Predictors of Pain, Perceived Health Status, Nutritional Risk, Social Support and Self-Transcendence on Depression Among Lower Income Senior Citizens

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Abstract

The purpose of this study was to identify the degree of effect that lower income senior citizens' pain, perceived health status, nutritional risk, social support and self-transcendence have on depression, and to develop a nursing mediation method. This is a descriptive research that was conducted on 164 subjects who were users of the S welfare center and P welfare center, located in D City, Korea. A questionnaire was conducted from July 27 to July 31, 2013 to collect data. Data was analyzed using SPSS 18.0 program, to conclude the descriptive statistics, t-test, ANOVA, Pearson's correlation coefficients and stepwise multiple regression. The study results show that the mean score for the elderly's pain was 7.37 and the total of perceived health status was 5.47 points, which is lower than the median. Nutritional risk was 9.85 points indicating a high risk of nutrition, while social support and self-transcendence were 33.67 points and 23.85 points, respectively, which are both below median. Depression recorded 9.53 points, indicating a high likelihood of depression. In the correlation with depression, perceived health status (r=-.463, *p*<.001) had a weak inverse correlation, nutritional risk(r=.439, *p*<.001) had a weak correlation, and social support (r=-.470, *p*<.001) and self-transcendence (r=-.328, *p*<.001) had a weak inverse correlation. In terms of effect on depression among low income senior citizens, social support (B=-.110, *p*<.001) had the biggest effect, followed by perceived health status (B=-485., *p*<.001), self-transcendence (B=-.095, *p*=.001), nutritional risk (B=.199, *p*=.003), and number of diseases (B=1.199, *p*=.037). Overall explanatory power was 44.4%. As a follow-up, a social support system to ease depression among lower income senior citizens, a mediation program to promote mental well-being or self-transcendence, and a social safety net to lower the health and nutritional risks would be needed.

Keywords: Aged, Depression, Health Status, Malnutrition, Self-transcendence, Social Support, Poverty

1. Introduction

Due to progress in medical technology, life expectancy has been greatly extended. The elderly population has grown but the share of those with chronic diseases is also increasing. 81.3% of the elderly have a chronic disease, 81.5% experience pain and 93.3% complain of inconvenience in daily life due to pain[1]. Pain is a major physical symptom accompanying aging[2] and are most frequently reported in the knees (62.3%), lower back (60.6%) and shoulders (24.8%). Most of the elderly who have pain have a musculoskeletal disease[1]. The compliance for pain treatment is low among the elderly while the tendency to depend on drugs is high and pain tends to exacerbate over time[3]. This not only causes functional disorders in the body but also psychological issues such as depression and stress, and lowers social participation, causing issues from physical, psychological and social aspects[4].

In particular, the lower income elderly, compared to others in their local community are not able to take advantage of medical services due to their lower education and economic hardship and thus have a high rate of disease[5]. As of end of December, 2013, the number of recipients for welfare for the lowest income was 1.35 million (810,000 households). Among them, the elderly took up the largest share (29.9%) following those in their middle ages (37%). The ratio to total population was highest at 6.0% among the elderly[6]. According to the 2011 survey on the elderly[7], 44.4% of the elderly said their perceived health status was bad, followed by 37.4% of those who answered relatively bad, 6.8% who answered very bad and 2.5% who answered healthy. This indicates that perceived health status of the elderly is very low and negative, and the lower the income and education level the more negative they were about their own health. This indicates that lower income elderly people have a lower level of knowledge and usage rate of medical services and due to economic hardship cannot afford appropriate treatment or health management, leaving them in a precarious state[8]. As an important determining factor for the health of the elderly, Choi, Park, Kim and Chang[9] emphasize nutritional risk. According to the 2007 National Nutrition Survey, for the elderly aged 65 or older, intake of all nutrients was very low[10], which led to high mortality and complication rates and a slower recovery rate[9,11]. In the 2011 survey on the status of the elderly, 30.5% of the elderly responded that there are issues with their nutritional management. The higher their age, the lower their education and the lower their income they had more of such issues[7]. In general, nutritional issues of the elderly are reported to be correlated with not only physical issues but also psychological issues such as depression and loneliness[12,13], raising the urgent need for nutritional management among lower income elderly people.

Human beings are also meant to constantly interact with others as a social being. But among the elderly, their social interaction tends to rely on unofficial support such as through family, friends or neighbors[14]. Due to recent changes in family structure and values, families are no longer expected to support for the elderly and as a result, older people are increasingly isolated from the rest of the world, losing social support and social roles. This can lead to loneliness and a sense of being excluded[14,15]. Social support provided against this backdrop can help reduce physical, economic and social issues, promoting a more effective adjustment at times of crisis or change and allows

for more psychological well-being[16]. The greater the social support, the greater the quality of life, too[17].

Self-transcendence which gives meaning and satisfaction to life comes in the form of accepting aging as a natural process, overviewing reality, seeking internal integration through persistence and turning to god[18]. This helps change one's view towards oneself and the world and allows him to see aging as a positive and natural process[19], helping to promote a more positive attitude towards life. In particular, lower income elderly people, who due to low social support, experience a high degree of loneliness and exclusion can benefit greatly in terms of mental health if this self- transcendence is formed. According to the 2011 survey on the status of the elderly, 29.2% have a serious degree of depression and the higher their age and the lower the income, the share of those suffering from depression tended to increase. In the group with the bottom 20% of household income, the share was 47.1%[7].

Through preceding studies, this study aims to identify the degree of pain, health status, nutritional risk, social support and self-transcendence among lower income elderly people, and identify the factors affecting depression among such elderly thus providing a basic set of data to help develop a nursing mediation program and measure to improve the quality of life among the elderly.

1.1 Purpose of the Study

1) Identify the general characteristics of lower income elderly people.
2) Identify the degree of pain, perceived health status, nutritional risk, social support, self transcendence and depression among lower income elderly people.
3) Identify the difference in depression in accordance with general characteristics of lower income elderly people.
4) Identify the relation between depression and pain, perceived health, nutritional risk, social support, and self transcendence.
5) Identify the factors that affect depression in lower income elderly people.

2. Methods

2.1 Study Design

This study is a descriptive research study in order to identify the degree of pain, perceived health, nutritional risks, social support, self-transcendence and depression

among lower income elderly people and the factors that affect their depression.

2.2 Study Subjects

For the study, 164 elderly people of lower income who use the S welfare center and P welfare center in D city, Korea and who understood and agreed with the purpose of the study were used as subjects.

The number of subjects was calculated using G*Power 3.1.7 program. For a multiple regression analysis, effect size .10, significance level 0.05, power of test 0.95, and 10 predictors were used, leading to 133 for the required number of samples. As such the actual number of subjects in this study 164 is deemed sufficient.

2.3 Ethical Considerations

Data was collected after gaining approval from the Institutional Review Board of Kongju University (KNU_IRB_2013_6). In order to protect the rights of the subjects, the purpose of the study was explained and those who agreed provided their signature on the questionnaire. If they wished not to pursue during the questionnaire, they were allowed to discontinue. It was notified in advance that there would be no harm or damages caused as a result of discontinuation and that the data collected would be used for study purposes only, with confidentiality of the data upheld.

2.4 Study Tool

2.4.1 Pain

The site and degree of pain in the subject were recorded. The degree of pain was measured using the visual analogue scale(VAS), where the pain subjectively felt was marked along a line of 0~10cm and the length of each mark was used as an index for pain. A higher score indicates more severe pain.

2.4.2 Perceived Health Status

The degree of perceived health status was measured using the three questions developed by Speake, Cowart and Pellet[20]. The questions asked about the present perception of health, perceived health compared to one year prior and perceived health compared to others of a similar age. Answers were given 1 point for 'very bad' and 5 points for 'very good'. A higher score indicates better health. Cronbach's α coefficient at the time of development was .85 while in this study it was .84.

2.4.3 Nutritional Risk

Nutritional risk among older people was measured using the translated version of 'Determine Your Nutritional Health' Checklist (Nutritional Screening Initiative Checklist, NSC Checklist) jointly developed by The American Dietetic Association, The American Academy of Family Physician, and National Institute on Aging. This tool consists of 10 questions on the risk factors related to nutrition, including inappropriate intake of food, social isolation, poverty, dependence or disorders, acute or chronic diseases, chronic administration of drugs and old age (≥80 years)[21]. Answer choices were either 'yes' or 'no' with 'no' given 0 points and 'yes' given a range of scores between 1 and 4 points depending on the level of risk. The range of total score was 0~21 points, with higher scores indicating higher nutritional risk and imbalanced nutrition. 0~2 points indicate decent nutrition, 3~5points middle level nutrition and scores of 6 points or higher indicate high risk nutrition.

2.4.4 Social Support

For social support, the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet, Dahlem, Zimet and Farley[22] and translated by Shin and Lee[23] was used. It consists of 12 questions, of which 4 of them (questions number 3,4,8,11) address support from family, 4 questions (numbers 6,7,9,12) address support from friends, and the remaining 4 questions (numbers 1,2,5,10) cover support from others. Using a 5 point Likert scale, the total scores ranged from 12 to 60 points, with higher scores indicating higher perceived social support. Cronbach's α coefficient at the time of development was .91 and was .94 in this study.

2.4.5 Self-transcendence

15 questions that address self-transcendence from the 140 question survey of Cloninger TCI-RS for adults that was translated by Min, Oh and Lee[24]. The questions cover creative self-oblivion, self-consciousness, unity with the universe, acceptance of the spirit and reasonable materialism. 'Not at all' is given 0 points and 'very much so' given 4 points. A higher score indicates a higher self-transcendence. In the study by Min, Oh and Lee[24], Cronbach's α coefficient was .93 and it was .92 in this study.

2.4.6 Depression

In order to measure depression in subjects, the GDS Short From developed by Sheikh and Yesavage[25] and translated by Kee[26] to create a Geriatric Depression Scale Short Form Korea Version (GDSSF-K) was used. This tool has the subjects answer in either yes or no and consists of 15 questions. Positive responses to the five questions, numbers 2, 7, 8, 11, and 12 are considered to indicate depression while for the rest of the 10 questions, a negative response indicates depression. The total score can range up to 15 points and a higher score indicates a more severe depression. Scores lower than 5 signify normal, 5~9 points a likelihood of depression and scores of 10 points or higher lead to a diagnosis of depression. At the time of standardizing the tool the Cronbach's α coefficient was .88. For this study it was .87.

2.5 Data Collection

164 elderly people who use S welfare center and P welfare center located in D city, Korea and who agreed to the purpose of the study were surveyed from July 27 to July 31, 2013. Given that the subjects were elderly, have poor eyesight and some were illiterate, three study assistants who had been trained in advanced read the survey to them and marked the relevant response. About 20-30 minutes were allocated per subject.

2.6 Data Analysis

The collected data were analyzed using SPSS/WIN 18.0 to calculate the frequency, percentage and mean for the general characteristics and for the degree of pain, perceived health, nutritional risk, social support, self-transcendence and depression, the mean and standard deviation were calculated. The difference in depression in accordance with general characteristics was analyzed using a t-test or ANOVA and a Scheffe test was conducted afterwards for verification. For the correlation of pain, perceived health, nutritional risk, social support, self-transcendence and depression, Pearson's correlation coefficients was used and for factors that affect depression a gradual multiple regression analysis was conducted.

3. Result

3.1 General Characteristics of Lower Income Elderly People

The general characteristics of lower income elderly people were as seen in Table 1. Average age was 75.81 with a

Table 1. General characteristics of lower income elderly people (*N*=164)

Characteristics	Category	Frequency
Age	65~74	66(40.2)
	75 or older	98(59.8)
Gender	Female	132(80.5)
	Male	32(19.5)
Religion	Yes	112(68.3%)
	No	52(31.7%)
Living arrangements	Alone	111(67.7)
	With spouse	19(11.6)
	With children	29(17.7)
	Others	5(3.0)
Education	No education	101(61.6)
	Elementary school	33(20.1)
	Middle school	20(12.2)
	High school or higher	10(6.1)
Residence type	Apartment	162(98.8)
	House	2(1.2)
Disease	Yes	162(98.8)
	No	2(1.2)
Number of diseases	0	2(1.2)
	1	19(11.6)
	2	38(23.2)
	3	57(34.8)
	4 or more	48(29.3)
Type of diseases (multiple choices)	Hypertension	122(74.4)
	Strokes	15(9.1)
	Hyperlipidemia	25(15.2)
	Cardiovascular	16(9.8)
	Diabetes	66(40.2)
	Arthritis	88(53.7)
	Rheumatism	12(7.3)
	Osteoporosis	14(8.5)
	Lower back or hip pain	32(19.5)
	Stomach ulcer	21(12.8)
	Cataract	7(4.3)
	Asthma	5(3.0)
	Respiratory inflammation	4(2.4)
Medication	No	8(4.9)
	Yes	156(95.1)
Number of drugs	0	8(4.9)
	1	18(11.0)
	2	37(22.6)
	3	53(32.3)
	4	31(18.9)
	5 or more	17(10.3)
Medical insurance type	Medical insurance type 1	98(59.8)
	Medical insurance type 2	6(3.7)
	Next level recipient of discounts	60(36.6)
Pain site (multiple choices)	Knee	126(76.8)
	Lower back	133(81.1)
	Shoulders	78(47.6)
	Head	42(25.6)
	Ankles	76(46.3)
	Other	37(22.6)

distribution between age 65 and 98. Male accounted for 19.5% and female 80.5%. 68.3% had a religion while 31.7% did not. In terms of living arrangements, those who lived alone accounted for the majority at 67.7%, followed by living with children (17.7%), living with a spouse(11.6%), and living with parents or grandchildren (3.0%). More than half had no formal education at 61.6% and most of them lived in an apartment (98.8%). 98.8% had a disease with the majority having 3 diseases at 34.8%, followed by 4 or more diseases (29.3%), 2 diseases (23.2%) and 1 disease (11.6%). The breakdown of disease types was as follows: hypertension (74.4%), arthritis (53.7%), diabetes mellitus (40.2%), lower back pain or hip pain (19.5%), hyperlipidemia (15.2%), ulcer in the stomach or duodenum (12.8%). The most frequent sites for pain were lower back (81.1%) and knees (76.8%), followed by shoulders (47.6%) and ankles (46.3%), showing that issues with the muscu-loskeletal system were rather severe. 95.1% of them were on medication, with 32.3% of subjects being on 3 types of drugs, followed by 2 types (22.6%), 4 types (18.9%), 5 types or more (10.3%), and one type (11.0%). In terms of the type of medical insurance, type 1 accounted for 59.8% and was the most common, the next level of welfare recipients eligible for discount accounted for 36.6% and type 2 medical insurance accounted for 3.7%.

3.2 The Degree of Pain, Perceived Health, Nutritional Risk, Social Support, Self-transcendence and Depression in Lower Income Elderly People

The degree of pain, perceived health, nutritional risk, social support, self-transcendence and depression in lower income elderly people is as shown in Table 2.

Table 2. The degree of pain, perceived health, nutritional risk, social support, self-transcendence and depression in lower income elderly people

Variable	M±SD	Range
Pain	7.37±1.39	0~10
Perceived health	5.47±2.09	3~15
Nutritional risk	9.85±4.31	0~21
Social support	33.67±9.99	12~60
Self-transcendence	23.58±9.34	0~60
Depression	9.53±4.13	0~15

Pain was 7.37 points on a scale of 10, indicating a high level, while perceived health was 5.47 points within a range of 3~15 points, indicating a low degree. Nutritional risk was 9.83 points out of a total of 21 points and social support was 33.67 points within a range of 12~60 points. The degree of self-transcendence was 23.58 points out of a total of 60 points, which is low and depression recorded 9.53 points out of a total of 15 points, indicating a high degree.

3.3 Difference in Depression across Different General Characteristics

Difference in depression across different general characteristics is as shown in Table 3.

There was statistically significant difference for living arrangement (F=2.979, p=.033), residence type (t=2.277, p=.024), number of diseases (F=10.596, p<.001), number of drugs taken (F=4.246, p=.016), and type of medical insurance (F=15.095, p<.001). An analysis of significant difference across groups showed that the depression score against living arrangement factor was higher in the order of living with children, with spouse, others (grandchildren or parents) and living alone. When seen against the type of residence, depression score was higher in the elderly living in apartments than those living in houses. Those with four or more diseases had a higher depression score than those with no disease and a higher number of drugs taken were also correlated with a high depression score. Depression was higher in recipients of type 2 medical insurance than those in the next level discount category. There was no statistically significant difference in depression against age, gender, religion, education, existence of disease or existence of medication.

3.4 Relation between the Pain, Perceived Health, Nutritional Risk, Social Support and Self-transcendence in Lower Income Elderly People and Depression

The relation between the pain, perceived health, nutritional risk, social support and self- transcendence in lower income elderly people and depression is as seen in (Table 4).

Depression and pain (r=.243, p=.002), and depression and nutritional risk (r=.439, p<.001) showed a weak correlation at a statistically significant level, while a weak inverse correlation was found with perceived health

Table 3. Difference in depression in accordance with general characteristics of lower income elderly people (N=164)

Characteristics	Category	M±SD	t or F(*p*)
Age	65~74	9.65±4.39	0.307(0.759)
	75 or older	9.45±3.97	
Gender	Female	9.64±4.07	0.713(0.477)
	Male	9.06±4.44	
Religion	Yes	9.25±4.14	1.278(0.203)
	No	10.13±4.08	
Living arrangements	Alone	10.14±3.70	2.979(0.033)
	With spouse	8.63±4.68	
	With children	7.76±4.73	
	Other	9.80±5.26	
Education	No education	9.87±4.12	0.760(0.518)
	Elementary school	9.27±4.18	
	Middle school	8.45±4.16	
	High school or higher	9.10±4.28	
Residence type	Apartment	9.61±4.08	2.277(0.024)
	House	3.00±4.24	
Disease	Yes	5.50±6.36	1.391(0.166)
	No	9.58±4.10	
Number of diseases	0[a]	5.50±6.36	10.596(<.001) a<c
	1~3[b]	8.71±4.20	
	4 or more[c]	11.65±3.02	
Medication	No	7.88±4.73	1.163(0.247)
	Yes	9.61±4.10	
Number of drugs taken	0	7.88±4.73	4.246(0.016)
	1~3	8.96±4.23	
	4 or more	10.89±3.41	
Medical insurance type	Medical insurance 1[a]	10.62±3.61	15.095(<.001) a>b
	Medical insurance 2[a]	12.66±1.75	
	Next level discount recipient[b]	7.43±4.24	

(r=-.463, *p*<.001), social support (r=-.470, *p*<.001) and self-transcendence (r=-.328, *p*<.001) at a statistically significant level. That is, greater pain, and higher nutritional risk, and lower perceived health, social support and self-transcendence were correlated with greater degrees of depression.

3.5 Factors Affecting Depression in Lower Income Elderly People

In order to identify factors affecting depression in lower income elderly people a gradual multiple regression analysis was conducted. For the independent variables, living arrangements (alone=0, with spouse. With children, others=1), residence type (apartment=0, house=1), number of diseases (0=1, 1~3 diseases, 4 or more =1), number of drugs taken (0 drugs=0, 1~3 drugs, 4or more=1), and type of medical insurance (medical insurance type 1=0, medical insurance type 2, next level discount recipients=1) that showed difference with depression were treated as dummy variables. Pain, perceived health, nutritional risk, social support and self-transcendence were treated as independent variables that led to an analysis result as seen in Table 5.

The issue of multicollinerarity that is anticipated in multiple regression analysis was verified using a tolerance (10 or higher), variance inflation factor (10 or lower) to show that there were no such issues.

Social support (β=-.266, *p*<.001) appeared to have the biggest effect on depression, followed by perceived health (β=-.245, *p*<.001), self-transcendence (β =-.216, *p*=.001), nutritional risk (β =.207, *p*=.003), and number of diseases DUM2 (β =.132, *p*=.037), with the overall explanatory power being 44.4%.

4. Discussion

This study was conducted to identify the degree of pain, perceived health, nutritional risk, social support, self-transcendence and depression in lower income elderly people and identify the factors that affect depression in order to ease depression in lower income elderly people.

The study shows that the degree of pain in lower income elderly people was high at 7.37 points out of a total of 10 points. this was higher than the in the study conducted on elderly people with chronic pain conducted by Cha and Park[27] where the score was 5.8 points or the 5.44 points in the study by Chang, Sohn and Cha[28] indicating that the degree of pain in lower income elderly people are high. In the case of pain that were 6 points or higher, it is pain that needs a visit to the hospital[29] but the study subjects were not able to undergo treatment or management due to economic hardships. Pain disrupts daily life and is associated with depression, anxiety, and sleep disorders[3,30]. Therefore ultimately it can become a

Table 4. Relation between the pain, perceived health, nutritional risk, social support and self- transcendence in lower income elderly people and depression

Variable	Pain r(p)	Perceived health r(p)	Nutritional risk r(p)	Social support r(p)	Self-transcendence r(p)
Depression	.243(.002)	-.463(<.001)	.439(<.001)	-.470(<.001)	-.328(<.001)

Table 5. Factors that affect depression in lower income elderly people

Variable	B	SE	ß	t	p
Constant	15.835	1.590			
Social support	-.110	.027	-.266	-4.047	<.001
Perceived health status	-.485	.132	-.245	-3.655	<.001
Self- transcendence	-.095	.027	-.216	-3.518	.001
Nutritional risk	.199	.066	.207	3.020	.003
Number of diseases (<4 or more)	1.199	.570	.132	2.103	.037

R^2=.444, F=25.187, p<.001

major factor undermining quality of life in the elderly, raising the need for pain management[31].

Perceived health was a total of 5.47 points (with average scores being 1.82 out of 5 points), indicating lower level of health. This is lower than the 9.30 points in the study by Kang, Kim, Lee, Jung and Ma[32] and is similar to the s core in the study by Kim[33] conducted on lower income elderly people. In the comparative study between general elderly people and lower income elderly people conducted by Park and Lee[34], the perceived health of lower income senior citizens was lower, which is in line with this study's results. Welfare and health management measures or alternatives would have to be established to allow lower income elderly people to view their health in a more positive light.

Nutritional risk was 9.85 points (average score 0.99 points) indicating high risk. This is in line with the results of the study by Lee[35] where the early female elderly people and the later female elderly people in a lower income group showed 11.90 points and 10.57 points, respectively. It is higher than in the study by Kim and Jung [36] where elderly people living alone recorded 7.70 points and also higher than in the study by Kim et al.[37] where general elderly people recorded an average of 0.44 points. This shows that lower income elderly people are more at risk than the general elderly population. 67.7% of the subjects in this study were living alone and therefore were more likely to have two meals per day rather than 3 and due to economic hardships or the trouble involved, the number of side dishes was limited to 1 or 2. They often ate the same food every day or did not eat fruit, vegetables or dairy items, causing a vicious cycle of bad health[36]. Nutritional issues in the elderly population can lead to higher rate of chronic diseases, mortality rates and complications, delays recovery from illness and is also associated with not only physical problems but also psychological problems such as depression or loneliness[9,11–13]. Therefore there is an urgent need to improve the nutrition among lower income elderly people.

Social support was 33.67 points, which is about medium level of social support. This is rather lower compared to the results from the study by Shin, Kim and Sung[38] conducted on lower income female elderly people and that of Kim, Lee and Chang[39] on elderly people with chronic diseases, where the results were middle to high. It is significantly lower than the 63.75 points from the study by Kang, Kim, Lee, Jung and Ma[32] on general elderly population. This shows that social support among male and female elderly people in the lower income bracket is low. Social support positively affects the elderly's mental health, level of depression, happiness and satisfaction with life[40–43], and appropriate social support can reduce or ease physical, psychological or social issues faced by the elderly, leading to successful aging and psychological well-being[42]. It also reduces loneliness and serves as a buffer against stressful situations, leading to improved health[32,44] and therefore establishing social support systems for lower income senior citizens is very important.

Self-transcendence showed 23.58 points (average score 1.57) showing low self-transcendence. This is in line with

the results in Kim[45] but even lower than the 2.70 points in the study on female senior citizens by Yang[46], leading to a lack of consistency, and therefore a need for follow-up studies. However, self-transcendence that helps one keep a positive attitude towards life is all the more important to lower income senior citizens who lack social support and experience more loneliness. Social activities, participation in religious activities, and volunteer activities should be encouraged and programs where the elderly and volunteers can participate together would be needed[46].

Depression was 9.53 points, indicating a high likelihood of depression. This was higher than the 8.36 points in the study by Kim[33] and also higher than the 6.41 and 7.06 for early and later year female senior citizens in a study conducted by Lee[35]. Moreover, it is higher than the elderly living alone[36] or the elderly with chronic pain[39]. Given that in the 2011 survey on the status of the elderly[7] a lower income, physical illness, worsened economic status and isolation from society or family were correlated with a higher depression rate[47] the depression of lower income elderly people can be deemed quite serious.

The difference in depression across general characteristics of lower income elderly people showed that there was statistically significant difference for living arrangements (F=2.979, p=.033), residence type (t=2.277, p=.024), number of diseases (F=10.596, p<.001), number of drugs taken (F=4.246, p=.016), and type of medical insurance (F=15.095, p<.001) An analysis of the significant differences show that depression was higher in the order of living with children, with spouse, others (grandchildren or parents) and living alone. This is in line with the results of the 2011 survey[7] but is in contrast with the results of Kim[33] where there was no statistically significant difference for living arrangements and depression. The elderly living in an apartment had a higher depression score than those living in a house. This seems to be due to the fact that compared to houses, apartments are more likely to lead to disconnect with neighbors, reservation towards others, focus on privacy and individualism, leading to higher sense of loneliness and exclusion[14]. A higher number of diseases and drugs taken were also correlated with a higher depression score. This matches the results by Kim and Jung[36] where those with diseases were more depressed than those without diseases, and the results of Kim[48] where those with 3 or more diseases had a higher depression than those without diseases. Depression scores were higher in medical insurance type 2 than in next level discount recipients. This is due to its association with income. In the 2011 survey on

the elderly[7], it was shown that lower income tended to be correlated with higher depression.

The relation between pain, perceived health, social support, self-transcendence and depression in lower income elderly people show that there was a weak correlation with depression and pain (r=.243, p=.002),and nutritional risk (r=.439, p<.001) at a significant level, and an inverse correlation with perceived health (r=-.463, p<.001), social support(r=-.470, p<.001), self-transcendence (r=-.328, p<.001) at a significant level. That is, higher pain and nutritional risk, and lower perceived health, social support and self-transcendence led to greater depression. This matches the results of Cha[49], Lee and Yang[50] where a greater degree of pain was correlated with greater depression and the study by Lee[35] and Kim and Jung[36] where higher nutritional risk was correlated with depressive symptoms. Lee [35] and the 2011 survey's in-depth analysis[51] show that lower perceived health had a higher degree of depression, which also matches this study's results. For social support, the result of Kim, Lee and Chang[39] where higher social support was correlated with a lower depression score is also in line. Although the variables are not the same, it is a similar result to that of Kim[48] that showed that without a reliable relationship, the elderly are vulnerable to depression. Lower self-transcendence was correlated with greater degree of depression. Self-transcendence in senior citizens is about accepting aging as a natural phenomenon and converting one's life towards one that focuses more on his children, while maintaining a good relationship with neighbors or contemporaries, taking a relaxed approach to reality and seeking internal integration. It is about accepting death as a reality and turning to god[18]. Religion during one's later years has a positive effect on one's mental and physical health[52]. Jung[53] showed that those with a religion showed lower depression than those without a religion and that those engaged in religious activities tended to be more physically active, have better relations with friends and family and more social interaction, which can all lead to decreased depression.

Among factors that can affect depression in lower income elderly people, social support (β=-.266, p<.001) had the biggest effect, followed by perceived health (β=-.245, p<.001), self- transcendence (β =-.216, p=.001), nutritional risk (β =.207, p=.003), and number of diseases with those with 4 or more diseases having an effect (β =.132, p=.037) with the overall explanatory power being 44.4%. The overall explanatory power was 44.4%.

This partially matches the study of Kim[48] where limits to participation in social activities, diseases, sleep quality, and IADL led to similar results. In Cha[54], daily activity, religion and diseases were found to be major variables that affect depression and according to a report by Jung, Lee, Park, Lee and Lee[51] that analyzed the 2011 survey on the elderly population in Korea, there were similar results to this study, with health status, financial readiness for later life, existence of a spouse, education, caring from family and social support affected depression.

Based on the above findings, we can conclude that in order to reduce the level of depression in lower income elderly people, establishing a social support system is of utmost importance. In addition, measures to improve their nutrition and health and reduce chronic diseases would also have to be implemented persistently. Social organizations and religious groups can also contribute to this effort.

5. Conclusion

This study was conducted to provide a basic set of data on measures to improve depression in lower income elderly people by investigating pain, perceived health, nutritional risk, social support, self-transcendence and depression among this population group. The findings show that higher pain and nutritional risk, and lower perceived health, social support and self-transcendence were correlated with higher depression, and the factors affecting depression were social support, perceived health, nutritional risk and number of diseases in descending order of impact. Overall explanatory power was 44.4%.

In order to improve depression in lower income elderly people based on this study, establishing a social support system is of utmost importance. In addition, measures to improve their nutrition and health and reduce chronic diseases would also have to be implemented persistently. Social organizations and religious groups can also contribute to this effort. Based on the findings of this study, the following are recommended:

1. A repeat study should be conducted as a follow-up as this current study only used subjects that visited welfare centers. The subject sample should be expanded to include lower income elderly people who do not visit such welfare centers.

2. Given that the explanatory power for factors affecting depression in lower income elderly people is only 44.4%, follow-up research should be conducted to identify additional factors.

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