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BRIEF INTERVENTION FOR MALE HEAVY DRINKERS IN ROUTINE GENERAL PRACTICE: A THREE-YEAR RANDOMIZED CONTROLLED STUDY

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Abstract — The aim of this research was to evaluate the effectiveness of long-term brief intervention in routine general practice. In five primary care out-patient clinics in a Finnish town, 296 male early-phase heavy drinkers consulting a general practitioner (GP) for various reasons were identified. Control group C (n = 88) was informed of the risks of drinking after the screening and were advised at the subsequent feedback about 2 weeks later to reduce their drinking. Groups A (n = 109) and B (n = 99) were offered in addition seven and three brief intervention sessions, respectively. All GPs took part, whether or not they indicated a special interest. The main outcome measures were differences between beginning and end-point at 3 years in self-reported alcohol consumption, mean corpuscular volume (MCV), and serum carbohydrate-deficient transferrin, aspartate aminotransferase, alanine aminotransferase and gamma-glutamyltransferase. There were no statistically significant differences between study groups A, B and C in mean changes in outcome measures. Within all the groups, MCV decreased. Depending on the outcome measure used and the study group analysed, clinically significant reduction of drinking was found in 25–53% of the subjects. In routine general practice, giving additional sessions of brief intervention may not be as effective as in special research conditions. Factors reducing the effectiveness of brief intervention programmes should be investigated, so that primary health care staff can be better supported in their efforts.

INTRODUCTION

About every fifth male patient seen in primary health care in Finland is a heavy drinker (Aalto *et al*., 1999), that is, a person whose drinking is likely to result in harmful consequences, but who does not at present have any major alcohol-related problems. Heavy drinking can lead to alcohol dependence and a multitude of other medical, behavioural and social problems (Lieber, 1995; O'Connor and Schottenfeld, 1998). After over a decade of clinical trials the evidence in favour of brief intervention treatment for heavy drinkers is fairly convincing (Bien *et al*., 1993; Heather, 1995; Wilk *et al*., 1997). Meta-analysis of 12 controlled studies found that heavy drinkers who received brief intervention were twice as likely to moderate their drinking when compared to heavy drinkers who did not receive any intervention (Wilk *et al*., 1997). However, a more recent meta-analysis of 14 studies in primary health care was less conclusive, especially in relation to males (Poikolainen, 1999).

Definitions and practice of brief intervention varies between studies (Heather, 1995; Jönson *et al*., 1995). However, in general brief intervention refers to any therapeutic or preventive consultation of short duration undertaken by a health care professional. In previous studies, brief interventions have included one to five sessions. In contrast to conventional alcoholism treatment, brief intervention is often performed by a health care worker who is not a specialist in addiction treatment. Generally, it takes place elsewhere than in an addiction treatment setting and the usual treatment goal is moderate drinking rather than total abstinence. In spite of evidence that brief intervention can be effective, there are problems in applying research findings into practice in routine primary health care (Heather, 1995; Richmond *et al*., 1995).

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One controlled study using naturalistic screening and intervention (Richmond *et al*., 1995) indicated that brief intervention may lose some of its effectiveness when translated from special research conditions to natural environments in general practice (Heather, 1995). In other earlier controlled brief intervention studies in general practice, there have been both positive (Wallace *et al*., 1988; Anderson and Scott, 1992; Fleming *et al*., 1997) and negative (Heather *et al*., 1987; Seppä, 1992; Burge *et al*., 1997) treatment results. In two of the positive studies, some subjects were recruited by mailed questionnaires (Wallace *et al*., 1988; Anderson and Scott, 1992). Subjects recruited in this way cannot be considered as a typical general practice population (Heather, 1995). In the third positive study, only consenting physicians participated (Fleming *et al*., 1997). This kind of study procedure raises questions about the generalizability of the results to the full range of general practitioners (GPs) (Drummond, 1997).

Because it often takes time to change one's drinking, the present study aimed at evaluating the effectiveness of brief intervention over a longer period (3 years) and included one group who were offered more sessions than offered in previous trials. Results regarding females are reported separately (Aalto *et al*., 2001*a*).

PATIENTS AND METHODS

Setting and screening

The study was a part of the arm (the Lahti Project: Sillanaukee, 1997) of the multi-component collaborative community action project of the World Health Organization (WHO) Regional Office for Europe. The study protocol was approved by the Ethical Committee of Lahti Primary Health Care Clinics, and conducted according to the Helsinki Declaration on Human Experimentation.

In Finland, primary health care clinics and occupational health care clinics are the two main providers of primary health care. Primary health care clinics provide equal access to the unselected population of a certain area. Depending on the area, 60–75% of its inhabitants visit their primary health care clinic each year, women and elderly people more often than men and young people. Occupational health care clinics provide services for a selected population of employed persons.

In this study, all patients aged 20–60 years visiting the four primary health care clinics and the one occupational health care clinic in the Finnish town of Lahti (95 000 inhabitants) between February 1993 and May 1994 were screened by a questionnaire in order to detect heavy drinkers (Fig. 1). Screening, detection and brief intervention were performed by the local personnel; GPs and nurses were not paid or selected and all of them participated. In total, 41 GPs and 15 nurses were involved and given two half-days of training in brief intervention.

When entering the clinic for the first time during the study period, patients were invited to participate in a health survey and given a health behaviour questionnaire by the receptionist to be completed before the routine GP's consultation. This self-administered questionnaire contained the CAGE test (in the 'ever' format) (Mayfield *et al*., 1974) and structured quantity–frequency alcohol consumption questions covering the last 2 months. The latter included nine different fixed quantities (1 unit to 30 or more units; a unit being 11 g of absolute ethanol), six different fixed frequencies (less than once a week to daily) and four different beverages (beer, wine and spirits). The weekly consumption (g of absolute ethanol per week) was calculated from these numbers. The patient was suspected of being a heavy drinker if his self-reported alcohol consumption was at least 280 g of absolute ethanol per week and/or his CAGE questionnaire gave at least three affirmative answers (Seppä and Mäkelä, 1993). The health behaviour questionnaire also contained questions related to the following sociodemographic and health factors: age, education (basic compulsory education to university), employment, marital status, smoking, coffee drinking, exercise, weight, height, type of fat used on bread, sleeping time per night and self-estimation of physical and mental health (five grades; from poor to excellent).

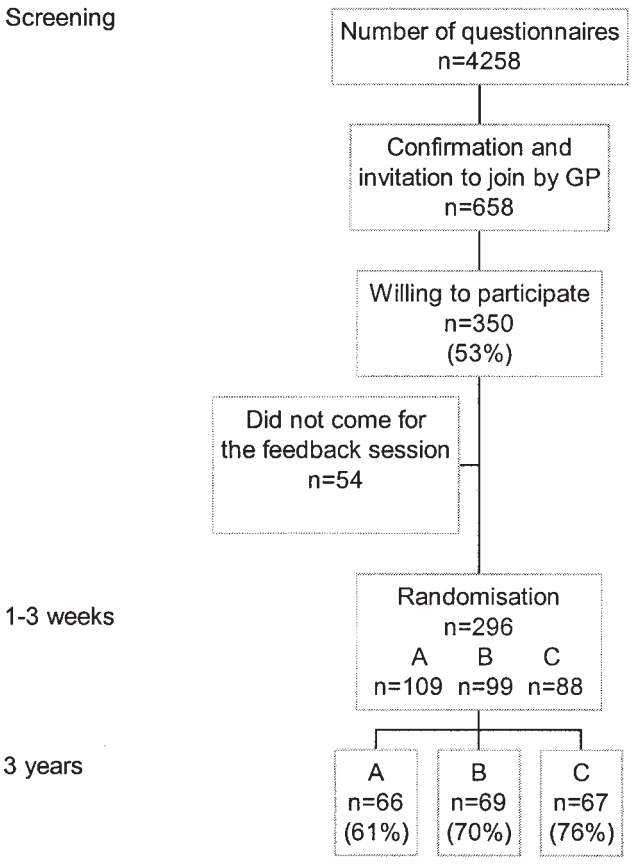

Fig. 1. Trial profile.

Recruitment

After screening positive, some patients were then excluded by the GP on the information in the medical records and a face-to-face interview: those who (1) had severe somatic or psychiatric disease; (2) had had detoxification treatment; (3) were known to be alcohol dependent; (4) had other alcohol-related diseases; (5) had CAGE scores above screening limits (≥3) because of earlier heavy drinking but who had now stopped or reduced their drinking. Altogether, 658 male early-phase heavy drinkers were identified. After detection, GPs informed patients about the risks of their drinking, invited them to participate in the study and 350 (53%) agreed to participate (Aalto and Sillanaukee, 2000). After this, patients gave a blood sample for laboratory testing of carbohydrate-deficient transferrin (CDT), erythrocyte mean corpuscular volume (MCV), aspartate aminotransferase (ASAT), alanine aminotransferase (ALAT) and gamma-glutamyltransferase (GGT) and were asked to return after 1–3 weeks for feedback from a GP.

Study groups and brief intervention

A feedback session was attended by 296 patients. Randomization was performed as follows: before the feedback began, the GP drew a card from a mixed pack including equal numbers of cards marked either A, B or C. Brief intervention group A (n = 109) were offered brief intervention sessions at baseline, 2, 6, 12, 18, 24 and 30 months, whereas brief intervention group B (n = 99) had sessions at baseline, 12 and 24 months. Brief intervention was always given by a GP, except for some sessions for group A, where advice was given by a nurse at 6, 18 and 30 months. Those who participated in the end-point assessment attended brief intervention sessions on an average 6.0 (range 2–7) times out of 7 in group A and 2.7 (range 2–3) times out of 3 in group B.

At feedback, control group C (n = 88) were advised to reduce drinking, and to contact their GP in the event of any health problems. When indicated by any abnormal laboratory values, appropriate clinical procedures were carried out. Control group C were not told they would be invited for follow-up at 36 months.

At feedback, groups A and B received their first advice (10–20 min) consisting of the FRAMES ingredients (Miller and Rollnick, 1991) according to the needs of each individual patient: information about the adverse effects of alcohol, information on how the patient's alcohol consumption compared with recommended limits, feedback from the laboratory test results, information on the benefits of drinking less, and encouragement to reduce drinking. Among groups A and B,

advice was supplemented with a self-help booklet at baseline (Sillanaukee, 1997). The subsequent brief intervention sessions were carried out in the same manner. Additionally, laboratory tests were taken before each session and a structured enquiry then made into the patient's alcohol consumption. However, the content of brief intervention was not strictly standardized, so as better to reflect real life.

End-point assessment

End-point assessment was carried out at 36 months, when patients were asked to complete a structured questionnaire on alcohol consumption and their physical and mental health. Blood samples were also collected for laboratory testing.

Laboratory analyses

Serum for CDT, ASAT, ALAT and GGT and EDTA blood for MCV were collected. MCV, ASAT, ALAT and GGT were measured on the same day. Serum samples for CDT were stored at –70°C and measured later. The CDT containing di-, mono- and asialotransferrin (Stibler, 1991) was separated by anion exchange chromatography and quantified by double antibody radioimmunoassay (CDTect, Pharmacia Upjohn, Diagnostics, Sweden). MCV was measured with a Coulter Counter Stacker haematological analyser (Coulter Electronics, Inc., Hialeah, FL, USA). Activities for serum ASAT, ALAT and GGT were determined by Hitachi 717 Automatic Analyzer (Hitachi Ltd, Tokyo, Japan). The upper limits of normal values of CDT, MCV, ASAT, ALAT and GGT are 20 U/l, 97 fl, 50 U/l, 50 U/l and 80 U/l. These are based on the recommendations of the European Society for Clinical Chemistry and Clinical Physiology as well as of manufacturers, and are in standard clinical laboratory practice in Finland.

Statistical analyses

SPSS statistical software was used. The primary aims were to compare the outcomes of the different study groups, and to test for changes within groups. In the intention to treat analysis, it was assumed that patients who did not attend the end-point assessment had no change in alcohol consumption or in other outcome measures. The varying sample size for different measures is due to lack of some data. In frequency comparisons, the χ^2-test was used. For parametric variables, means were compared using the *t*-test for independent samples or one way analysis of variance. For non-parametric variables, Mann–Whitney *U*–Wilcoxon rank sum *W* test or Kruskal–Wallis one-way analysis of variance were used. To test for change between two time-points within the groups, the *t*-test for paired samples was used for parametric variables, and Wilcoxon matched-pairs signed-ranks test was used for non-parametric variables. Kolmogorov–Smirnov test was used to distinguish the normality of distribution of each variable. Differences were considered statistically significant at $P < 0.05$.

RESULTS

The 296 patients were recruited at screening as follows: 170 only CAGE score positive (57%), 68 only self-reported alcohol consumption positive (23%), and 58 both CAGE score and self-reported alcohol consumption positive (20%). Table 1 provides a comparison of their characteristics at baseline. The only variable to show significant difference between groups was education ($P = 0.03$), group C tending to have had less education than groups A or B. Non-attendance at 3-year

Table 1. Baseline means (SD) and proportions in the brief intervention (A and B) and control (C) groups

Parameter	Group A *n* = 109	Group B *n* = 99	Group C *n* = 88
Age (years)	41.4 (9.5)	43.7 (10.2)	40.6 (9.1)
Partner (%)			
Yes	41 (40.6)	37 (38.1)	41 (48.8)
No	60 (59.4)	60 (61.9)	43 (51.2)
Education (%)			
Basic compulsory education	47 (47.0)	43 (44.8)	51 (61.5)
Vocational school	31 (31.0)	29 (30.2)	25 (30.1)
College/university	22 (22.0)	24 (25.0)	7 (8.4)
Employment (%)			
Working/studying	43 (42.6)	44 (45.8)	43 (51.2)
Unemployed	54 (53.5)	44 (45.8)	35 (41.7)
Retired	4 (3.9)	8 (8.4)	6 (7.1)
Drinking amount per week (g)	270 (251)	284 (262)	308 (337)
Drinking times per week	2.0 (1.6)	2.4 (1.6)	2.3 (1.8)
Usual drinking amount per occasion (g)	154 (86)	131 (80)	130 (83)
CAGE score	3.4 (0.9)	3.1 (1.1)	3.2 (1.0)
CDT (U/l)	20.3 (10.5)	22.6 (13.7)	21.0 (16.1)
MCV (fl)	94.5 (4.2)	94.2 (4.2)	94.5 (4.0)
ASAT (U/l)	35.2 (32.8)	30.9 (12.6)	36.4 (29.0)
ALAT (U/l)	46.2 (57.6)	38.0 (21.0)	49.1 (45.9)
GGT (U/l)	101.1 (229.4)	81.9 (72.0)	94.5 (183.5)
Self-estimation scale[a]			
Physical health	3.2 (0.8)	3.2 (0.8)	3.3 (0.8)
Mental health	3.0 (0.9)	2.9 (0.9)	3.0 (0.9)

[a]1 = poor, 5 = excellent.

There was no significant difference between the study groups except in education ($P = 0.03$).

CDT, carbohydrate-deficient transferrin; MCV, mean corpuscular volume; ASAT, aspartate aminotransferase; ALAT, alanine aminotransferase; GGT, gamma-glutamyltransferase.

assessment was 39% (43/109), 30% (30/99), and 24% (21/88) in the groups A, B and C, respectively ($P \geq 0.05$).

In mean changes in alcohol drinking variables between the beginning and end-point, there were no significant differences between the study groups A, B and C (Table 2). Likewise, mean changes of laboratory values did not differ between the study groups (Table 2).

During the first year, no significant change of drinking variables or laboratory values was found within group A (results not shown). Instead, a significant reduction of MCV values was found within all groups after 3 years (Table 2) and also when comparing initial versus 1 and 2 year values in the treatment groups A and B (Table 3). However, a significant increase was found in the ASAT value of the control group C at 3 years (Table 2). At the end-point of the study, self-estimation of mental health was significantly poorer within group A.

Mean changes of drinking variables and laboratory values were compared separately in the following subgroups: Age groups (20–30, 31–40, 41–50, 51–60 years old); partner (having, not having), education (basic compulsory education, vocational school, college/university) and employment (working/studying, unemployed, retired). Significant differences between treatment and control groups were not found in any of these subgroups (results not shown).

Figure 2 shows the proportion of patients with clinically significantly decreased or increased values in the main outcome variables indicating respectively positive or negative development during follow-up. There was no statistically significant difference between the study groups, although in the treatment groups values decreased more often than in control group C, in which values more often increased. Depending on the outcome measure and the study group, clinically significant reduction of drinking was found in 25–53% of heavy drinkers. On the other hand, in intervention group A 15–20% and in intervention group B, 5–13% more of the patients decreased their drinking than in control group C (Fig. 2).

DISCUSSION

The strengths of the present study were the use of the routine setting of general practice, a sufficiently long 3-year follow-up, and the use of several different outcome measures. Many outcome measures were used, because there is no absolutely reliable way to follow changes in drinking (Poikolainen, 1985; Sillanaukee, 1996).

In the present study, among primary care early-phase heavy drinkers, 25–53% reduced their drinking over 3 years (Fig. 2) (varying with the outcome measure used), if they had been

Table 2. Means (SD) of outcome measures at baseline and at 3-year follow-up

	According to protocol			Intention to treat		
Parameter	Group	Baseline	3 years	Group	Baseline	3 years
Drinking amount per week (g)	A (n = 58)	237 (169)	240 (279)	A (n = 102)	270 (251)	272 (302)
	B (n = 57)	269 (190)	278 (217)	B (n = 97)	284 (262)	290 (273)
	C (n = 49)	267 (278)	320 (350)	C (n = 84)	308 (337)	338 (371)
Drinking times per week	A (n = 58)	1.9 (1.7)	1.9 (1.9)	A (n = 102)	2.0 (1.6)	2.0 (1.8)
	B (n = 58)	2.5 (1.7)	2.8 (1.9)	B (n = 97)	2.4 (1.6)	2.6 (1.8)
	C (n = 52)	2.0 (1.6)	2.3 (2.3)	C (n = 84)	2.3 (1.8)	2.4 (1.9)
Usual drinking amount per occasion (g)	A (n = 58)	146 (81)	140 (88)	A (n = 102)	154 (86)	151 (89)
	B (n = 57)	122 (67)	111 (57)	B (n = 97)	131 (80)	125 (76)
	C (n = 49)	123 (71)	134 (70)	C (n = 84)	130 (83)	137 (82)
CDT (U/l)	A (n = 65)	21.2 (12.3)	19.0 (11.1)	A (n = 109)	20.3 (10.5)	18.9 (9.6)
	B (n = 67)	23.4 (13.2)	22.1 (13.4)	B (n = 97)	22.6 (13.7)	21.7 (13.7)
	C (n = 64)	20.6 (16.1)	20.3 (12.2)	C (n = 88)	21.0 (16.1)	20.8 (13.4)
MCV (fl)	A (n = 66)	94.5 (4.5)	93.1 (4.3)**	A (n = 109)	94.5 (4.2)	93.7 (4.1)**
	B (n = 67)	94.1 (4.0)	92.6 (3.8)**	B (n = 98)	94.2 (4.2)	93.2 (4.2)**
	C (n = 65)	94.2 (3.7)	92.4 (3.2)**	C (n = 88)	94.5 (4.0)	93.2 (3.9)**
ASAT (U/l)	A (n = 66)	31.9 (19.7)	32.8 (16.6)	A (n = 109)	35.2 (32.8)	35.8 (31.7)
	B (n = 69)	30.5 (11.0)	39.4 (60.0)	B (n = 99)	30.9 (12.6)	37.1 (50.8)
	C (n = 66)	37.0 (32.5)	38.2 (28.5)*	C (n = 88)	36.4 (29.0)	37.3 (25.6)*
ALAT (U/l)	A (n = 66)	40.1 (31.7)	37.7 (24.1)	A (n = 109)	46.2 (57.6)	44.7 (55.5)
	B (n = 69)	35.3 (19.3)	48.2 (93.6)	B (n = 99)	38.0 (21.0)	47.0 (79.0)
	C (n = 66)	49.7 (49.3)	47.4 (43.7)	C (n = 88)	49.1 (45.9)	47.3 (41.4)
GGT (U/l)	A (n = 66)	87.7 (83.0)	93.6 (113.6)	A (n = 109)	101.1 (229.4)	104.7 (237.0)
	B (n = 69)	77.2 (63.4)	89.1 (102.7)	B (n = 99)	81.9 (72.0)	90.2 (98.3)
	C (n = 65)	96.4 (208.3)	77.3 (89.1)	C (n = 88)	94.5 (183.5)	80.5 (87.2)
Self-estimation scale of physical health[a]	A (n = 57)	3.2 (0.8)	3.1 (0.7)	A (n = 101)	3.2 (0.8)	3.1 (0.7)
	B (n = 57)	3.2 (0.8)	3.1 (0.9)	B (n = 94)	3.2 (0.8)	3.2 (0.9)
	C (n = 52)	3.2 (0.9)	3.1 (0.8)	C (n = 84)	3.3 (0.8)	3.2 (0.8)
Self-estimation scale of mental health[a]†	A (n = 58)	3.1 (0.9)	2.8 (0.8)**	A (n = 102)	3.0 (0.9)	2.8 (0.9)*
	B (n = 56)	2.8 (0.9)	3.0 (1.0)	B (n = 94)	2.9 (0.9)	3.0 (0.9)
	C (n = 52)	2.9 (0.8)	2.8 (0.8)	C (n = 84)	3.0 (0.9)	2.9 (0.9)

[a]1 = poor, 5 = excellent.
*$P < 0.05$, **$P < 0.01$, comparison with the baseline value within groups.
†$P < 0.05$ A versus B both in analyses according to protocol and intention to treat.
For abbreviations, see Table 1.

Table 3. Means (SD) at baseline and at 1, 2 and 3 years

Parameter	Group	Baseline	1 year	2 years	3 years
Drinking amount per week (g)	A (*n* = 34)	241 (165)	209 (217)	228 (264)	215 (165)
	B (*n* = 36)	243 (182)	257 (190)	263 (212)	270 (221)
	C (*n* = 49)	267 (278)			320 (350)
CDT (U/l)	A (*n* = 49)	20.8 (11.9)	19.2 (12.0)	18.8 (8.6)	19.2 (11.7)
	B (*n* = 49)	23.7 (13.9)	21.5 (10.4)	20.7 (10.4)	23.0 (14.8)
	C (*n* = 64)	20.6 (16.1)			20.3 (12.2)
MCV (fl)	A (*n* = 50)	94.6 (4.3)	93.2 (4.2)**	93.7 (4.1)*	93.2 (4.2)**
	B (*n* = 47)	94.1 (3.9)	93.0 (3.8)**	93.0 (3.7)**	92.6 (3.6)**
	C (*n* = 65)	94.2 (3.7)			92.4 (3.2)**
ASAT (U/l)	A (*n* = 50)	32.7 (21.1)	34.8 (27.3)	37.6 (21.9)	32.4 (14.4)
	B (*n* = 49)	31.8 (11.4)	31.9 (11.5)	43.6 (49.1)	34.3 (14.5)
	C (*n* = 66)	37.0 (32.5)			38.2 (28.5)*
ALAT (U/l)	A (*n* = 50)	41.8 (33.5)	38.9 (32.8)	44.2 (37.5)	36.7 (21.1)
	B (*n* = 49)	36.9 (20.4)	37.4 (20.8)	56.7 (131.2)	37.3 (19.7)
	C (*n* = 66)	49.7 (49.3)			47.4 (43.7)
GGT (U/l)	A (*n* = 50)	90.0 (86.5)	82.5 (85.1)	97.4 (99.4)	91.1 (94.8)
	B (*n* = 49)	77.8 (54.9)	70.8 (56.9)	95.2 (114.1)	86.3 (91.9)
	C (*n* = 65)	96.4 (208.3)			77.3 (89.1)

*$P < 0.05$, **$P < 0.01$, comparison with the baseline value within groups.
There was no significant difference ($P < 0.05$) between the study groups in mean changes.
For abbreviations, see Table 1.

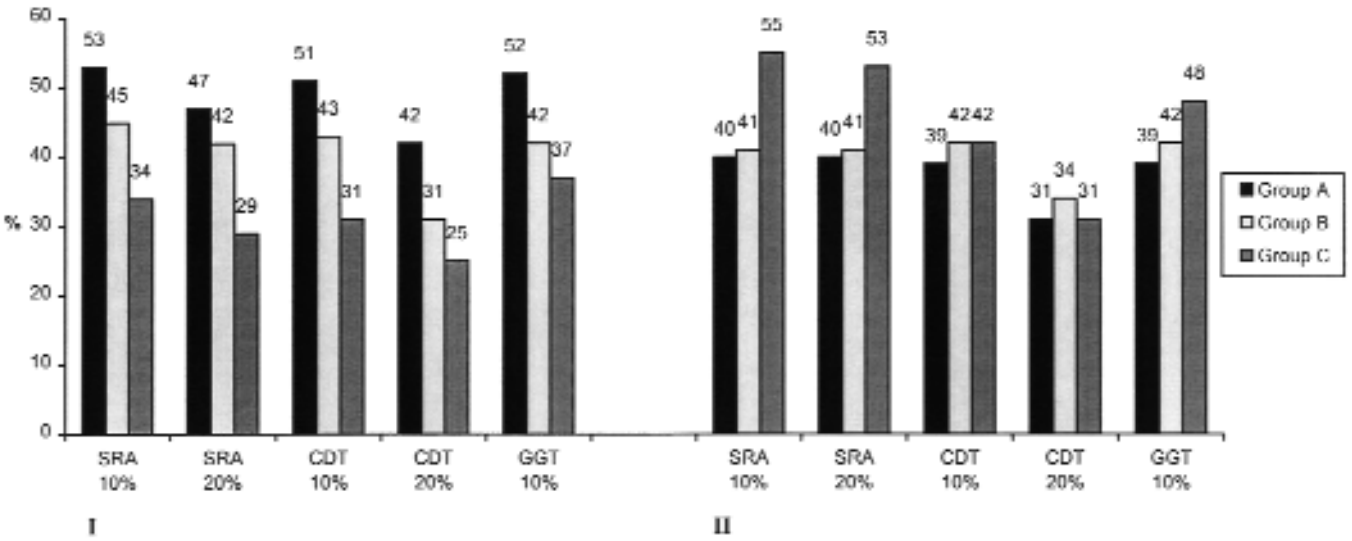

Figure 2. Proportion of patients with decreased (I) and increased (II) values.
Variable percentage refers to minimum decrease (I) or increase (II) from baseline to 3 years. There was no statistically significant difference between the study groups. SRA, self-reported alcohol consumption; CDT, carbohydrate-deficient transferrin; GGT, gamma-glutamyltransferase.

through a screening and recruitment procedure. This seemed to occur irrespective of further brief intervention treatment. It is unlikely, though not known, that these numbers would have been reached only by natural development without the study actions (Seppä *et al*., 1999). On the other hand, in intervention group A, 15–20% and in intervention group B, 5–13% more patients decreased their drinking in a clinically significant manner, than in control group C (Fig. 2), but this did not reach statistical significance. This may be due to the small sample size, because a sample size calculation gives the present study only 81% power at the 5% level of significance. A statistically significant decrease of MCV in all the study groups was found, and this, along with decreasing tendency of CDT, indicated that drinking was being reduced in all the groups. Results regarding females were similar: drinking was reduced in all treatment groups, but there were no significant differences between the groups (Aalto *et al*., 2001*a*).

One probable explanation for this study not being able to demonstrate an advantage to brief intervention is that the control group, too, took part in some discussion and feedback. After being screened by a health behaviour questionnaire, including alcohol-related questions, group C saw a GP twice, and received feedback about their laboratory tests and alcohol drinking. They were not, however, told that they would be asked to attend follow-up after 3 years. By the time the present study had started, the forming of a ‘true’ control group would

have been unethical, because of evidence already existing in favour of brief intervention. Thus, the control group C could be seen as a simple advice group. From that perspective, it was observed that brief intervention was not more effective than simple advice.

The question which has arisen before is the transfer of brief intervention from a research situation to the natural environment (Heather, 1995; Drummond, 1997). The present study protocol was planned to be as near a natural general practice environment as possible (Sillanaukee, 1997) and this might be another reason for the results of intervention groups A and B not being superior to the results of control group C. Screening, detection and brief intervention were done by the local personnel, and GPs and nurses were not selected; all of them participated in giving brief intervention. In giving health advice, they used mainly skills that they had adapted before through practical work and professional training; they were given only two half-day training sessions in carrying out brief intervention. One consequence of the routine setting may have been a problem of engaging GPs and nurses in providing competent brief intervention. It has been noted in health care that giving only information about treatment recommendations does not change practices much (Greco and Eisenberg, 1993; Glanville *et al*., 1998) and for this reason recently implementation of brief intervention has been paid attention to (Aalto *et al*., 2001*b*). In a practical setting, there are probably more negative attitudes against treatment of problem drinkers than in a research situation (Drummond, 1997). Negative attitudes about patients' alcohol problems, scepticism about effectiveness of the brief intervention treatment, and the perception that alcohol problems are not in the realm of general practice providers may have affected the treatment results (O'Connor and Schottenfeld, 1998).

In a naturalistic setting, study populations are often very different from those in strict research conditions. A further possible explanation why this study failed to demonstrate effectiveness of brief intervention is the high proportion of unemployed people among the subjects. There were about twice as many unemployed people among subjects than in the community at the time. Unemployment often includes a complexity of problems and may thus have an impact in brief intervention results at large. Because of this possible selection bias, employed and unemployed as well as some other sociodemographic subgroups were analysed separately, but differences were not found between brief intervention groups and the control group. Statistical power is always lower in subgroup analyses.

Because this study was performed in the natural environment of general practice, there are conceivable weaknesses which must be recognized. Because randomization was performed by GPs, it is possible that, in some cases, they manipulated the allocation. It is also possible that self-reported alcohol consumption may not be as reliable as in a strict research situation. This might explain why self-reported alcohol consumption was not reduced in the same way as CDT and MCV. In addition, the drop-out rate was high. The high drop-out rates may be discouraging for personnel, and damage the process of implementation of brief intervention. The long follow-up period (3 years) may have contributed to the high drop-out rate.

The study protocol was artificial in some ways. One study aim was to compare brief intervention programmmes with different frequencies; the protocol was therefore structured beforehand, but, in real life, it would vary for different patients. Also, a strategy where only those patients with health problems, possibly due to heavy drinking, would be screened is an alternative procedure to the screening-all strategy which we used. It might be better accepted by the personnel and patients, and may have led to better treatment results.

As far as we know, one study using naturalistic screening and brief intervention has been conducted (Richmond *et al*., 1995). In that study, follow-up time was 12 months, compared to the present study's 36 months. The results were parallel with the present study. In that study, male patients receiving brief intervention reduced drinking more than controls, but this difference was not significant. The lack of a significant effect of brief intervention was also indicated by the analysis of GGT level. However, there was a significantly greater reduction in the number of alcohol-related problems at the 6-month follow-up reported by those receiving brief intervention.

The present study indicates that, in the routine setting of general practice, the effectiveness of brief intervention may not be as good as in special research conditions. Factors reducing effectiveness should be under intensive evaluation in future studies, and different methods of implementing brief intervention need to be evaluated to better support health care providers in their efforts. It would also be beneficial to measure the attitudes of brief intervention givers and intensity of brief intervention sessions in relation to efficiency.

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