feel at home and feel they want to stay in the place. A good environment can support the elderly to achieve a high quality of life. The quality of life of the elderly is intrinsically related to the quality of life of others in their environment. The quality of a person's life reflects the cultural wealth of a person and those around him [12].

The creation of a beautiful and pleasant atmosphere to live in depends very much on the interaction of the members in it who have a shared commitment and are aware of their respective duties and obligations. Family functions as a place to exchange between family members to meet the physical and emotional needs of each. Good environment especially the family will support the elderly in obtaining a maximum quality of life [13]. More than half (62%) of the physical welfare of the elderly is sufficient. Scoring calculation results if the elderly do not have enough physical well-being, they get a prognosis score 1. Physical well-being is focused on health. In the elderly, a person will experience changes in terms of physical, cognitive, and psychosocial life (5). Overall physical health conditions experience a setback since someone enters the elderly phase in his life. It is partly marked by the emergence of various symptoms of illness that have not been suffered at a young age [14].

Physical functioning well allows the elderly to achieve a good quality of life. Poor physical factors make a person lose the opportunity to actualize himself. Physical limitations possessed by the elderly will hinder the achievement of physical welfare, which in turn will have an impact on the low quality of life. The weaker physical condition makes the elderly feel that their life is no longer meaningful and

discouraged by the life they live. This condition is one sign of the low quality of life for the elderly because they cannot enjoy their old age. The process and speed of decline in body function in older adults differ, even though they are the same age. In different parts of the old body, there is a process of diverse body functions. Elderly is expected to make adjustments to physical changes, body functions and health which are decreasing. Regular and regular exercise will help fitness and maintain elderly psychomotor abilities. The optimal physical condition of the elderly will enable them to enjoy their old age with meaning, happiness, usefulness, and quality. More than half (57.4%) of elderly psychological well-being is less stable. The results of scoring calculations if the elderly do not have stable psychological well-being then get a prognosis score 1. Psychological factors are important factors for the elderly to control all the events they experience. Psychological well-being includes influence, fulfillment, stress and mental state, self-esteem, status and respect, religious beliefs, and sexuality. The stability of psychological well-being is one of the factors that play a role in improving the psychological well-being of the elderly [14].

Older adults who have high emotional intelligence will be able to master themselves, manage emotions, motivate themselves and direct themselves to be more productive. The low emotional intelligence of the elderly causes the elderly to be anxious, aloof, often afraid, feeling unloved, feeling nervous, sad and likely to get depressed easily. Stress can affect the elderly to get satisfaction in life and become one of the factors that play a role in reducing the quality of life. If the elderly can achieve good psychological well-being, it will affect their quality of life.

V. CONCLUSIONS

The conclusions of this study are (1) the prognosis of the quality of life of the elderly can be determined based on scoring; (2) Conditions that play a role in determining the prognosis of the quality of life of the elderly are environmental welfare, psychological well-being, and physical factors.

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