Effectiveness of Advice to Drinkers Using “Weekly Alcohol Consumption” During a Health Checkup for Japanese Adult Males

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ABSTRACT

Objectives To investigate the effectiveness of advice to drinkers using “weekly alcohol consumption” during a health checkup for Japanese adult males.

Design A controlled trial.

Setting and Participants A physician advised 335 male drinkers to reduce drinking quantity during a health checkup based on “weekly alcohol consumption”, and we were able to follow 279 subjects a year later.

Measurement and Results We compared a new method using “Weekly Alcohol Consumption” with the conventional method by making the drinking improvement rate an index. We also investigated the change in quantities of 10 variables. The drinking improvement rate by the new method (48.4%; complete improvement rate 16.5%) was significantly higher than that of the conventional method (13.3%; complete improvement rate 5.4%) ($p < 0.001$). The change quantities of gamma-glutamyl transpeptidase, fasting plasma glucose, total cholesterol, HDL-cholesterol and triglyceride by the new method were also more improved than those by the conventional one.

Conclusions We consider that the drinking advice using “weekly alcohol consumption” was more useful than the conventional one which is using “2– drinks (50 g ethanol or less) per day” and “establishment of alcohol-free days”.

Key Words Advice to Drinkers, Alcohol Drinking Index, Alcohol Consumption, Controlled Trial, Intervention

INTRODUCTION

Alcohol consumption in Japan has tended to increase every year and health disorders including liver dysfunction which is caused by drinking have become a problem.^[1] We have therefore advised each drinker to reduce drinking quantity during a health checkup. It is general that we recommend the establishment of alcohol-free days in addition to the reduction of the quantity of alcohol per day, because drinking does not have habitude as does smoking.^{[2]–[4]} With such conventional advice, it is possible to drink 6 days a week and consume 2 drinks (50 g ethanol) per day at maximum. However, we consider this to be insufficient. Conversely, there is the possibility of it to becoming a great mental load for drinkers to reduce the quantity of alcohol per day and establishment of alcohol-free days at the same time. It seems that the conventional method often lacks the power of persuasion and does

not often lead to a reduction in drinking quantity. We have reviewed the usefulness of “weekly alcohol consumption” that combines drinking quantity per day and the number of drinking days per week.^[5] In the present study, we implemented an intervention research and investigated the effectiveness of advice to drinkers using “weekly alcohol consumption” during a health checkup.

MATERIAL AND METHODS

A physician advised 335 male drinkers who had 10+ drinks (more than 250 g ethanol) per week to reduce their drinking quantity based on “weekly alcohol consumption: 10– drinks (250 g ethanol or less) per week” on health checkup between January 2002 and December 2002, and we were able to follow 279 subjects a year later. Controls were 279 subjects who followed a year after 332 male drinkers were advised using a conventional method which used “2– drinks (50 g ethanol or less) per day” and “establishment of alcohol-free days” on health checkup between January 2001 and December 2001 (Table 1). All subjects were selected at random (Fig. 1).

Both methods were divided into a no improvement group (N group), incomplete improvement group (I group: with

Table 1 Characteristics of subjects.

Variables	New method* (n=279)	Conventional method† (n=279)	t-test p Value
Age (years)	50.2±7.7	49.9±7.5	0.668
Body weight (kg)	67.3±9.8	67.6±9.5	0.633
Systolic blood pressure (mmHg)	129.7±17.4	127.3±17.0	0.098
Diastolic blood pressure (mmHg)	80.7±10.6	79.8±10.4	0.318
γ-GTP (IU/l)	140.3±168.3	124.3±146.3	0.230
Fasting plasma glucose (mg/dl)	105.8±21.0	103.2±15.5	0.098
Uric acid (mg/dl)	6.48±1.39	6.37±1.35	0.340
Total cholesterol (mg/dl)	210.9±36.4	205.8±35.4	0.098
HDL-cholesterol (mg/dl)	57.2±14.7	55.9±13.4	0.251
LDL-cholesterol (mg/dl)	121.4±31.5	120.4±32.3	0.715
Triglyceride (mg/dl)	182.8±154.9	160.3±111.4	0.050

Values are presented as means±S.D.

* New method using “weekly alcohol consumption”.

† Conventional method using “2– drinks (50 g ethanol or less) per day” and “establishment of alcohol-free days”.

γ-GTP: gamma-glutamyl transpeptidase.

HDL-cholesterol: high density lipoprotein cholesterol.

LDL-cholesterol: low density lipoprotein cholesterol.

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Fig. 1 Outline of sampling for analysis in the study.

reduction the drinking quantity per week but 10+ drinks per week), and complete improvement group (C group: with reduction the drinking quantity to 10– drinks (250 g ethanol or less) per week), and we compared the new method with the conventional one by making the drinking improvement rate an index.

We also investigated the change in quantities of the following variables: body weight (BW), systolic blood pressure (SBP), and diastolic blood pressure (DBP), gamma-glutamyl transpeptidase (γ -GTP), fasting plasma glucose (FPG), uric acid (UA), total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), and triglycerides (TG).

LDL-C was calculated by Friedewald’s method if TG was 400 mg/dl or less.^[6]

The alcohol quantity was converted into a “go” as a unit of sake (1 “go” (180 ml): 1 drink: 25 g ethanol): one drink contained a can of beer (500 ml); or a double of whiskey or brandy (60 ml); or a glass of wine (180 ml); or a cup of shochu (100 ml).

STATISTICS

We used the chi-square test to estimate significant differences between the new method and the conventional one for the drinking improvement rate, and used the *t*-test to estimate significant differences between the new method and the conventional one for the change in quantities of the above-mentioned 10 variables.

Statistical analyses were performed with SPSS for Windows. All tests were interpreted using a significance level of $p<0.05$.

This study was conducted with the approval of the internal ethical committee.

RESULTS

The drinking improvement rate by the new method

Table 2 Comparison of the change in quantities of 10 variables between the new and conventional method.

	New method*	Conventional method†	<i>t</i> -test <i>p</i> Value
ΔBody weight (kg)	−0.09	−0.08	0.95
ΔSystolic blood pressure (mmHg)	−0.23	−1.68	0.082
ΔDiastolic blood pressure (mmHg)	0.50	0.74	0.72
Δ γ -GTP (IU/l)	−15.8	2.2	0.036
ΔFasting plasma glucose (mg/dl)	−0.80	1.92	0.002
ΔUric acid (mg/dl)	−0.063	0.049	0.14
ΔTotal cholesterol (mg/dl)	−5.1	−0.10	0.011
ΔHDL-cholesterol (mg/dl)	1.71	−0.10	0.016
ΔLDL-cholesterol (mg/dl)	−4.7	−1.8	0.17
ΔTriglyceride (mg/dl)	−14.5	13.3	0.009

*New method using “weekly alcohol consumption”.
† Conventional method using “2– drinks (50 g ethanol or less) per day” and “establishment of alcohol-free days”.
ΔBody weight: positive change in body weight.
ΔSystolic blood pressure: positive change in systolic blood pressure.
ΔDiastolic blood pressure: positive change in diastolic blood pressure.
Δ γ -GTP: positive change in gamma-glutamyl transpeptidase.
ΔFasting plasma glucose: positive change in fasting plasma glucose.
ΔUric acid: positive change in uric acid.
ΔTotal cholesterol: positive change in total cholesterol.
ΔHDL-cholesterol: positive change in high density lipoprotein cholesterol.
ΔLDL-cholesterol: positive change in low density lipoprotein cholesterol.
ΔTriglyceride: positive change in triglyceride.

(48.4%; complete improvement rate 16.5%) was significantly higher than that of the old method (13.3%; complete improvement rate 5.4%) ($p<0.001$) (Fig. 1).

The change in quantities of γ -GTP, FPG, TC, HDL-C and TG by the new method were also more improved than those by the conventional one (Table 2).

DISCUSSION

We have reported the usefulness of “weekly alcohol consumption” as a guide for drinkers.^[5] In the present study, we actually intervened with adult males who drank 10+ drinks (more than 250 g ethanol) per week.

As expected, γ -GTP, FPG, and TG, related to alcohol intake, were more improved because of a reduction of the drinking quantity by the new method. However, we never expected such improvement of TC and HDL-C. We consider that it might be possible to have an improved lifestyle including dietary modification or exercise as well as a reduction of drinking quantity.

There are many literatures on alcohol intake.^{[7]–[10]} However, most use quantity of daily alcohol consumption as an index, and there are a few reports which use weekly alcohol consumption as an index. Maheswaran et al. reported the

effectiveness of advice to reduce alcohol consumption by taking hypertensive men regularly consuming more than 20 units per week (1 unit=10 g alcohol) as objects of study.^[11] Bulpitt et al. reported that there was increase in either systolic or diastolic pressure in men because of total alcohol intake of more than 50 drinks per week (1 drink=a single whisky or a half pint of beer).^[12]

An average value of γ -GTP is generally considered to rise straight approximately with an increase in drinking quantity.^{[13]-[15]} For the liver, it may be desirable not to consume alcohol. Then, however, it is not possible to maintain the quality of life. The fact that γ -GTP rises straight with drinking also suggests the possibility that liver dysfunction can occur if there is a high quantity of total drinking, even if alcohol-free days are set.

In other words, the "weekly alcohol consumption" is approximately the same as average daily alcohol consumption. However, a calculation of the average daily alcohol consumption is complicated because of the addition of a division to a multiplication, whereas that of the "weekly alcohol consumption" is easy because there is only a multiplication.

In giving advice to drinkers on health checkup, we should not merely set a limit on alcohol drinking habits. It is reasonable to direct them to 10— drinks per week, and to use figures concretely as follows: You must have at least 2 alcohol-free days if you have 2 drinks (50 g ethanol) per day. But you can drink every day if you have 2 cans of beer (700 ml: 35 g ethanol) per day. You must consume alcohol 3 days or less a week if you have 3 drinks (75 g ethanol) per day. If you have 6 drinks (150 g ethanol) at a party, etc., you may have the residual 4 drinks during the remainder of the week.

We think that this method led to the reduction effect with drinking quantity, because that had stronger impact than the conventional method and was impressive. Moreover, this method met with their approval, because it was rational and logical. And we consider that the drinker can maintain quality of life by this method because there is permission to drink in a permissible range, whereas there are many limitations with the conventional method.

In conclusion, the present results suggest that the drinking advice using "weekly alcohol consumption" was more effective than the conventional method using "2— drinks (50 g ethanol or less) per day" and "establishment of alcohol-free days".

REFERENCES

[1] Health and Welfare Statistics Association: Health in Japan:

- Recent Vital Statistics. Journal of Health and Welfare Statistics 50: 83-84, 2003 (in Japanese)
- [2] Shigeta Y: Drinking Guidance to Outpatients, *Medicina* 23: 468-469, 1986 (in Japanese)
- [3] Ozasa K, Higashi A, Watanabe Y, Shimouchi A, Hayashi K, Hatta H, Morita M, Fukumoto M, Masumoto T, Oonishi S, Fukuma K, Fujita K, Asada K, Yuge M, Kawai K: Characteristics of Smoking, Drinking, Dietary Habits, and Physical Exercise in Health Behavioral Models. *Jpn J Public Health* 42: 1029-1041, 1995 (in Japanese)
- [4] Kunitsuka K, Yamatsu K, Adachi Y: A Correspondence Behavioral Approach for 6 Lifestyle's Improvements in a Workplace. *Jpn J Public Health* 49: 525-534, 2002 (in Japanese)
- [5] Mitsumune T, Matsuo K, Mitsumune I, Fujiwara T, Akagi K, Seno E, Kayashima E, Adachi M, Numata K, Hara Y: Usefulness of "Weekly Alcohol Consumption" as a Guide for Drinkers. *Health Evaluation and Promotion* 27: 367-371, 2000 (in Japanese)
- [6] Friedwald WT, Levy RI, Fredrickson DS: Estimation of the Concentration of Low-density Lipoprotein Cholesterol on Plasma, without Use of the Preparative Ultracentrifuge. *Clin Chem* 18: 499-502, 1972
- [7] Klatsky AL, Friedman GD, Siegelaub AB, et al.: Alcohol Consumption and Blood Pressure. *N Engl J Med* 296: 1194-1200, 1977
- [8] Dyer AR, Stamler J, Paul O, et al: Alcohol, Cardiovascular Risk Factors and Mortality: The Chicago Experience. *Circulation* 64: 20-27, 1981
- [9] Witterman JCM, Willett WC, Stampfer MJ, et al.: Relation of Moderate Alcohol Consumption and Risk of Systemic Hypertension in Women. *Am J Cardiol* 65: 633-637, 1990
- [10] Kitamura A, Iso H, Sato S, Iida M, Naito Y, Kiyama M, Okamura T, Nakagawa Y, Shimamoto T, Sankai T, Imano H, Komachi Y: The Relation of Alcohol Intake to Constitutional and Biochemical Variables in Japanese Populations. *Jpn J Public Health* 43: 86-101, 1996 (in Japanese)
- [11] Maheswaran R, Beevers M, Beevers DG: Effectiveness of Advice to Reduce Alcohol Consumption in Hypertensive Patients. *Hypertension* 19: 79-84, 1992
- [12] Bulpitt CJ, ShiPley MJ, Semmence A: The Contribution of a Moderate Intake of Alcohol to the Presence of Hypertension. *J Hypertension* 5: 85-91, 1987
- [13] Chick J, Kreitman N, Plant M: Mean Cell Volume and Gamma-glutamyl Transpeptidase as Markers of Drinking in Working Men. *Lancet* 1: 1249-1251, 1981
- [14] Shaper AG, Pocock SJ, Ashby D, et al.: Biochemical and Haematological Response to Alcohol Intake. *Ann Clin Biochem* 22: 50-61, 1985
- [15] Rollason JG, Pincherle G, Robinson D: Serum Gamma-glutamyl Transpeptidase in Relation to Alcohol Consumption. *Clin Chim Acta* 39: 75-80, 1972