1. Introduction

Starting from 2000, elderly population in Korea reached an aging society and with the increase from 12.8% to 14.5% in 2018, it is expected to reach an aged society. This rapid aging led to physical problems such as increase in chronic diseases and increase in elderly with dementia, loss of economic activity along with retirement led to poverty causing economic problems, as well as emotional and psychological problems such as loneliness, depression, and suicide due to social isolation and disconnection from interpersonal relationships. Especially among them, solitary elderly who do not live with spouses, children or other relatives accounted for 22.0% of all elderly which was an increase of 3.4% from 19.6% in 2011 and they are in absolute poverty and cannot be properly provided with help for loneliness, prevalence of disease, and support functions such as financial support from family and nursing and management about physical diseases which puts them in the class of the most vulnerable status. The number of solitary elderly is in a trend of continuous increase in the changes of family

Abstract

Objectives: The purpose of the study is to analyze predictive factors that influence subjective happiness to provide basic data about improvements in quality of life in old age and successful senescence. Methods/Statistical Analysis: The research method is a descriptive research study. The subjects were 150 solitary elderly women over the age of 65 living in D gu, D metropolitan city and data collection was done for 5 weeks from August 8, 2016 to September 9, 2016 and analysis was done through descriptive statistics, t-test, ANOVA, Pearson’s correlation coefficients and stepwise multiple regression analysis using SPSS/WIN 18.0 program. Findings: Between subjective happiness, Pain (r=-.502, p<.001), Suicidal ideation (r=-.507, p<.001), and Disabilities in daily living (r=-.535, p<.001) showed statistically significant level to average negative correlation and Depression (r=-.800, p<.001) showed high negative correlation. Between subjective happiness, Perceived health status (r=.587, p<.001), and Social support (r=.709, p<.001) showed average simple correlation. Factors influencing subjective happiness was in the order of Depression (B=-.059, p=.000), Social support (B=.011, p=.003), Disabilities in daily living (B=-.111, p=.004), and Age (B=.126, p=.009), with the total explanatory power of 70.3%. Improvements/Applications: To improve subjective happiness in solitary elderly women and for them to lead a successful life in later years, there needs to be emotional support, establishment of social support system, and development of intervention to reduce disabilities in daily life.

Keywords: Aged, Depression, Happiness, Health Status, Pain, Suicide, Social Support
relations and maintenance responsibility and especially there are much more solitary elderly women who account for 81.9% of them compared to 18.1% of solitary elderly men. This is because women have longer average lifespan compared to men resulting in a much longer later life and in 2014; the average lifespan in Korea was 85.5 for elderly women and 79.0 for elderly men with the difference of 6.5 years. However, according to the report from WHO in 2014, the healthy lifespan that represents the age where elderly can have healthy and active life was 73 and it was found that elderly people were under the pain of chronic diseases or disabilities for around 8 years. Therefore, about the increased later life in recent years, the desire and interest to lead a happy and satisfactory life rather than simply extending lifespan is emerging. Therefore, it can be said that there needs to be diverse measures to maintain optimum health for the elderly while increasing subjective happiness for the elderly to have satisfying lives.

On the other hand, according to the 2014 Elderly Status Investigation, the prevalence of chronic disease in solitary elderly was 93.2% which was 2.8% higher than the 90.4% in all elderly and there was high prevalence of pain related chronic diseases in elderly women such as high blood pressure (60.2%), osteoarthritis/rheumatoid arthritis (44.5%) and lumbago/sciatica (27.2%). Pain is a symptom that makes daily life difficult and because solitary elderly cannot receive housekeeping service aid or nursing, you can lower satisfaction in life and happiness. Therefore, in health status perceived by solitary elderly, there was high ratio of responses that their health status was bad compared to elderly living with children and elderly living with their spouses and also satisfaction about economic status was low where they were relatively in poverty and because hospital usage ratio was the lowest, it could be determined that due to financial difficulties they were not receiving proper treatment even with diseases.

Especially solitary elderly people are in the vulnerable group with high possibility of isolation from family and society compared to non-solitary elderly and looking at multiple domestic and international study results, it was found that solitary elderly had higher possibility of experiencing Suicidal ideation and it was found that prevalence of Suicidal ideation were more frequent with higher age, lower education level, without spouses, without religion, lower living standards, and more severe depression. In old age, financial difficulties due to loss of jobs, the duration of physical and emotional functions, and loneliness and social isolation due to disconnection from interpersonal and family relations act as a cause for elderly people to easily fall into depression. These experiences act as a more severe depression in solitary elderly that live under isolation and solitude without support from family or relatives and rates of depressive symptoms was higher than in elderly living with children (34.9%) and elderly living with spouses (26.2%) with 43.7%, it was higher in elderly woman (38.1%) compared to elderly men (26.1%), and it was found that rate of depressive symptoms increased with age which led to negative results in overall life of solitary elderly.

Subjective happiness is a state of an individual positively evaluating and determining their own life with components of subjective experiences with internal value such as fullness, sense of identity, sense of self, and sense of growth about life. People with high subjective well-being quickly adapt to emotional experiences and return to their neutral emotional state, are adaptive in interpersonal relations, are prosocial, receptive, and have extroverted personalities. Thus, subjective happiness refers to focusing on the positive aspects and being satisfied rather than negative aspects of life with their own internal emotion and psychological state even in situations of continuously being influenced by surrounding environment and the study aims to identify factors influencing subjective happiness in solitary elderly that have high social isolation, poverty, Suicidal ideation, depression, prevalence of disease, disabilities in daily living, and low social support to provide basic data on improvements in quality of life in later years and successful senescence.

1.1 Objectives

- Figure out the level of pain, perceived health status, Suicidal ideation, depression, social support and subjective happiness in female solitary elderly.
- Figure out the differences in subjective happiness according to general characteristics in female solitary elderly.
- Figure out the relation between subjective happiness in female solitary elderly and pain, perceived health status, Suicidal ideation, disabilities in daily living, depression and social support.
- Figure out the factors influencing subjective happiness in female solitary elderly.
2. Methods

2.1 Research Design
The study is a descriptive research study to explore the relation between pain, perceived health status, Suicidal ideation, depression, social support and subjective happiness in female solitary elderly and to identify predictive factors influencing subjective happiness.

2.2 Subjects
The subjects of the study were female solitary elderly over the age of 65 residing in D gu D metropolitan city who had no disabilities in cognitive function that could communicate, listen to and understand the contents of the survey, who agreed voluntarily to the explanation of the purpose and intent of the study.

For the number of subjects, using G*power 3.1.7 program, it was found that the required number of samples to maintain 6 predictive factors, effect size .15, significance level .5 and statistical power .9 was 146 and the study surveyed 153 subjects considering 5% rate of elimination and excluding data from 3 subjects that were inappropriate for data processing, data from a total of 150 surveys were used for final analysis.

2.3 Ethical Consideration
The study received review from Kongju National University Institutional Review Board and started collecting data after final approval (KNU_IRB_2016-35). To protect the rights of research subjects, participation agreements were received from female solitary elderly who agreed to the purpose and intent of the research and it was explained that at any time during the data collection they could withdraw and guaranteed confidentiality of data collection content and explained that it will not be used for purposes other than the research.

2.4 Instruments
2.4.1 Pain
To evaluate the degree of pain the subjects had, visual analogue scale (hereinafter VAS) was used. VAS indicates the subjective degree of pain subjects feel on a 0–10cm line. The measured length was used as an index of pain and higher points indicate higher degree of pain.

2.4.2 Perceived Health Status
To measure the health status the subjects perceived about themselves, a 4 question tool developed was used in the questions were composed of perception about current health, current level of activities of daily living, perception of health compared to one year ago, and perception of health compared to peers of the same age range. Each question was composed of evaluations from 1 point ‘very bad’ to 5 points ‘very good’ and higher points indicate better perceived health status. Cronbach’s α coefficient at the development of the tool was .85 and it was .97 in the study.

2.4.3 Suicidal Ideation
To measure the suicidal ideation in the subjects of the study, the 5 questions of Suicide Ideation Scale developed and adapted and modified was used. It is composed of 4 questions consisting of a 4 point Likert scale from 1 point ‘none at all’, 2 points ‘once or twice’, 3 points ‘sometimes’ to 4 points ‘often’ and higher points indicate more experiences of suicidal ideation. Cronbach’s α coefficient in the study was .74 and it was a .80 in the study.

2.4.4 Disabilities in Daily Living
KADL (Korean-Activities of Daily Living Index) which is a tool modified and supplemented from the tool developed was used. The contents of KADL consists of a total of 17 questions including standing 4 questions, walking 5 questions, grabbing objects 2 questions, extending arms 3 questions, and grooming 3 questions. It consists of a 4 point Likert scale from 1 point ‘Not uncomfortable at all’ to 4 points ‘extremely uncomfortable’ and higher points indicate more difficult daily activities. Reliability at the development of the tool was .94 and it was .98 in the study.

2.4.5 Depression
To measure the depression in the study subjects, Geriatric Depression Scale Short Form Korea Version (hereinafter GDSSF-K) that was adapted and standardized from GDS Short Form developed was used. The tool consists of 15 dichotomized yes or no
questions and 5 questions 2, 7, 8, 11, 12 is marked as 1 point with response ‘yes’ and the rest of the questions are marked as 1 point with response ‘no’. The maximum is 15 points and higher points indicate higher degree of depression. Generally, under 5 points indicate normal, 5–9 points indicate mild depression and 10 points or above indicate moderate to severe depression. Cronbach’s α coefficient at the time of standardization research was .88 and it was .90 in the study.

2.4.6 Social Support

To measure social support in the study subjects, a tool adapted from Multidimensional Scale of Perceived Social Support (MSPSS) developed was used. It consists of a total of 12 questions under 3 sub-factors, composed of 4 questions (3,4,8,11) asking about support from family, 4 questions (6,7,9,12) asking about support from friends, and 4 questions (1,2,5,10) asking about support from significant others, composed in 5 point Likert scale. The range of points is from 12 to 60 and higher points indicate higher perceived social support. Cronbach’s α coefficient at the time of development was .91 and it was .96 in the study.

2.4.7 Subjective Happiness

The subjective happiness in the study subjects was measured through an index developed, which was translated, modified and commitment that by 24 questions used in the study, duplicate question number 21 was deleted to use a total of 23 questions. Looking at the composition, it is composed of 11 questions about positive happiness and 12 questions about negative happiness where 5 point Likert scale from 1 point ‘strongly disagree’ to 5 points ‘strongly agree’ was used and negative happiness is processed as inverse points and higher points indicate higher degree of happiness. In the study, the Cronbach’s α coefficient was .83 and it was .93 in the study.

2.5 Data Collection

The data in the study was collected from 150 solitary elderly women over the age of 65 living in D gu, D metropolitan city and data collection was done for 5 weeks from August 8, 2016 to September 9, 2016 and considering difficulties in vision and hearing, 2 trained research assistants and 1 researcher explained purpose, method, and ethics of the study and to subjects who voluntarily agreed, read to the subjects the contents of the survey and wrote about corresponding feelings and thoughts of the subjects. Research assistants are visiting nurses and time taken for 1 survey was around 15 to 20 minutes.

2.6 Data Analysis

The collected data was analyzed using SPSS/WIN 18.0 program as follows.

1. Frequency, percentage, average and standard deviation was derived for general characteristics, pain, perceived health status, suicidal ideation, disabilities in daily living, depression, social support and subjective happiness in female solitary elderly.

2. T-test and ANOVA was conducted for differences in subjective happiness according to general characteristics of female solitary elderly and post verification was analyzed through Scheffe test.

3. Correlation between Pain, Perceived health status, Suicidal ideation, Disabilities in daily living, Depression, Social support and Subjective happiness in female solitary elderly was analyzed using Pearson’s correlation coefficients.

4. Stepwise multiple regression analysis was used for predictive factors influencing subjective happiness of female solitary elderly.

3. Result

3.1 General Characteristics of Subjects

The general characteristics of subjects are shown in Table 1.

Distribution of age was between 67 and 95 with average age of 77.52 and 69.3% was over the age of 75 and 66.7% had religious affiliation which was more than half of the subjects. 61.3% had no education and then it was in the order of Elementary school graduate (31.3%) and middle school graduate or over (7.3%). The most frequent type of residence was apartments with 51.3% and then permanent rental apartment 26.7%, detached house 16.7%, and Multiplex / Villa 5.3%. Most subjects were not engaged in economic activity with 94.0% and monthly living expenses on average was 416,700 KRW where 51 58.7% responded around 400,000 KRW and then over 500,000 KRW 24.0%, around 300,000 KRW 10.0% and under 300,000 KRW 7.3%.

In source of living expenses, over half reported
| Characteristics          | Division                        | Frequency (%) | Average |
|--------------------------|---------------------------------|---------------|---------|
| Age                      | 65~74                           | 46(30.7)      | 77.52   |
|                          | Over 75                         | 104(69.3)     | (67~95) |
| Religion                 | Nonreligious                    | 50(33.3)      |         |
|                          | Christian                       | 37(24.7)      |         |
|                          | Catholic                        | 10(6.7)       |         |
|                          | Buddhist                        | 52(34.7)      |         |
|                          | Other                           | 1(.7)         |         |
| Religious affiliation    | Yes                             | 100(66.7)     |         |
|                          | No                              | 50(33.3)      |         |
| Education                | No education                    | 92(61.3)      |         |
|                          | Elementary school graduate      | 47(31.3)      |         |
|                          | Middle school graduate or over  | 11(7.3)       |         |
| Type of residence        | Apartment                       | 77(51.3)      |         |
|                          | Detached house                  | 25(16.7)      |         |
|                          | Multiplex / Villa               | 8(5.3)        |         |
|                          | Permanent rental apartment      | 40(26.7)      |         |
| Economic activity status | Yes                             | 9(6.0)        |         |
|                          | No                              | 141(94.0)     |         |
| Monthly living expenses  | Under 300,000 KRW              | 11(7.3)       | 416700 KRW |
|                          | Around 300,000 KRW              | 15(10.0)      | (100,000~700,000 KRW) |
|                          | Around 400,000 KRW              | 88(58.7)      |         |
|                          | Over 500,000 KRW                | 36(24.0)      |         |
| Source of living expenses| Pension or severance pay        | 3(2.0)        |         |
|                          | Government funds, senior pension| 84(56.0)      |         |
|                          | Self earned                     | 3(2.0)        |         |
|                          | Aid from children               | 3(2.0)        |         |
|                          | Multiple sources                | 39(26.0)      |         |
| Economic status          | High                            | 5(3.3)        |         |
|                          | Medium                          | 68(45.3)      |         |
|                          | Low                             | 77(51.3)      |         |
| Use of medication        | Yes                             | 150(100)      |         |
|                          | No                              | 0             |         |
| Presence of disease      | Yes                             | 148(98.7)     |         |
|                          | No                              | 2(1.3)        |         |
| Number of diseases       | 1                               | 24(16.0)      | 2.53    |
|                          | 2                               | 46(30.7)      | (1~5)   |
|                          | 3                               | 53(35.3)      |         |
|                          | More than 4                     | 25(16.7)      |         |
| Exercise status          | Yes                             | 35(23.3)      |         |
|                          | No                              | 115(76.7)     |         |
| Type of health coverage  | Medical Care Type 1,2           | 69(46.0)      |         |
|                          | Low income reduction            | 8(5.3)        |         |
|                          | National health insurance       | 73(48.7)      |         |
Government funds/senior pension with 56.0% and 26.0% reported their source of living expenses as 2 of Government funds/senior pension, pension or severance pay, aid from children, and Self earned, and there was 3% each of pension or severance pay, self-earned, and aid from children. The most frequent economic status was low with the 1.3% and then medium 45.3%, high 3.3% and for use of medication, all of the subjects were taking medication. Most of the subjects had diseases with 98.7% with an average of 2.53 diseases where 35.3% had 3 diseases and then it was in the order of 2 (30.7%), more than 4 (16.7%) and 1 (16.0%). 76.7% did not engage in exercise and type of health coverage showed similar results between national health insurance 48.7% and medicare type 1.2 46.0%.

3.2 Level of Pain, Perceived Health Status, Suicidal Ideation, Disabilities in Daily Living, Depression, Social Support and Subjective Happiness in Subjects

The level of Pain, Perceived health status, Suicidal ideation, Disabilities in daily living, Depression, Social support, and Subjective happiness in subjects is shown in Table 2. It was found that, pain was 6.29 points out of 10 points, perceived health status was 11.02 points out of 20 points, Suicidal ideation was 2.55 point out of 4 points, disabilities in daily living was 2.09 points out of 4 points, depression was 8.53 points out of 15 points, social support was 40.88 points out of 60 points, and subjective happiness was 2.88 points out of 5 points.

Table 2. Level of Pain, Perceived health status, Suicidal ideation, Disabilities in daily living, Depression, Social support, and Subjective happiness in subjects

| Variable                  | M±SD  | Range |
|---------------------------|-------|-------|
| Pain                      | 6.29±1.73 | 0~10  |
| Perceived health status   | 11.02±3.79 | 4~20  |
| Suicidal ideation         | 2.55±0.91  | 1~4   |
| Disabilities in daily living | 2.09±0.68  | 1~4   |
| Depression                | 8.53±4.48  | 0~15  |
| Social support            | 40.88±8.48 | 12~60 |
| Subjective happiness      | 2.88±0.47  | 1~5   |

3.3 Differences in Subjective Happiness According to General Characteristics of Subjects

Differences in subjective happiness according to general characteristics of subjects were shown in Table 3. There was a statistically significant level of difference according to Age (t=-2.37, p=.019), Religious affiliation (t=-2.56, p=.012), Type of residence (F=7.12, p=.000), Monthly living expenses (F=8.68, p=.000), Economic status (F=5.51, p=.005), and Presence of disease (t=-7.33, p=.004). However, it was found that Education (F=2.22, p=.113), Economic activity status (t=1.34, p=.181), Source of living expenses (F=.77, p=.547), Number of diseases (F=.88, p=.478), Exercise status (t=-.09, p=.930), and Type of health coverage (F=1.15, p=.321) were not statistically significant.

According to the results of analysis of significant differences between groups, it was found that subjects over the age of 75 had higher subjective happiness compared to those between 65 and 74 and subjects with religious affiliation had higher subjective happiness. In type of residence, subjects living in permanent rental apartments had higher subjective happiness compared to those living in apartments and in monthly living expenses, subjects that responded Around 300,000 KRW, Around 400,000 KRW, and over 500,000 KRW had higher subjective happiness than those who responded Under 300,000 KRW. In economic status, subjective happiness was in the order of high, medium, low and subjective happiness was higher in subjects without diseases.

3.4 Relation between Pain, Perceived Health Status, Suicidal Ideation, Disabilities in Daily Living, Depression, Social Support, and Subjective Happiness in Subjects

Correlation between Pain, Perceived health status, Suicidal ideation, Disabilities in daily living, Depression, Social support, and Subjective happiness in subjects is shown in Table 4. Between subjective happiness, Pain (r=-.502, p<.001), Suicidal ideation (r=-.507, p<.001), and Disabilities
Table 3. Differences in subjective happiness according to general characteristics

| Characteristic               | Division                                | Subjective happiness | t or F(p) |
|------------------------------|-----------------------------------------|----------------------|-----------|
| Age                          | 65-74                                   | 2.75±.46             | -2.37     |
|                              | Over 75                                 | 2.94±.47             | (.019)    |
| Religious affiliation        | Yes                                     | 2.95±.46             | -2.56     |
|                              | No                                      | 2.75±.47             | (.012)    |
| Education                    | No education                            | 2.82±.44             | 2.22(.113) |
|                              | Elementary school graduate              | 2.96±.49             |           |
|                              | Middle school graduate or over          | 3.06±.56             |           |
| Type of residence            | Apartment                               | 2.82±.45             | 7.12      |
|                              | Detached house                          | 2.67±.52             | (.001)    |
|                              | Multiplex / Villa                       | 2.85±.67             |           |
|                              | Permanent rental apartment              | 3.15±.30             |           |
| Economic activity status     | Yes                                     | 3.09±.42             | 1.34      |
|                              | No                                      | 2.87±.47             | (.181)    |
| Monthly living expenses      | Under 300,000 KRW                      | 2.31±.22             | 8.68      |
|                              | Around 300,000 KRW                     | 2.74±.40             | (.001)    |
|                              | Around 400,000 KRW                     | 2.91±.44             |           |
|                              | Over 500,000 KRW                       | 3.05±.49             |           |
| Source of living expenses    | Pension or severance pay                | 3.12±.67             | .77       |
|                              | Government funds, senior pension        | 2.79±.44             | (.547)    |
|                              | Self earned                            | 3.07±.65             |           |
|                              | Aid from children                      | 3.01±.71             |           |
|                              | Multiple sources                       | 2.85±.47             |           |
| Economic status              | High                                    | 3.17±.54             | 5.51      |
|                              | Medium                                  | 2.99±.38             | (.005)    |
|                              | Low                                     | 2.77±.51             |           |
| Use of medication            | Yes                                     | 2.88±.47             |           |
|                              | No                                      | 2.87±.47             |           |
| Presence of disease          | Yes                                     | 2.88±.47             | -7.33     |
|                              | No                                      | 3.30±.06             | (.004)    |
| Number of diseases           | 1                                       | 2.96±.50             | .88       |
|                              | 2                                       | 2.89±.53             | (.478)    |
|                              | 3                                       | 2.88±.39             |           |
|                              | More than 4                             | 2.78±.50             |           |
| Exercise status              | Yes                                     | 2.88±.50             | -0.09     |
|                              | No                                      | 2.89±.46             | (.930)    |
| Type of health coverage      | Medical Care Type 1,2                   | 2.94±.43             | 1.15      |
|                              | Low income reduction                    | 2.92±.40             | (.321)    |
|                              | National health insurance               | 2.82±.51             |           |
in daily living ($r=-.535, p<.001$) showed statistically significant to average negative correlation and Depression ($r=-.800, p<.001$) showed high negative correlation. Between subjective happiness, Perceived health status ($r=.587, p<.001$) and Social support ($r=.709, p<.001$) showed average simple correlation and it was found that subjective happiness in solitary elderly woman was higher with lower Pain, Suicidal ideation, Disabilities in daily living, and Depression, and higher Perceived health status and Social support.

### 3.5 Factors Influencing Subjective Happiness in Subjects

To explore factors influencing subjective happiness in subjects, the me treatment was conducted on general characteristics that showed differences between subjective happiness including Age (65~74=0, over 75= dummy treatment), Religion (No=0, Yes= dummy treatment), Type of residence (Detached house=0, apartment, Multiplex/Villa, Permanent rental apartment= dummy treatment), Living expenses (Under 300,000 KRW=0, Around 300,000 KRW, Around 400,000 KRW, Over 500,000 KRW= dummy treatment), Economic status (Low=0, Medium, High= dummy treatment) and Presence of disease (Yes=0, No= dummy treatment). Pain, perceived health status, suicidal ideation, disabilities in daily living, depression, and Social support was set as independent variables to conduct stepwise multiple regression analysis and the results are shown in Table 5.

The problem of multi-collinearity predicted in multiple regression analysis was shown to be not present after confirmation through tolerance limits (TOL over .10) and variance inflation factor (hereinafter VIF under 10).

It was found that depression ($p<.001$) had the highest influence on subjective happiness and it was found that in the order of Social support ($p=.003$), disabilities in daily living ($p=.004$), and age ($p=.009$) there was significant influence on subjective happiness. Apart from depression, social support was added and 3.6% significantly increased. Also significant increase was in disabilities in daily living 1.2% and Age 1.4% and the total explanatory power was 70.3%. Therefore, it was found that there was influence on subjective happiness with lower depression ($B=-.059, p<.001$), higher Social support ($B=.011, p=.003$), lower disabilities in daily living ($B=-.111, p=.004$), and over 75 in age ($B=.126, p=.009$) compared to between 65 and 74.

### Table 5. Influencing factors of subjective happiness

| Variable       | B    | SE  | $\beta$ | t     | p    |
|----------------|------|-----|---------|-------|------|
| Constant       | 3.062| .218|         | 14.048| <.001|
| Depression     | -.059| .007| -.560   | -8.277| <.001|
| Social support | .011 | .004| .205    | 3.010 | .003 |
| Disabilities in daily living | -.111 | .038| -.160   | -2.919| .004 |
| Age            | .126 | .048| .124    | 2.647 | .009 |
4. Discussion

The study aimed to explore the level of pain, perceived health status, suicidal ideation, disabilities in daily living, depression, social support, and subjective happiness in female solitary elderly and figure out the relation between each variable and influencing factors of subjective happiness and the study will discuss based on the results as follows.

The degree of pain in female solitary elderly was 6.29 points out of 10 points and it was found that they had above average level of pain. This was a similar result from a study of quality of life in female solitary elderly that showed 5.91 points and higher than the 3.96 points of research of health status and depression related factors according to depression in elderly females and this signifies that pain in solitary elderly woman is higher than in elderly woman living with others and that health status in solitary elderly women is more severe and they are living in a state without support system of care enduring pain alone. Therefore, it can be said that it is necessary to seek nursing intervention plans to reduce experiences of pain by increasing physical health status of solitary elderly women.

Perceived health status was an average level with 11.02 points out of 20 points. This is a similar result from the study and it was lower than the subjective health status points of elderly women in the study of subjective health status of Korean elderly and it could be determined that subjective health status in solitary elderly woman was lower than in elderly woman living with others. This is supported by the result of the 2014 Elderly Status Investigation where rate of negative health perception was the highest in solitary elderly households with 52.2% compared to 39.5% of elderly couple households, and 44.0% of households with children. Also in the prevalence of chronic diseases it can be seen that physical health status is not good where 93.2% of solitary elderly households show prevalence of chronic diseases compared to 89.6% of households with children and 87.1% of elderly couple households. Therefore, it is determined that there is necessity for the development of nursing intervention that can maintain optimum health of solitary elderly woman.

It was found that suicidal ideation was above average with 2.55 points out of 4 points. This was slightly higher than results that studied low income solitary elderly in that studied the influence of level of activities of daily living of solitary elderly in suicidal ideation. It is determined that the different results are due to difference in region and also due to the fact that it was the result of suicidal ideations in male solitary elderly rather than female solitary elderly in the study. It was also found in the result of comparison of suicidal ideation according to gender of solitary elderly that women had higher suicidal ideation than men which supports the results of the study. In addition, in the study of comparison of suicidal ideations between solitary elderly and elderly couples it was found that solitary elderly had higher suicidal ideation experiences compared to elderly couples and in the result of the study that studied suicidal ideation in solitary elderly and non-solitary elderly, suicidal ideation was significantly higher in solitary elderly and looking at these results, it is determined that there needs to be social measures on female solitary elderly that have longer average life spans compared to men and in a time where there is higher ratio of female solitary elderly that have difficulties in acquiring various social resources and can be easily isolated from surrounding environments and it is considered that there needs to be establishment of plans for suicide prevention in visiting nursing services.

Disabilities in daily living were found to be average with 2.09 points out of 4 points. In the study by it was found there was higher degree of disabilities in daily living compared to the study with 3.53 points. According to the 2014 Elderly Status Investigation activities of daily living was shown to be higher in elderly couples (94.6%) compared to solitary elderly (93.4%) and also instrumental activities of daily living was found to be higher in elderly couples with 87.6% compared to 78.7% in solitary elderly where it was found that solitary elderly had more disabilities in daily living and care giving status in solitary elderly was 68.1% which was significantly lower than in elderly couples (84.2%) and households with children (89.5%) and they can be determined that there needs to be expansion of public policies currently under provisions such as long-term care insurance service and elderly care service.

It was shown that there was mild level of depression with 8.53 points out of 15 points. This is a similar result from journals and it was found in the study comparing solitary elderly and non-solitary elderly that solitary elderly had higher level of depression compared to non-
solitary elderly and it is considered that there is need for emotional and psychological support systems for solitary elderly.

Social support was 40.88 points out of 60 points which showed that although subjects lived alone, they had a degree of support from people such as family, relatives, neighbors, and friends. This is a similar result from studies33,34 and it can be seen as a result of Korea’s values that put importance on attachment between neighbors and activation of support systems through care service and visiting nursing service with the expansion of foundations of social systems. However, it was found in the result of 2014 Elderly Status Investigation35 that in family and social relations status of elderly, solitary elderly had fewer family, close relatives, close friends and neighbors compared to non-solitary elderly which shows that social support system of solitary elderly is lacking compared to non-solitary elderly.

Subjective happiness was 2.88 points out of 5 points which showed an average level of happiness. There were similar results of 3.01 points in the study36 which studied satisfaction in life which is considered interchangeable with subjective happiness. However, satisfaction in life (satisfaction in health status, economic status, social/leisure/cultural activity, friends, local community, etc.) in solitary elderly was found to be lower than in non-solitary elderly and as subjective happiness is an emotional and cognitive evaluation of how an old-age person at the later stages of life is determining how their life is progressing and how they will accept death, there is necessity for intervention plans to improve quality of life through increase in happiness.

Looking at differences in subjective happiness according to general characteristics, it was found that there was difference in subjective happiness according to age, religious affiliation and type of residence, monthly living expenses, economic status, and presence of disease.

In age, it was found that subjective happiness was higher in those over the age of 75 compared to subjects between 65 and 74. Although it was not on solitary elderly, it is similar to the results of the study by37 on male and female elderly where subjects with higher age evaluated life more positively and it was partially similar to the results of the study38 where subjects between the ages of 70 and 80 had higher subjective happiness compared to subjects between 60 and 70 while subjective happiness decreased in those over 80. In addition, studies39,40 showed different results where life satisfaction and well-being decreased along with the increase of age. Previous researches all focused on male and female elderly and there is need to conduct repeated study on the differences in subjective happiness in solitary elderly women according to age in the future.

Regarding religion, it was found that subjective happiness was higher in subjects with religious affiliation compared to those without. This correlates with the results of the studies41 and it is considered that religion provides emotional support for solitary elderly and that participation in religious activity for solitary elderly who have weak social support systems enabled a sense of connectedness and belonging to maintain friendships to share each other’s pain which increased subjective happiness.

In types of residence, subjective happiness was higher in permanent rental apartments compared to apartments. This is because due to characteristics of living environment, in apartments it is difficult to know who the neighbors are and there is no communication between neighbors while in permanent rental apartments, there are many cases where people live with their doors open resulting in frequent interaction as well as resident characteristics being majorly low income classes resulting in care services social welfare aspects such as visiting services and care services from community centers and health centers.

In monthly living expenses, it was found that subjective happiness was higher in Over 500,000 KRW compared to less than 300,000 KRW and economic status also showed subjective happiness in the order of high, medium, and low. This result partially coincided with the study42 where medium had higher subjective happiness compared to low. Because in later years economic power satisfy food, clothing and shelter as well as desires for cultural life, it is considered that subjective happiness was higher due to positive evaluation of one’s own life with abundance in life.

Regarding presence of disease, subjective happiness was higher in cases where there was no disease compared to cases where there was presence of disease. This result matches the result of the study43 that was on elderly men and this is because physical health is a factor that enables independent life for the elderly which is the most essential factor that can improve life satisfaction and happiness.

In the relation between subject of happiness and
related factors, pain (r=-.502, p<.001), suicidal ideation (r=-.507, p<.001), and disabilities in daily living (r=-.535, p<.001) showed significantly significant to average level of negative correlation and depression (r=-.800, p<.001) showed a high level of negative correlation. Between subjective happiness, perceived health status (r=.587, p<.001) and social support (r=.709, p<.001) showed average simple correlation. Regarding these results, in the study\textsuperscript{4} it was stated that with higher degree of health and the elderly, subjective happiness increased and that with higher degree of depression, subjective happiness was decreased and\textsuperscript{5} stated that health status and subjective happiness had significant positive correlation. Also in the study\textsuperscript{5}, higher physical, social, and emotional health was correlated to higher subjective happiness and the result of the study\textsuperscript{6} supports the results of the study where it is stated that social support and quality of life (life satisfaction) in later years has close relationship.

To solitary elderly who cannot receive appropriate aid from someone, pain causes much difficulty in everyday activities such as eating, moving, and cleaning. In reality, if one feels that they cannot control their life in activities of daily living, they feel helplessness and this helplessness causes hopelessness in the elderly and these factors have the potential to develop into depression in later years and this increases the potential of ideation of suicide.\textsuperscript{7} Also, disabilities in daily life acts as a factor omitting social activity further increasing the potential of social isolation\textsuperscript{8} which causes the deterioration of their quality of life, acting as a factor that lowers happiness. Therefore, it is determined that there is need for the development of nursing intervention that can increase the ability for activities of daily living by alleviating pain, expand social support system through increase in social activity, and reduce sense of depression and suicidal ideation through the emotional support.

Factors influencing subjective happiness were in the order of depression, social support, disabilities in daily living, and age which had total explanatory power of 70.3%. Thus, it was found that subjective happiness was higher with lower depression, higher social support, lower disabilities in daily living, and in ages over 75 compared to between 65 and 74. This result is similar to the study\textsuperscript{9} where influencing factors of quality of life in female solitary elderly were found to be health status perception, depression, and activities of daily living.

Elderly with high subjective well-being has a tendency to accept death positively, evaluate their past lives as meaningful, are satisfied with current life, have low anxiety, have bright prospects about their upcoming future lives, positively evaluates their health status, and believe in the afterlife.\textsuperscript{10}

As above, subjective well-being of the later years act as a factor that lead to vitality and happiness in the lives of elderly and it is important for the elderly to have positive self-perception and psychological well-being. However, among all classes, female solitary elderly are not provided with care living in isolation and loneliness and there are many cases where they are not provided with appropriate services due to being in the blind spot of the welfare system. It is important to increase the subjective happiness that enables positive evaluation of their own lives in the gradually increasing solitary elderly to enable them to successfully enjoy and organize the rest of their days. Development and application of nursing intervention is needed by using health information for the health of elderly women living alone.\textsuperscript{11}

5. Conclusion

The study had the purpose of determining the influencing factors of pain, perceived health status, suicidal ideation, disabilities in daily living, depression, and social support on subjective happiness to provide basic data for increase in quality of life in the later years and successful senescence as well as to contribute to the development of nursing intervention in local community visiting nursing and establishment of welfare service strategies to promote the adaptation into life after retirement for the gradually increasing female solitary elderly.

In the study results, age, religion, type of residence, ugly living expenses, economic status, and presence of disease showed significant differences in subjective happiness and it was found that subjective happiness was higher with lower pain, suicidal ideation, disabilities in daily living, and depression, and higher perceived health status and social support. Also, influencing factors of subjective happiness was found to be in the order of depression, social support, disabilities in daily living, and age.

Therefore, to increase subjective happiness in female solitary elderly and for them to lead a successful life in
the later years, there needs to be emotional support, establishment of social support systems and development of nursing intervention to lower disabilities in daily living. The study has a limitation in generalization of study results because the subjects were female solitary elderly living in D gu D metropolitan city and it is suggested to determine the predictive factors of subjective happiness by age for customized intervention by stages of life and suggest future studies on the predictive factors of subjective happiness in solitary elderly men.

6. Acknowledgment

This work was supported by the Jungwon University Research Grant (no. 2016-046).

7. References

1. Gyeonggi-do Elderly Welfare Section. The Elderly Population Nationwide. 2016.
2. Statistics Korea. Estimated future population. 2011. Available from: http://kostat.go.kr/
3. Seo IK, Cho HC. Mediation effects of depression in the relationship between stress and suicidal ideation of the elderly: A comparative study on people who live alone and those who live with family. Journal of Welfare for the Aged. 2013; 61:135-63.
4. Lee YC. Factors Associated with Suicidal Ideation of Elderly People Living Along: The Public Elderly Care Service with Focus on Recipients. Seoul: Soongsil University; 2015.
5. Korea Institute for Health and Social Affairs. 2014 Survey of Elderly Ministry of Health and Welfare; 2014.
6. Han YJ, Chung SD. Linkage effects of new social support system for the elderly women living alone. Journal of the Korea Gerontological Society. 2002; 21(3):145-56.
7. Keimyung University Industry-Academic Cooperation Foundation. 2008 Survey of Elderly. Seoul: Ministry of Health and Welfare and Family Affairs; 2009.
8. Statistics Korea. 2014 Life Table. Daejeon; 2016.
9. World Health Statistics. 2012 Life of the Major Health. 2014.
10. Han SS, Kang SW, Jeong SH. Experiences of depressive symptom and suicidal thinking between the elderly living alone and the elderly couples. The Korean Journal of Health Service Management. 2012; 6(3):29-38.
11. Sohn JN. A study on factors influencing the suicidal ideation in elderly people who live alone or live with family. Journal of Korean Academy of Psychiatric Mental Health Nursing. 2012; 21(2):118-26.
12. Ko JU, Kim SB. A study of influence factors on the suicidal tendency of elderly living alone. Health and Social Sciences. 2011; 30:29-48.
13. Kim CJ, Hwang JS. A study on the effects of senile disease and depression on the seniors’ ideation of suicide. Journal of the Korean Gerontological Society. 2008; 24(3):425-42.
14. Hur JS. Determinants of Loneliness among the users and Non-users of Senior Welfare Center. 2011; 53:101-31.
15. Seo IK, Cho HC. Mediation effects of depression in the relationship between stress and suicidal ideation of the elderly: A comparative study on people who live alone and those who live with family. Journal of Welfare for the Aged. 2013; 61:135-63.
16. Park SB. Integrated approach for quality research in the life of the elderly. Seoul Association for Public Administration Conference Proceedings; 2004. p. 217-33.
17. Jung KS. The Effect of Physical Self-Concept on the Psychological Happiness and Life-Satisfaction of the Elderly Participating in Exercise Programs. Seoul: Myong-Ji University; 2009.
18. Diener E. Subjective well-being: The science of happiness and a proposal for a national index. American Psychologist. 2000; 55:34-43.
19. Diener E, Sandvik E, Pavot W, Fusita F. Extrainversion and subjective well-being in a US national probability sample. Journal of Research in Personality. 1992; 26:205-15.
20. Furr RM, Funder DC. A multimodal analysis of personal negativity. Journal of Personality and Social Psychology. 1998; 74(6):1580-91.
21. Jose PE, Pryor J. Does social connectedness lead to a greater sense of well-being in New Zealand adolescents? Findings from the youth connectedness project. Psychology Aotearoa. 2010; 2(2):94-7.
22. Lee OS. The Influence of Marital Attachments to the Subjective Security Senses of the Aged People. Busan: Kyungsung University; 2014.
23. Speake DL, Cowart ME, Pellet K. Health perceptions and lifestyles of the elderly. Reasearch in Nursing and Health. 1989; 12:93-100.
24. Harlow, Newcomb, Bentler. Suicide Ideation Scale. 1986.
25. Kim HS. A study on epistemology of Korean elderly's suicidal thought. Journal of the Korea Gerontological Society. 2002; 22(1):159-72.
26. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged: The index of ADL: A standardized measure of biological and psychosocial functions. Journal of the American Medical Association.1963; 185(1):914-9.
27. Bae HS. Effect of Degenerative Arthritis on Health-related Quality of Life in the Elderly. Daegu: Daegu Haany University; 2011.
28. Sheikh JI, Yesavagem JA. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. In: Brink TL, editor. Clinical Gerontology : A Guide to Assessment and Intervention. New York: The Harwoth Press; 1986. p. 165-73.
29. Kee BS. A preliminary study for the standardization of a geriatric depression scale short form-Korea Version. Jour-
nal Korean Neuro-Psychiatric Association.1996; 35(2):298–307.

30. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional Scale of Perceived Social Support. Journal of Personality Assessment. 1988; 52(1), pp.30-41.

31. Shin JS, Lee YB. The effect of social supports on psychosocial well-being of the unemployed. Journal Korean Academy of Social Welfare. 1999; 37:241-69.

32. Kozma A, Stones MJ. Predictors of happiness. Journal of Gerontology. 1983; 38(5):626-8.

33. Jang HK. Scale Development of the Elderly in Korea. Seoul: Korea University; 1998.

34. Keum KY. Potential Effects of Satisfaction at Long-term Care Facility Services upon Old People's Subjective Sense of Wellbeing: Based on Mediating Effects of Loneliness. Seoul: Hanyoung Theological University; 2011.

35. Kim HK, Lee HJ, Park SM. Factors influencing quality of life in elderly women living alone. Journal of the Korean Gerontological Society. 2010; 30(2):279-92.

36. Jung YM. Health status and associated factors of depression according to depression in elderly women. Journal of the Korean Gerontological Society. 2007; 27(1):71-86.

37. Yeom JH, Chun MA. The effects of self-rated health change of korean older adults on the support change from their children: Focusing on gender differences. Journal of the Korean Gerontological Society. 2016; 36(1):151-72.

38. Kim YS, Ha WY. A study of the effect of participation in productive leisure activities on the suicide ideation and physical and mental health of elderly living alone. Health and Social Welfare Review. 2015; 35(4):344-74.

39. Ju SH. A study of the effect of suicidal ideation on the activities of daily living of elderly living alone - Focusing on the mediating effect of depression. Family and Culture. 2010; 22(2):31-53.

40. Rim CS, Jang GS, Jeong MS. A study on influential factors for the suicide ideation of the elderly living alone. Journal of Social Science Research. 2013; 192-223.

41. Lee SH. Comparative study on influencing factors of suicidal ideation according to sex in the elderly. Journal of Korean Public Health Nursing. 2013; 27(3):500-12.

42. Lee EJ. Relationship of social support and powerlessness in elder living alone and live with family. The New Medical Journal. 2003; 46(12):165-72.

43. Lin QL, Kim HK, Ann JS. Relationship between depression and quality of life in elderly women living alone: The moderating and mediating effects of social support and social activity. Journal of the Korean Gerontological Society. 2011; 31(1):33-47.

44. Lee SY, Kim EJ. The Social support patterns and depression among the elderly living alone and their friends and neighbors. Journal of Welfare for the Aged. 2012; 56:137-64.

45. Seok JE, Jang EJ. The effect of social relationship resource by gender on the life satisfaction of elderly living alone. Korean Journal of Gerontological Social Welfare. 2016; 71(2):321-49.

46. Lee CS. The Effect of Psychological and Social Characteristics of the Rural Elderly on their Feeling of Happiness. Mokpo: Mokpo National University; 2009.

47. Shin JH, Cho HM. The effect of senior citizens' participation in leisure activities on wellness and subjective happiness. The Korea Journal of Sports Science. 2011; 20(3):877-87.

48. Lim JS. The Relationships of a Self-enhancement Bias, Life Events and Subjective Well-being in Old-adults. Seoul: EwhaWomans University; 2003.

49. Kim YM. The Influence of Old People's Humor Sense on Health and Subjective Happiness- Focused on Senior Welfare Centers of User. Seoul: Myingji University; 2011.

50. Chung IS. Study of variables influencing subject wellbeing of the aged. Journal of Busan Women University. 2003; 25:169-77.

51. Kwon JD, Cho JY. A study of factors influencing the life satisfaction of the aged. Journal of the Korea Gerontological Society. 2000; 20(3):61-76.

52. Hub Y, Moon YS, Son BK, Lee SK, Lee K, Rho HJ, et al. The impact of religiosity, spirituality on depression and quality of life in solitary Korean elderly. Journal of Korean Geriatric Psychiatry. 2008; 12:87-94.

53. Choi DR. The Affecting Factors on The Sexual Awareness of the Elderly Male are Sexual Desire Coping Behaviors Impact on Subjective Happiness. Daegu: Daegu Haany University; 2015.

54. Bang YS, Nam KM. The influence of sexual attitude and sexual need coping behavior of the elderly on their subjective happiness-focusing on the mediating effects of health and depression. Journal of Welfare for the Aged. 2009; 46:215-38.

55. Chung IS. A study on the life satisfaction of elderly to causal attribution styles and self-esteem. Busan: Dong-A University; 2000.

56. Kavitha R, Kannan E, Kotteswaran S. Implementation of cloud based Electronic Health Record (EHR) for Indian healthcare needs. Indian Journal of Science and Technology. 2016 Jan; 9(3):1-5.

57. Yenuar F. The health status model in urban and rural society in West Sumatera, Indonesia: An approach of structural equation modelling. Indian Journal of Science and Technology. 2016 Jan; 9(4):1-8.

58. Ramya GR, Sivakumar PB. Advocacy monitoring of women and children health through social data. Indian Journal of Science and Technology. 2016 Feb; 9(6):1-6.