

Physical and social effects of a daily alcohol intake of < 20g amongst the Japanese community dwelling elderly

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Objectives: Japanese Ministry of Health, Labor and Welfare (JMHLW) recommended a daily alcohol intake of 20g. In the elderly, a smaller amount was recommended, however the exact amount was not mentioned. This study aims to clarify factors related to <20g alcohol intake, its physical and social effects amongst the elderly.

Methods: Internet survey among 400 Japanese elderly, 206 subjects with drinking habits, basic attributes, lifestyle, health status, conversation, SF-8, GDS, and PSQI were analyzed. Logistic regression analysis was performed between two groups (<20g, ≥20g) and compared by χ^2 test and t-test.

Results: The consumption of <20g (N=102) significantly associated with talking about health ($OR=2.12$; 95%CI: 1.068-4.239) and going to gym ($OR=3.64$; 95%CI: 1.353-9.112). Consumption of ≥20g (N=104) amongst young seniors ($OR=1.06$; 95%CI: 1.002-1.131) has social factors and correlated with enjoying life ($OR=0.179$; 95%CI: 0.085-0.377), lower conversation per day ($OR=1.33$; 95%CI: 1.112-1.597) and talking about work ($OR=0.109$; 95% CI: 0.021-0.573).

Discussions & Conclusion: Alcohol intake <20g relates to socialization in the elderly. Those who consume less prefer conversation, exercise and are more conscious about health. ≥20g alcohol intake leads to enjoying life by drinking and having less interests in conversation, which could decrease socialization. Thus, alcohol intake among elderly is related to social factors and <20g is recommended.

Keywords: Japanese, elderly, drinking, conversation, socialization

I. Introduction:

1. Background

Japanese Ministry of Health, Labor and Welfare initiated “Kenko Nippon 21” in 2008 which aids people to remain healthy nationwide. According to the statement, the appropriate amount of daily pure alcohol intake for Japanese people with normal alcohol metabolism was set at 20g¹⁾. Studies about Japanese men²⁾ and Westerners³⁾ have already showed that men have the lowest death rate of 10g to 19g per day for pure alcohol intake and 9g per day for females. It is shown that the mortality rate increases as the amount of alcohol per day increases. From those discussions, “Kenko Nippon 21” has set the ideal pure alcohol consumption as 20g. In the elderly, it was suggested that a lesser amount of pure alcohol per day was consumed⁴⁾, yet the exact amount was not mentioned. In the recent years, some evidence has been reported on moderate alcohol intake and the positive influences of alcohol. It is said that many Japanese people self-medicate with alcohol to aid with sleep⁵⁾. Previous studies have shown positive association of daily alcohol intake of wine with physical activity and perception of mental health⁶⁾, general alcohol intake on lowering risk of functional decline over time⁷⁾ and total lowering of mortality risk with the substantial age differences⁸⁾, coronary heart disease⁹⁾, cardiovascular disease^{10,11)}, and diabetes¹²⁾, inflammatory status¹³⁾, whereas moderate alcohol intake can independently reduce fatty liver disease¹⁴⁾. Earlier studies have shown recommended weekly limits of 21 units for adult men and 14 units for adult women¹⁵⁾, whereas consumption of more than 14 units of alcohol per week (2 unit per day) could increase chances of alcohol-related disease, in particular cardiovascular heart disease^{16,17)}. Japanese Ministry of Health, Labour and Welfare in 2008 recommended the appropriate amount of daily pure alcohol intake as 20g among adult general public^{1,18)}. However, less is known about daily 20g pure alcohol intake amongst the elderly and its relationship with physical or any social factors.

2. Objectives

This study aims to clarify factors related to 20g pure alcohol drinking and its physical and social effects among Japanese elderly, based on their sleep quality, life rhythm, social ties, and life conditions, in elderly both in urban and rural districts of Japan by adapting a questionnaire survey.

II. Methods:

1. Study design

This study was conducted in Japan, under online survey by the Rakuten Company. Based on the “Privacy Marking Agreement” with Rakuten Research Company seven pages questionnaire (94 questions) was introduced among community-dwelling elderly in the population-based study. For the social effects of alcohol intake, the standard measuring attributes of daily life content was measured through asking questions about family situation, educational history, current living status, questions regarding social ties, and communication with a partner. For measurement of physical effects of alcohol intake were used age, sex, heights, weight, current medical treatment, as well as following survey and scales. Short Form 8 Health Survey (SF8) was used for measuring subjective health for assessing health-related quality of life, showing Physical Component Summary (PCS) and Mental Component Summary (MCS). Geriatric Depression Scale (GDS) was used to measure the depression level as well as subjective well-being and Euro-QOL. To measure sleeping state, we used Pittsburgh Sleep Quality Index (PSQI) as well as self-reported number of night-time awakening, times going to toilet at night and use of sleeping pills.

2. Settings

The internet survey conducted in the period between January 9, 2018 and January 12, 2018. The following questions were used for alcohol intake measurement: type of alcohol drunk, ml of alcohol drunk at once, usual time of alcohol drinking, reason for alcohol intake, partner with

whom to drink, and self-reported physical and mental changes after alcohol intake. Participants of the survey stated the amount of alcohol intake per one time of drinking from the followed: beer, sake, wine, whisky, shōchū (distilled spirits), vodka, brandy, and other. Through this data, the amount of alcohol in grams per one time was analysed by the amount of alcohol in each drink based on the following calculation: alcohol percentage of the drink times 0.8 times ml of drink intake. For example, 500 ml of beer intake were calculated as 20g of pure alcohol. The amount of alcohol in each drink was taken as followed: beer 5%, sake 12%, wine 12.5%, whisky 43%, shōchū 25%, vodka 40%, brandy 40%^{1,18)}.

3. Participants

The participants were community-dwelling elderly aged 65 or above with no record of alcoholism belonged to the elderly in Japan with the ability to use the internet. A special account and password were issued for each participant by the Rakuten Research Company providing access to the database. The 400 Japanese elderly people living in communities and belonged to elderly clubs, geriatric associations and other community-dwelling geriatric associations around all Japan were measured using a questionnaire survey.

4. Quantitative variables

Participants were divided in two groups, drinking more than the cut-off point and less than that. As the result, we calculated number of grams of alcohol intake per one time as the independent variable and compared it with dependent variables stated above in two groups. The cut-off point of ≥ 20 g pure alcohol was decided due to Japanese Ministry of Health, Labour and Welfare recommendation from 2008^{1,18)}.

5. Statistical methods

Logistic regression analysis, Mann-Whitney U test and chi-square test were conducted with Statistical Package for Social Sciences (SPSS)

Statics ver.24. Mann-Whitney U test was performed for continuous variable, and chi-square test was used for categorical variable. As independent variable was chosen by sex, age, education level, income, conversation partner, PSQI score, self-reported awakening during nighttime sleep, sleep satisfaction, PCS, MCS and GDS. As dependent variables, we used self-reported alcohol intake in ml per one day. The P-value less than 0.05 were considered significant. The independent variable used for logistic regression analysis were age, sex, GDS, amount of conversation per day, enjoying life as the reason for alcohol drinking, health and work as a favorite topic to talk and gym as a daily activity. The items have been reported as relevant in previous studies.

6. Ethical statement

About obtaining the consent for the Internet survey, we prepared the written consent under the supervision by the University of Tsukuba Faculty of Medicine and if the survey taker agrees the consent, the taker can start taking the survey by pressing the button. This survey is constructed as not to acquire an IP address. If the survey taker wants to decline the consent, the taker can contact Rakuten Research directly at the following email address (pm-rsch-privacy@mail.rakuten.com) and withdraw the consent. About this withdrawal, Rakuten Research will contact the research director at University of Tsukuba and confirm that we do not use the withdrawn data for analysis. Survey takers can respond to inquiries on questionnaires in the same way. Ethical statement № N932-5.

III. Results:

1. Participants

The participants consisted of 206 males and 194 females with their mean age of 73.35 years old. None of the participants had any of following diseases: arteriosclerosis, digestive diseases, respiratory illnesses, polonaises or allergic diseases, urologic diseases, liver diseases, nervous system diseases, lumbago, autonomic dysfunctions,

mental illnesses, neuroses, cold, dermatological diseases, cataract nor diabetes.

2. Descriptive data

The cut-off point of pure alcohol intake in grams was decided based on Japanese Ministry of Health, Labor and Welfare recommendation of “Kenko Nippon 21” regarding the appropriate amount of daily pure alcohol intake for Japanese general public with normal alcohol metabolism and was set at 20g¹⁾. In general, a number of 194 subjects (45%) of the 400 participants were not drinking, whereas 206 subjects (65%) were those who drink. Within this, the majority of 27% (56 subjects) were drinking almost every day, 14% (30 subjects) more than 4 times per week, 17% (36 subjects) 2-3 times per week, 19% (41 subjects) 2-4 times a month, 22% (46 subjects) were drinking less than one time per month respectively.

3. Outcome data

The drinking participants were 206 subjects, the mean age of those who were drinking more than 20g of pure alcohol per day were lower 71.3 ± 5 , than those who have drunk less than 20g 73.2 ± 5.5 ($p=.010$), prevalently male ($p=.001$) with higher weight. Those who drank more than 20g of pure alcohol had relatively better GDS and PCS, but relatively worse PSQI results, however no significances were found neither in BMI, GDS, PSQI, PCS nor MCS. We also found no significance in ≥ 20 g pure alcohol intake in correlations with hypertension, sleep disorders nor heart diseases. Regarding their socialisation, those who drank less than 20g prefer to talk more about mass media (TV/Radio and newspapers and journals), family, shopping, books, the future, situation in the world, economy and health. Those, who drink more than 20g preferably less talk about work.

Regarding their drinking attitudes, in total average participants were drinking around 12 days per month. Those who drink more than 20g usually tend to drink more often per month, they tend to

prefer more stronger alcohol beverages (shōchū, whiskey, vodka, brandy), whereas those who drink less than 20g tend to prefer sake or wine. As for the type of alcohol drunk, the majority of 148 participants stated to drink beer, whereas majority of them drunk less than 20g of pure alcohol per day. Shōchū was the second most-popular beverage, drunk by 60 participants. Wine, sake and whisky were relatively close with 38, 25 and 21 participants, where around 69% (73%, 71%, 64%) of participants were taking less than 20g of pure alcohol. Only 2 of participants were drinking vodka and brandy. Regarding the time, they tend to drink, those who drink more than 20g were drinking more regularly in the same time and tend to start drinking from the day time and before sleep, whereas those who drink less than 20g don't have usual time for drinking. Moreover, the majority of 157 subjects were drinking during the night-time at dinner, 24 subjects were drinking before sleep, 31 subjects had no specific time for drinking and only 3 subjects started drinking from the lunch. It was interesting, that as the reason for alcohol intake, those who drink more than 20g tend to state drinking as a reward to themselves and enjoy their life by drinking ($p=.001$). Majority of 131 subjects stated the enjoy life as the reason for alcohol intake, 49 subjects were drinking in company settings, 37 stated alcohol drinking as a reward to themselves, 30 felt freer to talk after taking alcohol and 22 answered to sleep better. Regarding the partner for alcohol drinking, those who drink more than 20g used to drink alone ($p=.051$), whereas those who drink less tend to drink with family ($p=.070$). Majority of 117 subjects were drinking alone, 84 of the subjects were drinking with the family and 55 were drinking with their friends (Table 2).

4. Main results

As the result of logistic regression analysis, we found the correlation between alcohol intake of less than 20g of pure alcohol with age ($p=.043$), amount of conversation per day ($p=.002$), reason

Table 1. Participants characteristics.

N=206

		Total Drinking N=206	Alcohol <20g / occasion N=102	Alcohol ≥20g / occasion N=104	p
Age (65 - 90)		72.2±5.3	73.2±5.5	71.3±5	.010*
Sex	M	126	51	75	.001*§
	F	80	51	29	
BMI (15.2 – 32.0)		22.7±3	22.4±2.9	23.0±3.2	.110
GDS (0 - 14)		4.4±3.7	4.4±3.6	4.5±3.9	.989
PCS (11.8 – 62.0)		44.0±9.5	43.6±8.8	44.2±10.2	.300
MCS (17.9 – 63.7)		50.3±7.5	50.3±7.2	50.3±7.9	.500
PSQI (0 - 17)		5.3±3	5.4±2.7	5.3±3.3	.400
Nocturnal wake up for toilet	Yes	102	29	73	.263§
	No	104	73	31	
Sleep Disorders	Yes	81	40	41	.976§
	No	125	62	63	
Hypertension	Yes	73	37	36	.989§
	No	133	65	68	
Diabetics	Yes	28	12	16	.367§
	No	178	90	88	
Heart Disease	Yes	17	7	10	.411§
	No	189	95	94	
Living Alone	Yes	154	80	74	.230§
	No	52	22	30	
Working	Yes	159	85	73	.026**§
	No	47	17	31	
Exercise / gym	Yes	39	28	11	.002**§
	No	167	74	93	
Amount of conversation per day (times)	0 times	29	6	23	.007*§
	1 time	16	8	8	
	2 times	36	21	15	
	3 times	35	14	21	
	4 times	1	1	0	
	5 times and more	89	52	37	
Favourite topic to talk (multiple answer)	TV/Radio	Yes	83	46	.100§
		No	123	56	
	Newspapers, journals	Yes	54	32	.090§
		No	152	70	
	Friends	Yes	32	18	.500§
		No	175	85	
	Family	Yes	48	28	.100§
		No	158	74	
	Shopping	Yes	50	30	.080§
		No	156	72	
	Health	Yes	94	52	.100§
		No	112	50	
	Work	Yes	14	3	.030*§
		No	192	99	

*p <0.05, **p <0.01 mean ±SD Mann-Whitney U test, §: chi-square test.

for alcohol drinking enjoying life ($p=.000$), talk about health ($p=.032$), talk about work ($p=.009$) and going to gym ($p=.006$) (Table 3).

IV. Discussions:

1. Interpretation of the main results:

The current study sought to examine whether the daily alcohol intake of 20g of pure alcohol

has any positive or negative effects on physical or social life of Japanese elderly. The main strength of our study is high participation rate (99%).

First of all, regarding the amount of alcohol intake among Japanese elderly, our participants had relatively low level of drinking. Despite that majority of the participants (65%) were those who drink, only 13.2% were those who drink every

Table 2. Information about alcohol intake.

Table 2. Information about alcohol intake.					N=206	
Question			Total Drinking N=206	Alcohol <20g/occasion N=102	Alcohol ≥20g/occasion N=104	p
Reason for drinking (multiple answer)	To reduce stress	Yes	68	31	37	.600
		No	138	71	67	
	As a reward to yourself	Yes	37	15	22	.200
		No	169	87	82	
	To enjoy your life	Yes	131	50	81	.001**
		No	75	52	23	
	To talk freely	Yes	30	12	18	.200
		No	176	90	86	
	In a company	Yes	49	28	21	.200
		No	157	74	83	
	To sleep better	Yes	22	12	10	.600
		No	184	90	94	
Drinking partner	Alone	Yes	117	51	66	.051
		No	89	51	38	
	With the family	Yes	84	48	36	.070
		No	122	54	68	
	With friends	Yes	55	26	29	.600
		No	151	76	75	

*p <0.05, **p <0.01 mean ±SD chi-square test.

Table 3. Logistic regression analysis of 20g alcohol intake.

N=206			
Factor	Odds Ratio	95% CI	P-value
Age	1.06	1.002- 1.131	.043*
Sex	1.77	0.918- 3.449	0.088
GDS	1.01	0.927- 1.102	0.81
Amount of conversation per day	1.33	1.112- 1.597	.002**
Reason for alcohol drinking - enjoying life	0.179	0.085- 0.377	.000**
Favourite topic to talk: health	2.12	1.068- 4.239	.032*
Favourite topic to talk: work	0.109	0.021- 0.573	.009**
Daily activity: gym	3.64	1.454- 9.112	.006**

*p <0.05, **p <0.01, Hosmer-Lemeshow test p=.856, The discriminant predictive value=71.4%, cut-off point ≥20=0, <20g=1.

day. The young seniors tend to drink more than 20g of pure alcohol per day, whereas older elderly tends to drink less ($OR=1.06$; 95% CI : 1.002-1.131; $p=.043$). Majority of participants, who were drinking, tend to drink beer, sake and whisky with the mean of 15g of alcohol (equivalent of 1.8 units) per day. It was surprising, that 74% of Japanese elderly drinking wine were drinking less than 20g per day, were talking more about health ($OR=2.12$; 95% CI : 1.068-4239; $p=.032$) and going to gym ($OR=3.64$; 95% CI : 1.353-9.112; $p=.006$). It could be due to the fact, that it is well-known among Japanese, that drinking of low amount of wine is good for health⁷⁾. Those participants who were drinking wine had better GDS, PCS and MCS characteristics and worse PSQI, however we couldn't find any significance probability among that data.

Secondly, as for Japan, drinking was traditionally associated with socialization¹⁹⁾, whereas among elderly it was suggested to influence "smooth communication"²⁰⁾. In our study, those, who drink more than 20g preferably talk about work, which can be connected with Japanese socialisation and importance of social factor as "nomikai (socializing)" in working relations. The majority of our participants were working, however among those who drink daily more than 20g less people were working. Significance probability was found in the topic of conversation of more drinking group, stating that they tend to speak more about work ($OR=0.109$; 95% CI : 0.021-0.573; $p=.009$) than any other of the topics. At the same time, those who drink more than 20g of pure alcohol per day preferred to drink alone in pre-logistic analysis ($p=.051$), despite that, we couldn't find any relations of this fact with their social status nor family situation. In fact, it was previously stated that living alone has relationships with work activity and prescription medication, influencing emotional well-being of elderly²¹⁾. In our study, we found significance probability between data, showing that those who intake more than 20g of pure alcohol per day tend

to have a view conversation with others ($OR=1.33$; 95% CI : 1.112-1.597; $p=.002$), rather than those who drink less. It is also interesting, that we found strong significance probability for those who drink more than 20g of alcohol per day with the reason for alcohol intake, as for enjoying life ($OR=0.179$; 95% CI : 0.085-0.377; $p=.000$). From that we can state, that those who intake ≥ 20 g of pure alcohol could probably substitute their loneliness, unsatisfied life, or stress from work through alcohol intake, what could be a huge issue among elderly. Taking into consideration frequency of alcohol drinking per month and regularity to drink in the same time of the day we can state a crucial risk of 20g pure alcohol per day. Moreover, it is also clear, that drinking alcohol affects depression²²⁾. However, taking into consideration fact, that pure alcohol intake of more than 20g per day brings self-reported satisfaction of life ($OR=0.179$; 95% CI : 0.085-0.377; $p=.000$), which can be considered as stress relief and positive effects of alcohol against depression.

Thirdly, those, who intake less than 20g of pure alcohol per day have a higher interest on health and social participation, that in the context of physical health could be considered as a possible reason for self-controlled alcohol intake. Majority of less-drinking group answered that they like to talk about TV, radio, newspapers, journals and family more than other topics. Moreover, those who drink less than 20g of pure alcohol stated significant difference for this who drink more to go to gym ($OR=3.64$; 95% CI : 1.353-9.112; $p=.006$) and talk about health ($OR=2.12$; 95% CI : 1.068-4239; $p=.032$). Nevertheless, taking into consideration previously mentioned reports on moderate alcohol intake on coronary heart disease¹⁰⁾ and cardiovascular disease¹¹⁾, type 2 diabetes¹²⁾ or inflammatory status¹³⁾ and significant probability among those who drink less than 20g of pure alcohol per day with their higher consideration about health, we can assume positive influence of less than 20g of moderate pure alcohol intake among elderly. It is well known that blood vessels

lose their elasticity, fatty deposits build up against artery walls and the heart has to work harder to circulate the blood through your body. This can lead to high blood pressure (hypertension) and atherosclerosis (hardening of the arteries). In our study, we didn't find any significant connections between pure alcohol intake of 20g per day and any of previously mentioned diseases. Hence, taking into consideration higher consciousness about physical health among this group, that moderate intake of less than 20g of pure alcohol per day can possibly positively influence previously mentioned ageing related diseases. From this point of view, we can say, that daily moderate intake of less than 20g of pure alcohol potentially can be used as a mean of rehabilitation model for happy aging and improvement of health and longevity in Japan.

Fourthly, in elderly, transformation of lifestyle could change the purpose of drinking²³⁾. Similar to our findings regarding life enjoyment as a purpose for drinking ($OR=0.179$; $95\% CI: 0.085-0.377$; $p=.000$), drinking itself could be a purpose of living for elderly²³⁾. In other words, drinking which had been in a certain amount while maintaining social ties such as in communities and work relationships, like “nomikai”, was previously associated with changes in the environment due to retirement and spouse's death³⁰⁾. For those elderly who are relatively young and just retired, have a chance to get too dependent on drinking while it used for decreasing the stress. Moreover, taking into consideration their conversation amount ($OR=1.33$; $95\% CI: 1.112-1.597$; $p=.002$), there is a high chance of depression among them, despite we found no correlations with GDS. Furthermore, it is necessary to educate elderly people about “moderate drinking” in modern age and education for alcoholic drinking. It is important to disseminate an understanding of involvement in drinking and drinking related diseases, as it becomes a risk of alcohol dependence from the current inadequate drinking for elderly due to their lifestyle changes.

The cut-off point of $\geq 20g$, of Japanese Ministry

of Health, Labour and Welfare is advised to the general public^{1,18)}. In comparison, UK Medical Council on Alcoholism and British Medical Association refers to the risk of alcohol related diseases after intake of more than 112g of alcohol (14 units) per week for female and 168g of alcohol (21 units) for male^{15,16,17)}. Due to the fact that we haven't found any suitable information regarding Japanese elderly alcohol intake advises in any previous sources, we consider to focus on it in our future studies.

2. Study limitations:

Our survey included 400 Japanese elderly, however the analysis of relations of alcohol intake was made mainly among drinking group of 206 participants, based on what could affect the results in logistic regression analysis.

Furthermore, our findings were based on the self-reported alcohol intake and self-reported sleeping conditions. Participants may understand questions and report their condition differently. Therefore, we included the questionnaire to the formulae for the self-reported sleep conditions that we have been using in our other populational studies and compared our results with previously stated reports from these studies.

This is important to mention that this study only focuses on the amount of pure alcohol intake among the elderly. Proper drinking amount differs in personal level such as age, gender, metabolism and weight. However, as “Kenko Nippon 21” only focuses on pure alcohol intake among general public, this study tries to find out the actual impact of the policy itself and find out what should be discussed further in the future discussion regarding alcohol intake for elderly.

Last, but not least, it is important to suggest that this survey was conducted on the Internet and estimated that the survey takers are not typical elderlies. They may have high intellectual level which is enough to respond to the Internet questionnaire survey. We need to take this into consideration in the future study.

V. Conclusions:

As the result of the study, we found that:

- 1) the daily consumption of <20g of pure alcohol can sufficiently affect socialization level among Japanese elderly. Those who intake <20g of pure alcohol per day had higher amounts of conversation per day and preferred to talk about health more than other topics. Moreover, as a part of their daily activity, they were more often going to gym and have a relatively better physical health, however no significances were found neither in BMI, GDS, PSQI, PCS nor MCS.
- 2) consumption of ≥ 20 g of pure alcohol has social factors. Young Japanese seniors tend to drink more alcohol per day and to speak more about work, what approximately correlated with changing lifestyle after retirement.
- 3) maintaining moderate alcohol intake in approximately less than 20g of pure alcohol per day recommended among elderly, however, it is important to take into consideration age, gender, metabolism and weight.

VI. Other information:

1. Funding

The funding for the research was provided by University of Tsukuba.

2. Conflicts of interest statement

The authors have no conflicts of interest.

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