

# **The Characteristics of Elderly Population in Indonesia by Social, Economic and Health Status: Analysis of the 1999 National Social and Economic Survey (SUSENAS)**

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**Abstract.** *This study describes briefly the characteristics of elderly population in Indonesia by focusing on their health status. The 1999 SUSENAS (Survei Sosial Ekonomi Nasional/National Socio-economic Survey) data are utilized as a source. In examining factors influenced the health status of the elderly population, the logistic multinomial models are applied. The health status is put as a dependent variable, while individual characteristics, family life and environmental circumstances are considered as independent variables. Using a sample of 63,312 elderly people, the study reveals that the health status of elderly people in Indonesia is relatively bad, which is highly influenced by those explanatory variables considered.*

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**Keywords:** Elderly people; health status; life expectancy; 1999 SUSENAS; Indonesia.

## **1. Introduction**

In Indonesia, as in many developing countries, utilizing advanced technology that usually transferred from the developed countries has accelerated demographic developments. Rapid declining in fertility rates, for example, has been affected by applying the technology of modern contraceptive methods. In terms of mortality, advanced technology can improve the health status and increase the life expectancy. At the end, this situation will significantly contribute to the increasing number of elderly population. 'Post war baby boom' that emerged in the period of 1960s-1970s may have impacts on the emerging of the 'aged population boom' in the beginning of 21<sup>st</sup> century. By 1995, the elderly population in Indonesia was

already 6.9 percent (13,600,962 persons) and it is estimated to increase to 8.1 percent (18,351,100 persons) in 2005 (Mundiharno, 1999).

From economic point of view, the elderly population is often considered as an obstacle and burden of the development, instead of a potential development resource. The elderly is categorized as non-productive people, and their life has to be supported by the younger generation. Besides, if they are still in the labor market, their productivity is assumed declining. It is not surprising therefore almost in all countries over the world that the elderly population obtains a lower share of income compared to that of the younger, since they have no more (little) contribution to the labor market (De Jong, et al., 1997).

Based on the findings from a longitudinal survey (Hugo, 1995) done in 35 villages in Java during the period 1969–1993, it is concluded that the phenomenon of poverty faced by Javanese has changed. In the earlier time (at the beginning of the survey), the poverty was considered as a common problem found in all areas, either in rural or urban, and faced uniformly by all ages. At the end of the survey, however, the poverty in Java was mostly faced by the elderly people in rural area, and particularly among those who have no child (living alone) and in widows status whose life depend on their family's support. In other words, the finding shows that the elderly people in general are marginal and sensitive to the economic turmoil, such as an economic crisis. The economic crisis that occurred recently in Indonesia has caused the number of poor people raises higher in a short time relatively. Thus, it could be imagined how difficult is the elderly who are considered as non-productive population on their effort of life, more over with worse health condition. With the constant income or probably even lower, they have to finance their health care and food subsistence that have been increasing continuously.

It is for sure that health's problem is an important matter for everybody, especially for the elderly. Biologically, the elderly people are in aging process, which means that their physical power has reduced and it is signed by more susceptible to many illnesses that possible causes them to death. Elderly people's health depends on many things, among others is the daily life pattern from their childhood, such as the pattern of eating, drinking, working and physical exercising. According to Smith (Smith and Kington, 1997), the health status of the elderly reflects their health level at the beginning of their life as children, even when they were in their mother's womb. Thus, someone who has already aware the important of her/his health since her/his early time is suppose to be in a better health status in her/his elderly life. In Indonesia, unfortunately, such ideal situation is still hard to be

found. Most of Indonesian population is still in foods awareness and not yet in the awareness of health and nutrition. In fact, the awareness of health and nutrition are influenced by several factors, such as education level, economic condition, environment circumstances and other supporting instruments. According to Blum (Rahardjo and Priyotomo, 1994) the health status of the elderly people is mainly influenced by four factors, namely the individual characteristic, the household condition, environment circumstances, and health services.

Up to now, however, there is few studies done in Indonesia relates to the interrelationship between the variables of demographic, social, economic and environment and the variable of elderly people's health from a macro side. Therefore, the study on that phenomenon is important to do. Such study is valuable to understand the susceptibility of the elderly on the changes occurred, so that the study could be utilized as the basic source on decision making for the policy makers in the future.

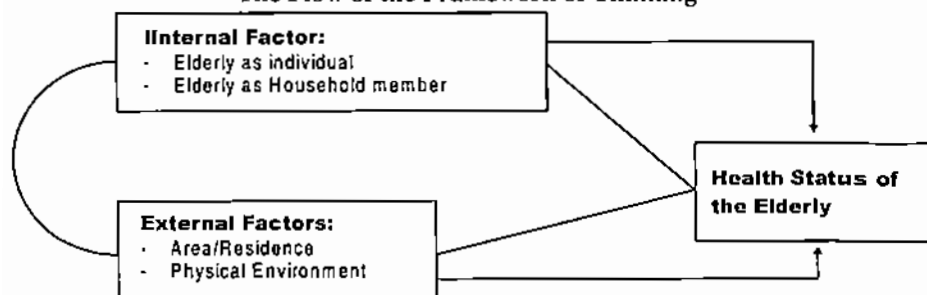
Based on the phenomenon described above, this paper attempts to contribute in understanding the social, economic and health condition of the elderly population in Indonesia, and to study factors influencing their health status. The figures on their social, economic and health condition are worthwhile to help the policy makers in designing a suitable decision that could be implemented, since the number of elderly population is predicted to increase quickly in the near future.

## **2. Framework of Thinking**

This present study adapts the framework of thinking from Blum (Rahardjo and Priyotomo, 1994). The framework has already been tested substantively and it is able to show the relationship among variables of social, economic and environment that are relevant to the purpose of this study.

The framework adopted puts the factor of the elderly as an individual, their household characteristics, environment and health services as the factors influencing the elderly people's health. This study uses the 1999 SUSENAS as data source. Since the data have no information on where the elderly people receive the health services, then the factor of health services is excluded. Figure 1 shows clearly the framework adopted.

**Figure 1**  
**The Flow of the Framework of Thinking**



Source: Blum (in Rahardjo and Priyotomo, 1994) - modified.

## 2.1 Variables/Indicators Chosen and Reason to Choose

Variables/indicators obtaining from SUSENAS data to complete the framework above, among others are:

### a. Factor of individual elderly

- Sex
- Marital Status
- Education
- Type of activity

### c. Factor of household

- Number of household member/s
- Relation to the household head
- Total household expenditure and expenses for health

### c. Factor of Environment

- Physical condition of the house (type of largest floor, space of house floor)
- Source of drinking water
- Facility of lavatory/toilet
- Source of lighting

### d. Residence area

- Urban/rural

### e. Health status

- Complaining on health
- Activity disturbance caused by health complaining

There are two main reasons in choosing the above variables to be used in this study: empirical and theoretical reasons. The empirical reason is that the variables/indicators chosen are available in the 1999 SUSENAS and are possible to be analyzed further. On the other hand, the theoretical reason is as follows.

## **2.1.1 Internal Factor**

### **2.1.1.1 Individual factor**

#### **(1) Sex**

It is known that life expectancy for female is generally higher than that of males. It indicates that there is a difference of the death risk between those two sexes. Genetically, the female chromosome that consists of two chromosomes *x* is stronger than chromosomes *x* and *y* owned by males. Thus, the female is considered more resistance to the illnesses, although there are many endogenous ones such as cancer i.e., breast and uterus cancer that used attacking the female. It is not surprising therefore many studies on health always compare the health of those two sexes. Among others is a study done by Smith and Kington (1997) so-called "Asset and Health Dynamics Among the Oldest Old (AHEAD)" survey. The study revealed that the health condition of the female elderly is better than that of the male.

#### **(2) Marital Status**

The marital status of the elderly people has an influence to the pattern of their life that have been passing through. A study from Kertonegoro (1996) showed that the elderly people generally depends on their spouse, so that the way of their life may be different between those who still have spouse and those who have not. The role of the spouse is big enough, it is supported by Wirakartakusumah et al., (1998) on the study of elderly people in Bogor and Cirebon. It was found that the male elderly people tend not to be a widower so long. They have a preference to remarry soon or later after they lost their spouse. This finding is also strengthened by Adioetomo and Lumatauw (1994) which stated that in 1990 more than fifty percent (58.11 percent) of the female elderly had widow status, while the male widower were only 11.43 percent.

This phenomenon indicates that if the elderly people have the chances (socially, economically and physically) to get a spouse, as revealed by the male elderly, they choose to have a spouse than to live alone. Whatever it is, psychologically, a person who has a spouse tends having higher 'value' than those who live alone.

#### **(3) Education**

Education attained by the elderly people will influence their knowledge, way of thinking, and way of live. It also influences the patterns of their life behavior and daily activities, included eating pattern, perception on

healthy life, and choice of the health services access. The education influences the health of the elderly in many ways. The more educated elderly people are, the more they are able to choose the high quality health services or medical doctor. In addition, they will be more careful on health disturbance, more aware to the pattern of unhealthy life (such as smoking or drinking alcohol), and more able to avoid the suddenly sicknesses attack (Smith and Kington, 1997).

MacFayden (Hill, 1995) also argued that the important non-biologically factors influencing the health status of the elderly people are the economic condition, nutrition, and education level. Beside willingness, education is one of the important keys to make the elderly people healthy and productive.

#### **(4) Activity**

As other population's groups, the elderly people also have the routine activities. Type of their activities is closely related to their health condition. If they are healthy without any complain, then it is expected their routine activities be not disturbed. In an economical study, an activity is considered as a productive one if that activity has an economic value, where in SUSENAS it is called 'working'. The size number of the working elderly population refers indirectly to their role as factor of production.

Based on the study of Wirakartakusumah et al., (1998), it shows that 29.1 percent of the elderly in the rural and 15.0 percent of those in the urban areas stated that they were working during the last week. They were mostly working at the informal sector since this sector is considered as the most elastic in observing the labor force. The elderly who decide to work usually are those who think, socially and economically, that they are not able to fulfill their basic daily needs, so that they do not consider retiring from their work.

According to Kertonegoro (1996), the main reason that might make the elderly people stop from working, especially in rural areas, is health disturbance. As far as they do not experience a serious health disturbance, they are still willing to work actively. The work activity, suppose, influences directly or indirectly, on a person's health condition. One who works in the agriculture sector will highly depend on his 'muscle', especially in long work hours, he will have the different health condition compared to those who work depends on his 'brain'.

### **2.1.1.2 Family factor**

#### **(1) The status of the relationship to the household head**

The status of the relationship to the household head will influence the function, the position and the responsibility of a person in his/her family. Generally, the most responsible person in a household is the household head, while other household members will have different roles and responsibilities.

The elderly who have the position as a head of household will have greater authority to manage or to decide the household policy. When it is seen from the health's point of view, there will be emerged two possibilities, first, seizing the greater authority on his/herself, then they feel having more freedom and not being restraint and having more 'meaning' in his/her life.

The positive psycho-social condition above supposes will have a good impact to the elderly people's health. The second possibility, meanwhile, by having a role as a household head makes the burden of their life is heavier than the other's that could reduce their health condition. Therefore, the variable of the status of the relationship to the household head is needed to be put for observing the health condition of the elderly people.

#### **(2) Living arrangement**

By increasing of the age, the reduction of the physical and mental capability of a person will be occurred, and like or not it will inevitably influence the productivity. In this condition, the elderly need support especially from the family in the form of material and moral as well. Based on the study of Wirakartakusumah et al. (1998), it is known that the proportion of the elderly people who confirmed that living together with family is the best is higher than those who confirmed that living alone is the best.

Living together with the family gives the feelings of save and avoids the feelings of lonely among the elderly. The need of the psycho-social of the elderly could be fulfill if they live together with their family. The better psycho-social condition will give positive impact on the health condition of the elderly people (Darmojo, 1999a).

#### **(3) Household expenses for health services**

The level of household expenditure is often used as an indicator of the economic status of a person. The study on the level of household expenses on health of the elderly is reasonable important. A person with a high level of household expenditure can be considered having a better

economic condition. Those who are having a better economic condition, health facilities, and healthy life information, will have balanced nutrition and better eating pattern. Those circumstances, for sure, will influence the health condition of the elderly.

It is often assumed that big proportion on spending of health expenses will indicate that a person has enough interest and understanding on health problems. In Indonesia, the cost of (modern) medical services tends to be more expensive than that of traditional treatment, therefore a person who spends her/his income for health cost indicates that she/he is interested in the prevention and treatment of medical health services.

The health cost spent by each household is very important, as in other developing countries, the Indonesia Government sets up the target for health services only around 2.3 to 2.6 percent of the national budget per year. This budget, however, is still lower than the budget in Thailand that provides the target for health services for 6.2 percent, or even in Korea for 5.6 percent per year (Saadah and Knowles, 2000).

Gani (Kompas, 2000) estimated health cost per capita in North Sumatra for the period 1999/2000. The allocation from the Government and the grant from other countries was Rp12,580 (US\$1.59, where US\$1=Rp8,000), from the community was Rp27,586 (US\$3.45) and from National Family Planning Board (NFPB) was Rp2,429 (US\$0.24), total was Rp42,595 or US\$5.32. Again, that amount is still lower than the health budget considered in Mozambique, one of the poorest countries in Africa, that is US\$6 per capita in 1999. Once it shows that the community should spend their private money around 70 to 75 percent to finance their health.

## **2.1.2 External factor**

### **2.1.2.1 Location (urban/rural)**

Place of residence of the elderly could reflect the different environment of social, economic and culture of their community. That difference, suppose, causes the different pattern of community behavior, including the different perception on the presence of the elderly. The elderly who are living in rural areas might have more freedom in entering or accessing to many activities than those who are living in urban areas. For example, to enter the agricultural sector in rural areas is much casier for the elderly than to enter the manufacture and services sectors in urban areas.



Based on a survey done by Wirakartakusumah et al., (1998) on the elderly people in Cirebon and Bogor, it was found that the elderly who are living in the rural areas are generally healthier than those who are living in the urban areas. It is due to the better environment condition that rural has than that of urban has. Looking at the social side, according to Davis (1979) in Hugo (1995), the rural areas are better location for the elderly people to live. Their skills are more applicable and more respectable in the rural, and they also could access the service facilities, especially that of the health which is relatively cheap. Looking at that point, the different location (urban and rural) is then very important to be put in the study of the health of the elderly population.

### **2.1.2.2 Environment of the residence**

The environment condition influences highly on the health condition of a person. The polluted environment and bad system of sanitation, directly or indirectly, for sure will have negative impact when it is related to the health of the elderly who are more susceptible biologically. The reduction of their body function will be worse in the non-conducive environment condition.

## **3. Data Source and Analysis Method**

Data used in this study are obtained from the 1999 SUSENAS. The data provide detail information on community welfare (i.e., social, economic and health condition), periodically and yearly. Unit analysis in this study is individual who already aged 60 years old and over. From the 1999 Susenas data, samples obtained are about 63,312 elderly people who are living in the regions of Indonesia.

Besides the descriptive analysis, this study also uses the inferential analysis by using the multinomial logistic model. There are four logistic models. Those models are chosen models designed based on the substance and the result of statistic test from the complete model. All dependent variables from the four models are health status that consists of three categories i.e.:

1. Bad (if the respondents stated have experienced health disturbance that hindrance their activities during the last month).

2. Middle (if the respondents stated that during the last month they have experienced health disturbance but not hindrance their activities)
3. Good (if the respondents stated that they have never experienced health disturbance during the last month).

The four models used are submitted in the following.

### 3.1 Model 1

Model 1 is designed to investigate the influence of individual characteristics on health condition of the elderly. The explanatory variables are sex, marital status, education, and activity. The detail is as follows:

$$g_{11}(x) = \ln(p_{11}/p_{13}) = \beta_{110} + \beta_{111}\text{Sex} + \beta_{112}\text{Marstat} + \beta_{113}\text{Educ} + \beta_{114}\text{Act} + \beta_{115}\text{Sex*Act}$$

$$g_{12}(x) = \ln(p_{12}/p_{13}) = \beta_{120} + \beta_{121}\text{Sex} + \beta_{122}\text{Marstat} + \beta_{123}\text{Educ} + \beta_{124}\text{Act} + \beta_{125}\text{Sex*Act}$$

\* = interaksi

p is probability of the health condition of the elderly:

$p_{11} = p(Y=1)$ ; if the health condition is bad for Model 1

$p_{12} = p(Y=2)$ ; if the health condition is middle for Model 1

$p_{13} = p(Y=3)$ ; if the health condition is good for Model 1

$\beta_{jk0}, \beta_{jk1}, \dots, \beta_{jk13}$  is parameter estimation;

i = 1 refers to Model 1

k = 1 refers to logit function Y=1 compared to Y=3 and

2 refers to logit Y=2 compared to Y=3

Sex = sex of the respondent, categorized in:

1. Male
2. Female

MarStat = Marital status, categorized in:

1. Single (Not married, divorcee, widow/widower)
2. Married

Educ = Education of the elderly, categorized in:

1. No school/not completed SD (Elementary School)
2. Completed SD/SLTP (Elementary School/Junior High School)
3. Completed SLTA\* (High School)

Act = Activity of elderly, categorized in:

1. Working
2. Others

### 3.2 Model 2

Model 2 is applied to learn the influence of the household factor on the health condition of the elderly. The independent variables in Model 2 are the status of relationship between the elderly and the household head, health expenses and living arrangement. The detail is as follows.

$$g_{21}(x) = \ln (p_{21}/p_{23}) = \beta_{210} + \beta_{211} \text{HubRT} + \beta_{212} \text{Livarr} + \beta_{213} \text{Outcome} + \beta_{214} \text{HubRT} * \text{Outcome}$$

$$g_{22}(x) = \ln (p_{22}/p_{23}) = \beta_{220} + \beta_{221} \text{HubRT} + \beta_{222} \text{Livarr} + \beta_{223} \text{Outcome} + \beta_{224} \text{HubRT} * \text{Outcome}$$

p is probability of the health condition of the elderly population:

- $p_{21} = p(Y=1)$ ; if the health condition is bad for Model 2
- $p_{22} = p(Y=2)$ ; if the health condition is middle for Model 2
- $p_{23} = p(Y=3)$ ; if the health condition is good for Model 2

$\beta_{ik0}, \beta_{ik1}, \dots, \beta_{ik7}$  is parameter estimation:

- $i = 2$  is Model 2
- $k = 1$  is logit function  $Y=1$  compared to  $Y=3$  and
- $2$  is logit function  $Y=2$  compared to  $Y=3$

HubRT = Relationship of the elderly to the household head, categorized in:

1. Household head
2. Others

Outcome = Health expenses, categorized in:

1. Low
2. Middle
3. High

LivArr = Living Arrangement, categorized in:

1. Living alone
2. Living together with family/relative

### 3.3 Model 3

Model 3 is to learn the influence of the external factor on the health condition of the elderly. The explanatory variables in Model 3 are the quality of the environment and the location or place of residence of the elderly. The detail is as follows:

$$g_{31}(x) = \ln(p_{31}/p_{33}) = \beta_{310} + \beta_{311}Wil + \beta_{312}Lingk + \beta_{313}Wil*Lingk$$

$$g_{32}(x) = \ln(p_{32}/p_{33}) = \beta_{320} + \beta_{321}Wil + \beta_{322}Lingk + \beta_{323}Wil*Lingk$$

$p$  is probability of the health condition of the elderly population:

$p_{31} = p(Y=1)$ ; if the health condition is bad for Model 3

$p_{32} = p(Y=2)$ ; if the health condition is middle for Model 3

$p_{33} = p(Y=3)$ ; if the health condition is good for Model 3

$\beta_{310}, \beta_{311}, \dots, \beta_{313}$  is parameter estimation:

$i = 3$  is Model 3

$k = 1$  is logit function  $Y=1$  compared to  $Y=3$  and

$2$  is logit function  $Y=2$  compared to  $Y=3$

Wil = Place of residence, categorized in:

1. Rural
2. Urban

Lingk = Physical condition of elderly residence:

1. Bad
2. Middle
3. Good

### 3.4 Model 4

In order to examine all factors influenced in one model, Model 4 is applied. Each factor is represented by one explanatory variable from previous models (Models 1, 2, and 3) that substantively and most significant statistically related to the health condition of the elderly. In other

words, independent variables in Model 4 are obtained after looking at the results of the analysis from Models 1, 2 and 3.

$$g_{41}(x) = \ln(p_{41}/p_{43}) = \beta_{410} + \beta_{411}\text{Sex} + \beta_{412}\text{Livarr} + \beta_{413}\text{Lingk} + \beta_{414}\text{Outcome} + \beta_{415}\text{Sex*Livarr}$$

$$g_{42}(x) = \ln(p_{42}/p_{43}) = \beta_{420} + \beta_{421}\text{Sex} + \beta_{422}\text{Livarr} + \beta_{423}\text{Lingk} + \beta_{424}\text{Outcome} + \beta_{425}\text{Sex*Livarr}$$

#### 4. General Characteristic and Health Status of Elderly Population

This section is addressed to discuss the results of description analysis. Regarding to sex ratio, this study obtains that it is less than 100, that is 89.98 with the age average of 67.8 years. It shows that there is conformity to life expectancy in Indonesia, which is around 60 years. In average, the education level of the elderly population in Indonesia is still relatively low, that might be due to the fact that the elderly is an old day 'product', which was indicated by the low quality of Indonesia human resource. It is revealed that about 74.6 percent of the elderly were not having completed SD (Elementary School) and only 4.5 percent have higher education, completed SLTA (High School). More over, when it is deployed by sex, the female population has lower education than the male has as shown in Table 1.

**Table 1**  
THE PERCENTAGE OF THE ELDERLY POPULATION BY EDUCATION AND SEX, 1999

Sex	Education		
	No school/Not finish SD	Finish SD/SLTP	Finish SLTA <sup>+</sup>
Male	40.8	64.7	76.1
Female	59.2	35.3	23.9
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
(N)	(47,239)	(13,194)	(2,879)

Source: 1999 SUSENAS (National Social Economic Survey).

Looking at the marital status, the percentage of those who are in married is 59.8 percent. This figure is higher for male than for female (Table 2).

**Table 2**  
**THE PERCENTAGE OF THE ELDERLY POPULATION BY**  
**MARITAL STATUS AND SEX, 1999**

Marital Status	Sex		Total	
	Male	Female	N	%
Single/not yet married	33.69	66.31	653	1.04
Married	66.95	33.05	37,848	59.79
Divorce	23.83	76.17	1,582	2.5
Death separation	17.44	82.56	23,229	36.65

Source: 1999 SUSENAS (National Social Economic Survey).

There are several matters that cause the higher percentage of male elderly on married status than female has. First, looking at the different in age at marriage, a man tends to choose a younger spouse than himself. It causes the number of his counterparts (females) who are living alone is getting bigger than that of males (NFPCB, 1998). Second, a man who has been left by his spouse has tendency to remarried than the woman (NFPCB, 1998). Woman has a longer life expectancy than the man has. Having higher expectancy of life combined with the younger age than the husband, and the culture that hindrances the woman to remarried after her husband left her, makes a woman chooses living alone compared to the man.

In terms of status at the household or the relationship to the head of household, higher proportion is found among elderly who become household head, that are 58.2 percent, and followed by those who are being a member of the household, as parents, that are 20.7 percent. On the other hand, those who are the spouse of the household head are 17.1 percent. The elderly males who play the role as household head have higher percentage than the females have. This condition is in accordance to the statement of Evans (NFPCB, 1998) that the male elderly tend to live stand alone as far as they are capable physically and able to sufficient economically. It is suppose related to the attitude of man who tends to remarry after living alone for a while, so that his (economic) life is not possible rely on his kids.

In Indonesia, from previous micro and macro studies, many elderly people are still working at their old age (Wirakartakusumah, 1994; CBS, 1998; Sirait et al., 1999). It is confirmed by the result from the data analysis of the 1999 SUSENAS, which shows that 46 percent of the elderly are still working. By looking at education level and age groups, there is a tendency that the older the person, the lower the percentage of people working. In

addition, the percentage of elderly people who are still working is higher among those who have low education.

Living arrangement, which shows with whom the elderly people live, is important matter in this study since the dependency of the elderly people, physically or non-physically, is relatively high. Thus, the study can also give more attention to those who become the elderly people's care-givers. Based on the 1999 SUSENAS, the elderly people who want to live alone without friend are about 7.9 percent.

In many studies, it is often found that the expenditure is related with the education attainment. So do the analysis results based on the 1999 SUSENAS. Those who have higher education have a higher average of total expenditure than those who have lower education, as shown in Table 3. Meanwhile, according to the type of commodity, the average expenditure for foods is higher than that of the non-foods. It shows indirectly that sufficiency for the primary needs is seen as the important thing to be fulfilled. The expense for health is also relatively small, its average is only 1.9 percent of the total expenditure per year. In fact, the elderly people are considered as the population group who has relatively worse health compared to the other groups of population. Thus, they suppose are expected to spend higher expenses on health care.

Table 3  
AVERAGE OF TOTAL HOUSEHOLD EXPENDITURE OF THE ELDERLY POPULATION  
DURING LAST YEAR BY EDUCATION (IN RUPIAH), 1999

Education	Average of Total Household Expenditure per Year	Deviation Standard
No school/not completed SD	4,522,314	3,459,189
Completed SD/SLTP	6,669,148	5,370,706
Completed SLTA <sup>+</sup>	16,760,909	77,066,026
<b>Total</b>	<b>5,526,235</b>	<b>17,078,829</b>

Source: Analysis of 1999 SUSENAS.

The interaction of the elderly as social human being will be considered through the environment and the culture where they live. The difference between physical and social condition in the urban and rural areas, for sure, will have impacts on the life styles, the way of thinking, and mental and physical condition of the elderly as well.

The location or the place of residence is categorized by urban and rural areas. The definition of urban and rural follows the definition from Indonesian CBS (Central Board of Statistics) given in the 1999 SUSENAS. Paying more attention to the location variable has also been done in many other studies on elderly population. It is often due to the fact that there are big differences between urban and rural areas in terms of the characteristic of economic, social and cultural condition. Those differences suppose will influence the activity and the life quality of the elderly people.

**Table 4**  
**THE ENVIRONMENT CHARACTERISTIC OF THE PLACE OF RESIDENCE OF THE ELDERLY BY URBAN-RURAL, 1999**

Environment Characteristic of Place of Residence	Urban (N= 18,031)	Rural (N= 45,281)	Urban+Rural (N=63,312)
<b>Type of house floor</b>			
Marble/ceramic/teraso/tile	41.7	12.9	21.9
Cement/red brake	42.6	33.9	36.5
Wood/Bamboo/Earth/others	15.7	53.2	42.6
<b>Lavatory/Toilet facility</b>			
Private	75.7	47.2	55.4
Together	3.9	9.8	9.5
Public/none	15.4	43.0	35.1
<b>Source of drinking water</b>			
Crane	46.0	9.3	19.8
Pump/well	49.5	59.7	56.7
Water source/rain/river water	4.5	31.0	23.5
<b>Lighting facility</b>			
Electricity	97.3	72.7	79.7
Petromax	0.7	3.7	2.9
Lantern/oil lamp/others	2.0	23.6	17.4
<b>Total</b>	<b>28.5</b>	<b>71.5</b>	<b>100.00</b>

Source: 1999 SUSENAS (National Social Economic Survey).

Based on the 1999 SUSENAS, there are about 71.5 percent (45,281 persons) of the elderly are staying in rural areas, while 28.5 percent (18,031 persons) are staying in the urban areas (Table 4). This reality has supported the idea that urban area is a preference place for the young people. When it is reviewed from the migration perspective, there are two possibilities that could explain why the elderly are found more in the rural. First, the city and its developments have exerted a pull on productive age group to come over.



Second, there is a flow of retirement migration or out-migration for the people who have retired to the rural areas with the expectation to get the rural atmosphere which is considered as a convenient place.

Nevertheless, the rural areas have less and simple social and health facilities. So that, it is more difficult for the elderly people who face the health problems and need intensive care. In other word, the rural area is not the properly place to live for the elderly people who has a serious health problem. That is the background of the different prevalence of the types of illnesses suffered by the rural and urban elderly population. As shown in the study of WHO\_SEARO (Darmojo, 1999b) towards 1,203 elderly in Indonesia, the finding shows that the elderly who were living in the urban areas facing cases of hypertension, stroke and diabetes more than those who were living in the rural. In a study done by Darmojo (Darmojo, 1999b), however, it is found that the case of the elderly who lacked of nutrition was found more in the rural areas than in the urban areas.

The physical environment has a big role on the health condition of a person. A house as a place of living and shading is a closest environment faced by the elderly people every day. It is natural if condition and facility of a house could show the physical environment influencing the health of the elderly. This study uses five variables to show the environment condition of a person: i.e., large of the house floor per occupant, type of largest floor, toilet facility, source of drinking water, and source of lighting. By using analysis factor, those five variables then to be analyzed, so that they produce a value that shows the environment condition of a person into three categories i.e., good, middle and bad. The quality of household environment of the elderly in the rural most likely is far better than that of those in urban (Table 5).

Table 5  
THE QUALITY OF THE HOUSEHOLD ENVIRONMENT OF ELDERLY  
BY LOCATION, 1999

Quality of Household Environment	Location		
	Urban	Rural	Urban + Rural
Good	8.3	43.5	18.3
Middle	67.8	54.7	64.1
Bad	23.9	1.8	17.6
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
	(45,281)	(18,031)	(63,312)

Source: 1999 SUSENAS (National Social Economic Survey).

#### 4.1 The Health Status of Elderly Population

From the impact of the reduction of physiological function of the body, it is natural if the health problem is the most important thing for the elderly. In this study the case of the health of the elderly is observed from two sides i. e., the complaint on certain illnesses and whether those complaints hindrance their daily activities. Those two matters are noted since the definition of an illness for each individual is not the same. In the rural areas, especially, there are many elderly who define 'being sick' when that sickness disturbs their daily activity.

In this study, a person is considered healthy if she/he has no complaint, and a person is considered as having a middle health status if her/his complaint does not disturb her/his activity. Meanwhile, a person is considered having a bad health status if her/his complaint disturbs her/his routine activity. The weak of this concept is that the health condition recorded in SUSENAS 1999 is based on a statement of the respondent which is sometimes subjective and not able to figure out the real condition of a person's health.

Based on 1999 SUSENAS, more than half (58.1 percent) of the elderly population stated that they had no complaint, 15.6 percent stated that the complaint they had was relatively light and did not disturb their activity, while 26.3 percent complained that they had a bad health condition, so that it was disturbed their daily activities.

In demographic review, it is clear that there is a difference of death risk between male and female in all groups of age. It could be caused by the difference of the body function and the activity between male and female. In almost all studies on elderly health, the characteristic of sex is always taken (Smith and Kington, 1997; Darmojo, 1999b; Andrews, 2000). Table 6 shows that the female has a little bit better health condition than the male, although that difference is not so great. Based on the age group, that table also reveals that the older the group, the higher the percentage of those who having worse health. The age group of this study is adjusted to the age group of gerontology study.

Goldsheider (1994) had stated that, in general, marital status supporting more to the elderly to be healthy. Goldscheider's statement is accordance to the analysis of 1999 SUSENAS, as revealed in Table 6, that the elderly people with the status of 'married' have relative good health than

those with other (marital) status. He said that there is a strong relationship between marital and the social and health status.

**Table 6**  
**HEALTH STATUS BY INDIVIDUAL AND HOUSEHOLD CHARACTERISTICS, 1999**

Individual and Household Characteristic	N	Health Status		
		Good	Middle	Bad
<b>Total</b>	<b>63,312</b>	<b>58.1</b>	<b>15.6</b>	<b>26.3</b>
<b>Age Group (years)</b>				
60 – 74	52,973	59.7	15.1	25.2
75 – 90	9,634	50.4	17.9	31.7
> 90	705	45.4	19.7	34.9
<b>Sex</b>				
Male	29,988	57.3	15.0	27.7
Female	33,324	58.7	16.2	25.1
<b>Marital Status</b>				
Married	37,848	59.8	14.8	25.4
Others	25,464	55.4	16.9	27.7
<b>Education</b>				
No school/not finish SD	47,239	56.9	15.9	27.3
Finish SLTP	13,194	61.0	14.7	24.3
Finish SLTA +	2,879	64.2	15.7	20.1
<b>Activity</b>				
Working	29,142	64.5	15.1	20.4
Others	34,170	52.6	16.0	31.4
<b>Relation to Household Head</b>				
Household head	36,872	56.6	15.9	27.5
Others	26,440	60.1	15.2	24.7
<b>Health Expenses/capita</b>				
Low (< Rp10,000)	32,237	68.1	13.6	18.3
Middle (Rp10,000-Rp20,000)	12,859	53.0	16.8	30.2
High (> Rp20,000)	18,216	43.8	18.4	37.8
<b>Living Arrangement</b>				
Alone	4,992	51.7	19.2	29.1
Others	58,320	58.6	15.3	26.1
<b>Area/location</b>				
Urban	18,031	57.5	17.8	24.7
Rural	45,281	58.3	14.8	27.0
<b>Environment Quality</b>				
Bad	11,133	56.2	14.6	29.2
Middle	40,578	58.2	15.5	26.3
Good	11,601	59.2	17.0	23.8

Source: Analysis of 1999 SUSENAS data.

Goldscheider stated that the status of 'married' support the elderly to become healthy people through three components, i. e., first is social support. It has already proved that the social support has a strong relation to the health status. In several studies by samples and different measurement show that those who have low social support have a high death risk, while those with high social support their level of mortality is low. Second is health monitoring. The spouse, especially wives, have a responsibility on their spouse's health and always remind them to avoid bad behavior that could be ruin their spouse' health. Umberson (Goldscheider, 1994) proved that in line to the raising of stress and lower control, then the level of consuming alcohol and cigarettes is higher on those who are unmarried than those who are married. Third is stress. The social support also reduces the stress through various dimensions.

In the study of Umberson (Golscheider, 1994) on the female elderly show that those with widow status have higher depression than those who are married. Part of the male elderly, meanwhile, the relationship between marital status and depression emerged as the impact of the domestic inability of the male towards the female, especially in the financial limitation.

The elderly with high education have a high percentage on health status than those with low education. This condition shows indirectly that the role of education is important to support a person's health status. An educated person is expected having a healthier pattern/life style than who is less educated.

Table 6 shows also that 64.5 percent of the working elderly stated that they have a good health, while only 52.6 percent of non-working stated the same thing. It means, 35.5 percent of the working elderly have health complaint. This condition is apprehensive enough. If that condition is compared to that of Thailand in 1986 (Ogawa et al., 1994), there was only 23.6 percent of working elderly who had health complaint. When it is observed from the health side, there is two possibilities emerged. First, they (the elderly) have good health for doing the economical activities. Second, although from the physical condition they have not been good enough for working, their economic condition makes them have no other choice than to work.

To become a household head make a person has a heavier responsibility than other household members do. Therefore, it is natural when this responsibility influences psycho-social and physical condition of the

elderly. Table 6 reveals that, indeed, there are many elderly who have a role as household head than those who are only a member who complain on their health.

The health expenses are relatively small, only in the average of Rp116,521 per year for one household of the elderly, or, only Rp35,156 per person per year. The amount is really small. When US\$1 is equal to Rp7,500, then the money spent for health per capita per year is only US\$4.55, compared to the other developing countries such as Srilanka that the health expense reached to US\$8 per person per year in 1993 (Hill, 1995). Table 6 shows that the elderly household having low health expenses (less than Rp10,000 per person per year), 68.1 percent of them stated that they have good health. Meanwhile, the household having middle and high health expenses, the percentage of the elderly who stated having good health is lessening.

Living arrangement in this study is differed into two categories that are live alone and others. Based on the consideration it shows that almost each of the elderly person has no idea to live alone, and if she/he lives alone it is forcedly done, because live alone is the most frightening for her/him (Golscheider, 1994). Something should be paid attention for the elderly who live alone is that the whole burdens and responsibilities of the household come to their shoulders. And it makes them difficult to ask if they need an emergency help. It influences their psycho-social condition. That table also shows that those who live alone and have a good health are fewer (51.7 percent) than those who live in other ways (58.6 percent).

## **5. Health Status of the Elderly Population: the influencing factors**

The analysis on the health status of the elderly population in this part focuses on the influencing factors. There are three main factors influencing substantively on health status. They are considered to represent the aspects of social, economic, demographic and environment that estimated having the impact on health condition of the elderly. Those three factors are elderly as individual, household factor and environment factor of the place of residence.

There are three primary models will be tested in this study. Each of the model is a complete model using inter-action variables within. Further, from each of those three models, one primary variable (independent variable)

considered to represent, statistically or substantively, that are the individual factor, household and environment factor are then taken. Those three variables taken will be applied as independent variables in Model 4 which effect will be tested on health status. The data processing is done by computer software of SPSS 9.0 version (Statistical Package for Social for Windows 0.9 Version).

The complete model has many parameters and has also a complicated structure (showing an inter-action of all primary factors). Therefore, a simple model is chosen, as shown in Table 7. This model chosen is done through stages and deleted the insignificant inter-action variables one by one. The reason to simplify the completed model to the chosen one is that, according to Bisshop (Agung, 1999), the scholars usually choose the simplest model. A simple model is, first, having the fewest parameters, second, having the simplest structure.

### **5.1 The Analysis of the Influence of Individual Factor on Elderly Health**

The influence of the individual factor on health of the elderly is shown by Model 1 in Table 7. Based on the information of appropriateness model, Model 1 is significant with the value of statistic test  $\chi^2 = 1997.39$ . This statistic test value is bigger than  $\chi^2_{12, 0.05} = 21.0261$ . The value of significance for all variables in Model 1 above is less than 0.05. It means, statically all variables in Model 1 having significant influence to the health status of the elderly. Referring to that result (according to Table 7), then the interpretation on each parameter are as follows.

The influence of sex on elderly health is very significant. Apparently, the different of sex has the impact on elderly health. It shows that compared to the female, the male elderly tend having worse health than good. Table 7 shows that in having worse health status compared to the good, the male elderly most likely have the risk of 2.03 times than the female. Meanwhile, in having middle health status compared to good, the male elderly have the risk of 1.24 times than the female. Once more, it shows that although the male seems stronger, but in the old days his health condition is worse than that of the female.

There are several reasons/possibilities to explain the above phenomena, among others are, first, in general the male has the shorter expectancy of life than the female. It is because the male has the greater risk on accident and the attack of specific illnesses. Second, since the health

condition shown in SUSENAS is subjective (based on the statement of the respondent), then it could be possible that the female elderly tend to 'hide'/closed the statement of the sickness/complain they felt.

There is significant difference of elderly health status based on the marital status. The elderly who are not married/widow/widower compared to those who are married tend to have bad health status than good. In having bad status than good, the elderly who are single has the risk of 1.16 times than those who are married. In having middle health status than good, those who are single have the risk of 1.21 times compared to those who are married. This study supports the study of Goldscheider (1994) which shows that those who have spouse will make them maintaining their health and avoiding the unhealthy disadvantaged behavior.

The education substantively has already been trusted as an important determinant on the analysis of the quality of human resources, as well as on the analysis of health quality. That basic substance is able to be proved by this study where the education has the significant impact on health status of the elderly. This study shows that those who have low and middle education compared to those who have high education tend having worse health than good, and middle than good. If it is compared between the elderly with low level of education (no school/not completed SD) and those who have high level of education (SLTA +), in having bad health status compared to the good, those who have low level of education have the risk of 1.99 times than those who have high education. In having middle health compared to good, the elderly population who have low level of education have the risk of 1.18 times than those who have high education level.

The high education elderly suppose having more understanding on the meaning of healthy life than those who have low level. They are considered to be able to identify the beginning phenomena on specific illnesses, so that they are more able to do some preventive and curative actions.

Based on the inference analysis, it apparently shows that working has the significant impact on the health of the elderly. Those who are working if they are compared to those who are not tend having bad health status than good, so does in having middle health status than good. In having bad health status than good, they have the risk of 1.67 (1/0,597) times than those who are working. In having middle health than good, the not working elderly have the risk of 1.24 times (1/0,809) times than those who are working.

Substantively, there are two possibilities as basic of the analysis. First, working (especially working proportionally) is able to train the body, has the positive impact psychologically, since it gives the feeling of 'worthwhile' because they could stand alone to fulfill their needs. Second, caused by the low quality of human resources, the job usually done is the job that needs 'muscle' than the 'brain', so that only those who have healthy body are able to work.

**Table 7**  
PARAMETER ESTIMATION, ODDS RATIO (OR), AND VARIABLE SIGNIFICANCE OF  
INDIVIDUAL, FAMILY AND ENVIRONMENT FACTOR

Variable	Bad towards Good			Middle towards Good		
	Estimation	(OR)	Significance	Estimation	(OR)	Significance
<b>MODEL 1</b>						
<b>(Individual Factor)</b>						
Constanta	-1.435		0.000	-1.484		0.000
Sex:						
Male	0.708	2.030	0.000	0.211	1.235	0.000
Female	-	1	-	-	1	-
Education:						
Low (< finish SD)	0.689	1.991	0.000	0.168	1.183	0.002
Middle (finish SD/SLTP)	0.426	1.531	0.000	0.032	1.033	0.581
High (SLTA +)	-	1	-	-	1	-
Marital Status:						
Single	0.1440	1.155	0.000	0.190	1.209	0.000
Married	-	1	-	-	1	-
Activity:						
Working	-0.497	0.597	0.000	-0.212	0.809	0.000
Not working	-	1	-	-	1	-
Sex*Activity	-0.478	0.620	0.000	-0.113	0.893	0.020
<b>MODEL 2</b>						
<b>(Family Factor)</b>						
Constanta	-0.252		0.000	-0.938		0.000
Relation to HH Head (V1)						
Household Head	0.138	1.148	0.000	0.052	1.054	0.030
Others	-	1	-	-	1	-
Living Arrangement (V2)						
Alone	0.155	1.167	0.003	0.284	1.328	0.000
Others	-	1	-	-	1	-
Health Expenses:						
Low	-0.716	0.489	0.000	-0.525	0.591	0.000
Middle	-0.370	0.691	0.000	-0.249	0.780	0.000
High	-	1	-	-	1	-
HKRT*Hout 1=1 (V1*V3)	-0.745	0.475	0.000	-0.275	0.759	0.094
HKRT*Hout 1=2 (V1*V3)	-0.416	0.660	0.000	-0.191	0.826	0.072

(To be continued)



(Continuation – Table 7)

<b>MODEL 3</b>						
<b>(Environ. Factor)</b>						
Constanta	-0.875		0.000	-1.343		0.000
<b>Location:</b>						
Urban	-0.058	0.944	0.224	0.136	1.146	0.014
Rural	-	1	-	-	1	-
<b>Environment:</b>						
Bad	0.147	1.159	0.101	-0.103	0.902	0.333
Middle	0.075	1.078	0.068	-0.042	0.959	0.401
Good	-	1	-	-	1	-
Location*Environ1 (=1)	0.087	1.091	0.593	0.126	1.134	0.515
Location*Environ1 (=2)	0.075	1.078	0.174	0.097	1.101	0.132
<b>MODEL 4</b>						
<b>(Individual, Family and Environment)</b>						
Constanta	-1.007		0.000	-1.269		0.000
<b>Sex:</b>						
Male	0.156	1.169	0.000	-0.013	0.987	0.576
Female	-	1	-	-	1	-
<b>Living arrangement:</b>						
Alone	0.296	1.344	0.000	0.389	1.476	0.000
Others	-	1	-	-	1	-
<b>Environment:</b>						
Bad	0.249	1.283	0.000	-0.107	0.899	0.005
Middle	0.114	1.121	0.000	-0.078	0.925	0.008
Good	-	1	-	-	1	-
Sex*Living arrangem.	-0.106	0.900	0.217	-0.217	0.805	0.040

### 5.1.1 Interaction Variable Model 1

In Model 1 (chosen) there are two basic factors i.e., sex and activity that making a two-factor interaction variable. That interaction has the significant impact on health status of the elderly. It means, the impact of sex on health status depends on the activity of elderly. The interpretation of interaction variables is shown in Table 8.

In discussion on sex, it shows that, in general, the male tends having worse health condition than the female, however, if it is described more by the interaction variable it shows that their health status is middle status (there are complains but do not disturb their activity). Table 8 shows that the female elderly who are not working have the risk of middle health status of 1.3 times than the not working male.

**Table 8**  
**DISTRIBUTION OF HEALTH STATUS OF ELDERLY BY SEX, ACTIVITY AND**  
**CONDITIONAL TENDENCY RATIO**

Activity/Sex	Health Status of Elderly			Conditional Tendency Ratio (CR)		
	Bad	Middle	Good	CR1	CR2	CR3
<b>Working:</b>						
Male	21.0	15.0	64.0	1.111	0.969	0.945
Female	19.3	15.4	65.3	1	1	1
<b>Others:</b>						
Male	39.2	15.0	45.8	1.691	0.887	0.945
Female	27.6	16.6	55.8	1	1	1

*Note:* - Partial tendency ratio is between male and female category with conditional activity.  
 - CR1 is tendency ratio for bad health status.  
 - CR2 is tendency ratio for middle health status.  
 - CR3 is tendency ratio for good health status.

## 5.2 Analysis of the Influence of Household Factor on the Elderly Health

The influence of the household factor on health of the elderly is shown by Model 2 in Table 7. Based on model fitting information, Model 2 is significant to the value of statistic test  $\chi^2 = 3325,967$ . This statistic test is bigger than  $\chi^2_{12, 0.05} = 21,0261$ . Significant value for all main variables is less than 0.05, except for interaction variable sex and activity that having that significant value. It means that in the level of 5% the interaction between sex and activity is not significant yet to influence the health of elderly, however, it is enough significant in the level of 20%. Referring to that result (according on Table 7), the interpretation of each parameter is as follows.

With whom the elderly live, it will influence significantly enough on their health status. The elderly who live alone compared to those who live with their spouse or other relatives most likely are having worse health status compared to good and also most likely are having middle health compared to good. Table 7 shows that in having middle health status compared to good, the elderly have the risk of 1.3 times compared to those who live with their spouse or other relatives. Meanwhile, in having bad health status compared to good, those who live alone have the risk of 1.2 times compared to those who live together with the other household member/s.

In general, the elderly who have a role as a household head compared to those who have not most likely are having bad health status compared to good and also most likely are having middle health status compared to good. In having bad health status compared to good, those who are household head

have the risk of 1.2 times than those who are not. While for having middle health status compared to good, the elderly who are household head having the risk of 1.1 times compared to those who are not.

In one side, the role of the household head shows that a person is considered to be able having a responsibility, socially and economically, to other household member/s. In the other side, however, caused by that responsibility which is sometimes great enough, it becomes a burden to person who is doing, including the elderly.

As shown in Table 7, the elderly who have low and middle health expense compared to those who have high health expense less likely are having bad health status compared to good and also less likely are having middle health status compared to good. It means, in Indonesia, the elderly who spend their money in a large amount for their health are those who have bad health status. It shows that the health expense paid most likely is for curative treatment.

### **5.2.1 Interaction Variable Model 2**

In Model 2 (chosen) there is only one interaction variable that is considered as significance in influencing the health of the elderly. That interaction variable is interaction result between variable of health expense and living arrangement. It means, the impact of health expense on health status depends on their living arrangement. There is a different interpretation on health expense and living arrangement variable if it is analyzed as primary variable and as interaction variable.

The analysis occurs for living arrangement as a primary variable is that the elderly who live alone most likely are having the risk on bad health status compared to good, but as shown in Table 9, it happened only on those who spend high health expense. Those who live alone most likely are having the risk of bad health status compared to those who live together with their family. Meanwhile, for those who spend low and middle health expense, apparently it shows that those who live alone less likely are having bad health status compared to those who live together with the family. For the elderly population groups with high average of health expense per capita, those who live alone having the risk of bad health status 1.1 times, and having middle health 1.2 times compared to those who live together with their spouse or other relatives.

The expense for health in this study is the health expense per person per year. For the elderly who live alone, their health expenses are really the expenses spent for their health. For those who live with their family, meanwhile, the expenses spent are not so sure that the money spent is really for them alone. Thus, in this case, when those who have high expense on health compared to those who live alone and live with the spouse or family, it seems that those who live alone most likely are having bad health status compared to those who live with their family.

**Table 9**  
**Distribution of Health Status of Elderly By Living Arrangement,**  
**Health Expense and Conditional Tendency Ratio**

Health Expense person/year	Living Arrangement	Health Status of Elderly			CR		
		Bad	Middle	Good	CR1	CR2	CR3
Low	Alone	16.2	16.5	67.2	0.857	1.277	0.955
	Others	18.4	13.4	68.2	1	1	1
Middle	Alone	26.0	19.3	54.7	0.797	1.202	1.079
	Others	30.6	16.6	52.8	1	1	1
High	Alone	40.2	21.2	38.6	1.1252	1.2256	0.7809
	Others	37.4	18.0	44.6	1	1	1

*Note:* - Partial tendency ratio is between living alone and others category with the conditional health expenses bad, middle and good.

- CR1 : Tendency ratio for bad health status
- CR2 : Tendency ratio for middle health status
- CR3 : Tendency ratio for good health status

### **5.3 The Analysis of the Influence of Location and Environment Quality Factor on Elderly Population Health**

The difference between urban and rural is great, especially in the developing countries like Indonesia, when it is observed either from the physical condition or from social and cultural. The great differences shown not only from the facility of social and economic services, but also from human resources quality. Therefore, the health needs also to be analyzed to understand its condition in urban and rural areas. Substantively, the quality of environment is also one of the determinant factors of health condition, including the health of the elderly. For that purpose, urban-rural variable and

variable of quality environment are two independent variables categorized as external factor that influences the health of the elderly.

Based on model fitting information, Model 3 is significant to statistic test of  $\chi^2_{10, 0.05} = 18,307$ . It means that this model is fit to be analyzed further. Thus, for hypothesis 3, which stated that the location and the environment quality factor do not influence significantly to health of elderly, is refused.

In Model 3, not all variables have the significant value less than 0.05. Even for environment quality and interaction variable have the significant value greater than 0.05. Although statistically there are many variables having low significant value (less than 0.05), but since this model is set up by based on the strong substance, thus according to the author, Model 3 is still could be analyzed further. Besides, according to Agung (1993), data used to measure the validity of theoretical model does not prove the rightness of the model. The model noticed is applicable for population, while data analyzed is just one among many other data that have been possible taken from that population. Based on that reason, Model 3 can still be analyzed further. From the analysis shown in Table 7, then the interpretation for each variable is as follows.

The location of a village as the out skirt area that having limited access on social and economic facility, and having low quality of human resources than that of urban apparently is appointed by this study. The difference is also found in the quality of health of the elderly. The result of the analysis shows that those who are living in the urban areas compared to those who are living in the rural less likely are having bad status compared to good. While those who are living in the urban compared to those who are living in the rural most likely are having middle status of health compared to good.

Referring to the analysis on Table 7, it shows in having bad health compared to good, those who are living in the rural have the risk of 1.06 (1/0.945) times compared to those who are living in the urban areas. In having middle health status compared to good, those who are living in the rural have the risk of 1.15 times compared to those who are living in the urban areas. Apparently, having cleaner environment and not pollution as in the rural areas is not enough for making the body healthier. The knowledge on health and healthy eating pattern, the completeness and the easiness on reaching health facilities are needed to support the health maintenance of the population, especially the elderly.

The quality of environment means the physical condition where the elderly are living. The good quality environment is the environment that normatively having better hygienic condition (private toilet is better than the public one, or the cemented floor is better than the earthen), and having modern facilities (electric lamp is better than *petromax*). It is expected that the better quality of the physical environment have the positive impact on the quality of the elderly health.

According to the analysis of the 1999 SUSENAS data, it obviously reveals that good quality of the environment has the positive impact on the elderly for having good health compared to that bad. Those who are living in the middle and good quality of environment when it is compared to those who are living in the bad environment less likely are having bad health status compared to good and also less likely are having middle health compared to good.

In having bad health status compared to good, the elderly who are living in bad environment have the risk of 1.16 times (1/0.862756) times compared to those who are living in the middle quality of the environment. Meanwhile, in having bad health status compared to good, the elderly who having bad quality of environment have the risk of 1.25 (1/0.800979) times compared to those having good quality environment.

### 5.3.1 Interaction Variable Model 3

Interaction variable analyzed in Model 3 is the interaction between location and environment variable. That interaction variable has the meaning that the impact of location on health status of the elderly depends on the quality of the environment. It is shown in Table 10 that although having similar bad quality of physical environment, the elderly who are living in the rural have the risk of bad health status 1.28 times (1/0.7816) compared to those who are living in the urban areas. For environment with the middle quality, apparently, for, the elderly who are living in the similar environment quality in rural have the higher risk (1.03 times) for having bad status compared to those who are living in the urban. So do those who are living in good quality environment, although they are living in good quality environment, those who are living in the rural areas have the higher risk for having bad health status than those who are living in the urban. Meanwhile, those who are living in the urban, although they have the same bad quality of environment as those of the rural, they have the risk of middle health status of 1.24, and having the risk of good health 1.08.

The matter above shows that although having the same health quality, the rural elderly, however, most likely are having bad health status compared to the urban. The low level of education and lack of information on health/healthy life pattern and the difficulty on providing good health services preventively and curatively could cause this condition.

**Table 10**  
DISTRIBUTION OF HEALTH STATUS OF ELDERLY BY AREA, QUALITY OF ENVIRONMENT AND CONDITIONAL TENDENCY RATIO

Quality of Environm.	Area	Health Status of Elderly Pop.			CR		
		Bad	Middle	Good	CR1	CR2	CR3
Bad	Urban	27.6	17.0	55.5	0.924	1.198	0.972
	Rural	29.2	14.6	56.2	1	1	1
Middle	Urban	25.8	17.8	56.4	0.969	1.257	0.906
	Rural	26.4	14.7	58.8	1	1	1
Good	Urban	23.2	17.7	59.1	0.916	1.164	0.979
	Rural	24.8	15.6	59.6	1	1	1

*Note:* - Partial tendency ratio is between urban and rural category with conditional environment quality, bad, middle and good.

- CR1 is tendency ratio for bad health status.
- CR2 is tendency ratio for middle health status.
- CR3 is tendency ratio for good health status.

#### 5.4 The Analysis of Interaction Between Sex and Living Arrangement Factor on the Elderly Health

Only one interaction variable is considered as significant included in Model 4. This interaction variable is interaction between sex and living arrangement variable. It has the meaning that the impact on living arrangement on health status of the elderly depends on their sex. The size of tendency ratio from this variable is shown in Table 11.

It is clearly shown in the table that although it is controlled by the living arrangement, the male elderly still have the higher risk on having bad health compared to the female, either they are living alone or living with their family. Those who are living alone, the males have bad health status of 1.1 times compared to the females; while those who are living with the family, the males have the risk of 1.2 times compared to the females.

Meanwhile, on the middle health status for those who are living alone or living together with the family, the females have the higher risk compared to the males. If it follows the common pattern, it should be that the females most likely have the higher risk on having good health status, but for those who are living alone, the males most likely having good health compared to the females. Although the difference is not too high, at least it is considered that the male elderly people could living in a good health as the females do although they are living without spouse or family.

**Table 11**  
**DISTRIBUTION OF HEALTH STATUS OF ELDERLY BY SEX, LIVING ARRANGEMENT AND CONDITIONAL TENDENCY RATIO**

Living Arrangement	Sex	Health Status of Elderly			CR		
		Bad	Middle	Good	CR1	CR2	CR3
Alone	Male	31.1	16.2	52.8	1.121	0.778	1.058
	Female	28.7	19.9	51.4	1	1	1
Others	Male	27.6	14.9	57.5	1.175	0.940	0.913
	Female	24.5	15.7	59.7	1	1	1

*Note:* - Partial tendency ratio is living arrangement category with conditional sex.  
 - CR1 is tendency ratio for bad health status.  
 - CR2 is tendency ratio for middle health status.  
 - CR3 is tendency ratio for good health status.

## 6. Conclusion

In general, the findings from this present study has supported the framework of thinking from Blum (Rahardjo and Priyotomo, 1994) which stated that the health of the elderly population is influenced by the quality of the elderly as an individual, by their quality as part of the community/household and the support of properly health facilities. The results on other facilities such as living arrangement, marital status, and the activities support the modernization theory, which stated that the modernization could have bad impact on social and health status of the elderly. The marital status, by the changes of the cultural value where unmarried status is not 'shameful' and could be chosen as a way of life, the elderly who choose having no spouse are increasing. This phenomenon apparently also influences the health status of the elderly i.e., those who have no spouse having higher risk for having bad health status compared to those who have spouse. It is accordance with the findings of Goldscheider (1994) who stated that the elderly who have spouse get support and the spirit for



having healthy body compared to those who have not. Referring to the results of this present study, there are several matters that should be considered to improve the life quality and the health status of the elderly population in Indonesia. In broad outline, they could be categorized in three parts, these are:

**(1) Policy Related to the Economic Activity of the Elderly Population**

Based on the analysis of the 1999 SUSENAS, it is found that there were many elderly people who are still working (46 percent). Besides, there was also many of them (58.2 percent) having position as a head of household. Thus, it could be estimated that there were many of the elderly population who were still having big responsibility and burden of the household as well.

Thus, it needs to be considered a pattern of investment on providing work opportunity for the elderly. Besides, it also needs to be considered type of jobs that are able to be done by the elderly, that the productive age are less interested on, so that there are several types of job that are possible identified later on as the jobs of the elderly.

**(2) Policy Related to the Social Activity of the Elderly Population**

The study has revealed that there are only few elderly people who were living alone (7.9 percent). This finding is strengthening the statement stated that, in Indonesia, the elderly people are intensively integrated to their family and community. Thus, it is important to consider the role of the family as their care-givers. As its consequences, the approach of the policy should be family and community oriented.

**(3) Policy Related to the Health of the Elderly Population**

The health problem is the main concern of the elderly. The Government, therefore, needs to improve the availability and the accessibility of the health care facilities, especially in the remote areas. It is more important that the health care services are able to handle the illnesses usually suffered by the elderly population.

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