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STRUCTURAL EQUATION MODELING THE ENVIRONMENT, PSYCHOLOGY, SOCIAL RELATIONSHIPS AGAINST PHYSICAL HEALTH IN DETERMINATION QUALITY OF ELDERLY COMMUNITY SURABAYA

Bambang Widjanarko Otok

Department of Statistic, FMKSD, Institut Teknologi Sepuluh Nopember Surabaya, Surabaya, Indonesia

Dya Sustrami

Health Nursing, STIKES Hang Tuah Surabaya, Surabaya, Indonesia

Puji Hastuti

Health Nursing, STIKES Hang Tuah Surabaya, Surabaya, Indonesia

Purhadi

Department of Statistic, FMKSD, Institut Teknologi Sepuluh Nopember Surabaya, Surabaya, Indonesia

Sutikno

Department of Statistic, FMKSD, Institut Teknologi Sepuluh Nopember Surabaya, Surabaya, Indonesia

Santi Wulan Purnami

Department of Statistic, FMKSD, Institut Teknologi Sepuluh Nopember Surabaya, Surabaya, Indonesia

Agus Suharsono

Department of Statistic, FMKSD, Institut Teknologi Sepuluh Nopember Surabaya, Surabaya, Indonesia

ABSTRACT

Aging is a condition that occurs in human life. The process of aging is not a disease, but the advanced stage of a process that will be undertaken lives of all individuals. The aging process in the elderly can lead to physical, social and psychological changes. Weak physical condition, social economy less prosperous, and the emergence of a

degenerative disease that can lead to decreased productivity, thus affecting social life, it is necessary to study the quality of life index of elderly global, urban and coastal communities in Surabaya to Structural Equation Modeling (SEM) approach. The results showed that the quality of life of the elderly in Surabaya, which is based on the physical health is fit model. The highest quality of life index elderly in some health centers, Siwalankerto for urban communities, and the health center Sidotopo Wetan for coastal communities. Physical health of elderly urban society strongly influenced by environmental factors with indicators availability of transport, feel safe in daily life, and the condition of the neighborhood, while coastal communities are very influenced by social relationships with indicators sexual life, personal relationships / socialand psychology with indicator enjoy life, have a feeling of loneliness and inability to concentrate. So that there should be dissemination of environmental factors involving the indicator for the elderly in Sidosermo health centers, and a factor of social relationships and psychological factors for the elderly health centers Tambak Wedi.

1. INTRODUCTION

Aging is a condition that occurs in human life. Growing old is a natural process that means someone has gone through three stages of life, namely children, adults, and elderly. The process of aging is not a disease, but the advanced stage of a process of life that will be lived all individuals (Nugroho, 2008). The aging process can cause a variety of problems both physical, biological, mental and social economical. The more advanced age, they will suffer a setback, especially in the field of physical ability, which can cause a decrease of the physical needs. The decline in physical abilities consist of decreased ability to move and maintain posture so that some elderly often fall, and the inability to walk far because of tiredness (Sya'diyah, et. al, 2017; Huda and Dhian, 2017). Quality of life is influenced by four factors, namely physical health, psychological health, social relationships and environmental factors (Stanley and Beare, 2006). Independence for the elderly can be seen from the quality of their health so that they can perform everyday activities. Independence in activities of daily average elderly independent and there is some elderly who still dependency in the fulfillment of their activities. With the increasing health and welfare of the population will affect the increase in Life Expectancy Enterprises (LEE).

This study examines indicators and variables that affect the quality of life, which are then compiled into a theoretical model that will be proven by field data to be a data-based model. This study is expected to provide information on environmental, psychological, and social relations models on physical health by first obtaining factors score through SEM modeling (Anekawati, et.al, 2017; Susilawaty et.al. 2015) and then to calculate the Surabaya Community Elderly Quality of Life Index.

2. RESEARCH METHODOLOGY

The data used is the elderly aged 60-65 in urban and coastal sub-district in Surabaya. The sampling technique is simple random sampling (Mangkoedihardjo, 2010; Samudro et al., 2018; Samudro et al., 2011, Utama et al., 2018), and data collection is done by using a questionnaire sheet Care Dependency Scale. Research variables used include four latent variables and 21 indicators. Psychology (PSY1, PSY2, PSY3, PSY4, PSY5, PSY6 and PSY7), social relations (SR1, SR2 and SR3), environment (ENV1, ENV2, ENV3, ENV4, and ENV5) and physical health (PH1, PH2, PH3, PH4, PH5 and PH6). The conceptual framework of research as follows.
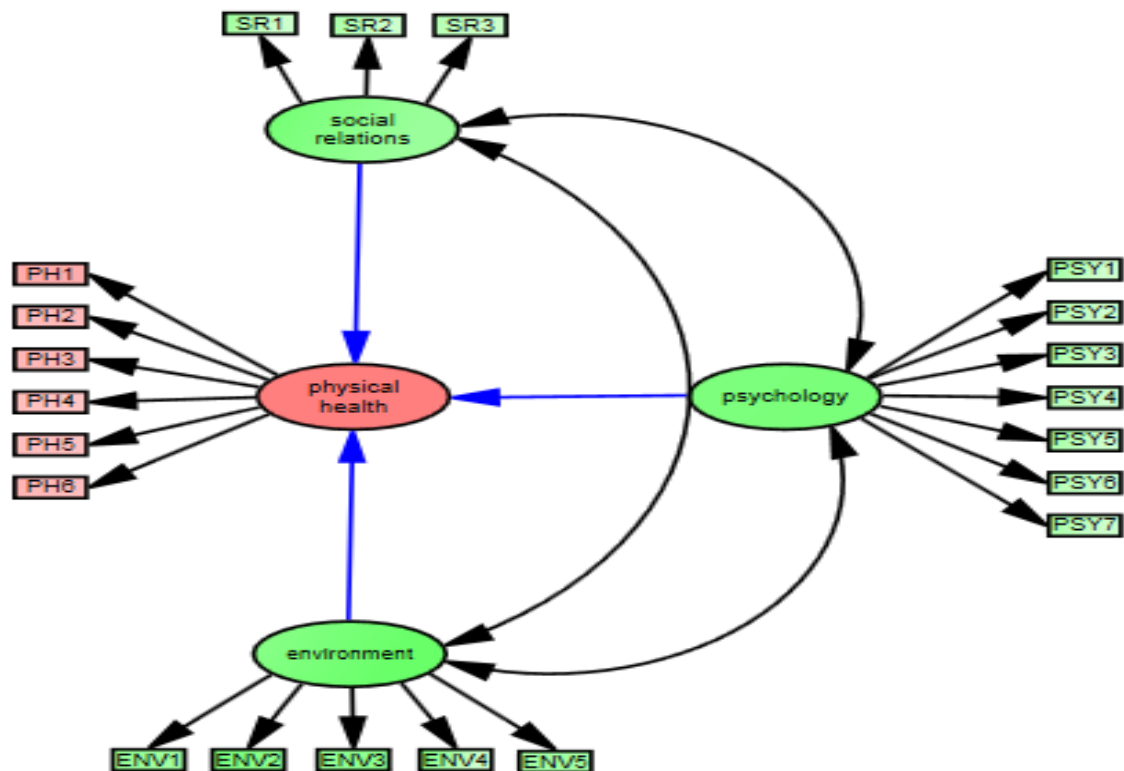
Figure 1. Conceptual Framework and Research Variables

SEM analysis with the following steps.

Multivariate normal testing on the data manifest (21 indicators)

Determining the structural model (according figure 1)

Getting a parameter estimator measurement model and the structural model with the maximum likelihood approach (Global, Urban, and Coastal)

Getting a score factor value (Global, Urban, and Coastal)

Getting an index on each of the latent variables.

Determination of the index is based on the SEM as follows (Susilawaty, et. al., 2015)

$$I_R = F'X \times 100 \tag{1}$$

Where: X = Data manifest and F = Score factor of variable latent

3. RESULTS AND DISCUSSION

General data research results is a picture of the demographic characteristics of the respondents in the form of data that includes age, gender, marital status, education, medical history, occupation, and income. The frequency distribution characteristics of elderly urban and coastal communities in Surabaya are presented in the following table.

Table 1. Distribution Frequency characteristics of elderly urban and coastal communities in Surabaya

Demographic variables	Category	urban		coastal	
		Frequency	%	Frequency	%
Age (year)	60	23	17.0	22	20.2
	61	9	6.7	6	5.5
	62	14	10.4	17	15.6
	63	13	9.6	16	14.7
	64	17	12.6	10	9.2
	65	59	43.7	38	34.9
Gender	Man	33	24.4	26	23.9
	woman	102	75.6	83	76.1
Education	No school	3	2.2	29	26.6
	SD	38	28.1	47	43.1
	SMP	34	25.2	26	23.9
	High School	52	38.5	5	4.6
	PT	8	5.9	2	1.8
Marriage	Married	90	66.7	86	78.9
	Widower	4	3.0	2	1.8
	Widow	40	29.6	21	19.3
Disease	Diabetes	27	20.0	24	22.0
	Hypertension	38	28.1	36	33.0
	stroke	4	3.0	3	2.8
	Cholesterol	13	9.6	17	15.6
	Uric acid	37	27.4	17	15.6
	rheumatism	16	11.9	8	7.3
	Heart	0	0	4	3.7
Work	Retired	47	34.8	9	8.3
	Retired civil servants	3	2.2	4	3.7
	Entrepreneur	26	19.3	6	5.5
	Housewife	41	30.4	27	24.8
	Trader	13	9.6	56	51.4
	Farmer	0	0	2	1.8
	Etc	5	3.7	5	4.6
Income	<1 million	34	25.2	52	47.7
	1 million - 2 million	57	42.2	44	40.4
	> 2 million	44	32.6	13	11.9

Table 1 shows that the distribution of urban respondents by age are elderly people aged 65 years and as much as 43.7%, female as much as 75.6%, high school educated as much as 38.5%, marital status, there are elderly people who were married as much as 66.7%, the status of the disease are elderly people who have a history hypertension as much as 28.1% and the elderly who have a history of gout as much as 27.4%, employment status are elderly pensioners and the elderly as much as 34.8% Housewives working as much as 30.4%, there is a monthly income seniors who earn 1 million -2 million as much as 42.2 %. Distribution coastal respondents by age are elderly aged 65 years and as much as 34.9%, female as much as 76.1%, 43.1% primary school educated,

Test the validity of using confirmatory factor analysis on each of the latent variables namely Psychology (X1), Environment (X2), Social Relations (X3), Physical Health (Y). Reliability test used composite reliability with a minimum cut-off value is 0.7. Results of testing the complete model with the AMOS program can be seen in Table 2 below:

Table 2. Loading factor Value Model Elderly, Urban and Coastal

Latent variables	variable Manifesto	Model Elderly			Model Urban Elderly			Elderly Model Coastal		
		loadings	Critical Ratio (CR)	p-value	loadings	Critical Ratio (CR)	p-value	loadings	Critical Ratio (CR)	p-value
Psychology	Enjoy life (PSY1)	0.871	11.208	0.000	0.854	8.495	0.000	0.890	7.309	0.000
	Feel alive (PSY2)	0.623	8.559	0.000	0.601	6.282	0.000	0.649	5.787	0.000
	Inability to concentrate (PSY3)	0.705	9.525	0.000	0.671	6.938	0.000	0.747	6.464	0.000
	Receive body appearance (PSY4)	0.768	10.219	0.000	0.804	8.117	0.000	0.725	6.331	0.000
	Satisfied with themselves (PSY5)	0.612	8.463	0.000	0.592	6.209	0.000	0.632	5.678	0.000
	Having feelings of loneliness (PSY6)	0.766	11.132	0.000	0.744	8.596	0.000	0.791	7.111	0.000
	Having feelings of anxiety and depression (PSY7)	0.654	Reference	-	0.676	Reference	-	0.630	Reference	-
Environment	Feel secure in their daily lives (ENV1)	0.757	8.010	0.000	0.770	5.512	0.000	0.744	5.916	0.000
	The condition of the neighborhood (enV2)	0.756	7.988	0.000	0.752	5.689	0.000	0.755	5.563	0.000

	Sports activities together (ENV3)	0.751	8.084	0.000	0.711	5.540	0.000	0.802	5.968	0.000
	Access to health services (ENV4)	0.638	7.470	0.000	0.597	4.979	0.000	0.683	5.698	0.000
	Availability of transport (ENV5)	0.855	Reference	-	0.909	Reference	-	0.824	Reference	-
Social Relation	Personal relationships / social (SR1)	0.719	Reference	-	0.695	Reference	-	0.743	Reference	-
	Sexual life (SR2)	0.784	9.856	0.000	0.759	6.284	0.000	0.820	7.814	0.000
	Support from friends (SR3)	0.560	8.128	0.000	0.539	5.502	0.000	0.588	6.046	0.000
physical Health	Physical pain in preventing activity (PH1)	0.733	11.800	0.000	0.727	8.553	0.000	0.744	8.160	0.000
	Needs medical therapy (PH2)	0.859	14.182	0.000	0.845	10.122	0.000	0.872	9.895	0.000
	For long endurance (PH3)	0.738	11.901	0.000	0.749	8.841	0.000	0.727	7.933	0.000
	The ability to associate (PH4)	0.748	13.163	0.000	0.715	8.971	0.000	0.783	9.693	0.000
	Satisfaction in bed (PH5)	0.761	Reference	-	0.752	Reference	-	0.770	Reference	-
	Ability in activities of life (PH6)	0.804	13.137	0.000	0.830	9.917	0.000	0.775	8.569	0.000

Value standardized loading (loading factor) is the magnitude of correlation between each indicator (manifest variables) with latent variables (for model reflexive). Table 1 shows all the individual indicators latent variable has a value above the loading factor of 0.5 with a p-value less than $\alpha = 0.05$, then it is valid and significant indicators. *Global Model:* Psychology is the dominant shaper Enjoy life (PSY1) (0871), Receive body appearance (PSY4) (0768) and has the feeling of loneliness (PSY6) (0766). Environment dominant shaper is availability of transport (ENV5) (0855), Feel safe in everyday life (ENV1) (0757), and the condition of the neighborhood (enV2) (0756). Social Relations is the dominant shaper sexual life (SR2) (0784), personal relationships / social (SR1) (0719). Physical Health is the dominant shaper Needs medical therapy (PH2) (0859), ability in activities of life (PH6) (0804), satisfaction in bed (PH5) (0761), and the ability to associate (PH4) (0748). Urban Elderly Model: Psychology is the dominant shaper Enjoy life (PSY1) (0854), Receive body appearance (PSY4) (0804) and has the feeling of loneliness (PSY6) (0744). Environment dominant shaper is the availability of transport (ENV5) (0909), Feel safe in everyday life (ENV1) (0770), and the condition of the

neighborhood (enV2) (0752). Social Relations is the dominant shaper sexual life (SR2) (0759), personal relationships / social (SR1) (0695). Physical Health is the dominant shaper Needs medical therapy (PH2) (0845), ability in activities of life (PH6) (0830), satisfaction in bed (PH5) (0752), andFor long endurance (PH3) (0749). Coastal Elderly Model: Psychology is the dominant shaper Enjoy life (PSY1) (0.90), has the feeling of loneliness (PSY6) (0791) andInability to concentrate (PSY3) (0747), Environment dominant shaper is availability of transport (ENV5) (0824),Sports activities together (ENV3)(0802), and the condition of the neighborhood (enV2) (0755). Social Relations is the dominant shaper sexual life (SR2) (0820), personal relationships / social (SR1) (0743). Physical Health is the dominant shaper Needs medical therapy (PH2) (0872), The ability to associate (PH4) (0783), Ability in activities of life (PH6) (0775), satisfaction in bed (PH5) (0770). Difference values manifest variables loading factor of global models that form in Table 2, showed that the heterogeneity in the measurement equation.

The test results of reliability indicators and latent variables with AMOS program can be seen in Table 3 below.

Table 3. Elderly model error variance value, Urban and Coastal

Latent variables	variable Manifesto	Model Elderly			Model Urban Elderly			Elderly Model Coastal		
		variance error	p-value	(CR)	variance error	p-value	(CR)	variance error	p-value	**(CR)**
Psychology	Enjoy life (PSY1)	0.236	0.000	0.881	0.250	0.000	0.876	0.217	0.000	0.887
	Feel alive (PSY2)	0.538	0.000		0.585	0.000		0.479	0.000	
	Inability to concentrate (PSY3)	0.463	0.000		0.525	0.000		0.388	0.000	
	Receive body appearance (PSY4)	0.373	0.000		0.314	0.000		0.442	0.000	
	Satisfied with themselves (PSY5)	0.554	0.000		0.508	0.000		0.610	0.000	
	Having feelings of loneliness (PSY6)	0.320	0.000		0.347	0.000		0.287	0.000	
	Having feelings of anxiety and depression (PSY7)	0.388	0.000		0.389	0.000		0.381	0.000	
Environment	Feel secure in their daily lives (ENV1)	0.296	0.000	0.868	0.261	0.000	0.867	0.339	0.000	0.874

	The condition of the neighborhood (ENV2)	0.317	0.000		0.293	0.000		0.353	0.000	
	Sports activities together (ENV3)	0.413	0.000		0.464	0.000		0.343	0.000	
	Access to health services (ENV4)	0.585	0.000		0.613	0.000		0.542	0.000	
	Availability of transport (ENV5)	0.326	0.008		0.220	0.018		0.367	0.010	
Social Relation	Personal relationships / social (SR1)	0.497	0.000		0.495	0.000		0.497	0.000	
	Sexual life (SR2)	0.394	0.000	0.732	0.443	0.000	0.706	0.327	0.000	0.764
	Support from friends (SR3)	0.608	0.000		0.658	0.000		0.542	0.000	
physical Health	Physical pain in preventing activity (PH1)	0.373	0.000		0.391	0.000		0.345	0.000	
	Needs medical therapy (PH2)	0.195	0.000		0.202	0.000		0.187	0.000	
	For long endurance (PH3)	0.402	0.000		0.384	0.000		0.423	0.000	
	The ability to associate (PH4)	0.373	0.000	0.900	0.391	0.000	0.898	0.350	0.000	0.903
	Satisfaction in bed (PH5)	0.368	0.000		0.356	0.000		0.383	0.000	
	Ability in activities of life (PH6)	0.338	0.000		0.301	0.000		0.377	0.000	

Having tested the validity and reliability on each of the latent variables, some of the prerequisites that must be met in structural modeling is a multivariate normal assumption, assuming the absence of outliers and data nonsingular. Here are presented the test results of each segment model assumptions in Table 4.

Table 4. Assumptions Testing on Elderly Model Global, Urban and Coastal

Assumption	Cut-Off	Elderly Health Physical Model					
		Global Model (N = 244)		Urban Model (n = 135)		Coastal Model (n = 109)	
		Value	information	Value	information	Value	information
Normal Multivariate	-1.96 ≤ Critical Ratio ≤ 1.96	1.196	fulfilled	0.083	fulfilled	0.446	fulfilled
No Outlier	p1≥ 0.001 is smaller than (nα)	0	fulfilled	0	fulfilled	0	fulfilled
Non Singularity	Determinant of a larger sample covariance matrix 10E-15	0.0000004	fulfilled	0.0000004	fulfilled	0.0000001	fulfilled

Table 4 shows that all assumptions are normal multivariate, no data are outliers and nonsingularity well on older models of global, urban older models as well as models of the coastal elderly are met, so that the resulting model can be generalized in the population.

Results of testing the structural model with a complete AMOS program can be seen in the following Table 5.

Table 5. GOF Value Model Global, Urban and Coastal Quality of Life of Elderly

Criteria	Cut-Off	GoF Value		
		Global Model	Urban Model	Coastal Model
Chi - Square	≤ χ^2 (0.05, 175) = 206.867	288.197	184.501	232.307
Significance Probability	≥ 0.05	0.000	0.297	0.002
RMSEA	≤ 0.08	0.052	0.020	0.055
CMIN / DF	≤ 2.00	1.647	1.054	1.327
GFI	≥ 0.90	0.901	0.887	0.841
AGFI	≥ 0.90	0.870	0.851	0.791
TLI	≥ 0.90	0.950	0.992	0.948
CFI	≥ 0.00	0.958	0.993	0.957

Based on Table 5, show that the two (2) criteria used to assess a decent / absence of a model turned out to be declared not meet the value of Chi-Square = 288.197 greater than the Chi-Square table = 206.867 and Significance Probability = 0.000 less than α = 0.05. Meanwhile there are six criteria that states that the model according to which CMIN / DF and RMSEA, as well as the three criteria stated quite good, that probability, TLI and CFA. It can be said that the physical health of the elderly structural model of global society is acceptable, which means there is a match between the model with data. Furthermore, Figure 3 and Table 5, showed that

6 (six) the criteria used to assess a decent / absence of a model of states have been met and that the value of Chi-Square = 184.501 less than the Chi-Square table = 206.867 and Significance Probability = 0.297 is greater than α = 0.05, the value CMIN / DF = 1.054 is less than 2, RMSEA = 0.020 less than 0.08, TLI and CFI greater than 0.90, as well as two criteria stated quite well that GFI and AGFI. It can be argued that the structural model of the physical health of urban elderly people can be accepted, which means there is a match between the model with data. Elderly Model coastal communities have the same criteria as the model of global society.

The following comparison of the value of the path coefficient and p-value generated in the global model, urban and coastal models.

Table 6. Comparison Value Path Coefficients and p-value

Latent Variables Exogenous → Latent Variables Endogenous	Global Model		Model Urban Elderly		Elderly Model Coastal	
	Coeff.	Critical Ratio (p-value)	Coeff.	Critical Ratio (p-value)	Coeff.	Critical Ratio (p-value)
Psychology→ physical Health	0.337	4.894 (0.000)	0.362	4.090 (0.000)	0.426	2.419 (0.016)
Social Relations→ physical Health	0.396	4.759 (0.000)	0.379	3.584 (0.000)	0.421	3.111 (0.002)
environment→ physical Health	0.308	3.910 (0.000)	0.317	2.925 (0.003)	0.256	2.653 (0.008)

Note: →: influence

Table 6 shows that the physical health of the elderly is influenced by psychological, social relationships and environment. It can be seen from the p-value at the Global models are less than 0.05. Elderly physical health of coastal communities more affected by psychology and social relations, while in older urban communities affected by the environment. It can be seen from the coefficient psychology coastal communities by 0.426 is greater than the value of the urban community psychology coefficient of 0.362, the same thing on the coefficient of social relations coastal community of 0.421 is greater than the value of the coefficient of the psychology of urban communities by 0.379. While urban communities coefficient of 0.317 is greater than the coefficient of urban communities by 0.256.

To obtain a quality of life index score first sought first factor of each latent variable, then according to the equation (1) is generated index global quality of life of elderly people, urban and coastal presented in the following table 7.

Table 7. Elderly Quality Index on Global, Urban and Coastal Health Center

Health Center	Global Model				Urban Model				Coastal Model			
	I_psy	I_env	I_sr	I_ph	I_psy	I_env	I_sr	I_ph	I_psy	I_env	I_sr	I_ph
Siwalankerto	105.3	111.8	99.2	105.7	104.8	114.1	101.1	106.8				
Jagir	99.0	98.1	100.7	98.4	98.3	100.0	103.7	99.3				
Sidosermo	97.4	85.3	93.0	93.2	96.9	85.9	95.2	93.9				
Tanah Kali Kedinding	99.5	98.0	97.0	97.5					99.8	96.6	95.8	96.8
Tambak Wedi	97.2	95.0	92.4	95.4					97.1	94.1	91.4	94.6
Bulak Banteng	89.3	97.5	102.5	99.5					90.4	96.6	99.7	98.5
Sidotopo Wetan	112.3	114.4	115.2	110.4					112.7	112.8	113.1	110.1

Table 7 shows that the elderly physical health index based on the largest global models respectively - participated in puskesmas *Sidotopo Wetan, Siwalankerto, Bulak Banteng, Jagir, Tanah Kali Kedinding, Tambak Wedi* and *Sidosermo*. This is also supported by environmental index, the index of social relations and psycologi index. Elderly physical health index based on the largest urban models respectively - participated in *Siwalankerto* health centers, *Jagir*, and *Sidosermo*. Elderly physical health index based on the largest coastal models respectively - participated in puskesmas *Sidotopo Wetan, Bulak Banteng, Tanah Kali Kedinding* and *Tambak Wedi*. This suggests that the elderly in the health center quality index *Sidotopo Wetan* provide the highest value, which means that the physical health of the elderly in Puskesmas *Sidotopo Wetan* as indicators in establishing the quality of life. Whereas in urban communities represented *Siwalankerto* health centers, as well as an example in building the quality of life of the elderly in urban areas. According Suhartin (2010), that improved health will improve the quality of life of individuals, social or family support is needed to achieve these conditions. Researchers have the assumption that the role of the family in the care of the elderly, among others, maintain and care for the elderly, maintain and improve mental status, in anticipation of socio-economic changes, as well as provide motivation, support and facilitate the spiritual needs of the elderly. While the physical decline in the elderly characterized by the inability of the elderly to be active and engaged in activities classified as severe.

5. CONCLUSION

The results showed with SEM approach that model based on quality of life of elderly physical health is a model that fit, and the dominant factor in shaping the physical health of the elderly row is a social relationship, psychology and environment. Physical health of elderly urban society strongly influenced by environmental factors, while the coastal community is strongly

influenced by psychological factors and social relationships. Elderly life quality index based on the model of the physical health of the largest elderly respectively - participated in *Sidotopo Wetan, Siwalankerto, Bulak Banteng, Jagir, Tanah Kali Kedinding, Tambak Wedi* and *Sidosermo* health centers. Urban community quality of life index *Siwalankerto* best in health centers, while in coastal communities *Sidotopo Wetan*.

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