Factors Affecting Unmet Needs in Elderly with Cognitive Decline - Using 2019 Community Health Survey

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Abstract

Purpose: The purpose of this study is to identify differences in the sociodemographic characteristics between the elderly who received help (hereinafter referred to as met "needs for help" or "met needs") and those who did not (hereinafter referred to as "unmet needs for help" or "unmet needs") among the elderly in need of help due to cognitive decline, and identify the sociodemographic factors that affect the unmet needs for help. **Study method:** This study is a secondary data analysis study using raw data from the Community Health Survey 2020 conducted in 2019 [15], and 21,880 elderly persons who answered that they needed help due to cognitive decline were selected from among the elderly population aged at least 65 years, and their answers were analyzed. For data analysis, the chi-square test and the Mann-Whitney U test were conducted using SPSS 23.0 to compare whether help was needed and whether the need was met, and logistic regression analysis was conducted to identify factors that affect unmet needs. **Study results:** Among the sociodemographic characteristics, gender, age, whether the person lives alone, whether the person has a spouse, income levels, and whether the person conducts economic activities showed significant differences depending on whether the respondent's need for help was met. As for factors influencing unmet need for help, age, whether the person lives alone, and income level were shown to have significant effects, and whether the respondent has a spouse, whether the respondent conducts economic activities, and education level were shown to have no significant effects. **Conclusions:** Women, those who live alone, those who have no spouse, groups with low economic levels, and groups with low education levels were identified as vulnerable groups with a high level of need for help and high level of unmet needs that were not sufficiently helped. In addition, it was identified that the ratio of unmet needs was higher among those who were younger, who lived alone, and those with lower income levels. Therefore, attention to these groups in health programs is necessary to prevent cognitive decline in elderly persons.

Keywords: Cognitive decline, Aged, Healthcare Disparities.

DOI: 10.47750/pnr.2022.13.S03.088

INTRODUCTION

The number of dementia patients is rapidly increasing worldwide due to aging [1]. In South Korea, the progress of cognitive decline and increase in dementia patients due to the increase in the elderly population are also receiving great attention as social problems since the estimated prevalence of dementia among the elderly aged at least 60 years is 7.24%, and dementia management costs are expected to be approximately KRW 19.2385 trillion as of 2021 [2]. Since there is no appropriate treatment method that can prevent dementia, which is the last stage of cognitive decline, the purpose of dementia treatment is to maintain cognitive function and daily life functions so that they are not worsened, rather than solving the root cause [3]. Therefore, early detection and management are perceived to be important. In the case of the elderly, with progression of cognitive decline, which is an early symptom of dementia, it becomes difficult to for them maintain an independent life. Because they cannot continue their daily activities well due to depression, memory decline, and diminished judgment, and cannot solve problems that occur in daily life, they need help from other people in one way or another. Since the cognitive functions of the elderly gradually and continuously deteriorate rather than recover, not only the elderly but also all of their family members have emotional, physical, and economic burdens for treatment and nursing care, and in cases where these burdens are not addressed, they will suffer from family conflicts, family dissolution, etc. [4]. Elderly persons with cognitive decline and their family members require help from various fields, that is, psychological, social, biological, and medical help [5]. As the need for help due to the cognitive decline of the elderly occurs in various ways, to meet the need for help, available resources at the individual level such as the existence of incomes and family members who will take care of the elderly, at the community level such as dementia centers and

day care facilities, and at the national institutional level such as long-term care insurance and delivery systems should basically be prepared [6].

In an environment where aging has been progressing rapidly [7, 8], South Korea has prepared basic support systems for dementia such as the establishment of the 1st-3rd National Dementia Management Comprehensive Plan in 2008, the enactment of the Dementia Management Act in 2012, and the provision of dementia tests and new establishment of fifth grade long-term care insurance (special grade for dementia) in 2014. However, blind spots still exist [9], and these may include the period of mild cognitive decline when early symptoms appear and dementia is hardly noticed by surrounding people. Also, even if the relevant people or family members of the person with mild cognitive decline think there are problems, the person cannot be included in the beneficiaries of dementia treatment or management, so care of the person remains the burden of individuals. Since dementia-related health and welfare policies must be able to identify the experience of early symptoms of cognitive decline, policies to expand early detection systems and the establishment of infrastructure began with a 2017 plan to promote a national responsibility system for dementia and the 4th National Dementia Management Comprehensive Plan in 2020 [9], so that dementia can be found early and those who have difficulties in daily life can use care facilities dedicated to dementia throughout the country. Therefore, preemptive methods to identify cognitive decline, restore life satisfaction with appropriate help and treatment, and slow the progression of dementia at the same time are attempted, and dementia is managed at the local level, such as with welfare centers, and installing dementia safety centers and short-term shelters at 56 public health centers across the country, so that more detailed policy adjustments are possible [9][29][30].

Many studies on factors affecting cognitive decline in the elderly [3][10][11] and the burden of care on caregivers [5][12][13] have already been conducted, but there are few studies on the extent to which the elderly with cognitive decline are actually helped when they need help (unmet needs). Previous studies related to unmet needs of medical care in the elderly population include Park and Choi [14], but studies on issues from the position of beneficiaries, such as whether all those who need help are actually helped, or whether there are differences in the degree of help depending on the subject are insufficient, and in particular, studies focusing on the characteristics of those who are not helped are rare.

Given that the purpose of health and welfare projects related to senile dementia is to ensure that those in need of help can actually be helped and there are no blind spots, studies to check whether the need for help is met from the viewpoint of beneficiaries and whether there are disparities in the satisfaction of the need for help between certain population groups are necessary.

Therefore, based on the idea that the need for of the elderly with cognitive decline who find it difficult to lead daily life independently should be met without disparities between certain population groups, this study is intended to identify the sociodemographic characteristics related to the unmet need for help of the elderly with cognitive decline and factors affecting the unmet needs. The results of this study will be helpful in planning dementia-related projects for the elderly so that no group is excluded from help by providing information on vulnerable groups depending on individuals' sociodemographic situations.

Purpose of the study

The concrete purposes of the study are as follows.

1. To identify differences in sociodemographic characteristics between the elderly who were helped (hereinafter met need for help) and the elderly who were not helped (hereinafter, unmet need for help) among the elderly in need of help due to cognitive decline.
2. To identify sociodemographic factors affecting the unmet need for help.

Study Method

1) Study design

This is a secondary data analysis study [general statistics approved by the National Statistical Office, approval no. 117075] using raw data from the 2019 Community Health Survey 2020 [15], and is a descriptive study to identify the sociodemographic factors that affect the unmet need for help of the elderly who experience difficulties in their daily life due to cognitive decline.

2) Study subjects

To analyze the raw study data, question items were checked through the 2019 Community Health Survey User Guide [16], and subjects were selected from among 74,471 elderly persons, excluding 76 who did not respond, out of 74,547 elderly persons aged at least 65 years. A total of 21,880 elderly persons who answered that they had experienced symptoms of cognitive decline were selected as subjects.

3) Data collection

The subjects of the data survey were adults aged at least 19 years, and the entire population was prepared by linking the resident registration population data of the Ministry of Public Administration and Security and the housing data of the Ministry of Land, Infrastructure and Transport. The data were collected from August 16 to October 31, 2019, by trained investigators who visited the households selected as samples to conduct one-on-one interviews using a laptop equipped with a questionnaire program.

The survey items were developed by the Indicator

Standardization Subcommittee, and consisted of 211 items in 21 areas, divided into items for an individual questionnaire survey and items for a household questionnaire survey.

4) Analysis variables

With regard to the experience of cognitive decline, the respondents were required to answer, "yes" or "no" to the question "Have you experienced more and more frequent or severe mental confusion or memory loss in the last year?" and with regard to the experience of disruption in daily life due to cognitive decline, the respondents were required to answer the question, "In the last year, how often have you been unable to do your usual housework due to confusion or memory loss? (Cooking, cleaning, taking medicine, driving, paying utility bills, etc.)." on a 5-point scale of "always," "often," "sometimes," "hardly ever," and "never." In this study, the answers were reclassified into three levels by combining "always" and "often" into "always/often," and "hardly ever" and "never" into "hardly ever/never."

With regard to the need for help, the respondents were required to answer the question "How often do you need help because of mental confusion or memory loss?" on a 5-point scale of "always, generally, sometimes, hardly ever, and never." In this study, the answers "always" and "generally" were reclassified into "always/generally need help," "hardly ever" and "never" into "hardly ever/never need help (no help needed)."

With regard to the degree to which the need for help are met, the respondents were required to answer the question, "How often can you get help when you need it in your daily life?" on a 5-point scale of "always," "often," "sometimes," "hardly ever," and "never." In this study, the answers "always" and "often," were classified into "the need for help is met (hereinafter met)," and the answers "hardly ever" and "never" into "the need for help is not met."

As for sociodemographic characteristics, the items age, whether the person lives alone, whether the person has a spouse, whether the person currently conducts economic activities, education level, and annual income were used. Ages were divided into three groups: 65- 75 years old, 75-85 years old, and at least 85 years old.

With regard to "whether the person lives alone," the responses about household types were surveyed as 19 types, and "single-person households" were classified into "live alone," and the remaining types other than "single-person households" were classified into "do not live alone." With regard to "whether the person has a spouse," the original item regarding marital status was divided into "have a spouse," "divorced," "bereaved," "separated," and "unmarried" and among them, "have a spouse" was classified into "have a spouse" and the rest were classified into "no spouse." Whether the person currently conducts economic activities was assessed with answers of "yes" or "no" to the question, "Have you worked for at least one hour for income or at least 18 hours as an unpaid family worker during the last one week?" and the answer "yes" was classified into "conducts economic activities" and the answer "no" into "no economic activity." Education was divided into four levels: "no education," "elementary school or lower," "middle school-high school," and "university or higher." Income was separately investigated as monthly income or annual income. In this study, monthly income was converted into annual income by multiplying by 12 to unify all incomes as annual incomes and divided into less than 5 million won, 5-10 million won, 10-20 million won, 20-40 million won, and at least 40 million won.

5) Data analysis

To analyze differences in frequency between the group that needs help due to cognitive decline and the group that does not need help, and between the group whose need for help is met and the group whose need for help is not met, the significance was checked through chi-square tests. In addition, for continuous variables, the mean and deviation were compared with Mann-Whitney U tests. To identify factors related to the unmet need for help of the elderly with symptoms of cognitive decline, simple logistic regression analysis was first conducted, an initial multiple logistic regression model was built using the variables that were significant in the simple logistic regression analysis, and the final model was fixed by leaving significant variables through backward elimination. All analyses used SPSS 23.0, and statistical significance levels were analyzed based on.05.

6) Ethical considerations

This study obtained raw data from the 2019 Community Health Survey after obtaining permission to use the data from the National Statistical Office [Approval No. 117075] [12]. In order to proceed with the study, approval for exemption from deliberation was obtained from the public institution institutional review board (IRB).

RESULTS

1) Whether help is needed due to cognitive decline and whether the need for help was met according to sociodemographic characteristics

Table 1 shows the results of comparison of whether help is needed and whether the need for help is met according to the sociodemographic characteristics of the elderly who experienced cognitive decline.

The ratio of respondents who need help due to cognitive decline was higher among women than men, with 8.80% among men and 12.70% among women (X^2=64.67, p<0.001), and increased with age with 52.21% among those aged less than 75 years, 60.99% for those aged 75-85 years, and 75.70% for those aged at least 85 (X^2=117.62, p<.001). With regard to whether the person lives alone, the ratio of elderly who live alone was higher at 13.60% than those who

do not at 10.40% (X^2=36.01, p<.001), and as for whether the person has a spouse, the ratio of having no spouse was higher at 16.70% than having a spouse at 7.60% (X^2= 348.75, p<.001). With regard to annual incomes, those with no need for help had higher incomes at 2116.60 (2170.81) million won than those who needed help at 1820.12 (2338.0) million won (z=-13.618, p<.001), and by income range, the ratio was higher for lower incomes with 23.30% for those with income less than 5 million won and 10.60% for those with income exceeding 40 million won, (X^2= 317.06, p<.001). The proportion was higher for the elderly who are not currently conducting economic activities at 16.20% than those who are at 2.60% (X^2= 769.78, p<.001). With regard to the ratio in relation to education level, it was lower for those at higher education levels with 20.90% among those who were not educated at all and 6.70% for those who graduated from junior college or were educated more (X^2= 493.38, p<.001).

With regard to whether the need for help was met, the ratio of those with unmet needs was higher among women at 21.55% than among men at 15.42% (X^2=*8.46*, p<.004), and the ratio decreased as age increased with 23.39% for those aged not more than 75 years, 17.65% for those aged 75-85 years, and 10.75% for those aged at least 85 years ($X^{2=}$=16.90, p<.001). The ratio of those with unmet needs according to whether the person lives alone was higher for the elderly who live alone at 34.36% than those who live with at least one other person at 12.77% (X^2=109.49, p<.001), and the ratio was significantly higher for those who have no spouse at 21.77% than those who have a spouse at 16.76% (X^2=6.52, p=.011). The average annual household income was lower in the group with unmet needs at 984.69 (± 1122.80) million won than the group with met needs at 2077.21 (±2399.8) million won (z=-10.34, p<.001), and the ratios of those with unmet needs were 32.01% for those with an average annual household income of less than 5 million won, 26.22% for those with 5-10 million won, 15.70% for those with 10-20 million won, 8.94% for those with 20-40 million won, and 4.18% for those with at least 40 million won (X^2=95.05, p<.001). The proportion of the elderly with unmet needs was significantly higher among those who conduct economic activities at 41.18% than those who do not at 17.88% (X^2 =42.91, p<.001). With regard to education levels, the ratio of those with unmet needs was the highest among those who were not educated at all at 14.49% and the lowest were those who graduated from junior college or were educated more at 14.49% (X^2=15.74, p<.028).

2) Factors affecting the unmet need for help of the elderly with cognitive decline

A simple logistic regression analysis was conducted to identify the degree of the effects of the sociodemographic characteristics that showed significant differences between the group with unmet needs and the group with met needs, and the results showed that age, gender, whether the person lives alone, whether the person has a spouse, whether the person conducts economic activities, and income range had significant effects, while education levels had no significant effect. A multiple logistic regression analysis was conducted to identify the effects of the variables under correlations between the variables, and the results showed that age, living alone, and income had significant effects <Table 2>. As the age increased by 1 year, the odds ratio of those with unmet needs decreased significantly (Odd's Ratio, OR; 0.95, 95% Confidence Interval, CI: 0.94-0.96, p<.001). The odds ratio of those with unmet needs was 2.53 (95% CI: 2.04-3.13; p<.001) times higher among those who live alone than those who live with others. The odds ratio of those with unmet needs was significantly lower at 0.53 (95% confidence interval: 0.37-0.77) times among those with average annual incomes of 20-40 million won (p=0.001), and 0.63 times (95% confidence interval: 0.41-0.96) times for those with average annual incomes of at least 40 million won(p=.032). than those with average annual incomes of less than 5 million won (p=0.001),

Discussion

In this study, the need for help and whether the need for help was met according to sociodemographic characteristics were checked in the elderly who are experiencing cognitive decline out of the elderly population in South Korea, and factors affecting the unmet need for help were identified.

In this study, the condition “need for help” due to cognitive decline means cases where the person always or generally needs help, that is, where the person should be helped whenever possible. The proportion of those who need help was significantly higher among women than men, younger persons than older persons, those who live alone than those who live with others, those who have no spouse than those who have a spouse, those with lower incomes than those with higher incomes, those who currently have a job than those who have no job, and those with low education levels than those with higher education levels <Table 2>. The differences between those with unmet needs and those with met needs were checked and according to the results, the group with unmet needs was younger, had a higher ratio of women, and had higher ratios of those who have no spouse, who live alone, and who conduct economic activities compared to the group with met needs. Among these variables, factors related to the unmet need for help were checked through logistic regression analysis, and as a result, age, single-person household, and annual income were found to have significant effects. In summary, women and those who live alone, who have no spouse, have a low economic level, and have low education levels were groups with a high level of need for help and high ratio of the elderly unmet needs. On the other hand, older persons and those who do not conduct economic activities were groups with a high level of need for help but low ratio of those with unmet needs, indicating that younger elderly persons and

elderly persons who conduct economic activities are rarely helped even if they need help. That is, the groups we should pay attention to are women and those who live alone, have low economic levels, and have a low education level with high ratio of those who need help but are seldom helped and young elderly persons and those who conduct economic activities who are rarely helped despite their low ratio of those who need help. Factors affecting unmet need for help were checked, and according to the results, education level, whether the person has a spouse, and whether the person conducts economic activities did not have any significant effect, and the ratio of those with unmet needs decreased as age increased and increased among those who live alone and those with lower incomes.

In the discussion below, the remaining characteristics that showed differences in the need for help and whether the need for help is met, that is, gender, whether the person has a spouse, and whether the person conducts economic activities, will be examined together with age, whether the person lives alone, and income.

With regard to age, as age increases, all executive and judgment abilities, which are cognition-related abilities, gradually disappear [17][18] and as the ability to perform daily living activities decreases, the need for help increases, but the ratio of unmet needs decreases as age increases. (OR 0.95). Kim and Ahn [19], and Kim, Park, and Kim [20] also showed that whereas the care needs of the elderly living in the community increased with age, the elderly with unmet needs among the elderly with care needs decreased, which is consistent with the results of this study. This low ratio of those with unmet needs despite the high ratio of the elderly with the need for help means that interest and help are being given to the elderly as senile dementia-related projects progress at the community level. However, since it shows that the cognitive decline of younger elderly persons remains a blind spot, attention and management are required for the group whose cognitive function begins to decline in the early years of senescence.

The results of this study are interpreted as indicating that women need help more than men, but the proportion of those who are not helped when they need help is higher than men, and this is consistent with the results of previous studies indicating that lower ratios elderly women with cognitive decline are provided with care than elderly men [1][6][19][21][22][23][24]. Therefore, when developing policies and programs related to cognitive decline in the elderly, it is necessary to consider gender differences and pay attention to elderly women [14][21][22][24][28].

In this study, the ratio of those who need help and the ratio of those with unmet needs were high among those who had no spouse, and this is the same as the case of those who live alone, with a high ratio of those who need help and a high ratio of those with unmet needs, but the two variables should not be viewed as completely different because elderly persons with no spouse may live alone. Previous studies have also reported that the elderly with a spouse were provided with care more frequently [6][14][18][19][21][22]. Previous studies have reported gender differences in cases where elderly persons are helped by a spouse [14][22][23], but the foregoing could not be checked in this study because differences between genders were not included.

The elderly with cognitive decline generally always need help, but the proportion of those with unmet needs was shown to be 1.62 times higher among those who conduct economic activities than among those who do not conduct any economic activity <Table 2>. This is interpreted to be attributable to cases where elderly persons can earn an income to some extent, but need help.Given the results of this study indicating that the ratios of those with unmet needs among those with the an average annual income of 10 million won to 20 million won were similar at 0.94 times of the ratio among those with and those with the average annual income of less than 5 million won.

But the ratioof those with unmet needs among those with the average annual income of 40 million was lower at 0.53 times, it can be seen that the elderly who conduct economic activities but cannot earn more than 20 million won are the group that can be hardly are rarely helped despite help being that help is needed.

The elderly are a group with a wide age range from 65 to over 90 years of age. In the case of elderly persons who have symptoms of cognitive decline, it progresses over time to reach dementia at some point, and as for elderly persons diagnosed with dementia, there are many health welfare policies. However, according to the results of this study, the ratio of elderly in need of help due to cognitive decline was 75.70% among those aged at least 85 years, and 52.21% among those aged not more than 75 years, but the ratio of those with unmet needs among younger elderly persons aged not more that 75 years was 23.39%, which was higher than the ratio among elderly persons aged at least 85 years at 10.75%, indicating that attention should be paid to relatively younger elderly persons as well. Since the difficulties caused by the progress of cognitive decline in the relatively young elderly are the same as those in older elderly persons, they will experience situations that cannot be solved within their family. The fact that they always need help means that cognitive decline progresses, and if they are not provided with appropriate help and management, their difficulties and those of their family members will grow larger, and the exacerbation is hard to prevent.

In the case of the elderly living alone, that is, single-person households, the proportion of those with unmet needs was 2.53 times higher than that of non-single-person households. Therefore, the elderly living alone appeared as a socioeconomic factor that greatly affects unmet needs. The high ratio of those with unmet needs among the elderly living alone is a predictable result because they have fewer help resources [6][8][14][19][21][22][23] than the elderly

living with their families. In South Korea, the proportion of single-person households aged at least 65 has increased rapidly, reaching 24.7% as of 2018 [7][8] and is expected to increase further [8]. Therefore, social attention and support are particularly required.

Given that the proportion of those with unmet needs is higher than that of those with met needs the elderly with small annual incomes and the ratio of those with unmet needs is 0.53 times smaller for those with annual incomes of 20-40 million won than those with annual incomes smaller than 5 million won, economic factors act greatly on whether the need for help is met. Given that previous studies also report that higher ratio of economically vulnerable groups are not helped [14][22][25], and that factors for the unmet need for medical care are closely related to economic limitations [6] [17][14][21][22][23][26], the attention of local services to economically vulnerable elderly persons with cognitive is necessary. Lee and Lee [27] reported that the higher the monthly consumption level, the higher the level of health. It is necessary to identify groups with a low income level that makes it difficult to spend for necessary care. When inferred from the results of this study, it can be assumed that the group with an annual income not larger than 20 million won needs help from outside.

When seen comprehensively, women, those who live alone, those who have no spouse, those with low incomes, and those with low education levels have a high level of need for help and high ratios of those with unmet needs and those aged more and those who conduct economic activities have a high level of need for help but low ratios of those with unmet needs. On the contrary, the proportion of those with unmet needs was shown to be high among younger groups and those who conduct economic activities. Among these factors, lower ages, living alone, and lower incomes were identified to be associated with high ratios of those with unmet needs. Given that the subjects of this study were those who experienced symptoms of cognitive decline and generally always require help and are expected to have difficulties if the need for help is not met, groups that need help but are rarely helped should be identified and attention should be paid to policies to solve such problems.

Since this study used the Community Health Survey questionnaire, what kind of help was needed was not specified, and whether official or informal services were provided when help was provided was not identified. Therefore, this study has a limitation that it did not check concretely where unmet needs occurred.

Conclusions and Suggestions

In this study, differences in the unmet need for help according to demographic characteristics among the elderly who always need help due to cognitive decline out of the elderly population aged at least 65 years were investigated. According to the results, women, those who live alone, those who have no spouse, those with low incomes, and those with low education levels were groups with a high level of need for help and high ratios of those with unmet needs, and those who are younger and those who conduct economic activities were shown to be vulnerable groups that are seldom helped even when they need help. Therefore, when implementing senile dementia prevention projects, attention should be paid to these groups so that they can receive the help they need.

In addition, living alone, income, and age were identified as major factors affecting unmet need, and it was shown that younger elderly persons, those who live alone, and those with low incomes are rarely helped. Therefore, attention is required for groups that correspond to these factors.

As suggestions, first, local governments or the state that wants to help the elderly with cognitive decline should reflect the results of this study to minimize people excluded from help considering the side of beneficiaries.

Second, to ensure that the elderly with cognitive decline are not excluded from help due to factors related to their unmet needs such as age, income, and the proportion of single households, it seems necessary to develop services and resources for them.

Third, as a suggestion for future studies, factors related to the failure to provide help to people in need due to cognitive decline should be checked from multiple angles, such as individual factors as well as the pattern of need for the method of providing help.

Acknowledgement

This study was supported by Korean Academy of Community Health Nursing funded by a grant from the Korean Centers for Disease Control and Prevention Chronic Disease Control Research.

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Table 1. Differences in Socioeconomic Characteristics between Groups in Need of Help or Not, and Met and Unmet Needs (N=17,824)

		Need for help				**Met for help**			
		No need (n=15,816)	Need (2,008)	X^2 or z	*p*	Met (n=1,371)	Unmet (n=337)	X^2 or z	***p***
		n(%) or M(±SD)	n(%)or M(±SD)			n(%) or M(±SD)	n(%) or M(±SD)		
Sex	Male	6123(91.20)	592(8.80)	64.67	<.001	428(84.58)	78(15.42)	8.46	.004
	Female	9693(87.30)	1416(12.70)			943(78.45)	259(21.55)		
Age (year)	>75	432(47.79)	472(52.21)	117.62	<.001	131(76.6)	40(23.39)	16.90	<.001
	75-85	792(39.01)	1238(60.99)			448(82.35)	96(17.65)		
	<85	244(24.30)	760(75.70)			382(89.25)	46(10.75)		
Living type	Living alone	4285(86.40)	672(13.60)	36.01	<.001	361(65.64)	189(34.36)	109.49	<.001
	None	11521(89.60)	1335(10.40)			1009(87.21)	148(12.79)		
Has spouse	Yes	9840(92.40)	814(7.60)	348.75	<.001	576(83.24)	116(16.76)	6.52	.011
	No	5966(83.30)	1193(16.70)			794(78.23)	221(21.77)		
Annual Income†		2116.60(±2170.81)	1820.12(±2338.00)	-13.61	<.001	2077.21(2399.80)	984.69(1122.80)	-10.34	<.001
Annual income level†	<500	1249(76.70)	379(23.30)	317.06	<.001	206(67.99)	97(32.01)	95.050	<.001
	500 to <1000	4592(87.60)	653(12.40)			394(73.78)	140(26.22)		
	1000 to <2000	4426(90.80)	448(9.20)			333(84.30)	62(15.70)		
	2000 to <4000	3456(92.50)	281(7.50)			224(91.06)	22(8.94)		
	>4000	2093(89.40)	247(10.60)			199(95.22)	10(4.18)		
Doing economic activity	Yes	6299(97.40)	165(2.60)	769.78	<.001	80(58.82)	56(41.18)	42.91	<.001
	No	9516(83.80)	1842(16.20)			1291(82.12)	281(17.88)		
Education-al level	None	2960(79.10)	781(20.90)	493.38	<.001	522(78.14)	146(21.86)	15.74	0.280
	Elementary school or lower	6858(89.40)	809(10.60)			556(81.64)	125(18.36)		
	Middle to high School	4949(93.50)	343(6.50)			233(80.62)	56(19.38)		
	College or higher	1029(93.30)	74(6.70)			59(85.51)	10(14.49)		

†monetary unit: 10,000 won

Table 2. Factors Affecting Unmet Needs in the Elderly with Cognitive decline

Variables		Simple logistic regression		Multi-variable logistic regression	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Age (year)		0.95 (0.94- 0.96)	<.001	0.95(0.94-0.96)	<.001
Female (ref: male)		1.33 (1.10-1.61)	.003		
Living alone (ref: not living alone)		3.10 (2.59-3.70)	<.001	2.53 (2.04-3.13)	<.001
Has spouse (ref: none)		0.49 (0.41-0.59)	<.001		
Doing economic activity (ref: none)		1.62 (1.30-2.02)	<.001		
Educational level	none	1 (Reference)			
	elementary school or lower	0.96 (0.79-1.17)	.694		
	middle to high school	0.97 (0.76-1.22)	.774		
	college or higher	0.86 (0.56-1.33)	.499		
Annual income (10,000 won)	< 500	1 (Reference)		1 (Reference)	
	500 to <1,000	0.91 (0.71-1.17)	.454	1.02(0.79- 1.33)	.854
	1,000 to <2,000	0.69 (0.53-0.90)	.007	0.94(0.69- 1.29)	.710
	2,000 to <4,000	0.35 (0.26-0.49)	<.001	0.53(0.37- 0.77)	.001
	≥4,000	0.30 (0.21-0.44)	<.001	0.63(0.41- 0.96)	.032