Association between Drinking Behavior and Activities of Daily Living in Community-dwelling Older Adults

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Abstract

As the elderly are more vulnerable to drinking than young adults, elucidation of the relationship between drinking habits of old age and ADL is an important issue from the perspective of public health science. This study explores the relationship between drinking habits of the elderly and impaired Activities of Daily Living (ADL) and provides basic materials to prevent impaired ADL in the old age. This study analyzed a total of 4,134 elderly people over the age of 65 who participated in 2011 Korean Longitudinal Survey of Aging. Drinking habits were classified into 'no drinking (no drinking experience in lifetime)', 'past drinking (have drinking experience in the past but presently do not drink)' and 'currently drinking'. ADL were classified into 'normal group' and 'Impaired ADL group'. To compare the relationship between alcohol drinking and impaired ALD, the odds ratio (OR) and 95% confidence intervals (CI) were presented using hierarchical logistic regression. As the result of multivariate analysis (adjusted model), even after all confounding variables were adjusted, drinking had significant relationship with ADL impairment. Past drinkers has 6 times more risk of ADL impairment (OR=5.86, 95% CI: 3.07-11.19) than nondrinkers and current drinkers 4 times more risk (OR=3.94, 95% CI: 2.08-7.48) (p<0.05). As drinking in old age is associated with impaired ADL, moderation is required on drinkers for healthy aging.

Keywords: alcohol drinking, Activities of Daily Living, cognitive function, drinking habits

1. Introduction

Presently serious social problems are occurring in Korea such as rapid change in population structure due to extremely low birth rate and radical aging. In particular, aging is progressing with very high speed in Korea and the elderly population over the age of 65 already surpassed 7% of total population in 2000, entering aging society and as of 2014, the elderly population reached 12.7%, facing aged society in the near future [1]. It is predicted that aging will accelerate even faster and Korea will turn into a post-aged society with elderly   population taking up 20% of total population in 2026 [1].

Recently, the goal of elderly health care is changing into 'healthy aging' which tries to extend life span and health [2]. For a successful aging, it is important to maintain activities of daily living (ADL) together with high cognitive capacity [901]. Especially, as impaired ADL is a state in which basic daily living activities previously possible becomes difficult due to diseases, which exerts negative effect on independent living, ADL is critical in the quality of life for the elderly.

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Numerous studies have found that impaired ADL has significant relationship with sociodemographic factors such as old age [3], low income [4] and low level of education [5], chronic diseases such as diabetes and cardio-cerebrovascular disease [6] and health behaviors such as drinking and smoking. Especially, it has been reported that drinking in old age not only has to do with reduced cognitive functions [7] but also is a risk factor for impaired ADL [8]. Many epidemiological studies have supported that excessive drinking is closely related to impaired ADL in old age [9] and recent systematic exploratory study [10] and Meta-research [11] scientifically verified that excessive drinking is a factor which has negative effect on cognitive health in old age.

Nevertheless, annual drinking rate of elderly population over the age of 65 in Korea is on the increase from 43% in 2007 to 46.8% in 2010 and high-risk drinking rate which means 7 glasses of Soju for male and 5 cups for female in one round of drinking also increased from 7.1% to 9.4% [1] for the same period. Besides, it was reported that the elderly who practice excessive drinking tend not just to consume larger quantity of alcohol in a single drinking round but to have higher frequency of drinking as well [1].

As the elderly are more vulnerable to drinking than young adults [12], elucidation of the relationship between drinking habits of old age and ADL is an important issue from the perspective of public health science. Nonetheless, studies on drinking habits have focused on specific regions [13, 14, 15] or on specific classes such as the elderly in the rural areas [16] or the female elderly living alone [15] and there has been lack of studies on the relationship between the drinking of the elderly and ADL using representative data.

This study explores the relationship between drinking habits of the elderly and impaired ADL and provides basic materials to prevent impaired ADL in the old age.

2. Methods

2.1 Subjects

This study analyzed a total of 4,134 elderly people (1,754 males and 2,380 females) over the age of 65 who participated in 2011 Korean Longitudinal Survey of Aging (KLoSHA). KLoSHA is supervised by Korea Labor Institute and TNS Korea conducted the survey on commission from July 7, 2011 through December 2011 [1]. Sampling frame was (enumeration) districts of Population and Housing Census 2005 and 261,237 districts were set as sampling units. In 2011 survey, 10,000 people was set as maximum valid sample size and considering that average population over the age of 45 was 1.67 per household in 2000 Population and Housing Census, 1,000 sampling districts were selected. The method of the survey was computer-assisted personal interviews using laptop computers.

2.2 Measurement

Drinking habits were classified into 'no drinking (no drinking experience in lifetime)', 'past drinking (have drinking experience in the past but presently do not drink)' and 'currently drinking'. Using Korean Activities of Daily Living (K-ADL) [17], ADL was assessed as 'without help', 'with some help' or 'completely unable' on seven items (questions); change of clothes, washing face & brushing teeth & shampooing, bathing (shower), eating, moving around, using bathroom and toilet-distinction, which are minimal functions for independent living. After completion of the assessment, in order to classify the elderly into elderly group within normal range and dysfunctional elderly group, this study classified those who responded 'without help' for all items into normal-range group and those who answered 'with

some help' or 'completely unable' to more than 1 item into impaired ADL group. The value of Cronbach's α which indicates internal consistency of ADL was 0.97.

Confounding variables included smoking (no smoking, past smoking, current smoking), gender, age (65~75, over 75), level of education (middle school and lower, over high school), level of income (gross income of the household), subjective health (good, fair, bad), diabetes (yes, no), high blood pressure (yes, no), stroke (yes, no), arthritis and rheumatism (yes, no), depression (yes, no), marital status (have spouse, divorced/separation, separation by death), cognitive function (normal, mild cognitive impairment, dementia), eyesight (good, fair, bad) and average monthly participation time in social activity (less than 1 hour, over 1 hour).

For level of cognitive function, Korean version of Mini-Mental Status Examination (K-MMSE) composed of 30 items was used [18]. The study classified the subjects with over 24 points as 'normal cognitive level', 20 to 23 points as 'mild cognitive impairment' and less than 19 points as 'dementia'.

For depression, CES-D10 [20] was used which standardized CES-D (the Center for Epidemiologic Studies Depression Scale) developed by Randolff [19] in Korean. CES-D10 is a depression screening test which reduced CES-D into 10 items and is in 4-point scale. Total score or point ranges from 10 to 40 and the higher the score, the more serious depression symptoms are, and the cutoff point was 24. The value of Cronbach's α which represents internal consistency of CES-D10 was 0.87.

2.3 Statistical Analysis

Chi-square test was used to compare smoking, gender, age, level of, level of, subjective health, diabetes, high blood pressure, stroke (yes, no), arthritis and rheumatism, depression, marital status, cognitive, eyesight and average monthly participation time in social activity of nondrinkers and drinkers. To compare the relationship between alcohol drinking and impaired ALD, the odds ratio (OR) and 95% confidence intervals (CI) were presented using hierarchical logistic regression. IBM SPSS version 22.0 (IBM Inc., Chicago, Illinois) was used for all analyses.

3. Results

3.1 General Characteristics of Population

General characteristics of population are presented in Table 1. For age group, those over 65 years of age to less than 75 were 54.8% and over 75 were 45.2%. Males were 42.4% while females were 57.6%. For level of education, those with less than middle school education were 78.2% and the elderly with spouse were the majority with 66.3%. 42% of the subjects perceived that their subjective health was poor and 27.9% responded that their eyesight is bad. For prevalence rate of diseases, diabetes was 21.7%, high blood pressure 51.4%, stroke 7.9%, arthritis and rheumatism 34.1%, depression 7.9%, mild cognitive impairment 24.6% and dementia 21.6%. Besides, 3.0% of the subjects responded that they participate in social activity for more than 1 hour per month. Current smokers were 12.3% while current drinkers were 57.4%. Prevalence rate of impaired ADL was 8.0%.

Table 1.General Characteristics of Population

Variables	n (%)
Impaired ADL	
Yes	330 (8.0)
No	3,804 (92.0)
Sex	
Male	1,754 (42.4)
Female	2,380 (57.6)
Age	
65-75	2,265 (54.8)
75-	1,869 (45.2)
Level of education	
Middle school and lower	3,232 (78.2)
Over high school	902 (21.8)
Level of income	
Q1	1,598 (38.7)
Q2	1,118 (27.0)
Q3	932 (22.5)
Q4	486 (11.8)
Marital status	
Have spouse	2,741 (66.3)
Divorced/separation	78 (1.9)
Separation by death	1,315 (31.8)
Subjective health	
Good	680 (16.4)
Fair	1,686 (40.8)
Bad	1,768 (42.8)
Diabetes	
Yes	898 (21.7)
No	3,236 (78.3)
High blood pressure	
Yes	2,125 (51.4)
No	2,009 (48.6)
Stroke	
Yes	325 (7.9)
No	3,809 (92.1)
Arthritis and rheumatism	
Yes	1,411 (34.1)
No	2,723 (65.9)
Depression	
Yes	326 (7.9)
No	3808 (92.1)
Cognitive function	
Normal	2,225 (53.8)
Mild cognitive impairment	1,015 (24.6)
Dementia	894 (21.6)
Eyesight	
Good	729 (17.6)

Fair	2,235 (54.1)
Bad	1,155 (27.9)
Smoking	
No smoking	2,910 (70.4)
Past smoking	714 (17.3)
Current smoking	510 (12.3)
Drinking habits	
No drinking	1,054 (25.5)
Past drinking	708 (17.1)
Currently drinking	2,372 (57.4)
Average monthly participation time in social activity	
Less than 1 hour	4,012 (97.0)
Over 1 hour	122 (3.0)

3.2 Characteristics of Subjects with Impaired ADL

Characteristics of subjects with impaired ADL are presented in Table 2. As the result of chi-squared test, there was significant difference between impaired ADL group and normal group in age, level of education, marital status, subjective health, diabetes, high blood pressure, stroke, arthritis & rheumatism, depression, cognitive impairment, eyesight, smoking, drinking and average monthly participation time in social activity ($p<0.05$). The rate of impaired ADL was higher in those over the age of 75 (13.4%), with high school education and lower (8.9%), separated by death (11.6%), with bad subjective health (16.7%), diabetes (10.8%), stroke (29.5%), arthritis & rheumatism (8.9%), dementia (27.0%), bad eyesight (16.1), past smoker (11.5%), past drinker (16.2%) and those with less than 1 hour of monthly social activities (8.2%) ($p< 0.05$).

Table 2.Characteristics of Subjects with Impaired ADL, n (%)

Variables	impaired ADL		P
	No (n=3,804)	Yes (n=330)	
Sex			0.245
Male	1,624 (92.6)	130 (7.4)	
Female	2,180 (91.6)	200 (8.4)	
Age			<0.001
65-75	2,186 (96.5)	79 (3.5)	
75-	1,618 (86.6)	251 (13.4)	
Level of education			<0.001
Middle school and lower	2,945 (91.1)	287 (8.9)	
Over high school	859 (95.2)	43 (4.8)	
Level of income			0.089
Q1	1,462 (91.5)	136 (8.5)	
Q2	1,044 (93.4)	74 (6.6)	
Q3	861 (92.4)	71 (7.6)	
Q4	437 (89.9)	49 (10.1)	
Marital status			<0.001
Have spouse	2,569 (93.7)	172 (6.3)	
Divorced/separation	59 (92.2)	5 (7.8)	
Separation by death	1,163 (88.4)	152 (11.6)	

Subjective health			<0.001
Good	675 (99.3)	5 (0.7)	
Fair	1,656 (98.2)	30 (1.8)	
Bad	1,473 (83.3)	295 (16.7)	
Diabetes			<0.001
Yes	801 (89.2)	97 (10.8)	
No	3,003 (92.8)	233 (7.2)	
High blood pressure			0.046
Yes	1,938 (91.2)	187 (8.8)	
No	1,866 (91.2)	187 (8.8)	
Stroke			<0.001
Yes	229 (70.5)	96 (29.5)	
No	3,575 (93.9)	234 (6.1)	
Arthritis and rheumatism			<0.001
Yes	1,285 (91.1)	126 (8.9)	
No	2,519 (92.5)	204 (7.5)	
Depression			<0.001
Yes	3,559 (93.5)	249 (6.5)	
No	245 (75.2)	81 (24.8)	
Cognitive function			<0.001
Normal	2,193 (98.6)	32 (1.4)	
Mild cognitive impairment	958 (94.4)	57 (5.6)	
Dementia	653 (73.0)	241 (27.0)	
Eyesight			<0.001
Good	710 (97.4)	19 (2.6)	
Fair	2,117 (94.7)	118 (5.3)	
Bad	969 (83.9)	186 (16.1)	
Smoking			<0.001
No smoking	2,682 (92.2)	228 (7.8)	
Past smoking	632 (88.5)	82 (11.5)	
Current smoking	490 (96.1)	20 (3.9)	
Drinking habits			<0.001
No drinking	2,171 (91.5)	201 (8.5)	
Past drinking	593 (83.8)	115 (16.2)	
Currently drinking	1,040 (98.7)	14 (1.3)	
Average monthly participation time in social activity			0.003
Less than 1 hour	3,683 (91.8)	329 (8.2)	
Over 1 hour	121 (99.2)	1 1 (0.8)	

3.3 The Relationship between Drinking Habits of Old Age and Impaired ADL

The relationship between drinking habits of old age and impaired ADL is presented in Table 3. As the result of univariate analysis (crude model), drinking has significant relationship with ADL impairment. Past drinkers had 14 times more risk of ADL impairment (OR=14.41, 95% CI: 8.20-25.32) than nondrinkers while current drinkers had 7 times more risk (OR=6.88, 95% CI: 3.98-11.88) ($p<0.05$).

As the result of multivariate analysis (adjusted model), even after all confounding variables were adjusted, drinking had significant relationship with ADL impairment. Past drinkers has 6 times more risk of ADL impairment (OR=5.86, 95% CI: 3.07-

11.19) than nondrinkers and current drinkers 4 times more risk (OR=3.94, 95% CI: 2.08-7.48) (p<0.05).

Table 3.The Relationship between Drinking Habits of Old Age and Impaired ADL: Odds Ratio and 95%CI

Drinking habits	Crude OR (95% CI)	Adjusted OR (95% CI)
No drinking	1.00	1.00
Past drinking	14.41 (8.20, 25.32)	5.86 (3.07, 11.19)*
Currently drinking	6.88 (3.98, 11.88)	3.94 (2.08, 7.48)*

*p<0.05

Confounding variables included smoking (no smoking, past smoking, current smoking), gender, age (65~75, over 75), level of education (middle school and lower, over high school), level of income (gross income of the household), subjective health (good, fair, bad), diabetes (yes, no), high blood pressure (yes, no), stroke (yes, no), arthritis and rheumatism (yes, no), depression (yes, no), marital status (have spouse, divorced/separation, separation by death), cognitive function (normal, mild cognitive impairment, dementia), eyesight (good, fair, bad) and average monthly participation time in social activity (less than 1 hour, over 1 hour).

4. Discussion

Since old age is the time when physical functions decline, it is important to maintain them for healthy aging. This study explored the relationship between drinking habits of old age and impaired ADL using national data.

Prevalence rate of impaired ADL was 8.0% in this study and was higher in females and old age. This result corresponds with that of Korea Institute for Health and Social Affairs that prevalence rate of impaired ADL was the highest among the female elderly and in old age over 75 [21]. In particular, since it has been reported that the elderly with impaired ADL have more chronic diseases, extra attention should be paid to the high-risk group for impaired ADL. In addition, as the elderly with problems of ADL require the help of caregivers and ultimately cause depletion of medical resources with the increase in the use of the medical system and increased burden of social security with the limitation of family support, it requires national-level support and attention.

In this study, drinking had significant relationship with impaired ADL. Even after adjusting all confounding variables, past drinkers had 6 times more risk and current drinkers had 4 times more risk of ADL impairment than nondrinkers. Numerous studies have reported that excessive drinking is a risk factor for ADL [22, 23]. In a follow-up study on 1,486 mid-aged Finnish for 22.8 years, excessive drinkers had around two times significantly more risk of cognitive impairment than nondrinkers [24]. In addition, 2-year follow-up study on 3,012 Chinese elderly over the age of 60 regarding the relationship between drinking habits and cognitive impairment found out that excessive drinkers who drank over 2 glasses of alcohol a day had 1.5 times more risk of cognitive impairment than nondrinkers [25]. This trend is similar in the progress of dementia as well; in the study by Xu et al. [26] on the elderly over the age of 60, excessive drinkers had significantly higher onset of dementia than nondrinkers. Although it is difficult to directly compare the result of this study with those of preceding studies as they mainly focused on cognitive impairment, it can be inferred that drinking may have negative effect on ADL in that chronic drinking causes neurological damages.

The imitations of this study are as follows; first, as this study is a crosssectional one, drawn-outresults cannot be interpreted in causal relationships. To verify causal relationship, longitudinal studies are required in the future. Second, this study did

not investigate period, amount and frequency of drinking, which requires careful interpretation of the results.

5. Conclusion

As drinking in old age is associated with impaired ADL, moderation is required on drinkers for healthy aging.

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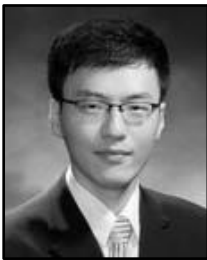
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