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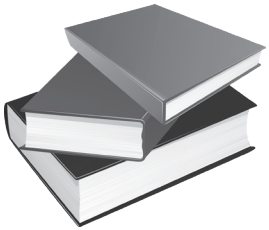

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IPB Press

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SUMMARY

One of the indicators of development success in a country is increased life expectancy of the citizens. The increased life expectancy of the citizens causes number of elderly increase from year to year. Up to now, Indonesia is ranked as the fourth country with the largest number of elderly after China, India, and United States. BPS estimated that this will continue to raise, shown by percentage of elderly in year 2010 reached 9.58% and will reach 11.20% in 2020 (Mariana & Kadir 2007). Furthermore, the number of senior citizens in Bandung City reached 360,000 people or 15% of the total population in Bandung which was 2.4 million people (Berita Indonesia 2009:1).

The objectives of the study were: (1) to analyze socioeconomic characteristics of the elderly, (2) to analyze food consumption and nutrient intake of the elderly, (3) to analyze nutritional status (anthropometry, Hb level and nutritional risk assessment) of the elderly, (4) to analyze health characteristics (health status, health care, living environment) of the elderly, (5) to analyze psychosocial aspects (perceived happiness, stress, family strength) of the elderly, (6) to describe government and non-government programs for the elderly, (7) to analyze factors affecting nutritional and health status of the elderly, and (8) to analyze the differences among factors affecting nutritional and health status and psychosocial aspect of the elderly living in nursing home and those living with their family.

The design of the research was cross sectional study. The research was taken place in Bandung, West Java, Indonesia. The whole research activity was conducted in 12 months. This study was carried out to the elderly (aged > 55 years old) as sampling unit. Eighty two elderly living in nursing home were selected as samples. Another 336 elderly living outside nursing home were chosen purposively.

The primary data included data on socioeconomic characteristics, nutritional status, health status and psychological aspects of the elderly. The secondary data included programs of local government and NGO for the elderly (type of programs, duration, source of fund, implementation, etc). The methods used to collect data consisted of interview, physical assessment, and Hb analysis depending on the variable measured. Prior to data collection, a set of questionnaires was formulated and tried out.

Data analysis included descriptive statistics, t-test analysis, and regression to analyze factors affecting nutritional and health status and psychosocial condition of the elderly. The data analysis was done by using the Statistical Analysis System (SAS).

The present study shows that sex proportion of elderly was dominated by female (80.9% female vs 19.1% male). Most of the elderly in nursing home were widowers (78.0%). The average of length of education among elderly in non nursing home, which was 7.7 ± 4.6 years, was higher than that among elderly in nursing home (6.8 ± 4.8 years). However, no statistical difference was found in length of education between elderly in nursing home and in non nursing home. The average income of the elderly in nursing home was IDR 408 111. On the other hand, the elderly in non nursing home had higher income with monthly average of IDR 1 298 003.

As side dish, the elderly usually consumed tempeh and tofu with relatively high frequency. For elderly, tempeh/tofu is relatively easy to consume due to their soft texture.

Pure water was the type of drink that was most consumed by elderly in nursing home (7,503.7 ml/week) and also by elderly in non nursing home (3,097.0 ml/week). Other type of water that usually consumed by the elderly is tea and coffee. Tea consumption among elderly in nursing home (990.2 ml/week) was higher than among elderly outside nursing home (650.0 ml/week). This condition was similar to coffee consumption (548.8 ml/week in nursing home and 264.9 ml/week in non nursing home). Other beverage which usually consumed by the

elderly was milk with quantity of 522.0 ml/week for elderly in nursing home and 271.6 ml/week for elderly in non nursing home. This number was relatively small compared to milk consumption of people in developed countries. The calculation of daily water consumption showed that elderly in nursing home consumed water as much as 1,441.6 ml/day and elderly in non nursing home consumed 659.0 ml/day. Besides, consumption of water for healthy person is 2000 ml/day so that it can be said that generally elderly consumed less than the adequacy.

Energy adequacy level among elderly was generally low, which was 49.0% for elderly in nursing home and 54.9% for elderly in non nursing home. This low energy adequacy level might relate to the declining appetite among elderly.

The impact of lack of appetite among elderly was low nutrient adequacy level, including protein, mineral, and vitamin. The energy, mineral, and vitamin adequacy level among elderly in nursing home were lower than those in non nursing home ($p<0.05$), except for vitamin C. The phenomenon of low energy, protein, mineral, and vitamin intake level among elderly in nursing home as well as in non nursing home indicated that group of elderly was susceptible to nutrition problem, which further reduced capacity of the body to prevent various diseases.

In this study, overnutrition was more prevalent than undernutrition in elderly in both groups, and the prevalence was higher in elderly living in family. The prevalence of central obesity in both groups were higher than the normal (59.8% and 75% in elderly in nursing home and in non nursing home, respectively), and the waist circumference was significantly higher in those in non nursing home.

Based on WHO criteria, the prevalence of anaemia of elderly living in nursing home and in non nursing home were 45.1% and 28.9%, respectively. The prevalence of anaemia in this study was much higher than other previous reports in Indonesia as well as other countries.

The prevalence of diseases in elderly showed that hypertension and arthritis were the most common diseases found in both groups, followed by dyspepsia syndrome, dyslipidemia and heart disease. The trend of the diseases was similar in both groups, except that the prevalence of cataract was much higher in elderly in nursing home. The cause of this higher prevalence of cataract might have correlation with age, which the age of elderly in nursing home was older than it of other group.

The efforts done by elderly to keep healthy were vary. Most elderly performed worship as their way to keep healthy. Maintaining healthy diet, exercise and avoiding stress were also common in both groups. In general, the awareness of elderly to keep their physical healthy was good, but still needed to be improved.

Sanitation condition among elderly in non nursing home was categorized as good. Almost all elderly had bathroom, family latrine, and garbage disposal facilities in their houses. Generally, place to defecate among elderly was family latrine and only few who defecated in public latrine, river or ditch. In nursing home, the sanitation facilities were considered as good.

The general result on perceived happiness among elderly showed that the highest factor which made elderly feel happy was always grateful with their lives (96.9%). Physical indicator of stress among elderly in the past six months which the most "often" was frequent urination, while the most "rarely" was coughing and the most "never" was excessive sweating. Psychological indicator of stress among elderly in the past six months which the most "often" suffered by elderly was sleepless (insomnia), while the most "rarely" was feeling weak and sluggish and the most "never" was not confident.

There was more than half (51.2%) of elderly in nursing home was in category of light depression, less than half (45.1%) of them in category of no depression, a little proportion (3.7%) of them in category of medium depression, and none (0%) of them in category of severe depression. The percentage was almost similar to the elderly in non nursing home.

The elderly in nursing home was better in aspect of psychological strength, while elderly in non nursing home was better in aspect of physical and social strength. The study result showed that the most potential factor causing low psychological welfare of elderly was feeling worry about the future. When compared, this was suffered more by elderly in non nursing home.

Government programs related to welfare of the elderly was under Ministry of Social Affairs of Republic of Indonesia. During period of 2009-2014, services which were given to the elderly in nursing home included: regular service, daily service, day care service, and cross-subsidy service which all was conducted in 237 nursing homes (2 nursing homes own by Ministry of Social Affairs, 70 nursing homes own by local government, and 165 nursing homes own by private/ community). Beside Ministry of Social Affairs, Ministry of Health also had service for elderly program, which was Integrated Development Post (Posbindu). Type of services which are given in Posbindu include: nutritional status examination through measuring body weight and height, blood pressure measurement, hemoglobin examination using, examination on glucose in urine as early detection of diabetes etc.

Regression analysis result showed that factors significantly influenced nutritional status assessed with MNA score were age of elderly (β=-0.104; p=0.030), protein adequacy level (β=0.147; p=0.041) and education level (β=4.316; p=0.000), with adjusted R square 0.128. As elderly age increased, MNA score decreased. Protein adequacy level had significant positive effect on MNA score, as protein adequacy was fulfilled, malnutrition risk in elderly would decrease. Among influencing variables, education had the strongest influence. As education level became higher, risk of elderly becoming malnourished would be lower.

Factor that significantly positive influenced Hb was sex (β=0.091; p=0.086), with adjusted R square 0.015. This means that men had Hb level significantly higher than women. Eventhough the correlation was weak as shown by low adjusted R square, and was in 10% level of

significance, it was in accordance with physiologic fact and confirmed many previous researches.

For elderly who lived in nursing home, there was no factor that significantly influence nutritional status assessed with MNA score. Different result was obtained in elderly who lived in non-nursing home, in which age and length of education had significant effect to MNA score.

Among elderly who lived in non nursing home, individual characteristics and nutrient intake did not affect Hb level, probably due to subjects' characters that was relatively homogenous.

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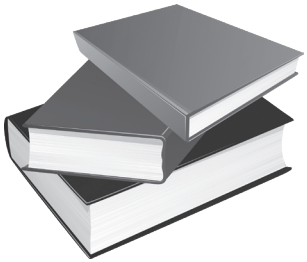


1 INTRODUCTION

1.1 Background

One of the indicators of development success in a country is increased life expectancy of the citizens. The increased life expectancy of the citizens causes number of elderly increase from year to year. Up to now, Indonesia is ranked as the fourth country with the largest number of elderly after China, India, and United States. BPS estimated that this will continue to raise, shown by percentage of elderly in year 2010 reached 9.58% and will reach 11.20% in 2020 (Mariana & Kadir 2007). Furthermore, the number of senior citizens in Bandung City reached 360,000 people or 15% of the total population in Bandung which was 2.4 million people (Berita Indonesia 2009:1).

The elderly are a group of people who are experiencing a changing process gradually in a certain period. Old age or usually called as late-adult is a living period which is marked by change or decrease in body function, which is usually started in different ages for different individuals (Papalia & Old 2001). Ministry of Health (Depkes RI 2006) defined the elderly as follow:

1) People who enter a preparation period of the old age which show mental maturity (55-59 years of age).
2) The early of being old age, which is a group of people who have just entered the old age (60-64 years of age).
3) A group of elderly who have high risk to experience some degenerative diseases (more than 65 years of age).

Referring to National Population and Family Planning Agency (BKKBN 1998), there are three aspects that should be considered in defining the elderly, which are: 1) Biological Aspects. Biologically, the

elderly are the citizens that experience the continuous aging process, which is marked by decrease in body resistance and susceptibility to diseases that can cause death. This is due to change in the structure and function of cell, tissue and organ system; 2) Economic Aspects. Economically, old aged citizens are seen as burden, instead of human resource. Many people think that old age life does not give any advantage, even they consider that old age life is often perceived negatively as burden for the family and other citizens; 3) Social Aspects. Socially, the elderly are a social group. In the western country, the elderly belong to a social stratum below young generation. This is seen from their involvement in economic source, influence in decision making and wide social relationship that is getting decreased. On the contrary, in Indonesia, the elderly belong to a high social class that should be respected by young generation (Wijayanti 2008).

According to Soekirman (2006), the speed of maturity for every individual is different depending on several factors, namely: (1) Genetic. The ability to repair the damaged cells is decreasing in the old age. The speed of this decrease is determined by genetic factor, which mean that there are people coming from gene for becoming old faster and slower; (2) Environment. Environment, such as sun exposure, smoke, air pollution, ozone, can damage the body cells so that people get old fast; (3) Fitness. It is obtained from adequate rest and proper as well as regular exercise; this can slower aging of heart, artery, vena etc. and also reduce risk of heart attack; (4) Stress. Physical stress such as cold, hot, pain, etc. and also psychological stress such as life pressure, anger, hatred, sadness etc. in fact can accelerate the aging process; (5) Nutrition. Balanced nutrition, which is shown by the comparison between body weight and height, also influences the aging process, meaning that balanced nutrition can extend lifespan. This happens because balanced nutrition is potential to prevent infectious and degenerative diseases.

The appearance of diseases in the elderly is often different from that in young adults because disease in the elderly is the combination of disabilities which appear due to the diseases and the aging process, that is the process of gradual losing of cell ability to regenerate and to keep the normal structure and function so that it cannot bear injury as well as infection nor repair the damage (Siburian 2011). The elderly often suffer from immobility (cannot move), instability (not stable in standing up and walking or easy to fall down), incontinence (often poop or urinate), intellectual impairment (intellectual damage/ dementia), infection, vision impairment in vision, hearing, taste, smell, communication, convalescence, skin integrity, impaction, isolation (depression), malnutrition, impecuniousness (do not have any money), iatrogenesis (suffering a disease due to drugs), insomnia (sleeplessness), immune deficiency (easy to suffer from disease) and impotence (ineffectiveness).

The decrease in physical, psychological and social conditions which are interrelated one another tend to cause generally health problems or specifically psychological problems among the old people (Kuntjoro 2002). The physical condition which is relatively getting weak and psychological condition of loneliness causes the old people often feel neglected. In such condition, the elderly need togetherness to control each other and to eliminate loneliness. They also need caring and love from other elderly as well as from other people (Wijayanti 2008). The psychosocial of the elderly is stated as at crisis if they have: (a) dependency to other people (need help from other people) and (b) tendency to isolate themselves from social activity due to many reasons, such as after having retirement period, after long period and severe sickness, after death of their couple (Anonim 2009). The health survey by Ministry of Health which was quoted by Mujiyati (2009) stated that mental disorder in the age of 55-64 years reached 7.9%, while in the age of more than 65 years was 12.3%.

Since the beginning of their life until being elderly, every person has the basic psychological needs. Some of the needs of the elderly are usually need for feeling comfortable and require comfortable environment. The fulfillment level of the need depends on the elderly themselves, family and their environment. If those needs are not fulfilled, some problems will emerge in the life of the elderly and decrease their independence (Setiati 2000).

Nowadays, there is a tendency in the community to separate the elderly by "entrusting" them into a house for the elderly that is owned by government or private institution. As stated in Mujiyati's research, there were some elderly who love to live in nursing home rather than to live in their own family house. They thought that living in nursing home is more fun than live in their own house because in nursing home they can get a lot of friend. And based on research by Bessi (2007), the reason why the elderly become the residents of nursing home was because of poverty, being neglected by their family or having no family member. Entrusting the elderly people in nursing home is not a mistake since there is positive side of it. Nevertheless, the love from the family is the most important thing so that it is advised that family should take care of the elderly in their own house by paying attention to their psychological condition (Mujiyati 2009).

The role of the family in taking care of the elderly is very important. Many elderly feel "alienated" even frustrated due to lack of attention from the family because each of the family members are busy with their own business. The family strength becomes the main pillar to make the elderly remain physically and mentally healthy. Family strength is the ability of household to manage the problems based on available resources to meet the needs of its members, especially in this context the elderly who live in the family, which is eligible for fulfilling their physical, social, and psychological needs (Sunarti 2003).

1.2 Goals and Objectives

1. To analyze socioeconomic characteristics of the elderly.
2. To analyze nutritional status (anthropometry, Hb level and nutritional risk assessment) of the elderly.
3. To analyze food consumption and nutrient intake of the elderly.
4. To analyze health characteristics (health status, health care, living environment) of the elderly.
5. To analyze psychosocial aspects (perceived happiness, stress, family strength) of the elderly.
6. To describe government and non-government programs for the elderly.
7. To analyze factors affecting nutritional and health status of the elderly.
8. To analyze the differences among factors affecting nutritional and health status and psychosocial aspect of the elderly living in nursing home and those living with their family.

2 REVIEW OF LITERATURE

2.1 Elderly

Old age group (elderly) is community group aged more than 60 years. This definition is common and used by several institutions, such as Ministry of Health of Indonesia and WHO. In more specific, Law Number 4 Year 1965 defined elderly as an individual which related to the old age, whose no capability to earn money for his/her daily basic needs.

Elderly is often being related to aging. During aging, body system overcome decline in body function and capability to repair tissue damage. Body fat mass and visceral fat increase, while lean body mass decrease. The decline in mass, muscle strength and function caused by aging, which called as sarcopenia, reduce mobility of elderly, increase risk of falling, and alter metabolism rate of the body (Wellman & Kamp 2008).

Wellman and Kamp (2008) categorized aging theory in two general categories which are predetermined and accumulated damage theories. The categorization of the two categories above is presented as follow:

1 Predetermined Theory

Predetermined theory is theory on mechanism that influences determination of starting time for aging which will be ended by death. The theory consists of pacemaker theory, genetic theory, rate of living theory, oxygen metabolism theory, and immune system theory. Pacemaker theory stated that human biological clock is determined from birth until particular time period which started with aging and ended by death. Genetic theory stated

that living time period is determined by genetic factor. Rate of living theory stated that every living creature has vital substance in limited number and when it reach exhausting border, aging and death occur. Oxygen metabolism theory stated that living creature, especially animal, with the highest metabolism is likely to have shortest living period. Immune system theory stated that cells overcome limited fission which rapidly reduces immune system function, excessive inflammation, aging, and death.

2 Accumulated Damage Theory

Accumulated damage theory is theory stating that there is systemic reduction in body function overtime. The theory consists of cross-link theory, wear and tear theory, free radical theory, and somatic mutation theory. Cross-link theory stated that overtime, there is abnormal attachment among DNA protein and other structural models or cross-link which leads to reduction in mobility, elasticity, and cell permeability. Wear and tear theory stated that years of damage in cell, tissue, and organ will rapidly come and cause death. Free radical theory stated that accumulated and random damage due to radical oxygen will slowly cause cell, tissue, and organ function stop. Somatic mutation theory stated that genetic mutation due to oxidative radiation and other factors accumulated will cause cell worsen and lose its function.

2.2 Nutritional Status of Elderly

Nutritional status is expression of balance state in term of particular variable or shape of nutriture in term of particular variable (Supariasa *et al.* 2001). Almatsier (2000) explained that nutritional status represent condition of someone's body as the effect of food consumption and nutrient utilization. Assessment of nutritional status can be conducted using four methods, which are anthropometry, biochemical, clinic, and food consumption.

Assessment of nutritional status using anthropometric method is conducted by directly measuring dimension and composition of the body from various ages and nutrition level (Jellife 1996). Anthropometric method is commonly used to assess nutritional status from imbalance in energy and protein intake and expenditure. Nutritional status of elderly can be measured by body mass index (BMI). BMI is calculated by comparing the body weight in kilogram with square of body height in meter.

$$BMI = \frac{body\ weight\ (kg)}{[body\ height\ (m)]^2}$$

Based on equation above, to measure BMI, two data are needed, which are body weight and height. Hunckback which often happen to elderly causes height measurement of elderly not accurate. Fatmah (2008) stated that body height of elderly can be predicted by using arm span, knee height, and sitting height. Determination of measurement type to predict body height is adapted to capability of the elderly. Arm span is recommended as the best predictor. However, if the elderly is not able to expand the arm, knee height is suggested to be measured. If the elderly also find difficulty during knee height measurement, the last predictor recommended is sitting height. The equation models of body height prediction (in cm) based on the three parameters are presented as follow:

a. Male

   Body height = 23.247 + 0.826 arm span

   Body height = 56.343 + 2.102 knee height

   Body height = 58.047 + 1.210 sitting height

b. Female

   Body height = 28.312 + 0.784 arm span

   Body height = 62.682 + 1.889 knee height

   Body height = 46.551 + 1.309 sitting height

Other anthropometric measurement is abdominal circumference. Abdominal circumference measurement is used to determine central obesity status related to metabolic syndrome. Abdominal circumference shows fat accumulation in stomach or abdomen. WHO (2011) stated that abdominal circumference has relationship with risk of cardiovascular disease, type 2 diabetes mellitus, hypertension, death, colorectal cancer and breast cancer. Size of abdominal circumference which is still in low risk is less than 102 cm for male and less than 88 cm for female.

Other measurement of nutritional status which also commonly used is hemoglobin concentration examination. Hemoglobin concentration examination is used to determine anemia status. Landi *et al.* (2007) stated that higher hemoglobin concentration is related to better stamina among elderly.

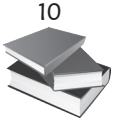
2.3 Health Status of Elderly

Aging is also related to decline in health status due to decline in body organ function. During aging, there is disturbance in body function and decline in body capability to manage living process, such as presented as follow:

1. Bone and Muscle

Elderly will overcome damage in bone tissue which cause bone porous or called osteoporosis. Osteoporosis raises risk of bone fracture in the elderly due to bump or falling. Osteoporosis consists of two types, which are type I and type II. Type I osteoporosis is marked by phase of losing bone mass very rapidly due to deficiency in estrogen or testosterone hormone. Type II osteoporosis is called as phase of slow bone losing due to reduction in calcium absorption caused by aging (Soekirman 2006).

Aging also causes change in fat and muscle proportion. Fat proportion increase while muscle proportion decrease and become weaker overtime. This causes overweight or obesity in elderly.



Overweight will affect health, which is giving additional burden to the bone causing arthritis or joint inflammation. Overweight also increase risk of degenerative disease, such as diabetes, hypertension, heart disease, cancer, and stroke (Soekirman 2006).

Health problem which is also often suffered by elderly is arthritis or inflammation in the joints. NIA (2012) classified arthritis as osteoarthritis, rheumathoid arthritis, and gout. Osteoarthritis is arthritis which caused by depletion of cartilage tissue as bearing joints so that bone friction happens. Rheumatoid arthritis is autoimmune disease which causes pain, inflammation, and stiffness in the joints. On the other hand, gout is accumulation of crystal as residue in purine metabolism in the joints which causes joint inflammation.

2. Heart and Blood Vessel

Aging causes change in heart and blood vessel, including reduction in arterial wall filling, reduction in maximum heart rate, reduction in responsivity on β-andrenergic stimuli, increase in ventrical muscle mass, and slowdown in ventrical relaxation (Wellman & Kamp 2008). Moreover, Soekirman (2006) emphasized that by entering old age, heart valve become stiff and thickened, pericardium will be coated by fat, and blood vessel reduce its elasticity and overcome calcification. This causes reduced capacity to pump blood and deliver oxygen. Heart in old age does not endure physical stress, such as increase in blood pressure, over exercise, and fever. Systolic blood pressure usually increases during aging, while diastolic blood pressure does not change much.

3. Tooth Loss

Damage in gum and tooth commonly happen in old age which cause tooth fall out or need to be taken. Tooth fall out, false teeth use, and xerostomia or dry mouth can cause difficulty in chewing and swallowing. This condition cause elderly tend to like food with soft consistency and easy to chew and avoid hard and nutrient dense food (Wellman & Kamp 2008).

4. Gastrointestinal System

Production of water and enzyme in gastrointestinal tract is reduced during aging so that appetite and capability to absorb nutrients decrease. Reduced saliva secretion cause reduction in capability to chew and swallow food. Weakened tongue and cheek muscle also make chewing and swallowing process difficult. Reduction in mucosa and gastric acid production cause digestion and absorption of nutrient decrease. Reduction in nutrient absorption increase risk of chronic malnutrition, such as osteoporosis and anemia (Wellman & Kamp 2008). Elderly also find difficulty in defecation due to slower bowel movement, low fiber consumption, medicine and gastrointestinal infection.

5. Renal System

Renal overcome cell loss whose function to produce urine so that it cannot function optimally and bloodstream reduce. As the effect, salt and sugar are accumulated in the blood, and secretion of residue from protein utilization reduces (Soekirman 2006).

6. Endocrine System

There is disturbance in endocrine function so that cell metabolism and capability to cope with stress reduce, while insulin and reproduction hormone production reduce (Soekirman 2006).

7. Immune System

Immune system is divided into two, which is innate immune system and adaptive immune system. Innate immune system consists of barrier and specific cells which prevent harmful foreign substance for entering the body, which consists of skin, coughing reflex, mucosal membrane, reaction of inflammation, and gastric acid. Adaptive immune system has role in producing, storing, and transporting cell and specific substance to counter health damage. Adaptive immune system consists of thymus tissue, spleen, tonsil,

bone marrow, and lymphatic system. Both immune system decrease overtime. This body immune reduction in elderly causes susceptibility to infectious disease (NIA 2011).

8. Nervous System

There is reduction in capability to deliver nerve impulse which may due to age. The decline in cognitive function, strength, reaction, coordination, sensation, and routine works can reach 10-90% (Wellman & Kamp 2008). Brain cell tend to break down and memory reduces so that senility happens. There is also disturbance in sleeping pattern, making elderly sleeps more at daytime than at night (Soekirman 2006).

9. Respiratory System

Elasticity of lungs decreases by aging so that capability of body to do physical activity is also decreases. There is also reduction in capability of lungs to inhale O_2 and exhale CO_2 (Soekirman 2006).

10. Sense

Sense of taste, smell, hearing, sight, and touch reduces. Therefore, reduction in appetite and sensitivity for salty and sweet taste happen (Soekirman 2006). Cumulative effect of daily exposure of noise, such as traffic, construction, loud music, noise in work place, and machine, can cause complex change in inner part of ears. This change slowly occur and often unrealized by the patients so that the effect on hearing reduction happens when they enter old age.

Cataract is change in vision, which often happens among elderly in Indonesia, which is blurring in crystalline lens. The medication for cataract is usually done through surgery by replacing the blurred crystalline lens with permanent plastic lens. Consumption of food which rich in antioxidant, such as B-caroten, selenium, resveratrol, and vitamin C and E is believed having ability to slower cataract formation, while high-salt diet can accelerate cataract formation.

11. Skin

The skins become dry, wrinkled, forming pigmentation, and capillary under the skin is easily broken (bruised). Hair is graying and easily fall (Soekirman 2006).

2.4 Psychosocial Aspect of Elderly

Psychosocial aspect is one of the parts of mental health. According to Law Number 23 Year 1992 regarding Health, mental health is one of the points to maintain in order to create optimal health status in community. Psychosocial aspect assessed in this study includes three indicators, which are perceived happiness, stress level, and family strength of elderly.

Happiness and life satisfaction according to Ryff (1989) is one of the indicators of well-being. Moreover, Ryff explained that positive perceived happiness contain aspect on self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth.

Family strength based on Sunarti *et al.* (2003) is formulated as family capability to manage own resource and to solve problem, in order to fulfill physical and psychosocial need of the family. Family strength consists of three factors, which are physical, psychological, and social strength. Physical strength includes capability of family to identify physical problem, to cope with physical problem, and to create physical social welfare. Psychological strength includes capability to create psychological welfare and to identify non physical family problem. Social strength includes capability of family to cope with non physical problem, and to create non physical resource and non physical social welfare.

2.5 Mini Nutritional Assessment (MNA)

Mini Nutritional Assessment (MNA) is an easy and inexpensive screening to detect tendency of complication development due to malnutrition (Gazzotti 2000). Based on Miller (2004), MNA is the most suitable screening tool for elderly because it is fast, easy to use, and effectively reflects nutritional status of elderly. MNA is widely used in various managements as trusted and valid assessment tool to identify malnutrition or risk of severe malnutrition among elderly. MNA is aimed to identify whether someone is at risk of malnutrition or not so that nutrition intervention can be determined early without assessment by special nutrition team (Vellas 1999).

MNA is screening tool validated specially for elderly, has high sensitivity, specific, eligible, widely used as screening method and recommended by national and international scientific and clinical organization. MNA is fast, easy to use and does not need much time to answer the questions, does not need specific training, and does not need laboratory examination (MNA 2011 cited in Oktariyani 2012).

MNA has two types, which are full MNA and short form MNA. Full MNA includes 18 items grouped into 4 parts, which are anthropometric assessment (BMI which calculated from body weight and height, body weight loss, mid-upper arm circumference and calf circumference), general assessment (life style, medicine, mobility and marker of depression or dementia), dietary assessment (number of food, food and water intake and independency in eating) and subjective assessment (individual perceived health and nutritional status). Full MNA can be completed in less than 15 minutes and every answer has score which will influence final score with maximum score of 30. Based on cut-off of full MNA, score of ≥24 indicates good nutrition, 17-23.5 risk of malnutrition and <17 malnutrition (Guigoz *et al*. 1996; Guigoz *et al* 2006).

The second type of MNA is short form MNA. Short form MNA is developed and validated to make possible 2 screening processes among low risk population to maintain validity and accuracy of full MNA (Guigoz 2006). Short form MNA is developed in 2001 by Rubenstein to reduce time for screening. Short form MNA can identify someone with malnutrition in two stages of process, when someone is identified as at risk using short form MNA, further assessment is given to confirm the diagnosis and determine next intervention plan (Rubenstein 2001).

Short form MNA consists of 6 questions for screening which each question has different score for each answer. Then, every score is summed as total score. Maximum score of short form MNA is 14. Total score of ≥12 shows normal nutritional status or not at risk and therefore does not need further assessment. However, score of ≤11 shows risk of malnutrition so that further assessment is necessary by filling out full form MNA (Guigoz *et al*. 2006).

The MNA questionnaire consists of 2 parts, which are screening and assessment. The six questions in the beginning is the screening or called as short form MNA which consists of question on whether elderly reduce food intake in the past 3 months due to appetite loss, gastrointestinal problem, problem in chewing and swallowing. If the elderly answer reducing food intake severely, the score is 0; if moderately, the score is 1; and if not reducing food intake, the score is 2. Regarding question on body weight loss in the past 3 months, if the elderly lost weight more than 3 kg, the score is 0; if do not know, the score is 1; if lost 1-3 kg, the score is 2; and if did not lose weight, the score is 3. Then, regarding question on mobility of the elderly, if only lying on bed or wheel chair, the score is 0; if able to go out from bed but not able to do other activity, the score is 1; and if still able to go out or to do activity, the score is 2.

The next questions are: did the elderly suffer from psychological stress or acute disease in the past 3 months, if yes, the score is 0, if no, the score is 2; do the elderly suffer from neuropsychological problem, if suffer from dementia or severe depression, the score is 0, if mild dementia, the score is 1 and if do not suffer from neuropsychological problem, the score is 2. After all questions are answered, the next stage is calculating BMI. If BMI less than 19, the score is 0; if 19-21, the score is 1; if 21-23, the score is 2; if 23 or more, the score is 3. If BMI is not able to be calculated, it can be determined by measuring calf circumference, if the measurement is less than 31, the score is 0; if 31 or more, the score is 3 (MNA 2011).

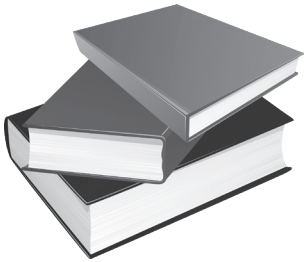
After the result of screening is obtained and total score is summed, if the elderly is identified possible to suffer from malnutrition, the assessment to the elderly is continued by asking 12 questions. The questions are: is the elderly live independently (not in home care, nursing home or hospital), if no, the score is 0 and if yes, the score is 1; is the elderly take more than 3 type of drugs per day, if yes, the score is 0, and if no, the score is 1; is the elderly has pressure sores/skin ulcers, if yes, the score is 0, and if no, the score is 1.

The next question is how many times the elderly eat in a day, if once a day, the score is 0; if twice a day, the score is 1; and if three times a day, the score is 2. Then, the question is protein intake which usually consumed by elderly. For this question, 3 choices is available, the first choice is protein consumed is one portion of dairy products (milk, cheese, yoghurt) per day, the second choice is two portions or more legumes/eggs per week, and the third choice is beef, fish, poultry every day. Among these choices, if none or only 1 answer, the score is 0; if two answers, the score is 1; and if all answer, the score is 2. Furthermore, the question is whether the elderly consume 2 portions or more vegetables or fruits every day, if no, the score is 0 and if yes, the score is 1.

Water which commonly consumed by elderly every day is pure water, juice, coffee, tea, milk, etc. This is asked to the elderly. If the elderly drink less than 3 glasses, the score is 0; if 3-5 glasses, the score is 1; and if more than 5 glasses, the score is 2. Then, the question is how the elderly eat, if cannot eat without help, the score is 0; if can eat by themselves but find difficulty, the score is 1; and if can eat by themselves without problem, the score is 2.

The elderly is also asked about perceived nutritional status, if the elderly perceive them with nutritional problem, the score is 0; if the elderly doubt/do not know their nutritional problem, the score is 1; and if the elderly perceive them without nutritional problem, the score is 2. Beside perceived nutritional status, the elderly is also asked to compare their health status with other people of the same age, if the elderly feel not better than others, the score is 0; if the elderly do not know, the score is 1; and if the elderly feel better than others, the score is 3.

The next question is mid-upper arm circumference (MUAC) and calf circumference measurement. If MUAC is less than 21 cm, the score is 0; if MUAC 21-22 cm, the score is 0.5; and if MUAC more than 22 cm, the score is 1. If calf circumference less than 31 cm, the score is 0 and if more than 31 cm, the score is 1. Then, all assessment score is summed with previous screening score. Finally, the nutritional status of elderly whether they are well nourished, at risk of malnutrition or suffer from malnutrition is determined (Guigoz 2006).



3 CONCEPTUAL FRAMEWORK

The life expectancy of Indonesian people is increasing in line with the increase of their living and health service standards. The condition brings effects to the increase of the number of the elderly people in Indonesia. According to the report of World Health Organization (WHO) in year 1998 (*Life in the 21st Century, A Vision for All*), the life expectancy of Indonesian people in year 2025 is 73 years. And now, the life expectancy of Indonesian people reaches 70 years.

In the next twenty years, it is estimated that the number of the elderly people will reach 1.2 billions in the world, and 70% of them comes from the developing countries. The number of the elderly people in Indonesia in year 2000 is 14 millions, and in year 2020 will increase to be more than 28 millions.

The increasing number of elderly people will bring some effects to the social economic in the family as well as community and government. The economic implication that is important from the increasing number of elderly people is the increase the *old age dependency ratio*. Every citizen in the productive age will support more elderly (Rahayu 2009). Kusuma and Anwar (1994) predicted that the number of elderly people in 1995 is 6.93% and 2015 becomes 8.74%, which means that in 1995 at least 100 productive citizens must support 7 elderly of upper 65 years old and in 2015 at least 100 citizens must support 9 elderly of upper 65 years old. The dependency of elderly people is caused by the decrease of their physical and psychological condition; in other words they experienced the negative development.

Old age is a period where people experience various kinds of deterioration overtime (Akhmadi 2009). Individually, the effect of aging process can cause many problems either physically, biologically,

psychologically or socioeconomically. Older the people, more the deterioration they will experience, especially in their physical ability which may lead to the decrease of their social roles. This will also cause the disorder in fulfilling their living need so that they depend on someone's help. Old age is not only marked by physical decrease, but also influenced by psychological condition (Rahayu 2009).

The aging process which causes the decrease in physical condition of elderly can be equalized to low physical fitness. Physical fitness is someone's ability to do daily activity without causing fatigue. Physical fitness is influenced by many factors, such as age, sex, BMI, blood pressure, hemoglobin level, and physical activity. As a whole, the advantages of physical fitness for the elderly are to reduce expenditure for health care, increase productivity, and raise status and dignity of the elderly. Based on the survey of Physical Fitness Norm Making for the elderly by Ministry of Health in 2002, around 85% of the elderly had low physical fitness.

The problems of physical deterioration among elderly people will influence their psychological condition. Akhmadi (2009) stated that psychological fitness problems of the elderly come from four aspects, namely, physical, psychological, social, and economic. Those problems are marked by unstable emotion, easy to be offended, easy to feel disregarded, disappointed, unhappy, feel loneliness, and feel useless. The elderly with those problems are sensitive to get psychological disorder, such as depression, anxiety, and psychosis. Generally, the mental health problem of the elderly is a matter of adaptation. The adaptation is due to change from the previous condition (being strong, working, and having income) to a decline.

Everyone has a relatively different perceived happiness. Indicators of happiness for a child, adolescent, adult, and elderly will be different. For the elderly, happiness becomes a very important factor, considering weakening physical condition which allows the emergence of various diseases that can lead to condition of less happy. Similarly, the psychological/mental instability (feeling useless, burden for others,

lacking social relation) gives the elderly certain burden and makes them tend to be less happy. Ryff (1989) as cited by Latifah (1999) believed that one of the ways that can be done by the elderly to deal with the problem is trying to achieve psychological well-being. Further, Bradburn defined psychological well-being (PWB) as happiness and can be seen through several dimensions. Those dimensions are autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self acceptance. PWB describes the extent to which individuals feel comfortable, peaceful, and happy based on subjective assessments and how they view the achievement of their own potentials. Hurlock (1991) mentioned that the PWB or happiness in the elderly depends on the fulfillment of the three aspects of happiness, namely acceptance, affection, and achievement. When an elderly cannot fulfill all the three aspects, it will be difficult for them to be able to achieve happiness.

The period of aging is the last period in human development. This is where a person experiences natural decrease of physical and social function. Internal and external problems which faced by the elderly can be stressful. Stress in the elderly is the pressure experienced by the elderly as result of source of stress with assumption of aging process and problems/limitations along the aging process. Stress level can be grouped into three parts, namely low, medium and high level. A person's stress level can be determined by observing the symptoms of stress which both physical and emotional symptoms (Wilkinson 1989 cited by Furi 2006).

The nutritional status of elderly people is much influenced by the aging process. The aging process is individual and develops differently for every individual because it depends on internal and external factors. Beside disease and environment, factors related to nutrient intake obtained from food influences the aging process because cell activity/ metabolism of the body needs adequate nutrition (Fatmah 2006). The decrease in body metabolism affects the nutrition adequacy for the elderly (Hurlock 1991). The proper and adequate nutrition is really important for the elderly. This is due to consideration that elderly

need adequate nutrition to support and maintain their health. Some factors that influence nutrition need, among others are: decrease in food digestion process, decrease in appetite, nutrient absorption. The elderly habit in consuming food is related with decrease in physiologic body function, especially in digestion system which the elderly have tendency to choose and consume more food that is easy to digest (Whitney 1998).

There is a norm which considers that the old people are an inseparable part of the family, old people should be respected by young people. Because of that, children have responsibility to take care of their old family members. In some communities, the elderly live with their children' family, get food and also care from the family members who live with them. On the other hand, in some other communities, family members entrust their elderly to live in nursing home together with other elderly. The differences in living environment will give different impact on their quality of life.

Psychologically, elderly often feel like to live in alienation and this may cause depression and decrease in body resistance that leads to the emergence of various kinds of diseases (Anonim 2011). Growing old is also associated with the deterioration of the functions of body organs so that many diseases, especially degenerative disease, can easily attack their body.

The elderly is viewed as biologic degenerating period suffering from several diseases and problems as well as understanding that everyone will die so that anxiety of the death becomes psychological problems for elderly, especially for old people who experience chronic disease (Nugroho 1992). The old people usually have tendency to suffer from chronic disease (lasting for several years) and progressive (getting more severe) until they passed away. In fact, aging process is accompanied by decrease in body resistance and metabolism so that the elderly become sensitive to diseases, but most of the diseases can now be controlled and cured (Mujiyati 2009).

When facing the problems above, in general, the elderly who have family members (in the eastern culture) are of great advantage because the family members, such as children, grandchildren, grand-grandchildren, comrade, and friends will help to take care of them patiently and dedicatedly. On the other hand, for those who have no spouse nor family members due to being unmarried, or having no children or the spouse passed away or staying alone in other region and often becoming neglected, nursing home should be important for elderly as place for looking after and taking care of the elderly as well as long stay rehabilitation which still sustains social life. Since it is necessary to socialize to the community, living in nursing home is better than living alone without family as old person (Kuntjoro 2002).

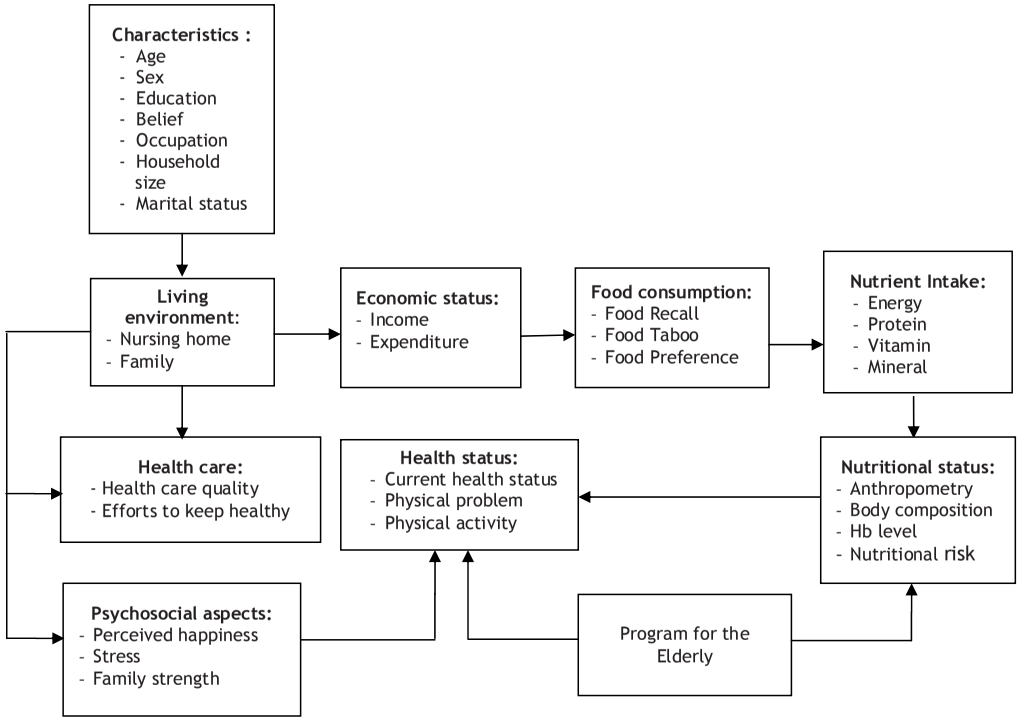


Figure 3.1. Conceptual framework

4 METHOD

4.1 Research Design and Time

The design of the research was cross sectional study. The research was taken place in all nursing homes in Bandung and nearby. The whole research activity was conducted in 12 months.

4.2 Sampling

This study was carried out to the elderly (aged > 55 years old) as sampling unit consisting of 4 categories i.e: living in nursing home, living with family, living alone but with close family within one sub village or 10-15 minutes by foot, and living alone without close family nearby.

Eighty two elderly living in nursing home were selected as samples. Another 336 elderly living outside nursing home were chosen purposively. The elderly who were selected were totally fed by mouth with typical eating utensils and were not having parenteral feeding. They had no amputation so that body weight did not require approximate correction for missing limb. They lived in nursing home for at least 6 months without any hospitalization more than one week. This assured that nutritional status most reflects it in the nursing home, and not in other place. They were able to communicate and agreed to participate in this study.

4.3 Data Collection

The primary data included data on socioeconomic characteristics, nutritional status, health status and psychological aspects of the elderly. The secondary data included programs of government. The methods

used to collect data consisted of interview, physical assessment, and Hb analysis depending on the variable measured. The type of data, variables, and method of collection are listed below.

Table 4.1 Data collected and the methods

Data	Variables	Indicators	Methods
Socioeconomic characteristics	Individual characteristics	- age - sex	Interview using questionnaire
	Social	- education - occupation - family member - marital status	Interview using questionnaire
	Economic	- personal income - family income - expenditure	Interview using questionnaire
Nutritional status	Anthropometric	- weight - knee height	Physical assessment
	Hematology	- blood hemoglobin level	Finger prick HemoCue
	Nutritional intake	- food consumption - food preference - food taboo	Interview using questionnaire
	Nutritional risk	- Mini Nutritional Assessment	Interview using questionnaire
Psychosocial aspects	Perceived happiness	Psychological Well-Being (PWB): - Self-Acceptance - Positive relations with others - Autonomy - Environmental mastery - Purpose in life - Personal growth	Interview using questionnaire
	Stress	- level of stress - symptoms of stress	Interview using questionnaire
	Family strength	- physical - social - psychosocial	Interview using questionnaire
Programs for the elderly	Health program		Related copied documents
	Social program		
	Others		

The data on socioeconomic characteristics contains individual characteristics (ages, sex), social characteristics (job, education, family members, marital status), and economic status (personal income, family income).

Data regarding nutritional status contained anthropometric data, hemoglobin (Hb) level, nutrient intake, nutritional risk (measured by mini nutritional assessment/MNA®). The details of data regarding nutritional status were presented as follow:

Anthropometric measurements

Body weight was measured by bathroom scale with precision of the nearest 0.1 kg. For elderly whose height was not easily measured in standing position, their height was estimated from knee height as recommended for the old people who often have difficulty to stand straight. The procedure of knee height measurement was lying supine, both knee and ankle of the subject was measured at 90-degree angles. One blade of sliding Medford caliper was placed under the heel of the foot, and the other blade was placed on the anterior surface of the thigh over the femur. The shaft of the caliper was held parallel to the long axis of the lower leg, and pressure is applied to compress the tissue. The measurement was recorded to the nearest 0.1 cm, and converted to height using the following formula:

Men = 69.38 + (1.924 X knee height in cm)

Women = 50.25 + (2.225 X knee height in cm)

Hb analysis

Blood was taken by finger prick method and analyzed by portable Hb analyzer (Hemo-Cue®). Paramedic was responsible for this task.

Nutrient intake

The data of nutrient intake was obtained through one day 24 hour recall on type and amount of food consumed by the elderly.

Nutritional risk

Nutritional risk was assessed using a Mini Nutritional Assessment (MNA) questionnaire containing diet and personal history and anthropometric measurements (Guigoz 1997). The element of MNA was described in the following table.

The data on health status was obtained from interview about health status (current health condition, physical disorder, physical activity), health service (the quality of the health service that was received by the subjects, efforts to keep them healthy), and the condition of their housing (sanitation, source of drinking water, personal hygiene), and also from observation of the subjects' environment.

Table 4.2 Elements of Mini Nutritional Assessment (MNA)

I. Anthropometric assessment	- BMI – body mass index - mid upper arm and calf circumferences - body weight loss in the past 3 months
II. Global evaluation	- accommodation type–living independently or in nursing home, - taking more than 3 type of drugs, - psychological stress or acute disease in the past 3 months, - mobility, - neuropsychological problems, - pressure sores or skin ulcers
III. Dietetic assessment	- quantity and quality of eating meals, - loss of appetite, - digestive problems, chewing or swallowing difficulties causing reduced intake of patient - food intake, - water intake per day, - type of feeding
IV. Subjective assessment	- patient perception of having any nutritional problem - how the patient consider his/her health status in comparison with other people of the same age

Source: Guigoz 1997

Data regarding psychological aspects of the elderly people were also obtained from interview, such as perceived happiness (self-acceptance, positive relations with other, autonomy, environmental mastery, purpose in life, personal growth), stress (level and symptom of stress), and family strength (physical, social and psychological strength).

4.4 The Control of Data Quality

Prior to data collection, a set of questionnaires was formulated and tried out. The revision was done to the questionnaire according to the result of the tryout. Supervision had been done by the researchers while the data collection was carried out by the enumerators. The questionnaire that has been completed was checked by the researchers.

4.5 Data Processing

Data processing was begun by preparing the file structure in MS Excel that contained sheets completed with variables for entering the data. The data from the questionnaire were entered to the sheets. Editing and cleaning was applied for the data which were already entered. Editing was applied to data which were not suitable with the data in the questionnaire. Cleaning was applied by excluding the extreme data. The next step was elicitating variables on income, expenditure, nutrient intake, nutritional risk, etc.

Nutrient intake. Data on food consumption obtained using recall method were transformed into nutrients, namely, energy, protein, fat, calcium, phosphor, zinc, and vitamin A in Excel 2000. These data were used to calculate nutrient adequacy which were consumed based on RDA (Recommended Dietary Allowance).

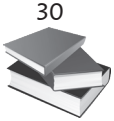
Nutritional risk. Every question in the MNA questionnaire was scored with total score ranging between 0 – 14. A score of 12 or greater indicates that the person is well nourished. A score of 8-11 indicates the person is at risk of malnutrition. A score of 7 or less indicates the person suffer from malnutrition.

Data processing of psychosocial aspects were: as explained above, there are three main indicators to measure the psychosocial aspects of the elderly people, which were perceived happiness (self-acceptance, positive relations with other, autonomy, environmental mastery, purpose in life, personal growth), stress (level and symptom of stress), and family strength (physical, social and psychological strength).

a. Perceived happiness. Perceived happiness was measured by 6 variables, namely, self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, personal growth. The way to answer the questionnaire was by stating yes or no to each of the statement/question in the questionnaire. If the answer is "yes", the score is 1, and score 0 for the "no" (Ryff in Yustina 2004).

Table 4.3 Six variables of perceived happiness

Variable	High criteria	Low criteria
Self-acceptance	The elderly people have positive behavior of themselves, know and accept their own whole aspect, have positive point of view about their past	Do not satisfy with themselves, disappointed with their past, have an anxiety with their own quality
Positive relations with others	Warm, honest, empathy, take and give,respect with others' happiness	Depressed, feel isolated, extrovert
Autonomy	Free to decide themselves, able to control their activities	Depend on others' opinion to them, follow social pressure in thinking and acting
Environmental mastery	Able to control the condition of environment and external activities, create the environment that is suitable with their own wish	Do not care with the surrounding, unable to control their daily activities
Purpose in life	Have a purpose in life and able to make a sense of their life either in past, now, or future.	Have no clear purpose in life, unable to make sense of their life
Personal growth	Have point of view that they always develop, are open-minded to new experience, self-actualization	Stagnant, surfeited, bored, unable to develop their own potentials



b. Family strength. Family strength was measured by three aspects, which were physical, social, and psychological strength (Sunarti 2001). In this study, the criteria that are used were based on the criteria of "strong" family and "weak" family. Strong family was family which in various dimensions had been able to develop their family physical, social or psychological resources. Whereas, weak family was family in various dimensions was unable or did not have any chance to develop themselves as result of their physical and non-physical family in various dimensions (Law Number 52 Year 2009 regarding Population Growth and Family Development).

Table 4.4 Three aspects of family strength

Variable	Indicators
Physical Physical Family Problems (PFP), Prevention of Physical Problems (PPP), Physical Prosperity, (PP), Physical-Social Prosperity (PSP), and Physical Source (PS)	Economic ability of the family is component of family members to obtain an economic resource from outer system to fulfill the basic need, such as food, clothes, shelter, education, and health
Social Non-physical resources, prevention of non-physical family problems and non-physical social prosperity.	Family strength in applying the religion values to maintain good mechanism for crisis prevention
Psychological Psychological prosperity (PsP) and non-physical family problems (NFP)	The family ability in controlling emotion which resulting the positive self conception.

Source: Sunarti (2003)

c. Depression indicator and level. In this context, there were 2 observed variables, namely:

(a) Depression indicator was measured by the indicator felt by the elderly in the past 6 months that indicate depression of the elderly (physical and psychological indicator). The measurement was done by observing the average score of appearance of depression indicators, both physical and psychological. Aprilianti (2007) stated that physical depression

indicators were excessive sweating, headache, stomachache, coughing, frequent urination, etc. Whereas, the psychological indicators were sensitive, hesitate to make decision, sleepless (insomnia), not confident, irritability, feeling weak and sluggish;

(b) Depression level was the severity of the stress that was experienced by elderly seen from depression indicators. The assessment of the depression level was categorized into four categories: no depression, light depression, medium depression, and severe depression (Aprilianti 2007). Each question was scored from 1 to 4. The result of the assessment was converted into scale as presented in Table 4.6 below:

Table 4.5 The scale of depression assessment

Depression level	Scale
No depression	11 - 19
Light depression	20 – 27
Medium depression	28– 35
Severe depression	35 – 44

4.6 Data Analysis

Data analysis included: (1) descriptive statistics (mean and standard deviation) for the whole numeric variables; (2) proportion for all variables which are categorical, (3) t-test analysis to compare variables of elderly in non nursing home and those in nursing home; and (4) Regression to analyze factors affecting nutritional and health status and psychosocial condition of the elderly. The data analysis was done by using the Statistical Analysis System (SAS).

4.7 Relevance of Research

The aging process is an unavoidable process, happening gradually and going on since the conception in the womb until the individual dies. The aging process for most people is considered as an unpleasant thing, even it is often considered as a stressing experience that needs adaptation. The physical, social, or psychological changes that are experienced during the aging process needs the readiness of individuals to face it. The changes that occur in the elderly period are physiologic, motoric ability, and socio-psychological ones. The effects from the changes determine whether the elderly males or females will adapt themselves to the changes well or not (Hurlock 1991).

When individuals enter the old age phase, the general indications which are observable are "afraid of being old". The fear originates in the decrease of their ability. A mental decrease is related with the physical decrease so this influences the ability of memory, intelligence, and disliking themselves.

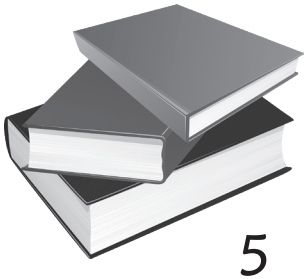
Physical changes in elderly cause them feel unable to do many activities done when they were young. This will then cause the elderly become demotivated and pull themselves out from the social environment. The other problems that are related with this old age are loneliness, and feeling of being useless. These problems can make the life expectancy of the elderly people reduced. The depression is experienced by approximately 12-14% of the elderly population. The changes of social environment, being isolated, loneliness, and lack of activity make the elderly feel frustrated and apathetic. Consequently, their appetite is disturbed so that this may indirectly trigger the emergence of bad nutritional status.

This nutritional status, beside of being influenced by the environmental factors above, is also influenced by health factors. The health factors that affect the changes of the nutritional status are, for instance, the degenerative or non-degenerative diseases that influence food intake, nutrient absorption and utilization in the body tissues, and

also the influence of the drugs that should be taken by the elderly. These health factors have significant influence to the change in nutritional status of the elderly and this will be more observable in the age of 70s.

To face those problems above, in general, the elderly who still have family are very lucky because the family members also take care of them patiently and dedicatedly. Nevertheless, those who do not have any family member because they are unmarried, their spouse passed away, or they do not have any children, are often neglected. Therefore, organizing nursing home for the elderly or Panti Werdha is very important as the place for keeping and looking after the elderly people as well as long stay rehabilitation to keep their social lives. What should be underlined is that for elderly, reaching long life is not only a matter of maintaining physical health but the more important thing is how they manage their life span.

In line with the mission of the Neys van Hoogstraten Foundation (NHF) that funds the studies focused on the household socioeconomic, food consumption, nutritional status, and health, the study on the elderly will enrich the previous studies that have already been funded by NHF. The focus of the study on the elderly is very important because there is no similar research from NHF projects before.



5 GENERAL DESCRIPTION OF NURSING HOME IN BANDUNG

The development in science and technology and also improvement in socio-economic have impact on improved health status and life expectancy of community so that population of elderly increases. Program to improve life quality of elderly is done through, for example, community service and nursing home management. Nursing home is community social organization or institution which support government in accommodating and treat the elderly. Based on government regulation, especially Ministry of Social Affairs, a member or patient in nursing home is only weak elderly who can not manage him/her, has dependency and can be accepted or cared (Hardywinoto & Setiabudhi 1999). Elderly in nursing home has sufficient physical need (food, clothes and shelter). Besides, other positive side for elderly in nursing home is that they can gather with their fellow, exchange experience and share happiness and sadness.

There were four nursing homes under management of Office of Social Affairs in Bandung, which are Panti Sosial Tresna Wredha (PSTW) Budi Pertiwi located on Jl. Sancang No. 2, PSTW Laswi located on Jl. Caringin Gang Lumbung I, PSTW Ny. J Soenarti located on Jl Pa Gatot I No. 20 KPAD and PSTW Senjarawi located on Jl. Jeruk No. 7 Bandung. The management in all nursing home is commonly done by foundation which technical operationally chaired by Head of Dormitory or Chief of Dormitory.

Table 5.1 showed that number of elderly who live in nursing home was 171 people. Actually, this number was considered as very small compared to total number of elderly in Bandung City. However, this showed caring for the elderly who was neglected by their family or who was permitted by their family to live in nursing home. This small number of elderly who live in nursing home was due to the capacity, seen from available room and budget.

The success in holding all activity in nursing home was supported by role of nursing home management committee. The activity in nursing home was social work so that the understanding of being social worker was necessary, especially in nursing home where the elderly live with many problems, such as loneliness, impairment in hearing and sight, physical weakness, which was natural process faced by all person if he/she do not die young. Based on the research, number of person involved as management committee was 87 people, including manager and staff. The smoothness in organizing nursing home was supported by role of the staff, which was administration staff, nurse, cleaning service worker, chef and food distributor, security officer and others. The complete data was presented in Table 5.1.

There was no registration fee to be patient in nursing home, and also 3 of 4 nursing homes did not ask monthly operational fee from the patient, except in PSTW Ny. J Soenarti. This nursing home applied monthly fee only for patients who have good economical background. This was done with aim to be cross subsidy for other patients who was free from any fee. Therefore, operational of nursing home was optimally conducted.

One of the activities in nursing home was food service. Everyday, nursing home provide breakfast, lunch and dinner and a snack which usually given as morning snack. Food which provided as snack usually was snack low in salt and sugar.

Individually, entering old age means natural aging process which can cause physical problem (Nugroho 2008:11). Physical problem in the elderly will affect physical health so that effort is necessary to maintain health of the elderly. One of the efforts is by preventive effort, such as routine health examination and proper exercise activity for the elderly. Regarding health examination, only 3 out of 4 nursing homes provided special doctor who routinely examine health of nursing home patient and usually did not have nurse, physiotherapist and health care. Generally, training for health personnel was still lack, especially for special care of the elderly in nursing home. Nevertheless, effective basic health care for elderly is very important as the effort to improve health by preventing and managing chronic disease. Moreover, WHO stated that all health personnel, regardless the profession, have to get training on aging issues (Kemenkes RI 2012).

The advantage of doing exercise activity, especially for elderly, are maintaining fitness and freshness of the body because it keeps bone strong, supporting optimal heart performance, and eliminating free radicals inside the body. One of the exercises that can be done by the elderly is gymnastic, which has positive impact on strengthening body organ function and immunity when done routinely (Depkes 2006; Ekasari *et al.* 2005:4). However, regarding mean and infrastructure for exercise in the nursing home, only 1 out of 4 nursing homes had garden, hall and field.

Table 5.1 Characteristics of the nursing home (PSTW)

Characteristics of Nursing Home	Budi Pertiwi	Laswi	Ny. J Soenarti	Senjarawi
Total number of elderly	34	30	20	87
Total number of nursing home management committee				
- Cleaning service	16	6	7	5
worker	4	2	2	18
- Chef	1	2	1	15
- Security officer	0	2	0	2
- Others	2	1	1	0
Fee				
- Registration	No	No	No	No
- Monthly	No	No	Yes	No
Eating frequency				
- Meal	3	3	3	3
- Snack	2	1	1	1
Exercise facility				
- Hall	Yes	No	No	No
- Garden	Yes	No	No	No
- Field	No	No	No	Ada
- Others	No	No	No	Ada
Health facility				
- Doctor	Yes	Yes	Yes	No
- Nurse	No	No	No	Yes
- Heath care	No	No	No	Yes
- Physiotherapist	No	No	Yes	No
Additional activity				
- Embroider	No	No	Yes	No
- Sewing	Yes	No	Yes	No
- Crochet	Yes	No	No	No
- Recitation	No	Yes	No	No
- Gardening	No	No	Yes	No

The building of the nursing home was generally permanent with cement wall and ceramic floor. All lighting used electricity and main fuel used for cooking is gas (LPG).

The size of the nursing home varied based on the capacity started from the biggest nursing home which was PSTW Senjarawi (7600 m^2), PSTW Budi Pertiwi (2000 m^2), PSTW Ny.J Soenarti (600 m^2) and PSTW Laswi (400m2). The size of the nursing home gave direct impact on number of bedroom available for the elderly. The bedroom had different sizes and capacity started from bedroom for 1 person to bedroom for 5-8 elderly. The details were presented in Table 5.2.

Table 5.2 Characteristics of nursing home building

Characteristics of nursing home building	Budi Pertiwi	Laswi	Ny. J Soenarti	Senjarawi
Size (m^2)	2000	400	600	7600
Wall	Permanent	Permanent	Permanent	Permanent
Floor	Ceramics	Ceramics	Ceramics	Ceramics
Lighting	Electricity	Electricity	Electricity	Electricity
Fuel	Gas	Gas	Gas	Gas
Number of bedroom	12	12	12	26
- Single	4	-	6	10
- Double	1	7	-	-
- Multiple (>2 persons)	7	5	6	16
Size of various rooms				
- Office	120	9	-	15
- Hall	381.4	36	100	600
- Mosque	20	-	25	-
- Clinic	6	-	12	-
- Isolation room	24	-	-	-
- Storeroom	-	-	4	6
- Library	-	-	4	-
- Lobby	-	-	60	-
- Kitchen	24	8	8	60
- Laundry	6	12	6	32
Ventilation meet health requirement	Yes	Yes	Yes	Yes

Bathroom, latrine, and garbage disposal are obligatory requirement for every building which functioned both as place to do various activities and resident. This requirement is the same with nursing room. Based on Table 5.3, all nursing home had adequate number of bathroom and latrine. Trash can was also available in every bedroom including garbage disposal in each nursing home.

Table 5.3 Availability of bathroom, latrine, and garbage disposal

Variable	Budi Pertiwi	Laswi	Ny. J Soenarti	Senjarawi
Number of bathroom	13	4	9	37
Number of latrine	12	4	9	37
Availability of trash can in every bedroom	Yes	Yes	Yes	Yes
Garbage disposal	Landfills	Landfills	Landfills	Landfills

Fulfillment of clean water source for daily need is the basic thing which needs to be prioritized. Assuring eligibility of water which used as primary need for consumption as well as for washing is important. As presented in Table 5.4, water source which usually used to cook, drink and bath in the nursing home was tap water, except in PSTW Laswi which use pumped ground water but fulfilled the requirement for being suitable for consumption and washing.

Table 5.4 Water source of nursing home

Variable	Budi Pertiwi	Laswi	Ny. J Soenarti	Senjarawi
Water source for drinking	Tap water	Well	Tap water	Tap water
Water source for cooking	Tap water	Well	Tap water	Tap water
Water source for bathing	Well	Well	Tap water	Tap water

6 SOCIO ECONOMIC CHARACTERISTICS

Nowadays, structure of world population including Indonesia is moving towards aging which is marked by increasing number and proportion of the elderly population. National Commission for Older Persons predicted that in 2015, Indonesian population is projected to reach 248 million people. The increasing population of elderly is caused by increasing life expectancy as the impact of increased health quality. Between year 2000 and 2050, world population aged more than 60 years (elderly) will be three-fold from 600 million to 2 billion. Most of the increase happens in developing countries –which number of old people will rise from 400 million in 2000 to 1.7 billion in 2050 (Kemenkes RI 2012).

6.1 Characteristics of Elderly

Entering old age needs special care from the environment nearby. Based on research conducted to 171 elderly in nursing home (Table 5.1), only 82 elderly (Table 6.1) which were able to be respondents or in other words, fulfill the requirement to be interviewed. Then, 336 people were samples to represent non nursing home elderly. High number of elderly and limited number of nursing home in Indonesia causes many elderly live in community. Moreover, is has been the tradition in society that a child or inheritance take care and become potential source to fulfill need of the parents, especially who has entered the old age.

In general, proportion of sex of elderly was dominated by female. Female elderly (80.9%) was far more than male elderly (19.1%) as seen in Table 6.1. This big number of female composition was confirmed by Soewono (2004), women life expectancy is higher (68 years) than men (65 years). Similar thing was also found based on data from BPS (2010), proportion of women that was 8.96% (10.4 million people) was higher than men that was 7.76% (8.8 million people).

Table 6.1 showed percentage of population according to marital status. Most (78.0%) of the elderly in nursing home was widower. More than half (55.5%) of the elderly was widower, while not married elderly was 4.1%. On the other hand, the married elderly in community was 50% or 40.4% of all respondents.

Table 6.1 Distribution of sociodemographic characteristics of the elderly

Sociodemographic characteristics	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Sex						
- Male	15	18.3	65	19.3	80	19.1
- Female	67	81.7	271	80.7	338	80.9
Religion						
- Islam	43	52.4	329	97.9	372	89.0
- Christian/Catolic	39	47.6	6	1.8	45	10.8
Marital status						
- Married	1	1.2	168	50.0	169	40.4
- Widower	64	78.0	168	50.0	232	55.5
- Not married	17	20.7	0	0.0	17	4.1
Age category (years)						
- 55-59	7	8.5	91	27.1	98	23.4
- 60-64	9	11.0	87	25.9	96	23.0
- >65	66	80.5	158	47.0	224	53.6
Mean age (years)	72.3 ± 8.8		65.7 ± 8.6		67.0 ± 9.0	
Household size (person)	1 ± 0.0		3.2 ± 1.8		2.7 ± 1.8	

The age biologically points out period of life from birth. Elderly is a natural process which cannot be avoided similar with human age that is limited by nature regulation (Nugroho 2008). Based on the result on age distribution of sample, more than half (53.6%) aged >65 years with mean age of 67.0 years. There were 23.0% of them aged 60-64 years and 23.4% aged 55-59 years (Table 6.1). This condition showed that global health improvement will also create special challenge in 21st millennium in both developed and developing countries. Based on Darmojo and Martono (2006), increasing number of elderly in Indonesia is influenced by science and technology improvement and socioeconomic progress, which finally improve community health status and lengthen life expectancy. In 2005, life expectancy in countries like Japan and France was more than 80 years. Life expectancy was also increase in developing country. As example, child birth today in Chile, Costa Rica, Jamaica, Lebanon, Sri Langka, Thailand or Indonesia can expect to live more than 70 years (Kemenkes RI 2012). Moreover, according to Bappenas (2009), life expectancy projection of Indonesian in 2025 will reach 73.7 years.

Table 6.2 Distribution of education level of the elderly

Education level	Nursing home		Non nursing home	
	n	%	n	%
No schooling	35	42.7	92	27.4
Elementary school	15	18.3	83	24.7
Junior high school	13	15.9	65	19.3
Senior high school	12	14.6	60	17.9
University	7	8.5	36	10.7
Length of education (years)	6.8 ± 4.8		7.7 ± 4.6	
p value of t-test	0.058			

Education is one of the important elements to increase community capacity to reach better life. Education in the future will create quality human resource. Based on the research, mean length of education among

elderly in non nursing home, which was 7.7 ± 4.6 years, was higher than it among elderly in nursing home (6.8 ± 4.8 years). However, data analysis showed that no difference in length of education between elderly in nursing home and in non nursing home (Table 6.2).

More than half of the elderly in nursing home and in non nursing home received education ≤ 6 tahun. This low education level was in line with result from Susenas 2009 which showed that education among elderly was relatively low, which was no schooling and elementary school (not graduate). Elementary school graduated elderly was only 23.01%. This showed low human resource quality of the elderly (BPS 2009).

Employment history is strongly related to educational background of the elderly. Low education level of the elderly affects professional work. This is the result of colonialism in the past, which most of them were unskilled workers (Darmojo 2004). This was proven by research result as seen in Table 6.3, more than half (58.9%) of them did not have work experience and only 22% had work experience as retiree of civil servant/private. The rest was distributed to seller (8.9%) and labor (3.1%).

Table 6.3 Distribution of type of work among elderly

Type of work	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Not working	64	78.0	182	54.2	246	58.9
Seller	1	1.2	36	10.7	37	8.9
Civil servant/ABRI	0	0.0	1	0.3	1	0.2
Private	0	0.0	3	0.9	3	0.7
Retiree	5	6.1	87	25.9	92	22.0
Labor	2	2.4	11	3.3	13	3.1
Farmer	1	1.2	1	0.3	2	0.5
Others	9	11.0	15	4.5	24	5.7

6.2 Income and Expenditure

Entering retirement period have financial impact on reduced income of someone. Based on the result of research, average income of the elderly in nursing home was IDR 408 111 with average food and non food expenditure of IDR 66 134 and IDR 218 980, respectively. This income was obtained from retirement pension and money from the family. This was in line with Suardiman (2004), wage and financial aid from children/grandchildren were the most important income sources. Moreover, as older age, productivity was reduced so that role of children as income source became very big.

Table 6.4 Economic status of elderly (IDR/cap/month)

Variables	Nursing home	Non nursing home	*p value of t-test*
Income	408 111 ± 775 705	1 298 003 ± 1 446 152	0.000
Expenditure			
- Food	66 134 ± 94 376	459 509 ± 430 780	0.000
- Non food	218 980 ± 497 976	362 068 ± 661 959	0.049

On the other hand, the elderly in non nursing home had higher income with monthly average of IDR 1 298 003. Although most of them were not working, the income was obtained from spouse or income from couples who ever actively worked. The financial distribution managed for food expenditure was in average IDR 459 509, while non food expenditure was in average IDR 362 068 (Table 6.4). Result of data analysis showed that there was significant difference on income obtained by elderly in nursing home and in non nursing home.

Table 6.5 Statistics of non food expenditure among elderly (IDR/cap/month)

Non food expenditure	Nursing home	Non nursing home	Total
Personal need	9 271 ± 32 442	49 784 ± 81 800	41 837 ± 76 416
Clothes	6 885 ± 26 388	24 827 ± 46 277	21 308 ± 43 665
Social	11 360 ± 37 967	42 578 ± 71 475	36 454 ± 67 366
Health cost	168 293 ± 434 579	81 573 ± 579 703	98 585 ± 554 839
Cigarette	17 415 ± 67 403	27 649 ± 80 166	25 641 ± 77 858
Others (HP voucher, electricity, fuel)	5 757 ± 228 834	135 657 ± 145 948	11 0174 ± 47848

Financial management by the elderly in nursing home and in non nursing home was different because the need of elderly in nursing home was fulfilled, while elderly in community manage their financial by themselves for food and non food expenditure. In general, expenditure for personal need, clothes, social, cigarette and others (HP voucher, electricity, fuel) was higher among elderly outside nursing home. However, there was interesting finding that health expenditure was higher among elderly in nursing home (in average IDR 168 293) than in non nursing home elderly (IDR 81 573) (Table 6.5). This showed that even though health examination in nursing home was done routinely, the physical health of respondent in community was relatively better. Economic condition, family support and good access to health service caused physical complain overcome soon so that no dependency on medical therapy (Setyoadi, Noerhamdani & Ermawati 2011). Also when seen from psychological aspect, elderly in the family tend to get better psychological and social support than in nursing home because their interaction in community is wider than in nursing home. Elderly in community can interact with family, friend, and community, while interaction in nursing home was limited to patient and worker in nursing home (Setyoadi, Noerhamdani & Ermawati 2011).

7 FOOD CONSUMPTION AND NUTRIENT INTAKE

7.1 Food Consumption

In human body, there is 1200 g calcium which 99% of it available in skeleton. Some calcium is excreted routinely through urine, sweat and faecal. Everyday, we need 800-1200 mg calcium.

Very small amount of calcium is found in soft tissue and body water. Calcium is important for bone formulation, regulator for thrombosis metabolism, conductor of nerve impulses, hormone production, enzyme production, regulator for membrane permeability, regulator for contraction and relaxation cycle of heart muscle and acid base and electrolyte maintenance.

In this research, consumption of calcium food source was measured through consumption of spinach, cassava leaves, anchovy, tempeh and tofu. Data on milk, which was also source of calcium, was collected together with other drink.

Food consumption frequency can show food habit of someone. Food which is frequently consumed usually showed preference of someone on particular food. Besides, food is frequently consumed due to factor of availability and purchasing power affordability.

Elderly often have limited food choice due to decreasing appetite as the effect of increasing age. Sense of taste among elderly also reduces so that the elderly eat less.

Table 7.1 showed consumption frequency of several calcium food sources which dominantly consumed by the elderly in nursing home as well as in non nursing home. As side dish, the elderly usually consumed tempeh and tofu with relatively high frequency, which was 36.8 times per month (tempeh) and 36.6 times (tofu) for elderly in nursing home, and 27.0 times (tempeh) and 28.2 times (tofu) for elderly in non nursing home.

Tempeh/tofu is food usually seen in Indonesian community as side dish which is cheap and abundantly available in shop or market. For elderly, tempeh/tofu is relatively easy to consume due to soft texture.

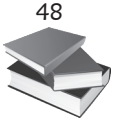
Table 7.1 Statistics of food consumption frequency of calcium food source (times/month)

Food type	Nursing home	Non nursing home	Total
Tempeh	36.8 ± 28.5	27.0 ± 20.8	29.0 ± 22.8
Tofu	36.6 ± 27.6	28.2 ± 21.2	29.9 ± 22.8
Anchovy	0.8 ± 1.4	2.4 ± 6.4	2.1 ± 5.8
Spinach	2.6 ± 3.1	3.4 ± 4.3	3.2 ± 4.1
Cassava leaves	0.9 ± 2.4	1.4 ± 2.4	1.3 ± 2.4

Tempeh is known as protein source, rich in vitamin B12 and antioxidant. This last compound makes tempeh possible to be used to avoid free radicals, prevent degenerative disease, and avoid early aging process.

Many researches have proven potential of tempeh to reach healthy life. Tempeh is able to reduce atherosclerosis in experimental animal. Tempeh has hipocholesterolemic characteristic, which means can reduce body cholesterol level.

As one of traditional food, position of tempeh is difficult to be replaced by other food. Moreover, some people who have economic welfare and have daily menu dominated by meat, fish, or eggs still want tempeh as secondary side dish. This is related to attached long history of tempeh as common food.



Tofu is made from filtration of milled soybean which added by water. The soft texture make tofu easily chewed like meat without bone. Since tofu is made from soybean, the protein content is also qualified. The digestibility can reach 85% - 98%, and total protein which can be absorbed by the body is 65%.

As common food, tofu can be cooked in many ways, such as fried, steamed with sugar, or even only boiled. Indonesian people like tofu as side dish or snack.

Tofu contains 7.8% protein and water content reaches 84.8%. Food, whose high water content, usually contains less protein. As traditional food, popularity of tofu has spread out in Indonesia. Especially in Java Island, tofu lover is a lot and not limited to particular age and location (rural or urban). Tofu fulfills criteria for food for elderly due to soft texture and neutral taste (depend on the spices).

Other side dish which relatively preferred by elderly in the research site was anchovy which is also known as calcium food source, has relatively inexpensive price and has relatively high availability. Consumption of anchovy among elderly in nursing home was 0.8 times per month, and among elderly in non nursing home was 2.4 times per month. Compared to tempeh/tofu, the price of anchovy is more expensive. This food consumption pattern of elderly (Table 7.2) also showed that elderly who live in non nursing home were more flexible in choosing protein and calcium food source.

Consumption of calcium food source, which relatively known among elderly, was spinach with frequency of 2.6 times per week for elderly in nursing home and 3.4 times for elderly in non nursing home. Consumption of cassava leaves was 0.9 times per week in nursing home and 1.4 times in non nursing home.

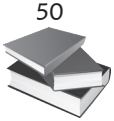
Based on the nutrient content, spinach is the source of beta caroten (vitamin A), vitamin C, riboflavin, and folic acid. The most important mineral content is iron and calcium. Other minerals, such as zinc, magnesium, phosphor, and potassium were also available in spinach.

Habitual consumption of green leafy vegetables is good for elderly since they have varied and high nutrient content. Particular vegetable with soft texture like spinach is not difficult to consume by the elderly.

Description on water consumption among the elderly was presented in Table 7.2. According to the table, pure water was consumed by elderly in nursing home (7 503.7 ml/week) or by elderly on non nursing home (3 097.0 ml/week). Drinking adequate amount of water can improve hormone function, improve capability of liver to break and release fat, and reduce hunger. On the contrary, lack of water consumption can cause constipation, urinary tract infection, kidney stones formation, fatigue, and skin, hair, and nail problem. Water has function to transport mineral, vitamin, protein and other nutrients to all part of the body. Body balance and temperature also depend on water. Water is also lubricant of body tissue as well as bearing joint, bone, and muscle.

Table 7.2 Statistics of beverage consumption among elderly (ml/week)

Type of beverage	Nursing home	Non nursing home	Total
Pure water	7 503.7 ± 2 900.3	3 097.0 ± 4 903.0	3 961.5 ± 4 900.6
Milk	522.0 ± 743.5	271.6 ± 647.9	320.7 ± 674.2
Tea	990.2 ± 1 184.2	650.0 ± 1 540.0	716.7 ± 1 481.8
Coffee	548.8 ± 1 023.6	264.9 ± 668.6	320.6 ± 758.5
Syrup/fruit extract	97.6 ± 328.5	64.1 ± 226.8	70.7 ± 249.9
Juice	164.6 ± 389.8	122.0 ± 239.8	130.4 ± 275.7
Herb	201.2 ± 457.9	116.8 ±357.3	133.4 ± 380.0
Others	63.4 ± 349.8	26.5 ± 179.5	33.7 ± 223.3
Total water consumption (ml/week)	10 091.5	4 612.9	5 687.7
Total water consumption (ml/day)	1 441.6	659.0	812.5



Drinking pure water is different from drinking fruit extract, syrup water, or sweet tea. Drinking pure water gives no calorie contribution but fulfills need of body to get water and eliminate thirst. Meanwhile, other beverages can eliminate thirst but give calorie.

Human constantly lose water everyday. When we breathe, sweat, urinate, and defecate, we release water from the body. When the body release water and then the brain detect it as dehydration, body will feel thirsty. When thirst comes, actually the body is already deficiency of water. Habituating drinking before feeling thirsty is important to maintain health.

About 80% of human body consists of water. Among organ in human body, blood and brain have the highest water content, which are 95% and 90%, respectively. Lacking of water will make body do adaptation process, such as by reduce level of water in blood so that blood will be more viscous. This will disturb blood function as nutrient and oxygen carrier. Due to big role in our body, water is often included as the sixth nutrient after carbohydrate, protein, fat, vitamin, and mineral.

Other beverage that usually consumed by the elderly is tea and coffee. Tea consumption among elderly in nursing home (990.2 ml/week) was higher than among elderly outside nursing home (650.0 ml/week). This condition was similar to coffee consumption (548.8 ml/week in nursing home and 264.9 ml/week in non nursing home).

Tea is beverage which extend the life. Study in Norwegia showed that those who consume tea minimally a cup a day would reduce death rate. Other study with elderly as subject in Netherland produced finding that risk of death due to heart disease (mainly) decreased in line with habit of drinking tea.

Tea will also neutralize nitrosamine (cell destroyer) which came from preserved processed meat, and prevent heterocyclic amine (HCA). When we cook meat, HCA compound is formed. HCA is the element causing mutation which can stimulate creation of free radical

and widely damage human body cell DNA. Several animal experiments showed that HCA cause colorectal, breast, pancreatic, liver, and bladder cancer. HCA is predicted to be responsible for increased breast and colorectal cancer incidence in America. The power of antioxidant in tea will avoid negative effect of HCA.

Drinking tea will hamper plaque cumulation in artery so that it will reduce risk of coronary heart disease. The tea drinkers have younger and less damaged artery. Fragile artery will facilitate cholesterol cumulation which plug blood vessel. Compounds inside tea also can resist activity of particular bacteria which cause damage in gum tissue and tooth loss. The bacteria are *streptococcus mutans* which cause tooth decay.

Habit of drinking coffee is often difficult to stop. The pleasure of drinking coffee is not creating addiction. When someone addicts, there will be negative effect if the habit is stopped. Addiction also causes desire to increase intake, and finally cause loss of control.

Those who have been years making drinking coffee as habit and part of lifestyle may experience mild headache, fatigue, or drowsiness when they stop drinking coffee. However, this will only last in 1-2 days. After that, we will not experience those temporary mild effects anymore. This explains that drinking coffee will not cause addiction and can be stopped without causing meaningful bad effect. It is clearly understood that coffee makes body awake. Moreover, there is also statement that drinking coffee in moderate will generate energy, motivation, or even concentration.

Coffee is not only safe but also beneficial for health. Drinking 2-4 cups of coffee a day can reduce colon cancer, reduce risk of gallstone disease, and prevent cirrhosis of the liver. Coffee also reduces incidence of asthma due to chemical substance called theophylline. Caffeine may also benefial to prevent kidney stones. Kidney stones are formed when oxalate calcium and other chemical elements crystallize and plug urinary tract. Role of caffeine is support urine excretion and reduce the concentration. However, it is predicted that there is other factor which has role other than caffeine.

Drinking 4 cups of coffee or more reduce 24% risk of colon cancer. It seems that coffee will increase colon activity, and anti-mutagenic component inside coffee can prevent the cancer. This cancer usually attack person whose age more than 50 years.

Other beverage which usually consumed by the elderly was milk with quantity of 522.0 ml/week for elderly in nursing home and 271.6 ml/week for elderly in non nursing home. This number was relatively small compared to milk consumption of people in developed countries.

In Indonesia, milk is widely known. Prof. Poorwo Soedarmo has done socialization regarding the importance of drinking milk by creating slogan "Empat Sehat Lima Sempurna/Four Healthy Five Perfect". Milk is inserted in the last position of the slogan due to reason that Indonesia in the early 1950s was just independent so that food consumption was still limited. Milk was considered luxurious at that time. Besides, milk was still a rare food product.

The increasing trend of milk consumption in Indonesia was very slow. In 1970, our nation only consumed milk with amount of 1.82 kg/cap/yr and in 2000, it increased and became 6.50 kg. Thus, during 30 years, the increase was only 4.68 kg.

Beside as calcium source, milk has other benefit, which is helping body to rest. Drinking milk before sleeping at night is very important for those who often have insomnia problem. This is because milk is source of amino tryptophan which supports production of melatonin inside the body that causes drowsiness.

Beside milk, other beverages which were consumed by the elderly were herb, juice, and syrup. Indonesia is producer of spices. Therefore, some people have habit of drinking herb to maintain health, even everyday, in order to be always fit.

The calculation of daily water consumption showed that elderly in nursing home consumed water 1,441.6 ml/day and elderly in non nursing home consumed 659.0 ml/day. Besides, consumption of water for healthy person is 2000 ml/day so that it can be said that generally elderly consumed less than the adequacy.

Human body organs which perform important function, such as brain, kidney, lungs, and blood, will be impaired if the water content decrease. Therefore, ensuring water consumption from beverage as well as food is very important.

The importance of water for health of kidney is already understood by many people. The presence of drinking water is important for kidney, such as to excrete sodium. Lacking in water intake in someone will inhibit sodium excretion. High sodium concentration in the body will trigger hypertension for people who are sensitive to sodium.

Formation of kidney stones is also can be prevented if the person is willing to drink in adequate amount. If someone ever suffers from kidney stones, making habit of drinking more water and reducing high calcium food intake will help overcoming this problem.

Basically, every person including elderly need to be aware that drinking adequate amount of water is important for the body. Health problem of the body can be prevented when we want to drink regularly, at least 8 glasses a day.

7.2 Nutrient Intake

In this study, intake of energy, protein, calcium, phosphor, iron, vitamin A and C were assessed. Table 7.3 showed that energy and nutrient intake, except vitamin A and C, among elderly in nursing home was lower than elderly in non nursing home. Further, in Table 7.4, it was presented energy and nutrient adequacy level for elderly which generally higher among elderly in non nursing home.

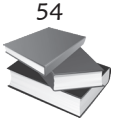


Table 7.3 Statistics of energy and nutrient intake of elderly per capita per day

Nutrient	Nursing home	Non nursing home	Total
Energy (kcal)	946.4 ±260.7	1 091.4 ± 429.0	1 062.9 ± 405.4
Protein (g)	27.0 ± 7.8	35.8 ± 17.9	34.1 ± 16.8
Calcium (mg)	172.5 ± 127.1	671.0 ± 2 064.8	573.0 ± 1 861.6
Phosphor (mg)	394.2 ± 144.5	500.9 ± 378.8	479.9 ± 348.0
Iron (mg)	8.8 ± 3.2	10.7 ± 6.0	10.3 ± 5.6
Vitamin A (RE)	687.7 ± 329.2	454.7 ± 693.1	500.5 ± 644.5
Vitamin C (mg)	38.8 ± 26.3	32.5 ± 34.5	33.7 ± 33.1

Table 7.4 Statistics of energy and nutrient intake per capita per day

Nutrient	Nursing home	Non nursing home	Total
Energy (kcal)	1 935.4 ± 143.9	1 988.8 ± 189.1	1 978.3 ± 182.2
Protein (g)	49.3 ± 2.7	49.4 ± 2.8	49.3 ± 2.8
Calcium (mg)	525.6 ± 84.3	581.5 ± 133.6	570.5 ± 127.4
Phosphor (mg)	459.1 ± 19.4	477.6 ± 83.1	474.0 ± 75.3
Iron (mg)	13.8 ± 0.4	13.8 ± 0.4	13.8 ± 0.4
Vitamin A (RE)	518.3 ± 38.9	525.4 ± 55.6	524.0 ± 52.8
Vitamin C (mg)	60.0 ± 0.0	60.0 ± 0.0	60.0 ± 0.0

Table 7.5 shows the energy and nutrient adequacy level which calculation was based on intake per requirement (Table 7.3). The table shows that energy adequacy level among elderly was generally low, that is, 49.0% for elderly in nursing home and 54.9% for elderly in non nursing home. Energy intake is important to sustain all activity of elderly. Low energy adequacy level in this study might be related to the declining appetite of elderly subjects due to declining sense of taste and teeth loss.

Table 7.5 Statistics of energy and nutrient adequacy level per capita per day

Nutrient (%)	Nursing home	Non nursing home	*p value**
Energy (%)	49.0 ± 13.4	54.9 ± 20.7	0.007
Protein (%)	54.9 ± 15.9	72.4 ± 35.2	0.000
Calcium (%)	33.4 ± 24.6	125.3 ± 403.8	0.021
Phosphor (%)	86.0 ± 31.8	105.3 ± 78.9	0.015
Iron (%)	63.9 ± 23.3	77.7 ± 44.1	0.003
Vitamin A (%)	133.2 ± 64.6	85.7 ± 120.0	0.000
Vitamin C (%)	64.7 ± 43.8	54.1 ± 57.6	0.061

* statistical calculation was conducted using t-test analysis of difference between the two groups.

The consequences of lack of appetite among elderly include low nutrient adequacy level, i.e protein, mineral, and vitamin. Table 7.5 shows that energy, mineral, and vitamin adequacy level among elderly in nursing home were lower than those in non nursing home ($p<0.05$), except for vitamin C ($p>0.05$).

Elderly in nursing home consumed only 54.9% of RDA for protein and 33.4% of RDA for calcium. These numbers were relatively lower than those of other nutrients. Though the data from food frequency questionnaire showed that the elderly in nursing home consumed more often calcium food source, the consumption was too low that the adequacy level was still low, and even lower in comparison with that of elderly in non nursing home (125.3% RDA).

In elderly living in nursing homes, the phosphor and vitamin A adequacy level were higher compared to other nutrients. For vitamin A, the number was also higher in comparison with that of elderly in non nursing home (133.2 % vs 85.7%). However, in general, elderly in nursing home was more at risk to suffer from malnutrition if compared to those in non nursing home. This is also reflected in

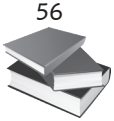


Table 7.6 which showed that many of the elderly in nursing home who only consumed <70% of RDA for energy and protein. The elderly who consumed energy <70% of RDA in nursing home was 96.3% and in non nursing home was 78.9%, while elderly who consumed protein <70% of RDA was 80.5% in nursing home and 53.3% in non nursing home. These findings, i.e low energy, protein, mineral, and vitamin intake level among elderly in nursing home as well as in non nursing home indicated that elderly are susceptible to nutrition problems, which potentially reduce the capacity of the body to prevent various diseases.

Table 7.6 Distribution of elderly based on energy and protein adequacy level

Adequacy Level /AL (%)	Energy				Protein			
	Nursing home		Non nursing home		Nursing home		Non nursing home	
	n	%	n	%	n	%	n	%
<70	79	96.3	265	78.9	66	80.5	179	53.3
70 ≤ AL ≤ 89	3	3.7	48	14.3	15	18.3	78	23.2
90 ≤ AL ≤ 110	0	0.0	18	5.4	1	1.2	34	10.1
≥111	0	0.0	4	1.2	0	0.0	44	13.1

8 NUTRITIONAL STATUS

Nutritional status of subjects was assessed by Body Mass Index (BMI), waist circumference, anaemic status and nutritional risk assessment using Mini Nutritional Assessment (MNA) indicator.

8.1 Nutritional Status by BMI

Among 82 elderly in nursing home included in the study, only 29.3% were classified as having normal BMI, 14.6% were classified as deficient and more than half were classified as having either overweight, obese 1 or obese 2 (17.1%, 26.8% and 12.2%, respectively). Similar trend was found among 336 elderly living in family, only 24.4% were classified as having normal BMI, only 8% were classified as deficient while 67.5% were classified as either overweight, obese 1 or obese 2 (21.4%, 33.3% and 12.8%, respectively). There was no significant difference in BMI found between both groups (Figure 8.1).

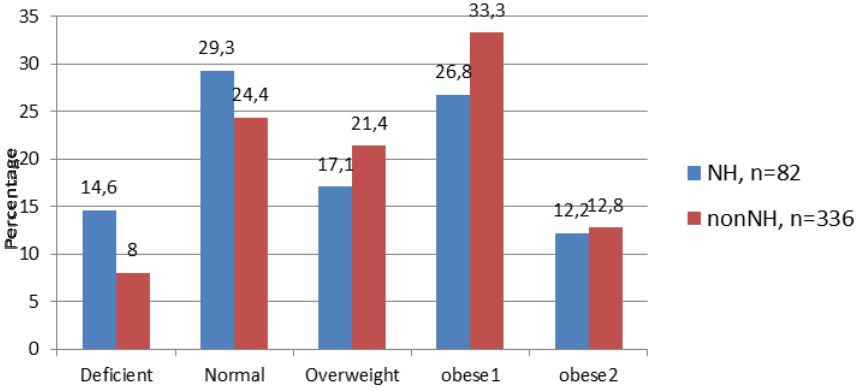


Figure 8.1 Prevalence of chronic energy deficiency and obesity as assessed using BMI

In this study, overnutrition was more prevalent than undernutrition in elderly in both groups, and the prevalence was higher in elderly living in family. The finding was in contrary with most previous studies in Indonesian elderly population which found that undernutrition was the most prevalent nutritional problem (Oktariyani 2012; Samaptaningtyas 2006; Rianto 2005; Napitupulu 2002).

The result of this study was more similar with study by Sanches-Garcia *et al.* 2007 which revealed that according to the BMI values, the prevalence of malnutrition was lower than 5% in both sexes. The BMI values indicated that 62.3% of the population was overweight, and 73.6% of the women and 16.5% of the men had high fat tissue distribution. The different finding might be due to geographic and sociocultural factors, which is unique in every region. Bandung is well known as culinary city in which various delicious foods are available, and considered to be an important factor in cultural life of its residence.

Figure 8.2 shows the nutritional classification using BMI in elderly living in nursing homes. It showed that 45.6% female subjects were suffer from overnutrition (overweight, obese 1 and obese 2), 36.8% had normal BMI and 17.6% were classified as malnutrition. This finding showed that undernutrition is still a problem for female although overnutrition was the biggest problem to be considered. The problem of overnutrition was even greater in male subjects with prevalence reached 78.6%. Looking at significant nutritional problem in elderly living in nursing home, it is strongly suggested that the nutrition education is properly given as well as dietary management.

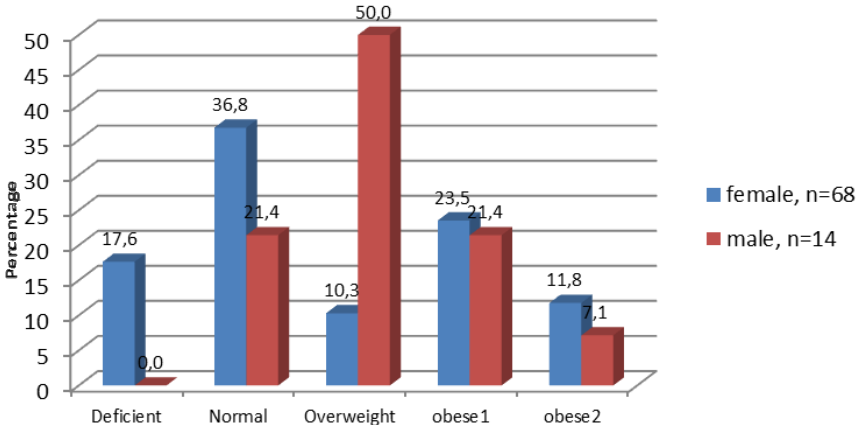


Figure 8.2 Nutritional status of elderly in nursing home

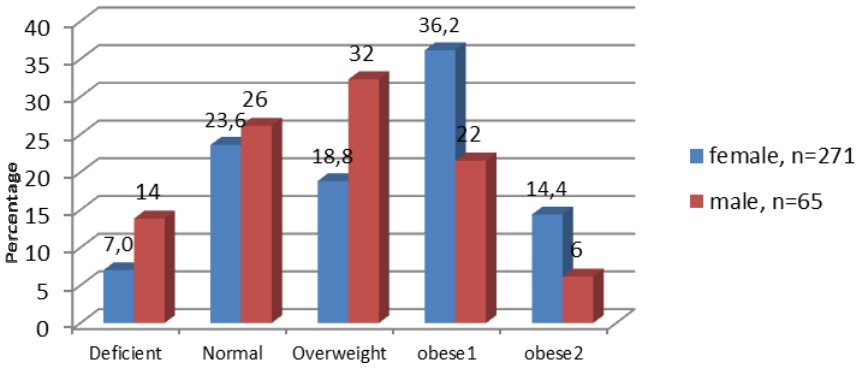


Figure 8.3 Nutritional status of elderly in non nursing home

The distribution of nutritional status of female and male elderly in non nursing home was a little bit different from that of elderly living in nursing home, in term of prevalence of malnutrition, in male subjects in this group is higher than that of female (13.8% vs 7.0%), and the prevalence of overnutrition is higher in female than in male (69.4% vs 60.0%). But still in both groups, overnutrition is apparently the main nutritional problem.

8.2 Nutritional Status by Waist Circumference

It is well known that being overweight and obesity are closely linked to an increased risk of cardiovascular disease, as well as with chronic disorders. Both the body mass index and waist circumference have been used as markers of obesity and adiposity to study their relation to chronic diseases (Janssen, Katzmarzyk & Ross 2004). Waist size is a marker of abdominal fat depots responsible for the occurrence of insulin resistance.

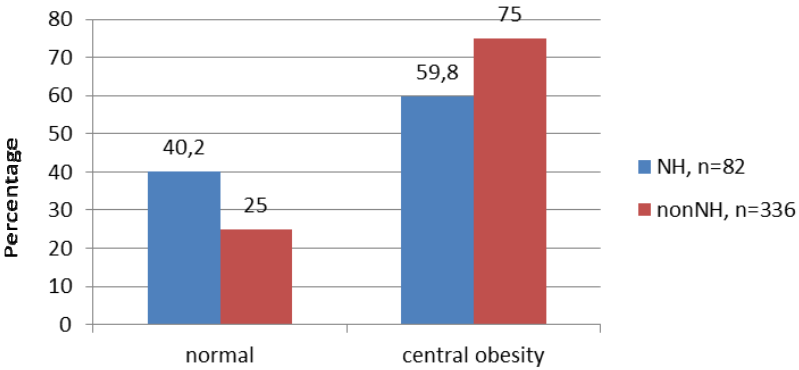


Figure 8.4 Prevalence of normal waist circumference and central obesity in elderly

In this study, the prevalence of central obesity in both groups were higher than the normal (59.8% and 75% in elderly in nursing home and in non nursing home, respectively), and the waist circumference was significantly higher in those in non nursing home (Figure 8.4). This finding was in accordance with the BMI features in the same study that tend to be higher in elderly in non nursing home in comparison with those in nursing homes, though the difference was not statistically significant.

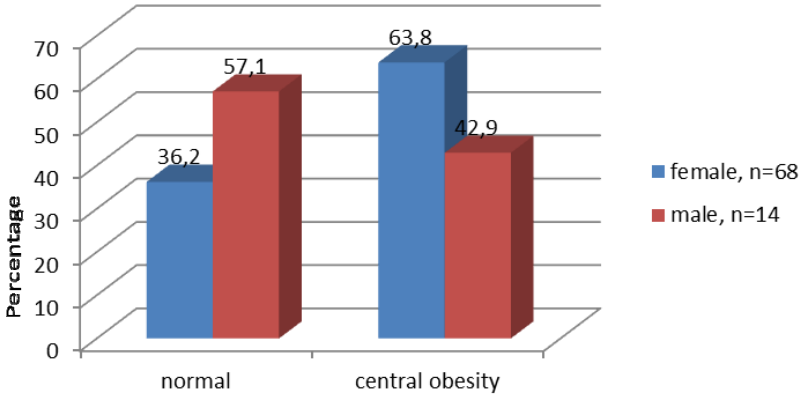


Figure 8.5 Nutritional status by waist circumference of elderly in nursing homes

In elderly living in nursing homes, central obesity was more prevalent in female than in male (63.8% vs 42.9%). The similar feature was found in elderly in non nursing home with the prevalent of central obesity reached 83.7% in female subjects. This finding was similar with previous study by Perissinotto *et al.* 2002 which concluded that the visceral redistribution in the elderly mainly affects women.

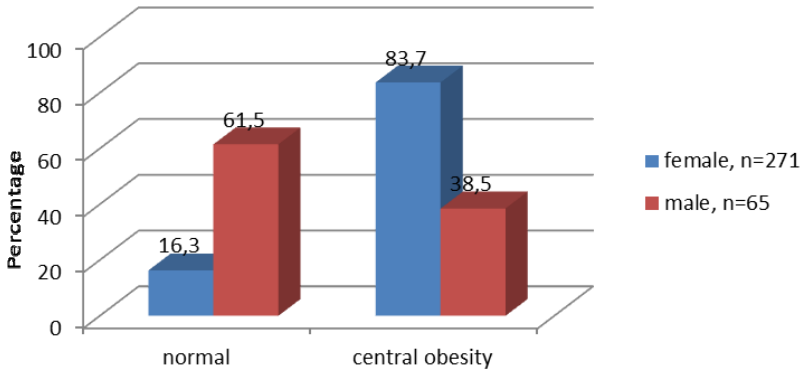


Figure 8.6 Nutritional status by waist circumference of elderly in non nursing home

These findings suggest that overnutrition, instead of undernutrition, is the main nutrition problem in all groups of subjects studied, as assessed by both BMI and waist circumference parameters. The lifestyle change especially dietary pattern is suggested to play important role in determining the general features of nutritional problems, as well as the complications, that faced by elderly in Indonesia. Therefore, it is important that the community including caregivers in nursing homes as well as the family to pay attention to the issue so that the problem could be reduced.

8.3 Anaemic Status

Anemia in the elderly is an under-diagnosed condition often not reported to the patient because it is mostly perceived as a mere consequence of aging or as a disease marker. Current data suggests a hypothesis that low hemoglobin concentrations are related to adverse outcomes. Underlying diseases may induce anemia through increased inflammation suppressing erythropoiesis, low hemoglobin concentration as marker for heart or renal failure, or malnutrition. Accumulated evidence suggests that low hemoglobin concentration adversely affects the cardiovascular system and that correction of anemia in renal patients may reduce mortality by up to 20% and reverse mild left ventricular dilation.

Based on WHO criteria, the prevalence of anaemia of elderly living in nursing home and in non nursing home were 45.1% and 28.9%, respectively. Among elderly in nursing home, the prevalence was higher in male than in female (50% vs 57.1%), but as expected, the mean hemoglobin level was lower in female. In those in non nursing home, the prevalence was higher in female than in male (41.3% vs 38.5%), while the mean hemoglobin level was equal.

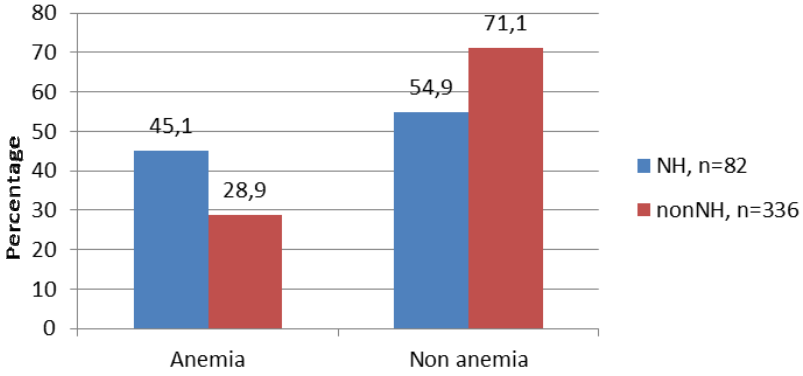


Figure 8.7 Prevalence of anaemia in elderly

These findings shows that the prevalence of anaemia in elderly was higher than that of national data for all age in population which is around 30% (Riskesdas 2007), and also higher than previous findings in other countries. The prevalence of anemia was unusually high in elderly residents of Holmsted County: 20.5% in men and 15.9% in women (Ania 1994), 3.8% in Denmark (30-60 years old) (Milman *et al.* 2001), and 5.0% in Norway (Skjelbakken 2005). The prevalence of anemia appears relatively high also in Japanese (14.5% in men and 17.1% in women aged 51 to 80 years, and 17.9% in women 60 years or older), and Taiwanese (18.8%) elderly populations. In a Korean population aged 60 to 95 years, the prevalence of anemia was 13.6%, but higher in women (14.7%) than in men (9.9%).

The prevalence of anaemia in this study was much higher than other previous reports in Indonesia as well as other countries. Though the bias of method was still possible, yet it gave important data on the magnitude of this particular nutrition problem of elderly in Indonesian population. Further study should be conducted to analyze the cause of anaemia and the association with other diseases in Indonesian elderly.

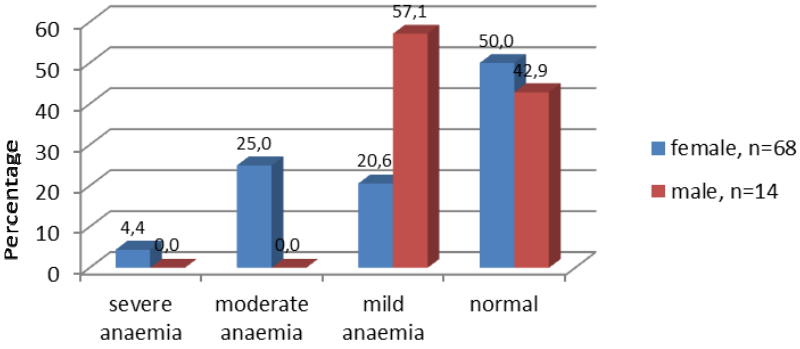


Figure 8.8 Anaemic status of elderly in nursing home

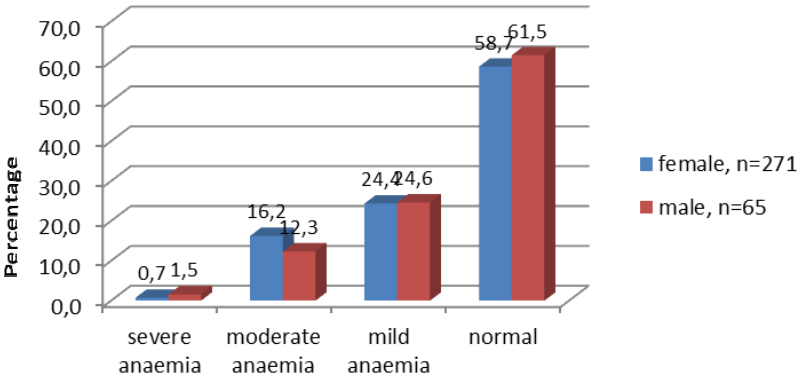


Figure 8.9 Anaemic status of elderly in non nursing home

8.4 Nutritional Risk Assessment

Nutritional risk assessment using Mini Nutritional Assessment (MNA) consisted of 2 steps. The first step was screening MNA using short form MNA, which variables were listed in table below. If subjects were found having risk of malnutrition, the deeper analysis using full MNA was further conducted.

In Table 8.1, it was showed that only 10 subjects or 12.2% of elderly in nursing home were classified as well-nourished, while the number was higher in those in non nursing home (26.5%). At the other side, the prevalence of elderly that suffered from malnutrition was higher in elderly in nursing home than those in non nursing home. The data showed that overall nutritional status of elderly in non nursing home was better than those in nursing home, as shown by significantly higher score. The attention and care coming from family seem to give beneficial effect on nutritional status of elderly. It is noteworthy to remember that elements in MNA does not only consider body mass, but also historic and present clinical signs and symptoms.

Table 8.1 Nutritional status by screening MNA score of the elderly

Nutritional status	**Nursing home (n=82)**		**Non nursing home (n=336)**	
	n	**%**	**n**	**%**
Well-nourished (12-14)	10	12.2	89	26.5
Risk of malnutrition (8-11)	47	57.3	193	57.4
Malnutrition (0-7)	22	26.8	53	15.8
Average	8.9 ± 2.4		9.8 ± 2.3	
p value of t-test	0.001			

From the elements included in screening MNA, it was found that stress or acute illness and neurophysical problem, dementia or depression were the elements that contributed most to lower score of screening MNA. The complaints in those elements were commonly found in elderly, regardless the living environment, and related to the nature of aging process itself.

Table 8.2 Variables of the screening Mini Nutritional Assessment (MNA) in elderly in nursing home and non nursing home

Variables	Answer	Nursing home	Non nursing home	Total
Reduced food intake in the past 3 months	– Severe	3.7	1.5	1.9
	– Moderate	28.0	33.3	32.3
	– No	68.3	65.2	65.8
Weight loss in the past 3 month	– More than 3 kg	6.1	4.8	5.0
	– Do not know	29.3	16.9	19.4
	– Between 1-3 kg	21.9	24.7	24.2
	– No	42.7	53.6	51.4
Mobility	– Only lay in bed wheelchair	6.1	1.5	2.4
	– Walk only at home	17.1	5.9	8.1
	– Normal	76.8	92.6	89.5
Stress or acute ilness in the last month	– Yes	53.7	42.3	44.5
	– No	46.3	57.7	55.5
Has neurophysical problem, dementia or depression	– Severe	12.2	5.9	7.1
	– Mild	54.9	66.7	64.4
	– No	32.9	27.4	28.5
Arm circumference	– <21 cm	7.3	0.9	2.1
	– 21-22 cm	3.7	4.2	4.1
	– >22 cm	89.0	94.9	93.8

The analysis of full MNA revealed that the greatest prevalence in both elderly in nursing home and those in non nursing home was at risk of malnutrition (54.9% and 66.1% in nursing home and non nursing home group, respectively). The prevalence of malnutrition by MNA was higher in elderly in nursing home than that in non nursing home (26.8% vs 9.8%). The finding suggested that elderly in nursing home were more vulnerable to have nutritional problem than those in non nursing home.

Independent t-test between female and male subjects in each group showed that male elderly in non nursing home had better nutritional status than the females, while the number was not significantly different in elderly in nursing home. In total, male elderly had better nutritional status than the females. This was probably caused by the fact that female elderly tend to have more stress in life than the males that in turn gave negative effects on their nutritional status.

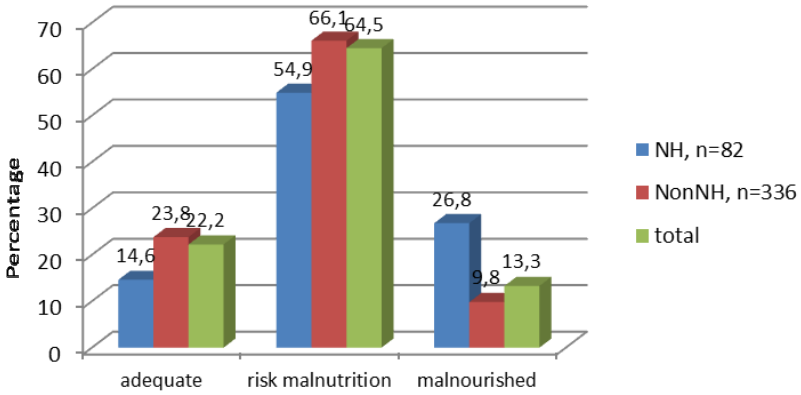


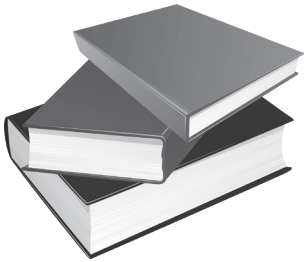
Figure 8.10 Nutritional assessment by full MNA score in elderly

The independent t test analysis between elderly in the 2 groups showed that those in non nursing home had significantly higher score of full MNA in comparison with those in nursing home (p=0.000), indicating better nutritional status.

Table 8.3 Distribution of MNA score by sex in elderly in nursing home and non nursing home

Group	Sex	MNA score	p-value (female vs male)	p-value (Nursing home vs Non nursing home)
Nursing Home	Female	18.7	0.249	0.000
	Male	20.5		
	Total Nursing Home	19.0 ± 3.9		
Non Nursing Home	Female	21.1	0.019	
	Male	22.2		
	Total Non Nursing Home	21.0 ± 3.5		

The study confirmed previous studies that, institutionalized elderly, especially women, should be considered a nutritionally vulnerable population group in comparison with elderly living with family (Rambouskova, *et al.* 2013; Pai, *et al.* 2011). The results of this study, as well as similar studies around the world raise great consideration about care of the elderly in nursing home. The professional competence of caretaker and their abilities in the field of nutrition should get more attention.



9 HEALTH STATUS

9.1 Health Status

The process of aging involves a great number of physiological and nutritional changes such as an increase in body weight and height loss. Furthermore, this leads to a reduction in fat-free mass, which is closely associated with increased fat mass. In fact, the reduction or stability in body weight may mark an increase in body fat mass as the result of aging and loss of muscle mass in people. In this study, the body composition including body fat mass and muscle mass were not measured, but it can be assumed that the increase of body weight in elderly was due to body fat mass increase, rather than muscle mass.

Tabel 9.1 Distribution of health indicators of elderly in nursing home and non nursing home

Variables	Nursing home	Non nursing home	*p value*
Body mass index	24.0 ± 6.3	26.6 ± 19.6	0.123
Waist circumference	87.2 ± 16.3	90.2 ± 12.8	0.041
Blood hemoglobin level	11.9 ± 1.7	12.2 ± 1.5	0.071
Blood pressure - Systole - Diastole	 156.7 ± 29.7 81.5 ± 13.6	 150.2 ± 28.9 90.2 ± 35.4	 0.036 0.015
Perceived health status score*	6.3 ± 1.8	6.7 ± 1.4	0.020

Body mass index and waist circumference in elderly in non nursing home were higher than those in nursing home (Table 9.1), indicating greater problem of overnutrition in this group. It was well understood and confirmed that increase in BMI was associated with increase in chronic degenerative diseases, such as type 2 DM, cardiovascular diseases

and cancer. Males that have waist circumference over 94 cm were at increased risk, and over 102 cm at very high risk for the development of comorbidity, especially of the cardiovascular system. An increased risk of developing these complications was determined in the case of females with a waist size over 80 cm, and a strongly increased risk in the case of females with a waist size of over 88 cm (WHO 1997).

The prevalence of diseases in elderly was listed in the table below. Hypertension and arthritis were the most common diseases found in both groups, followed by dyspepsia syndrome, dyslipidemia and heart disease. The trend of the diseases was similar in both groups, except that the prevalence of cataract was much higher in elderly in nursing home. The cause of this higher prevalence of cataract might have correlation with age, which the age of elderly in nursing home was older than it of other group. As much as 80.5% of elderly in nursing home were 66 years old or more, while in other group, the number was only 53.6% (Table 6.1).

Table 9.2 Distribution of diseases in elderly

Disease	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Hypertension	45	54.9	144	42.9	189	45.2
Artritis (rheumatic)	38	46.3	146	43.5	184	44.0
Dyspepsia syndrome (stomach ulcer)	26	31.7	96	28.6	122	29.2
Heart disease	12	14.6	29	8.6	41	9.8
Diabetes	7	8.5	27	8.0	34	8.1
Respiratory disease (asthma/ pneumonia)	4	4.9	16	4.8	20	4.8
Dyslipidemia (high cholesterol)	11	13.4	63	18.8	74	17.7
Kidney disease	2	2.4	10	3.0	12	2.9
Cataract	26	31.7	19	5.7	45	10.8
Others	0	0.0	15	4.5	15	3.6

Table 9.2 indicates that vision and hearing problems were not prevalent in both groups, though in elderly in nursing home, the prevalence of serious visual problem was higher than that of other group. This was in accordance with the relatively high prevalence of cataract in the group.

Physical activities of elderly in both groups were generally similar (Table 9.3). Most elderly did not have any difficulties in doing daily activity such as wearing clothes, eating, and drinking. Difficulties in getting on and off the bus or train were more common in elderly in nursing home, as well as doing exercise. This might be due to the older age of this group, in comparison with the other group.

Table 9.3 Physical activity problem among elderly

Activity	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Wear clothes, tie shoelaces and button up clothes						
- Not difficult	76	92.7	329	97.9	405	97.0
- Somewhat difficult	4	4.9	5	1.5	9	2.0
- Very difficult	2	2.4	2	0.6	4	1.0
Drink using glass						
- Not difficult	81	98.8	334	99.4	415	99.3
- Somewhat difficult	1	1.2	1	0.3	2	0.5
- Very difficult	0	0.0	1	0.3	1	0.2
Bath						
- Not difficult	75	91.5	326	97.0	401	95.9
- Somewhat difficult	3	3.7	7	2.1	10	2.4
- Very difficult	4	4.9	3	0.9	7	1.7
Wear clothes						
- Not difficult	67	81.7	317	94.3	384	91.9
- Somewhat difficult	4	4.9	9	2.7	13	3.1
- Very difficult	11	13.4	10	3.0	21	5.0
Get off the bus, car or train						
- Not difficult	52	63.4	261	77.7	313	74.9
- Somewhat difficult	8	9.8	53	15.8	61	14.6
- Very difficult	22	26.8	22	6.6	44	10.5
Do exercise (walk, do gymnastics)						
- Not difficult	62	75.6	273	81.3	335	80.1
- Somewhat difficult	7	8.5	45	13.4	52	12.4
- Very difficult	13	15.9	18	5.4	31	7.4

9.2 Health Care

As someone's age increases, many chronic illnesses, such as diabetes, dementia, and osteoporosis come. Therefore, a greater demand from health care system for assisting elderly's daily living is needed.

Elderly living in nursing home and those in non nursing home had different way to get health care services. As the number of elderly increase, the need of the nursing home will continue to increase. Long term health care provided by nursing homes for elderly must be able to met need of elderly for healthy productive living. In community, long term care need of elderly was met by their family members, with or without medical home care services.

Table 9.4 Type of health examination among elderly

Type of examination	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Physical examination	38	46.3	147	43.8	185	44.3
ECG	13	15.9	40	11.9	53	12.7
Blood pressure	68	82.9	219	65.2	287	68.7
Blood glucose	15	18.3	73	21.7	88	21.1
Lipid profile	6	7.3	42	12.5	48	11.5
Liver/kidney test	2	2.4	25	7.4	27	6.5
Rontgen	2	2.4	19	5.7	21	5.0
Urinalysis	0	0.0	25	7.4	25	6.0
Others	0	0.0	15	4.5	15	3.6

The decrease of multiorgan function in elderly leads to the need of routine medical check up, such as cardiovascular function, blood glucose, blood lipid, liver/kidney function, etc. Table 9.4 showed the health care performed to the elderly. Blood pressure test was the most common test performed, but did not cover all subjects. There were still 31.3% of elderly in non nursing home that did not have their blood pressure examined routinely. Hypertension, a common pathologic

condition commonly found in elderly, has relatively no clear sign nor symptoms, that makes the patients feel just fine and blood pressure monitoring is not considered to be important. It is important for the caregivers or family to give attention on this as it gives good prediction of complications that potentially happened.

Physical examination by general practitioner was the second common service received in both groups of elderly; yet, it covered only less than half of subjects. Other important health services, such as electrocardiography, blood glucose and lipid analysis, liver/kidney test, chest x ray, and urinalysis, are not common in both groups. This finding led to great concern of elderly health monitoring. In both settings, nursing home and non nursing home, the condition should be improved, that is the elderly should get more attention about their health and health monitoring.

Elderly are vulnerable to many acute diseases as well as chronic diseases. The accessibility to health care therefore should be maintained. Most elderly came to clinics or general practitioner if they feel sick. Others would go to hospital and community health center. About 40% of elderly in both groups bought and took medicine from store before going to health care. It was also interesting to find that the use of herb was moderately high (+20% in both groups).

Table 9.5 Distribution of elderly by access to health care

Health Care	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Clinic/practitioner	57	69.5	180	53.6	237	56.7
Hospital	19	23.2	85	25.3	104	24.9
Community health center	21	25.6	130	38.7	151	36.1
Traditional healer	0	0.0	5	1.5	5	1.2
Take medicine from store	32	39.0	137	40.8	169	40.4
Drink herb	17	20.7	67	19.9	84	20.1
Not treated	4	4.9	23	6.9	27	6.5
Others	1	1.2	8	2.4	9	2.2

For elderly in nursing home, financial support for medication mainly came from the nursing home, family, and from the elderly themselves, while for those in non nursing home the support came mainly from family and the elderly themselves. It was unexpectedly found that the support from government was very low especially in nursing home, indicating that the government did not give serious attention to this issue, in spite of the growing population of elderly.

Table 9.6 Distribution of elderly by source of financial support for medication

Source of financial support for medication	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Self-paying	41	50.0	179	53.3	220	52.6
Family	27	32.9	186	55.4	213	51.0
Nursing home	43	52.4	1	0.3	44	10.5
Government/non government insurance	3	3.7	106	31.6	109	26.1
Private/NGO	1	1.2	3	0.9	4	1.0
Others	1	1.2	0	0.0	1	0.2

The responsibility on health of elderly is not only carried by the caregivers or community, but also by the elderly themselves. Table 9.7 showed the efforts done by elderly to keep healthy. The feature was similar in both groups. Most elderly performed worship as their way to keep healthy. Maintaining healthy diet, exercise and avoiding stress were also common in both groups. In general, the awareness of elderly to keep their physical healthy was good, but still needed to be improved. The efforts also need to be noticed by caregivers so that they can give more support to improving health status of the elderly.

Table 9.7 Efforts to keep healthy

Efforts to keep healthy	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Manage diet	60	73.2	230	68.5	290	69.4
Avoid particular food	53	64.6	241	71.7	294	70.3
Avoid stress	49	59.8	230	68.5	279	66.7
Do exercise	59	72.0	183	54.5	242	57.9
Consume herb	20	24.4	93	27.7	113	27.0
Consume supplement	21	25.6	98	29.2	119	28.5
Regular health examination	36	43.9	101	30.1	137	32.8
Do worship	65	79.3	254	75.6	319	76.3

9.3 Living Environment

Health and welfare of elderly are supported by many aspects, one of which was good environmental sanitation. Notoatmodjo (2003) defined environmental sanitation as health status of an environment that includes housing, defecation, and clean water. Those aspects have important role in supporting health and welfare of elderly. This section describes environmental sanitation condition nearby the dwelling for elderly in non nursing home. The details on housing of the elderly are presented in Table 9.8.

Table 9.8 Distribution of elderly in non nursing home by criteria of housing

Housing of elderly in non nursing home	n	%
Type of house		
- Stage house of stilt	13	3.9
- Non stage	311	92.6
Type of wall		
- Non permanent	5	1.5
- Semi permanent	15	4.5
- Permanent	315	93.8
Type of floor		
- Soil	1	0.3
- Cement	49	14.6
- Tile/ceramics	284	84.5
Ventilation condition of the house		
- ≥ 15% of room space	198	58.9
- < 15% of room space	138	41.1

Most of elderly in non nursing home don't live in house of stilt. House of stilt is commonly used in area with potential natural disaster, such as flood, earthquake, or wild animal attack. Geographically, environment in the research site was categorized as area which was safe from those natural problems so that house of stilts was no longer used. People who live in house of stilts often use the pit under the floor as a space to grow animal or to dispose garbage, making it potential to cause health problem (Prasetyo *et al.* 2007). The house pit, which is low, is also difficult to be reached and cleaned. Hence, it can be assumed that not using a house of stilt is better than using one since it is more beneficial for the health of elderly.

The type of wall in the house of elderly was mostly permanent. This was related to the culture and housing building policy in Indonesia. According to Decree of Minister of Regional Housing and Infrastructure Number 403/KPTS/M/2002 regarding Technical Guidance in Building Healthy Ordinary House, based on potential of building materials, culture, and geological condition, type of house recommended for West Java was brick house.

Floor as the next component of healthy house is expected to be water resistant and easy to be cleaned. Most of the elderly in this study lived in the house with ceramic, tile, or cement floor. Sanropie (1989) stated that floor from soil was not recommended to be used anymore since it tend to be humid in rainy season so that potentially cause problem or disease for the resident. Soil can be coated by ceramic, tile, or cement to prevent the problem.

Ventilation is very important part of the house to exchange air and light. The Ministerial Decree of Regional Housing and Infrastructure Number 403/KPTS/M/2002 about criteria of healthy house stated that ventilation inside a house should be minimum 10% of the room space. In this study, more than half of the elderly living in house with ventilation of more than 15% of the room space which indicated good ventilation.

Table 9.9 Distribution of source of lighting and fuel among elderly in non nursing home

Source of lighting and fuel	n	%
Source of lighting		
- Electricity	330	98.2
- Kerosene	6	1.8
Source of fuel		
- Kerosene	27	8.0
- Gas	306	91.1
- Firewood	8	2.4
- Others	2	0.6

Almost all source of lighting in the house of elderly was electricity, while the source of fuel was mostly gas. Bandung District as the study site was one of the areas which is close to the city and government center so that access to electricity and gas is quiet good. The use of electricity and gas as energy source tend to be more practical and friendly compared to other energy sources so that most people chose them. The details on use of source of lighting and fuel are presented in Table 9.9.

Sanitation condition among elderly in non nursing home was categorized as good. Almost all elderly had bathroom, family latrine, and garbage disposal facilities in their houses. Generally, place to defecate among elderly was family latrine and only few who defecated in public latrine, river or ditch. The ownership of bathroom and family latrine in the house is quite important to facilitate elderly to clean themselves since they had more limited movement.

Table 9.10 Distribution of elderly in non nursing home by criteria of environmental sanitation

Environmental sanitation	n	%
Have bathroom	325	96.7
Have family latrine	317	94.4
Place to defecate		
- Family latrine	322	95.8
- Public latrine	12	3.6
- River/ditch	2	0.6
- Garden	0	0.0
Distance between well and septic tank	9.3 ± 6.7	
Have garbage disposal	325	96.7
Garbage disposal		
- Carried by dustman	286	85.1
- Thrown to the river	2	0.6
- Thrown to vacant land/garden	42	12.5
- Burnt	6	1.8

The average distance between the well and septic tank in the house of elderly was 9.3 meters. This distance was a little less than the standard (SNI) on septic tank planning, which was minimum of 10 meters. There were some septic tanks in the house of elderly which did not meet minimum standard on the distance. The determination was based on estimated speed of water flow inside the soil and living period of *E. coli* bacteria in human feces. In the range of 10 meters, *E. coli* from septic tank would not pollute the water in the well (Table 9.10).

Another aspect of environmental sanitation in the house of elderly was availability of garbage disposal. Good garbage disposal can minimize health problem due to disease source in the garbage. Garbage disposal of elderly was mostly taken by dustman, while the rest was thrown out to vacant land or garden, thrown out to the river, or burnt.

Table 9.11 Distribution of elderly in non nursing home by source of drinking water

Source of drinking water	Yes		No	
	n	%	n	%
Mineral water	127	37.8	209	62.20
Well	130	38.7	206	61.3
Tap water	96	28.6	240	71.4
Spring	25	7.4	311	92.6
Others	6	1.8	330	98.2
Boil water before drinking	265	78.9	71	21.1

The details on source of drinking water among elderly are presented in Table 9.11. Based on Minister of Health Regulation (Permenkes) 492/MENKES/PER/IV/2010 regarding Requirements for Quality Drinking Water, the definition of drinking water is the water undergoes processing or not which meet health criteria on physical, microbiological, chemical, and radioactive and can be consumed directly. Drinking water can be obtained from many sources. In this study, the main sources of drinking water among elderly in non nursing home were well, mineral air, and tap water. Well had high possibility to be contaminated as well as refilled mineral water. Therefore, additional effort to ensure safety of drinking water, which was boiling the water, was necessary. However, not all elderly, consumed boiled water. This gave risk on health problem, especially among elderly who undergo reduction in body immune. The main sources of water for cooking were well and tap water, while the rest used mineral water and spring. Using these sources of water for cooking was relatively safe because the

water from these sources were considered safe for consumption after undergoing boiling process. The use of source of water for cooking among elderly in non nursing home is presented in Table 9.12.

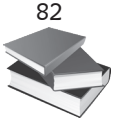
Table 9.12 Distribution of elderly by source of water for cooking

Source of water for cooking	Yes		No	
	n	%	n	%
Mineral water	19	5.7	317	94.4
Well	156	46.4	180	53.6
Tap water	145	43.2	191	56.9
Spring	20	6.0	316	94.1
Others	1	0.3	335	99.7

Most of the elderly in non nursing home used water from well for bathing. Other half of them used tap water and spring. The use of well or tap water was safe for bathing since it commonly met criteria for clean water.

Table 9.13 Distribution of elderly based on source of water for bathing

Source of water for bathing	Yes		No	
	n	%	n	%
Well	227	67.6	109	32.4
Tap water	106	31.6	230	68.5
Spring	12	3.6	324	96.4



9.4 Personal Hygiene

Some of the elderly in non nursing home took a bath twice a day, while the elderly in nursing home did it once or twice a day. Only few elderly took a bath more than twice a day in nursing home as well as in non nursing home. Almost all elderly used soap when taking a bath.

Most of the elderly did not brush their teeth everyday. Generally, the elderly in nursing home and in non nursing home used tooth paste when brushing their teeth. Data on bathing habit among elderly in nursing home and non nursing home is presented in Table 9.14.

Table 9.14 Distribution of elderly by bathing habit

Bathing habit	Nursing home		Non nuring home		Total	
	n	%	n	%	n	%
Bathing in a day						
- Once	36	43.9	55	16.4	91	21.8
- Twice	40	48.8	251	74.7	291	69.6
- Three times	6	7.3	30	8.9	36	8.6
Use soap when bathing						
- Yes	77	93.9	326	97.0	403	96.4
- No	3	3.7	8	2.4	11	2.6
- Sometimes	2	2.4	2	0.6	4	1.0
Frequency of brushing teeth per day						
- Yes	17	20.7	33	9.8	50	12.0
- No	38	46.3	220	65.5	258	61.7
- Sometimes	16	19.5	81	24.1	97	23.2
Use tooth paste when brushing teeth						
- Yes	61	85.9	306	91.1	367	87.8
- No	8	11.3	14	4.2	22	5.3
- Sometimes	2	2.8	14	4.2	16	3.8

Most of the elderly washed their hands before eating although not all of them used soap. The poor knowledge and awareness on the importance of washing hands with soap, has caused soap provision in wastafel not common in Indonesia. Moreover, there was opinion that washing hands with soap was more troublesome than washing only with water.

Other aspects of personal hygiene were cutting nails, wearing own towel, and changing clothes. Generally, elderly cut their nails minimum once a week, for both in nursing home and in non nursing home. All elderly in nursing home and most of elderly in non nursing home had their own towel. Besides, frequency of changing clothes among elderly was mostly 1-2 times per day.

Table 9.15 Distribution of elderly by personal hygiene

Personal hygiene	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Wash hands without soap before eating						
- Yes	56	68.3	162	48.2	218	52.2
- No	12	14.6	112	33.3	124	29.7
- Sometimes	14	17.1	62	18.4	76	18.2
Wash hands with soap before eating						
- Yes	40	48.8	195	58.0	235	56.2
- No	21	25.6	66	19.6	87	20.8
- Sometimes	21	25.6	75	22.3	96	23.0
Cut nails minimum once a week						
- Yes	47	57.3	204	60.7	251	60.1
- No	6	7.3	39	11.6	45	10.8
- Sometimes	29	35.4	93	27.7	122	29.2
Have own towel						
- Yes	82	100.0	325	96.7	407	97.4
- No	0	0.0	6	1.8	6	1.4
- Sometimes	0	0.0	5	1.5	5	1.2
Change clothes in a day						
- Once	39	47.6	99	29.5	138	33.0
- 2 times	34	41.5	202	60.1	236	56.5
- 3 times	9	11.0	35	10.4	44	10.5

10 PSYCHOSOCIAL ASPECTS

10.1Perceived Happiness

Perceived happiness among elderly is one of the important factors that needs to be noticed since the physical condition is weakening and various types of disease which give unhappy condition exist. Besides, labile mental condition (feeling worthless, burdening others, lacking social relationship) make elderly has self-burden and tend to be not happy.

This study captured perceived happiness among elderly from several indicators, which were self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth, as seen in Table 10.1.

The general result on perceived happiness among elderly showed that regarding the first aspect, the highest factor which made elderly feel happy was always grateful with their lives (96.9%), while feeling guilty about past events became lowest factor which make elderly happy (55.3%) or in other words, recalling mistake in the past made elderly not feeling happy. The mistake done in the past made aspect of self-acceptance among elderly was also poor.

Particularly, based on data obtained from the study, both elderly in nursing home and in non nursing home had similar perception that the high aspect of self-acceptance was always grateful with their lives, while the low aspect was feeling guilty about past events. This psychological condition was indeed one of the symptoms which is often found in elderly. Elderly tend to see what had been done in the past (Yustiana 2004). To avoid this condition, it is good that elderly make the mistake in the past as precious learning and therefore able to give positive guidance to young generation nearby.

The second aspect related to positive relations with others as one of the indicators of perceived happiness among elderly showed that respecting others was the highest rank (98.8%) which became characteristic of positive relations among elderly which made them happy. On the contrary, feeling lonely was placed in the lowest rank (35.2%) in creating positive relations with others. Psychological condition of feeling lonely gave the biggest contribution to the elderly to feel unhappy because they could not communicate and create positive relations with others.

Tabel 10.1 Perceived happiness

Perceived happiness	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Self-acceptance						
- Satisfy with life	68	82.9	264	78.6	332	79.4
- Always grateful with your condition	77	93.9	328	97.6	405	96.9
- Feel guilty about past events	39	47.6	192	57.1	231	55.3
- Optimist with the future	63	76.8	312	92.9	375	89.7
- Understand your strength	40	48.8	210	62.5	250	59.8
- Understand your weakness	45	54.9	235	69.9	280	67.0
Positive relations with others						
- Friendly to others	76	92.7	331	98.5	407	97.4
- Honest to yourself and others	79	96.3	327	97.3	406	97.1
- Concern about adverse event of others	78	95.1	334	99.4	412	98.6
- Respect others	80	97.6	333	99.1	413	98.8
- Share with others	69	84.2	328	97.6	397	95.0
- Feel lonely	37	45.1	110	32.7	147	35.2
- Love to hang out	66	80.5	298	88.7	364	87.1
Autonomy						
- Do something not due to opinion from others	42	51.2	182	54.2	224	53.6
Environmental mastery						
- Involved in activity in nursing home/ environment	63	76.8	257	76.5	320	76.6
- Care to environment	69	84.2	309	92.0	378	90.4
Purpose in life						
- Have purpose in life	57	69.5	283	84.2	340	81.3
Personal growth						
- Love to experience something new	38	46.3	178	53.0	216	51.7
- Love to share expertise/ knowledge for the sake of others	38	46.3	200	59.5	238	56.9

Condition of elderly in nursing home and in non nursing home was different in perceived happiness regarding aspect of positive relations with others. The highest rank according to the elderly in nursing home was respecting others (97.6%), while it in non nursing home was concerning about adverse event of others (99.4%). The result was understandable since elderly in nursing home lived in the same house so that respecting each others became one of the important factors to create positive relations among them. Whereas, among elderly in community which had wider and varied socialization area, positive relations with others which made the elderly happy was concerning about adverse event of family member as well as community nearby.

The similar perception between elderly in nursing home and in non nursing home was on the aspect of feeling lonely. Loneliness, according to perception of elderly in nursing home and in non nursing home, gave the lowest contribution to create positive relations with others which potential to make elderly feel unhappy. Loneliness among elderly needed to be prevented since it could cause depression. Stronger the loneliness, bigger tendency to had depression, and on the contrary, weaker the loneliness, smaller tendency to had depression (Nugrahaningsih 2006).

The third aspect related to autonomy as one of the indicators of perceived happiness was doing something not due to opinion from others. As much as 53.6% of elderly perceived that becoming independent by doing something according to their own desire made elderly happy. Elderly in non nursing home perceived more (54.2%) than them in nursing home (51.2%) that doing something not according to opinion from others made elderly happy.

The study result on perceived happiness based on the fourth aspect, which was environmental mastery, showed that as much as 90.4% of elderly perceived that environmental mastery which made elderly happy was caring to the environment and not requiring elderly to actively involved in activity in nursing home/environment which reached lower percentage (76.6%). This was happen due to limitation

of elderly, particularly physical disability which disabled elderly to actively involve in activity in nursing home and environment. When compared on perceived happiness in aspect of environmental mastery, elderly in non nursing home perceived higher (92.0%) than elderly in nursing home (84.2%) to care the environment so that they feel happy.

Regarding the fifth aspect on aspect of purpose in life own by elderly as one of the indicators of happiness, as much as 81.3% elderly had clear purpose in life so that they had hope which made them happy. The rest, which was 18.7%, of elderly did not mean that they did not have purpose in life, but rather than the elderly was not able to formulate clearly purpose in life as part of supporting mean of happiness for elderly.

Regarding the last aspect of perceived happiness which was personal growth, proportion of elderly who love to share expertise/knowledge for the sake of others was higher (56.9%) than who love to experience something new (51.7%). This was possibly because elderly had more difficulty in experiencing something new due to physical and psychological limitation than in sharing expertise/knowledge for the sake of others to make them happy. Sharing the expertise/knowledge from elderly would make it as learning for young generation nearby.

10.2 Stress

Indicators of stress were divided into two categories, the first one was physical, including excessive sweating, headache, stomachache, coughing, and frequent urination (Table 10.2). The second was psychological, including being sensitive, hesitate to make decision, sleepless, not confident, irritability, and feeling weak and sluggish (Table 10.3). The subjects were asked whether they have the indicators or not during the last 6 months.

Physical indicator of stress which was suffered "often" by the elderly in the past six months in sequence from the highest to the lowest was frequent urination (46.9%), headache (26.8%), coughing

(15.6%), excessive sweating (15.1%), and stomachache (14.8%). The elderly in nursing home had frequent urination more often than those in non nursing home.

Physical indicators of stress which was suffered "rarely" by the elderly was coughing (54.1%), headache (49.0%), stomachache (48.1%), excessive sweating (30.9%), and frequent urination (30.1%). The elderly in non nursing home was more often to have cough than those in nursing home.

Table 10.2 Physical indicator of stress of elderly in the past 6 months

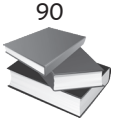
Physical indicator	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Excessive sweating						
- Never	48	58.5	176	52.4	224	53.6
- Rarely	24	29.3	105	31.3	129	30.9
- Often	9	11.0	54	16.1	63	15.1
- Very often	1	1.2	1	0.3	2	0.5
Headache						
- Never	23	28.1	74	22.0	97	23.2
- Rarely	28	34.2	177	52.7	205	49.0
- Often	29	35.4	83	24.7	112	26.8
- Very often	2	2.4	2	0.6	4	1.0
Stomachache						
- Never	30	36.6	124	36.9	154	36.8
- Rarely	41	50.0	160	47.6	201	48.1
- Often	11	13.4	51	15.2	62	14.8
- Very often	0	0.0	1	0.3	1	0.2
Coughing						
- Never	23	28.1	102	30.4	125	29.9
- Rarely	41	50.0	185	55.1	226	54.1
- Often	17	20.7	48	14.3	65	15.6
- Very often	1	1.2	1	0.3	2	0.5
Frequent urination						
- Never	13	15.9	72	21.4	85	20.3
- Rarely	16	19.5	110	32.7	126	30.1
- Often	47	57.3	149	44.4	196	46.9
- Very often	6	7.3	5	1.5	11	2.6

Physical indicator of stress that "never" suffered by the elderly was excessive sweating (53.6%), stomachache (36.8%), coughing (29.9%), headache (23.2%), and frequent urination (20.3%). The elderly who never had physical problem of excessive sweating was more among them in nursing home than them in non nursing home.

Thus, it could be concluded that physical indicator of stress among elderly in the past six months which the most "often" was frequent urination, while the most "rarely" was coughing and the most "never" was excessive sweating. Frequent urination due to stress does not only happen to elderly but also to non elderly. Frequent urination due to stress in elderly is caused by weaken vesica urinaria muscles so that frequency of urination became higher (Ismayadi 2004).

Table 10.3 Psychological indicator of stress of elderly in the past 6 months

Psychological indicator	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Sensitive						
- Never	49	59.8	179	53.3	228	54.6
- Rarely	24	29.3	116	34.5	140	33.5
- Often	8	9.8	41	12.2	49	11.7
- Very often	1	1.2	0	0.0	1	0.3
Hesitate to make decision						
- Never	42	51.2	133	39.6	175	41.9
- Rarely	25	30.5	159	47.3	184	44.0
- Often	15	18.3	44	13.1	59	14.1
- Very often	0	0.0	0	0.0	0	0.0
Sleepless (insomnia)						
- Never	43	52.4	148	44.1	191	45.7
- Rarely	14	17.1	112	33.3	126	30.1
- Often	22	26.8	73	21.7	95	22.7
- Very often	3	3.7	3	0.9	6	1.4
Not confident						
- Never	49	59.8	191	56.9	240	57.4
- Rarely	25	30.5	111	33.0	136	32.5
- Often	7	8.5	34	10.1	41	9.8
- Very often	1	1.2	0	0.0	1	0.2
Irritability						
- Never	49	59.8	158	47.0	207	49.5
- Rarely	23	28.1	144	42.9	167	40.0
- Often	10	12.2	34	10.1	44	10.5
- Very often	0	0.0	0	0.0	0	0.0
Feeling weak and sluggish						
- Never	33	40.2	101	30.1	134	32.1
- Rarely	24	29.3	171	50.9	195	46.7
- Often	25	30.5	63	18.8	88	21.1
- Very often	0	0.0	1	0.3	1	0.2



Psychological indicator of stress which was suffered "often" by elderly in the past six months as seen in Table 10.3 in sequence from the highest to the lowest was sleepless (22.7%), feeling weak and sluggish (21.2%), hesitate to make decision (14.1%), sensitive (11.7%), irritability (10.5%), and not confident (9.8%). When compared, elderly who more often had sleepless problem was those in nursing home than those in non nursing home.

Psychological indicator which was suffered "rarely" by the elderly was feeling weak and sluggish (46.7%), hesitate to make decision (44.0%), irritability (40.0%), sensitive (33.5%), not confident (32.5%), and sleepless (30.1%). When compared, those who were more rarely feel weak and sluggish were those in non nursing home than those in nursing home.

Psychological indicator of stress which was "never" suffered by the elderly was not confident (57.4%), sensitive (54.6%), irritability (49.5%), sleepless (45.7%), hesitate to make decision (41.9%), and feeling weak and sluggish (32.1%). When compared, elderly who more never not confident were those in nursing home than those in non nursing home.

The conclusion was that psychological indicator of stress among elderly in the past six months which the most "often" suffered by elderly was sleepless (insomnia), while the most "rarely" was feeling weak and sluggish and the most "never" was not confident. Sleepless in elderly was symptom which often happened due to several factors, which were due to retirement, change in social environment, increased drug use, diseases, and change in biological rhythm (Anwar 2010).

Table 10.4 Score of depression among elderly

Category of Depression among Elderly	Nursing home		Non nursing home	
	n	%	n	%
No depression (11-19)	37	45.1	168	50.0
Light depression (20-27)	42	51.2	156	46.4
Medium depression (28-35)	2	3.7	12	3.6
Severe depression (36-44)	0	0.0	0	0.0
Mean	19.9±4.0		19.7±4.0	
p-value	0.760			

In general, depression level among elderly in nursing home and in non nursing home was scored as presented in Table 10.4. There was more than half (51.2%) of elderly in nursing home was in category of light depression, less than half (45.1%) of them in category of no depression, a little proportion (3.7%) of them in category of medium depression, and none (0%) of them in category of severe depression.

Elderly in non nursing home had slightly different result, which half (50%) of them was in category of no depression, less than half (46.4%) of them in category of light depression, a little proportion (3.6%) of them in category of medium depression, and none (0%) of them in category of severe depression.

Data presented above showed that elderly in non nursing home or in family and community environment had the highest score in aspect of no depression compared to them in nursing home.

10.3Family Strength

The result on family strength of elderly was divided into three parts, which were physical, psychological, and social strength (Table 10.5, 10.6, and 10.7).

Physical strength of elderly as seen in Table 10.5 which more influencing to the elderly was family problem related to conflict with family which became more serious. This family conflict was suffered more by the elderly in nursing home. The best way to solve the problem according to the elderly was by belief in the importance of family integrity, especially for those in non nursing home. In the context of social relation, physical strength which could be indicator of physical social prosperity was condition that the elderly feel loved by friend or neighbor.

Table 10.5 Distribution of elderly by family physical strength

Aspect of physical strength	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Family problem						
- Conflict with spouse	8	9.8	27	8.0	35	8.4
- Conflict with spouse become more serious	3	3.7	11	3.3	14	3.4
- Conflict with family	14	17.1	23	6.9	37	8.9
- Conflict with family become more serious	7	8.5	12	3.6	19	4.6
Coping with physical problem						
- Belief in the importance of family integrity	80	97.6	330	98.2	410	98.1
- Share problem to family/ neighbor/friend	41	50.0	246	73.2	287	68.7
- More worship	71	86.6	288	85.7	359	85.9
Physical social prosperity						
- Participate in community activity	53	64.6	257	76.5	310	74.2
- Feel loved by friend/ neighbor	69	84.2	320	95.2	389	93.1

Table 10.6 shows the data regarding aspects of psychological strength of elderly, which were psychological prosperity and non physical family problem.

The study result showed that the most potential factor causing low psychological welfare of elderly was feeling worry about the future. When compared, this was suffered more by elderly in non nursing home. This condition was understandable since the elderly in nursing home was in safe and convenient condition under the auspices of institution where they lived in old ages.

Non physical family problem which was more suffered by the elderly was losing nearest family/close friend due to death. This condition caused misery among the elderly since the family or close friend was the nearest where they shared and cared each other.

Table 10.6 Distribution of elderly by aspect of family psychological strength

Aspect of Psychological Strength	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Psychological welfare						
- Feel upset to yourself due to incompetence	44	53.7	160	47.6	204	48.8
- Hide anger to the nearest	28	34.2	104	31.0	132	31.6
- Feel worry about the future	25	30.5	184	54.8	209	50.0
Non physical family problem						
- Lose spouse due to death (<1 year)	5	6.1	24	7.1	29	6.9
- Lose nearest family/close friend due to death	11	13.4	125	37.2	136	32.5

Data on social strength of elderly is shown in Table 10.7. The social strength is consisted of three factors, i.e, non physical resource, couping non physical problem, and non physical social prosperity. Non physical resource which gave the most positive influencing to the

elderly was how they look at the positive side of an event. This attitude is usually own by the elderly because basically they had series of life experience which generate wisdom in facing every life problem.

Coping with non physical problem of elderly was when family can help with economic problem. In other words, elderly had good social strength when there was sharing among "family", especially in economic aspect which then influence "relation" of the elderly. Non physical social prosperity which could strengthen social strength of elderly was behavior of loving to help others. The help in this context was in term of material or non material.

When scored, strength of elderly in nursing home and in non nursing home was presented in Table 10.8. In general, in aspect of physical strength, more than half of elderly was in category of "strong". When compared, elderly in non nursing home had better (74.1%) physical strength than those in nursing home (54.9%).

Table 10.7 Distribution of elderly by family social strength

Aspect of social strength	Nursing home		Non nursing home		Total	
	n	%	n	%	n	%
Non physical resource						
- Have goal/purpose	4	59.7	246	73.2	295	70.6
- Have gathering time with spouse/ family/ friend	61	74.4	325	96.7	386	92.3
- Accept all past events	74	90.2	325	96.7	399	95.5
- Look at the positive side of an event	76	92.7	329	97.9	405	96.9
Coping with non physical problem						
- Family help with economic problem	57	69.5	256	76.2	313	74.9
- Neighbor/environment help with economic problem	56	68.3	172	51.2	228	54.6
Non physical social prosperity						
- Love to help others	70	85.4	308	91.7	378	90.4
- Often become sharing place of others	50	61.0	243	72.3	293	70.1

Psychological strength of elderly in nursing home as well as in non nursing home was categorized as "strong". When compared, aspect of psychological strength in nursing home was better (51.2%) than those in non nursing home (41.1%).

Different from physical and psychological strength which generally in category of "strong", regarding aspect of social strength, the elderly in both nursing home and non nursing home were categorized as "somewhat strong". When compared, aspect of social strength among elderly in non nursing home was better than it in nursing home. This condition was because elderly in non nursing home had wider and varied social relation so that the opportunity to form social strength among elderly was better.

The present study shows that the elderly in nursing home was better in aspect of psychological strength, while elderly in non nursing home was better in aspect of physical and social strength.

Table 10.8 Scores of aspect of strength of elderly

Aspect of strength	Nursing home		Non nursing home	
	n	%	n	%
Physical strength				
- Strong (> 80%)	45	54.9	249	74.1
- Somewhat strong (60-80%)	33	40.2	80	23.8
- Weak (<60%)	4	4.9	7	2.1
Mean	7.4±1.1		8.0±1.0	
p-value	0.000			
Psychological strength				
- Strong (> 80%)	42	51.2	138	41.1
- Somewhat strong (60-80%)	28	34.1	106	31.5
- Weak (<60%)	12	14.6	92	27.4
Mean	3.6±1.0		3.2±1.2	
p-value	0.004			
Social strength				
- Strong (> 80%)	11	13.4	55	16.4
- Somewhat strong (60-80%)	42	51.2	239	71.1
- Weak (<60%)	29	35.4	42	12.5
Mean	6.0±1.5		6.6±1.1	
p-value	0.000			

11 PROGRAMS FOR ELDERLY

Caring to the welfare of the elderly had become national commitment. Even more, in international level, it became global movement. This was reflected in UN-Resolution Number 045/026 year 1991 regarding International Year for the Elderly which set that October 1 was starting period of International Day of Older Persons. Vienna Resolution Number 37/51 year 1992 initiated International Plan of Action on Aging which call for development and implementation of life enhancement of elderly, physical and mental welfare, peace, health and safety, and assessment of impact of aging population on development to develop potential of elderly (Sumarno 2011).

For Indonesia, the government program in managing elderly population was initially stressed on giving compensation to the displaced person based on Law Number 13 Year 1998 regarding Welfare of Elderly. However, the policy had broaden the target by giving motivation to empower and increase welfare of elderly to the family and community in order to support realization of helpful, quality and independent elderly.

Management of problem of elderly was conducted in two ways, which were service in nursing home and in non nursing home. The service in PSTW (Panti Sosial Tresna Wredha) included food aid, clothes, shelter, health examination, and religious mental tutorial, and leisure time use including recreation, exercise, and skill. On the other hand, the service for elderly in non nursing home or in their family environment was by food aid and empowerment in productive economic enterprise (Depsos RI 2003).

Establishment of Law Number 13 Year 1998 on Welfare of Elderly could be one of indications on better attention of government on elderly population. In that Law, effort to improve welfare of elderly population was stated clearly. Article 4 of the Law mentioned that "the effort to improve social welfare was aimed to extend life expectancy and productive period, create the independence and welfare, maintain culture value and kinship system of Indonesian nation and closer to God Almighty" (Depsos RI 2003).

In the effort to improve social welfare of elderly, Ministry of Social Affairs through Directorate of Social Service for Older Persons, General Directorate of Social Service and Rehabilitation developed various technical policy based on national, regional and international commitment as well as policy of Minister of Social Affairs as follow:

1. Improve and strengthen role of family and community in management of social service for the elderly by involving all element and component of community including business with basic of self reliance and social solidarity to become institutionalized and sustainable.
2. Improve intra and inter sectoral coordination, among various related government institution in national and local and also with community/social organization including business to support management of social service for the elderly.
3. Build and develop social security and system for the elderly.
4. Improve and expand accessibility for welfare of the elderly.
5. Improve, develop and stabilize role of institution of the elderly to improve quality and profesionality of social service for the elderly.

The implementation of the policy by government was done through strategies: 1) Empowerment; 2) Partnership; 3) Participation; 4) Decentralization; 5) Improving working network and partnership; and 6) Building and developing participation and advocacy with basic of social solidarity.

Government programs related to welfare of the elderly was under General Directorate of Social Service and Rehabilitation, Ministry of Social Affairs of Republic of Indonesia. During period of 2009-2014, services which were given to the elderly consisted of:

a. Services for elderly in nursing home program which included: regular service, daily service, day care service, and cross-subsidy service which all was conducted in 237 nursing homes (2 nursing homes own by Ministry of Social Affairs, 70 nursing homes own by local government, and 165 nursing homes own by private/ community).

b. Services for elderly in non nursing home program which included: home care service (6 units), foster care, day care service (6 units), productive economic enterprise, and Kube (aid and development).

c. Institutional program, included: national and international inter-institutional network, intra and inter-sector coordination, creating National Day of Older Persons and International day of Older Persons, institutional guide and empowerment for elderly.

d. Protection and accessibility which included Social Security for Older Person (2006-2009), Trauma Centre (5 units), social accessibility, emergency service, and inter-institutional management network.

Beside Ministry of Social Affairs, Ministry of Health also serves program for elderly, which was Integrated Health Center (Posyandu) for elderly. Posyandu for elderly is a health service with community resource, based on initiative and need of elderly. The direct targets of this Posyandu are pre elderly (45-59 years old), elderly (more than 60 years), and elderly at high health risk (more than 70 years) age groups. Whereas, indirect targets of Posyandu for elderly are family, NGO related to elderly, and community. Type of services which are given in Posyandu for elderly include:

a. Daily activity examinations include basic life activity, such as eating, drinking, walking, bathing, wearing clothes, getting on and off bed, urination and defecation.

b. Mental status examination. This examination is related to emotional mental using 2-minute-method guidance.

c. Nutritional status examination through measuring body weight and height and noted in body mass index graph.

d. Blood pressure measurement using tensimeter and stethoscope and pulse calculation during 1 minute.

e. Hemoglobin examination using Talquist, Sahli, or Cuprisulfat.

f. Examination on glucose in urine as early detection of diabetes.

g. Examination on albumen/protein in urine as early detection of kidney disease.

h. Implementation of referral to Puskesmas if there is complain and or found abnormality on examination number 1 to 7.

i. Education can be done in or outside the group in order to do home visit and health and nutrition counseling according to health problem suffered by individual and or group of elderly.

j. Home visit by cadres accompanied by personnel for elderly group who are not coming in order to do community health care activity.

12 FACTORS INFLUENCING NUTRITIONAL STATUS OF ELDERLY

Regression analysis showed that the factors that significantly influence nutritional status as assessed with MNA score were; age (β=-0.104; p=0.030), protein adequacy level (β=0.147; p=0.041), and education level (β=4.316; p=0.000), with adjusted R square 0.128 (Table 12.1).

As elderly's age increased, the MNA score decreased. This was in line with the fact that in late human life phase, deterioration of physiological function will become more prominent as the age increased, thus augmenting the risk of malnutrition in elderly. Previous studies found various results. Thomas *et al*. 2002 reported there was no correlation between age and MNA score, while Saletti *et al.* 2000 reported that age was correlated with MNA score. Study involving many respondents, i.e 1564 elderly, reported that MNA score would decrease as age increase (Kucukerdonmez *et al.* 2005).

Protein adequacy level had significant positive effect on MNA score, as protein adequacy was fulfilled, malnutrition risk in elderly would decrease. Adequate protein intake is especially required to maintain elderly physiological function that has started to decline.

Table 12.1 Analysis results of factors influencing MNA score in elderly

Independent variable	β	t	Sig
Age (yr)	-0.104	-2.177	0.030**
Sex (0=woman, 1= man)	0.072	1.494	0.136
Energy adequacy level (%)	0.000	-0.002	0.999
Protein adequacy level (%)	0.147	2.046	0.041**
Length of education (yr)	0.230	4.316	0.000***
Income per month (Rp)	0.057	1.119	0.264
Adjusted R Square	**0.128**		
F (p)	**11.041 (0.000)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

Beside age and protein adequacy level, MNA score was significantly influenced by education level. Moreover, among influencing variables, education had the strongest influence. As education level became higher, risk of elderly becoming malnourished would be lower. This showed that education has important role in achieving optimal nutritional status for elderly. Although in several other studies education was not the major determinant of elderly nutritional status, in this study it had important role. Good education will improve knowledge and will affect on food habits and life style of elderly that is beneficial for health.

Based on analysis result, factors that significantly influence waist circumference in elderly were age (β=-0.108; p=0.035), sex (β=-0.144; p=0.005) and education level of elderly (β=2.059; p=0.040) with adjusted R square 0.048 (Table 12.2).

In this study, it was found that when age of elderly became older, their waist circumference became smaller. Waist circumference is believed to be an accurate mortality predictor and it is better than body mass index (Vissche *et al.* 2003). Eventhough, increased waist circumference will increase mortality risk, negative correlation between age and waist circumference in this study was not showing that as they became older, their health status would be better, because its correlation with nutritional status showed the opposite. Decreased waist circumference as age increasing might likely caused by reduced muscle mass that physiologically occurs in elderly.

In this study, sex had effect on waist circumference in which elderly women had larger waist circumference than elderly men. This results is similar to research conducted by Milanovic *et al* 2011 which reported that based on review of several studies, fat redistribution to visceral was more dominant in women than men.

Results also showed that elderly who received better education quality would have larger waist circumference. Although education had positive effect to nutritional status based on MNA score, it had opposite effect to waist circumference. It is suspected that education is related to higher income level and nutrient intake. Waist circumference is not included as a parameter to determine MNA score thus in this study it was shown that nutritional status assessment of elderly need to be done with various parameter to obtain complete description of the actual health status.

Table 12.2 Analysis results of factors influencing waist circumference in elderly

Independent variable	β	t	Sig
Age (yr)	-0.108	-2.117	0.035**
Sex (0=woman, 1= man)	-0.144	-2.847	0.005***
Energy adequacy level (%)	-0.016	-0.221	0.826
Protein adequacy level (%)	0.052	0.684	0.494
Length of education (yr)	0.116	2.059	0.040**
Income per month (Rp)	0.083	1.552	0.121
Adjusted R Square		**0.048**	
F (p)		**4.369 (0.000)**	

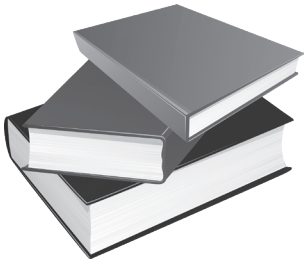
Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

As shown in table 12.3, factors that significantly positive influenced Hb was sex (β=0.091; p=0.086), with adjusted R square 0.015. This means that men had Hb level significantly higher than women. Eventhough the correlation was weak as shown by low adjusted R square, and was in 10% level of significance, it was in accordance with physiological process and confirmed many previous researches (Zakai *et al*. 2005; Tettamanti *et al*. 2010).

Table 12.3 Analysis results of factors influencing Hb in elderly

Independent variable	β	t	Sig
Age (yr)	0.010	0.180	0.857
Sex (0=woman, 1= man)	0.091	1.723	0.086*
Energy adequacy level (%)	0.029	0.357	0.721
Protein adequacy level (%)	0.122	1.493	0.136
Length of education (yr)	-0.017	-0.289	0.773
Income per month (Rp)	-0.023	-0.405	0.686
Adjusted R Square		**0.015**	
F (p)		**1.943 (0.073)**	

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance



13 DIFFERENCES OF FACTORS INFLUENCING NUTRITIONAL STATUS OF ELDERLY IN NURSING HOME AND NON NURSING HOME

For elderly who lived in nursing home, no factor that significantly influence nutritional status assessed with MNA score (Table 13.1) was found. The absence of influence of age, sex, nutrient adequacy level and elderly characteristics to MNA score might be caused by limited sample size or due to relatively homogeneous sample. Different result was seen in elderly who lived in non-nursing home, in which age and length of education had significant effect to MNA score (Table 13.2). As elderly in non-nursing home became older, their MNA score would be lower or their risk to experience malnourished would be higher.

Table 13.1 Factors influencing MNA score in elderly (nursing home)

Independent variable	β	t	Sig
Age (yr)	0.101	0.858	0.394
Sex (0=woman, 1= man)	0.105	0.886	0.378
Energy adequacy level (%)	0.014	0.076	0.939
Protein adequacy level (%)	-0.154	-0.823	0.413
Length of education (yr)	0.154	1.238	0.220
Income per month (Rp)	0.015	0.123	0.903
Adjusted R Square	**0.11**		
F (p)	**1.145 (0.346)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

Tabel 13.2 Factors influencing MNA score in elderly (non-nursing home)

Independent variable	β	t	Sig
Age (yr)	-0.122	-2.307	0.022
Sex (0=woman, 1= man)	0.051	0.954	0.341
Energy adequacy level (%)	0.036	0.468	0.640
Protein adequacy level (%)	0.138	1.763	0.079
Length of education (yr)	0.269	4.515	0.000
Income per month (Rp)	0.016	0.285	0.776
Adjusted R Square	**0.141**		
F (p)	**10.077 (0.000)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

Among elderly who lived in nursing home, influence from factors such as individual characteristics and nutrient intake to nutritional status assessed by waist circumference was not seen. This was once again might be caused by lack of individual variation because they lived in similar environment. Previous studies have confirmed that energy intake, sex and age had effect on waist circumference.

Table 13.3 Analysis results of factors influencing waist circumference in elderly (nursing home)

Independent variable	β	t	Sig
Age (yr)	-0.016	-0.131	0.896
Sex (0=woman, 1= man)	-0.041	-0.329	0.743
Energy adequacy level (%)	-0.136	-0.748	0.457
Protein adequacy level (%)	0.162	0.877	0.384
Length of education (yr)	0.071	0.532	0.596
Income per month (Rp)	0.035	0.270	0.788
Adjusted R Square	**-0.062**		
F (p)	**0.265 (0.951)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

In elderly who lived in non-nursing home, waist circumference was influenced by age, sex and length of education. As elderly in non-nursing home became older, their waist circumference would become smaller; elderly women had waist circumference smaller than elderly men; the longer the length of education, the waist circumference would be larger.

Table 13.4 Factors influencing waist circumference in elderly (non-nursing home)

Independent variable	β	t	Sig
Age (yr)	-0.120	-2.151	0.032
Sex (0=woman, 1= man)	-0.174	-3.100	0.002
Energy adequacy level (%)	0.002	0.022	0.982
Protein adequacy level (%)	0.034	0.416	0.678
Length of education (yr)	0.132	2.104	0.036
Income per month (Rp)	0.084	1.421	0.156
Adjusted R Square	**0.057**		
F (p)	**4.249 (0.000)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

Hemoglobin (Hb) level of elderly who lived in nursing home was affected by energy and protein adequacy level, in which higher energy adequacy level would have lower Hb. On the contrary, higher protein adequacy level would have higher Hb level. Negative influence of energy adequacy level to Hb level is theoretically difficult to explain because theory explained otherwise (Zhang *et al*. 2010). This might happen due to report bias from respondent during interview which was reflected from low energy adequacy level although majority were overnutrition.

Table 13.5 Factors influencing Hb in elderly (nursing home)

Independent variable	β	t	Sig
Age (yr)	0.058	0.511	0.611
Sex (0=woman, 1= man)	0.187	1.633	0.107
Energy adequacy level (%)	-0.437	-2.507	0.014
Protein adequacy level (%)	0.532	2.994	0.004
Length of education (yr)	0.021	0.171	0.864
Income per month (Rp)	-0.039	-0.331	0.742
Adjusted R Square	**0.059**		
F (p)	**1.824 (0.106)**		

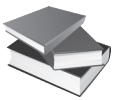
Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance

Among elderly who lived in non-nursing home, influence from factors such as individual characteristics and nutrient intake to Hb level did not seem to be significant. Theoretically, Hb level of elderly was affected by sex, nutritional status and nutient intake. No significant results from this study might be caused by subjects' characters that was homogenous. In analysis that involves elderly with more heterogenous characters, i.e those living in nursing home and non-nursing home, influence of sex to Hb level was found significant (Table 12.3).

Table 13.6 Factors influencing Hb in elderly (non-nursing home)

Independent variable	β	t	Sig
Age (yr)	0.017	0.286	0.775
Sex (0=woman, 1= man)	0.094	1.565	0.119
Energy adequacy level (%)	0.047	0.514	0.608
Protein adequacy level (%)	0.101	1.097	0.274
Length of education (yr)	-0.016	-0.243	0.809
Income per month (Rp)	-0.029	-0.452	0.651
Adjusted R Square	**0.010**		
F (p)	**1.521 (0.171)**		

Note: * 10% level of significance
** 5% level of significance
*** 1% level of significance



14 CONCLUSIONS AND RECOMMENDATIONS

14.1 Conclusions

1. The present study shows that sex proportion of elderly was dominated by female (80.9% female vs 19.1% male). Most of the elderly in nursing home were widowers (78.0%). The average of length of education among elderly in non nursing home, which was 7.7 ± 4.6 years, was higher than that among elderly in nursing home (6.8 ± 4.8 years). However, no statistical difference was found in length of education between elderly in nursing home and in non nursing home. The average income of the elderly in nursing home was IDR 408 111. On the other hand, the elderly in non nursing home had higher income with monthly average of IDR 1 298 003.

2. a. As side dish, the elderly usually consumed tempeh and tofu with relatively high frequency. For elderly, tempeh/tofu is relatively easy to consume due to their soft texture.

   b. Pure water was the type of drink that was most consumed by elderly in nursing home (7,503.7 ml/week) and also by elderly in non nursing home (3,097.0 ml/week). Other type of water that usually consumed by the elderly is tea and coffee. Tea consumption among elderly in nursing home (990.2 ml/week) was higher than among elderly outside nursing home (650.0 ml/week). This condition was similar to coffee consumption (548.8 ml/week in nursing home and 264.9 ml/week in non

nursing home). Other beverage which usually consumed by the elderly was milk with quantity of 522.0 ml/week for elderly in nursing home and 271.6 ml/week for elderly in non nursing home. This number was relatively small compared to milk consumption of people in developed countries. The calculation of daily water consumption showed that elderly in nursing home consumed water as much as 1,441.6 ml/day and elderly in non nursing home consumed 659.0 ml/day. Besides, consumption of water for healthy person is 2000 ml/day so that it can be said that generally elderly consumed less than the adequacy.

c. Energy adequacy level among elderly was generally low, which was 49.0% for elderly in nursing home and 54.9% for elderly in non nursing home. This low energy adequacy level might relate to the declining appetite among elderly.

d. The impact of lack of appetite among elderly was low nutrient adequacy level, including protein, mineral, and vitamin. The energy, mineral, and vitamin adequacy level among elderly in nursing home were lower than those in non nursing home ($p<0.05$), except for vitamin C. The phenomenon of low energy, protein, mineral, and vitamin intake level among elderly in nursing home as well as in non nursing home indicated that group of elderly was susceptible to nutrition problem, which further reduced capacity of the body to prevent various diseases.

3. a. In this study, overnutrition was more prevalent than undernutrition in elderly in both groups, and the prevalence was higher in elderly living in family. The prevalence of central obesity in both groups were higher than the normal (59.8% and 75% in elderly in nursing home and in non nursing home, respectively), and the waist circumference was significantly higher in those in non nursing home.

b. Based on WHO criteria, the prevalence of anaemia of elderly living in nursing home and in non nursing home were 45.1% and 28.9%, respectively. The prevalence of anaemia in this study was much higher than other previous reports in Indonesia as well as other countries.

4. a. The prevalence of diseases in elderly showed that hypertension and arthritis were the most common diseases found in both groups, followed by dyspepsia syndrome, dyslipidemia and heart disease. The trend of the diseases was similar in both groups, except that the prevalence of cataract was much higher in elderly in nursing home. The cause of this higher prevalence of cataract might have correlation with age, which the age of elderly in nursing home was older than it of other group.

   b. The efforts done by elderly to keep healthy were vary. Most elderly performed worship as their way to keep healthy. Maintaining healthy diet, exercise and avoiding stress were also common in both groups. In general, the awareness of elderly to keep their physical healthy was good, but still needed to be improved.

   c. Sanitation condition among elderly in non nursing home was categorized as good. Almost all elderly had bathroom, family latrine, and garbage disposal facilities in their houses. Generally, place to defecate among elderly was family latrine and only few who defecated in public latrine, river or ditch. In nursing home, the sanitation facilities were considered as good.

5. a. The general result on perceived happiness among elderly showed that the highest factor which made elderly feel happy was always grateful with their lives (96.9%). Physical indicator of stress among elderly in the past six months which the most "often" was frequent urination, while the most "rarely"

was coughing and the most "never" was excessive sweating. Psychological indicator of stress among elderly in the past six months which the most "often" suffered by elderly was sleepless (insomnia), while the most "rarely" was feeling weak and sluggish and the most "never" was not confident.

b. There was more than half (51.2%) of elderly in nursing home was in category of light depression, less than half (45.1%) of them in category of no depression, a little proportion (3.7%) of them in category of medium depression, and none (0%) of them in category of severe depression. The percentage was almost similar to the elderly in non nursing home.

c. The elderly in nursing home was better in aspect of psychological strength, while elderly in non nursing home was better in aspect of physical and social strength. The study result showed that the most potential factor causing low psychological welfare of elderly was feeling worry about the future. When compared, this was suffered more by elderly in non nursing home.

6. Government programs related to welfare of the elderly was under Ministry of Social Affairs of Republic of Indonesia. During period of 2009-2014, services which were given to the elderly in nursing home included: regular service, daily service, day care service, and cross-subsidy service which all was conducted in 237 nursing homes (2 nursing homes own by Ministry of Social Affairs, 70 nursing homes own by local government, and 165 nursing homes own by private/community). Beside Ministry of Social Affairs, Ministry of Health also had service for elderly program, which was Integrated Development Post (Posbindu). Type of services which are given in Posbindu include: nutritional status examination through measuring body weight and height, blood pressure measurement, hemoglobin examination using, examination on glucose in urine as early detection of diabetes etc.

7. a. Regression analysis result showed that factors significantly influenced nutritional status assessed with MNA score were age of elderly (β=-0.104; p=0.030), protein adequacy level (β=0.147; p=0.041) and education level (β=4.316; p=0.000), with adjusted R square 0.128. As elderly age increased, MNA score decreased. Protein adequacy level had significant positive effect on MNA score, as protein adequacy was fulfilled, malnutrition risk in elderly would decrease. Among influencing variables, education had the strongest influence. As education level became higher, risk of elderly becoming malnourished would be lower.

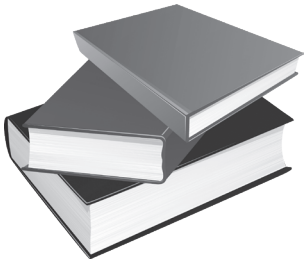
   b. Factor that significantly positive influenced Hb was sex (β=0.091; p=0.086), with adjusted R square 0.015. This means that men had Hb level significantly higher than women. Eventhough the correlation was weak as shown by low adjusted R square, and was in 10% level of significance, it was in accordance with physiologic fact and confirmed many previous researches.

8. a. For elderly who lived in nursing home, there was no factor that significantly influence nutritional status assessed with MNA score. Different result was obtained in elderly who lived in non-nursing home, in which age and length of education had significant effect to MNA score.

   b. Among elderly who lived in non nursing home, individual characteristics and nutrient intake did not affect Hb level, probably due to subjects' characters that was relatively homogenous.

14.2 Recommendations

1. The present of elderly with longer life expectancy, requires more optimal attention from all stakeholders. Health, nutrition and psychosocial are three important aspects that need attention from the government through related offices such as District Office of Health and Social. These offices that currently more focused to help elderly through Posbindu program (Integrated Development Post), were expected to give more attention to elderly living in nursing home.
2. High prevalence of anemia in elderly at Bandung City should be given special attention by District Office of Health by increasing health program such as Fe supplementation and nutritional education on the importance of high Fe food consumption, especially to elderly living in nursing home.
3. College in Bandung City should establish cooperation with related office so they could participate in improving life quality of elderly, i.e doing community service related to nutrition and health. Activity that could be done are designing balanced and healthy menu for elderly or giving consultation to elderly in nursing home and Posbindu.
4. Nursing home and Posbindu must have various programs/ activities and develop broader activity scope with surrounding community thus elderly will have more chance to socialize, share and self developed to be more open.
5. Empowerment of the elderly living in nursing home or non-nursing home should be directed to active participation and socialization models of the elderly themselves, thus existing empowerment program can be interpreted as elderly needs with unique characteristics seen from physical, psychological, social and emotional aspects.



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APPENDICES

Picture 1. Weight and height measurement

Picture 2. Blood pressure measurement

Picture 3. Hb measurement

Picture 4. Nursing home atmosphere

Picture 5. Seminar of research results