

Involvement of general practitioners in managing alcohol problems: a randomized controlled trial of a tailored improvement programme

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ABSTRACT

Aims To assess the effect of a tailored multi-faceted improvement programme on general practitioners' (GPs') behaviour towards prevention of hazardous and harmful alcohol consumption. The improvement programme consisted of activities aimed at the GP, organization and patient. Educational training sessions and visits by a facilitator were tailored to the GPs' needs and attitudes. **Design** Cluster randomized controlled trial. **Setting** General practices in the Netherlands. **Participants** Seventy-seven general practices; 119 GPs participated. Data from 6318 patients were available, of whom 765 (12.1%) were at risk. A total of 1502 patients' electronic medical records were reviewed. **Measurements** The primary outcome was the number of eligible patients who received screening and advice. **Findings** Difficulties in recruiting GPs and in motivating GPs for participation in the tailored parts of the programme impeded optimal implementation of the programme. Although GPs in both groups became more involved after enrolment, this improvement waned during the trial. The quality improvement programme enhanced the initial improvement in behaviour and it tempered waning (intervention group), compared to our control condition, resulting in average improvement rates of 5% (screening) and 2% (advice-giving) at 12-month follow-up (not significant). **Conclusions** A tailored, multi-faceted programme aimed at improving general practitioner management of alcohol consumption in their patients failed to show an effect and proved difficult to implement. There remains little evidence to support the use of such an intensive implementation programme to improve the management of harmful and hazardous alcohol consumption in primary care.

Keywords Alcohol, awareness, brief interventions, family practice, multi-faceted, RCT.

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INTRODUCTION

Alcohol contributes substantially to the global burden of disease through intoxication, alcohol dependence and related neuropsychiatric conditions. It is a major risk factor for several chronic diseases, cancers, accidents, injuries and violence [1–3]. Intervening in risky drinking patterns through screening and brief interventions (SBI) at an early stage is a cost-effective strategy to prevent drinking problems [4–6]. Primary health care is a potential setting for such interventions, because large numbers of patients can be reached. Despite the evidence

for SBI in the prevention of hazardous and harmful alcohol consumption, this approach is not integrated into routine clinical practice. General practitioners (GPs) feel, among other things, hindered by lack of basic training, time constraints and doubts about the effectiveness of SBI [7–10]. A systematic review of strategies to engage GPs showed that educational and office-based strategies increased involvement in screening and delivering brief advice by 13%. Alcohol-specific and multi-faceted strategies were the most promising [11,12]. This is consistent with other implementation studies [13,14]. However, to date, very few studies of acceptable methodological

quality with reasonable follow-up periods have tested implementation strategies to engage general practice in the prevention of hazardous and harmful alcohol consumption.

In this study, we therefore assessed the effect of a multi-faceted improvement programme on GPs' behaviour towards prevention of hazardous and harmful alcohol consumption. This programme targeted the attitudes and competences of GPs in order to improve their SBI activities. Additionally, the programme was targeted at improving the practice organization to overcome barriers in the prevention of alcohol-related problems.

METHODS

Design and participants

We performed a cluster-randomized controlled trial with measurements before (T0) and 1 year after (T1) the improvement programme. In total, 2758 Dutch general practices were invited during three recruitment waves. Every GP within a practice received an individual invitation, but practices could only enrol if all GPs in the practice agreed to participate. The practices enrolled were randomized using a computerized scheme to an equal-sized intervention group and control group. Randomization was performed at two time-points: after the first two recruitment waves and again after the third wave. The GPs were acquainted with the aims of the study, and after baseline measurement they were informed which group to take part in. To identify possible selection bias, a non-respondent survey was conducted during the first recruitment wave, which included 833 practices and 1566 GPs. All invited GPs from this recruitment wave who did not return a positive response to our invitation to participate in our trial ($n = 1517$) were requested to complete a shorter questionnaire.

The improvement programme was offered to general practices during October 2006–June 2007 (intervention period). The programme was offered in eight clusters. After randomization, the practices were divided into clusters for logistic reasons, dependent on their location in the Netherlands. Clusters 1–6 (all from recruitment waves 1 or 2) began the programme in October 2006, and their last possible activity was in May 2007. Clusters 7 and 8 (wave 3) began the programme in December 2006, also ending in May 2007.

Ethical approval

The trial was approved by the Research Ethics Committee CMO of the region Arnhem-Nijmegen (letter dated 2 January 2006; SE/CMO 0003). The committee concluded in their letter that in compliance with the law on medical–scientific research (WMO), the GPA trial did not

need approval. We asked for written informed consent, which was indeed provided by all participants.

Intervention

The improvement programme combined professional, organization- and patient-directed activities. The emphasis was upon educational training sessions and support visits by a trained facilitator, which were tailored to the participants' needs and attitudes. Patient awareness was raised, among other methods, through personal feedback. A GP was involved as an adviser in the development of this programme. For a detailed outline of the programme, see Table 1 [15–21].

The guideline and patient information letters on problematic alcohol consumption were mailed to the control group (this can be regarded as usual care), and this group received no further support or training. For ethical reasons, their patients also received the personal feedback on alcohol consumption in May 2007.

Outcome measurements

The primary outcome was the number of eligible patients who received screening and advice as recommended by the guidelines. GPs' screening and advice-giving behaviour were measured in patients' electronic medical records and via self-administered questionnaire at T0 and at T1.

Medical record reviewing

We reviewed the medical records to check the GPs' notes after their contacts with the at-risk patients [Alcohol Use Disorders Identification Test (AUDIT) score ≥ 8] and with a sample of patients not at risk (AUDIT score < 8). Information about the number of contacts, annotations about alcohol and advice-giving was obtained per patient. The information was gathered for three different periods, namely the 12 months before the start of the intervention, the 12 months after the last possible intervention activity and the intermediate period (i.e. intervention period). This intermediate period varied in length per cluster of practices. To correct for this variance we converted the number of contacts to a period of 12 months.

Self-administered questionnaires

In the pre- and post-measurement questionnaires we asked GPs to estimate: (i) how many patients they had asked about their alcohol consumption during the month prior to the questionnaire (screening); and (ii) how many patients with alcohol-related problems they had counselled during the previous year (advice-giving behaviour).

Table 1 Outline of the intervention.

The tailored improvement programme offered to the general practices comprised nine activities, which can be divided into the following three levels:

Professional-directed interventions

- (1) Distribution of the guideline on problematic alcohol consumption issued by the Dutch college of GPs [15]
- (2) A reminder-card to display on the desk of the GP

This card featured the signs, symptoms and characteristics which should trigger a physician to ask about alcohol consumption.

On the reverse, the Five Shot Test was listed, a five-item questionnaire designed to estimate the amount of alcohol consumption of a patient, which is recommended in general practice because of its practical advantages and diagnostic properties [16]

- (3) Educational training session tailored to professionals' attitudes

The entire general practice team (including practice assistants and nurses) was invited to participate in the small-scale training sessions (maximum around 10 participants). Minimally one and maximally three sessions could be attended, tailored to the wishes, needs and attitudes of the teams. These sessions were offered to the practice teams in the early evening hours together with a light dinner (soup, bread, fruit). The duration of the sessions was between 2 and 3 hours. The basic content of the educational training was standardized by means of a PowerPoint presentation, which was based on the evidence-based guidelines and training programmes (PIN) of the Dutch college of GPs and on recent international guidelines [15,17].

Furthermore, we used the accompanied training module which was developed in the Phepa Project [18]

The teacher was instructed to ask for bottlenecks encountered by the GPs so that the content could be tailored to the attitudes and needs of the participants. The attitudes were measured with the Short Alcohol and Alcohol Problems Perception Questionnaire (SAAPPQ) [19]. During the first training session, the outcomes of the SAAPPQ were discussed and presumptions towards hazardous and harmful levels of alcohol consumption were addressed. Furthermore, the evidence-based guidelines were discussed. The second and third sessions focused on bringing theory into practice to overcome the barriers that might hinder GP activity. After a short standardized summary of the theory (PowerPoint) about how to approach alcohol problems, the participants were able to revert to topics that remained unclear after the first session or support visit (if attended) or to bring in cases from their daily practice. Next, the participants practised motivational interviewing in role-plays, a useful method in the treatment of life-style problems and disease [20,21]. The content of the role-plays depended on the attitudes and experiences of the participants

Organization-directed interventions

- (4) Feedback report

From the Alcohol Use Disorders Identification Test (AUDIT) questionnaires, distributed by the practice teams, the amount of alcohol consumption for each responding patient was calculated. The patients were divided into four categories: (i) safe to moderate drinker; (ii) hazardous drinker; (iii) harmful drinker; and (iv) possibly dependent drinker. For each practice, the proportion of patients in each category was calculated. The practices received this anonymous information together with the total number of returned patient questionnaires

- (5) Facilitation of the cooperation with local addiction services for support and referral

The local addiction services were invited to join in the first educational training session. The goals were that the practice teams learned from the experiences of the addiction services, and GPs knew more precisely when to refer and what subsequently happened to their patients. Agreements were reached about communication, accessibility and cooperation

- (6) Outreach visits by a trained facilitator tailored to needs of practice

The entire practice team was invited and participation was tailored to the wishes and needs of the teams. Minimally one and maximally three visits were offered. The visits took place during daytime and lasted approximately 1 hour. The content of the visits was tailored to the barriers of the practice organization as a whole. Remaining questions after the educational training sessions were dealt with, and implementation barriers in daily practice were addressed. Besides practical tips to tackle structural, logistical and communicative issues, the facilitator focused on the attitudes and beliefs of the practice team and discussed individual barriers to act upon alcohol problems

Patient-directed interventions

- (7) Patient information letters about alcohol issued by the Dutch college of GPs, and leaflets and self-help booklets issued by the National Institute for Health Promotion and Disease Prevention (NIGZ). These patient materials were offered to the general practices in order to be distributed to patients by the GPs

- (8) Poster in the waiting room

The poster drew attention to alcohol with the advice to contact the GP or look at the websites of the NIGZ or Netherlands Institute of Mental Health and Addiction (Trimbos Institute) for further information

- (9) Personal feedback based on their alcohol consumption

The patients received a letter which cited the category (see above) to which they belonged and the corresponding advice. The advice was to consult their GP or to look at the websites of the NIGZ or Trimbos Institute. For patients in category I this was not necessary and for patients in category IV the advice to inquire at the local addiction service was added

At pre-measurement, questions about the GPs' and practices characteristics were also included. At post-measurement we asked additionally if the role of practice assistants and nurses was enhanced. A shortened version was sent to GPs who had not responded after two reminders. This questionnaire comprised only estimations about their current screening and advice-giving behaviour.

At-risk patients were identified with the AUDIT, a validated screening questionnaire [22]. Each practice team was asked to hand out a written questionnaire to up to 230 patients who visited the general practice consecutively within a 3-month period. The questionnaires were completed and returned to the research team prior to the start of the improvement programme.

Finally, a log was kept to evaluate the GPs' participation in the tailored components of the improvement programme.

Sample size

The trial was designed to detect a 13% increase of screening and advice-giving rates from 32% (usual care) to 45% in the intervention group [4]. A total of 64 practices each with 10 at-risk patients were needed [intraclass correlation coefficient (ICC) = 0.05, alpha = 0.05, beta = 0.80]. Anticipating a dropout of 20% of the practices, the aim was to recruit 80 general practices.

Statistical analysis

Outcomes were analysed by the intention-to-treat principle, meaning that general practices (and GPs) were analysed in the groups to which they were originally randomly assigned, regardless of whether or not they actually participated in the intervention.

The analyses compared intervention and control group. In the analyses of screening and advice-giving behaviour as reported in the medical records, the patient was the unit of analysis. Because of the hierarchical structure (patient nested within practice) we performed multi-level analyses. In this analysis we took account of the variability associated with each level of nesting. Analyses were performed using SAS version 9.2 and based on the mixed-effects model (PROC MIXED and PROC GLIMMIX) [23]. We used a random intercept model with fixed variables. The covariates were screening and advice-giving rates, age of the GP at baseline and degree of participation.

Next, we computed differences in self-reported screening and counselling of GPs by analysis of covariance (not multi-level), using the same covariates. Descriptive statistics were used to outline the characteristics of the study population and the non-responders (SPSS version 16.0).

RESULTS

Study population

Figure 1 outlines the trial flow. Overall, 2758 general practices were invited to participate; 2676 practices declined. The 82 participating practices (3.0%), with 124 active GPs, were randomized. After randomization, but before pre-measurement, five practices withdrew: one in the intervention group and four in the control group. This resulted in 77 general practices (119 GPs): 40 practices (63 GPs) receiving allocated intervention and 37 practices (56 GPs) acting as a control group.

The baseline questionnaire was returned by 102 GPs (86%): 50 (intervention group) and 52 (control group). At T1 the questionnaire was returned by 88 GPs (74%): 47 (intervention group) and 41 (control group). Data extraction from the medical records were available for 57 practices (74%): 28 (intervention group) and 29 (control group). In total, 1502 medical records were reviewed (of which 505 were at risk).

Descriptive demographics of the GPs are detailed in Table 2. Although in both groups the majority of GPs was middle-aged (45–50 years), the intervention GPs turned out to be, on average, 4 years younger than their colleagues in the control group. This difference is significant, and therefore age was included as a covariate during analysis. Otherwise, there were no significant baseline differences. The non-respondent questionnaire was returned by 764 GPs (50%). With the exception of practice type [non-responding GPs worked on average in practices with more colleagues ($P = 0.00$)], non-responders did not differ from participating GPs.

Patients

The GPs from 77 practices estimated that they had distributed, on average, 137 patient AUDIT questionnaires per practice (see Fig. 1); 6775 questionnaires were returned (64%); 457 questionnaires were excluded from the analysis due to missing data, resulting in data from 6318 patients to be available, of whom 765 (12.1%) were at risk. The intervention and control group did not differ significantly in percentage of at-risk patients compared to patients with safe drinking patterns ($P = 0.17$).

Participation

The activities of the programme were tailored to the needs and attitudes of the GPs and practices, which resulted in differences in attendance per GP. Despite several reminders and invitations, 13 GPs did not even attend one educational training sessions or visit by the facilitator. Half the intervention practices had met the minimal demands made on enrolment (every GP in the practice attended minimally one training session and

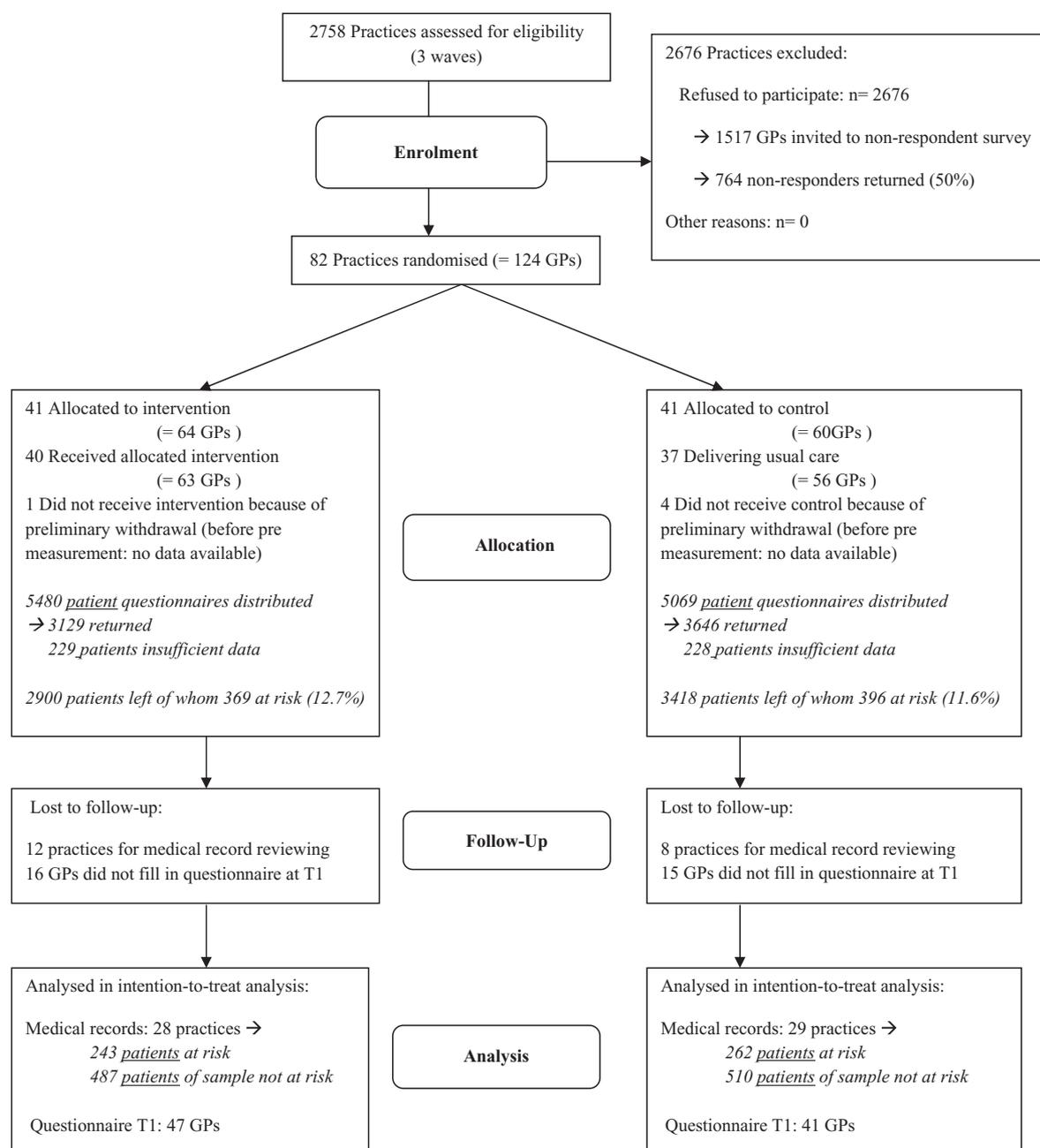


Figure 1 Flow of participating practices, general practitioners (GPs) and patients through the trial

one visit): $n = 20$ practices; 25 GPs. Of these, 55% was a solo practice. Another 12 GPs met these criteria, but in their practices ($n = 11$) at least one GP did not comply. Several other practice staff members also attended the educational training sessions: 14 practice assistants/nurses attended one training session and another eight attended two sessions. Six practices (15%) indicated that the role of these practice assistants/nurses was enhanced.

Screening and advice-giving rates

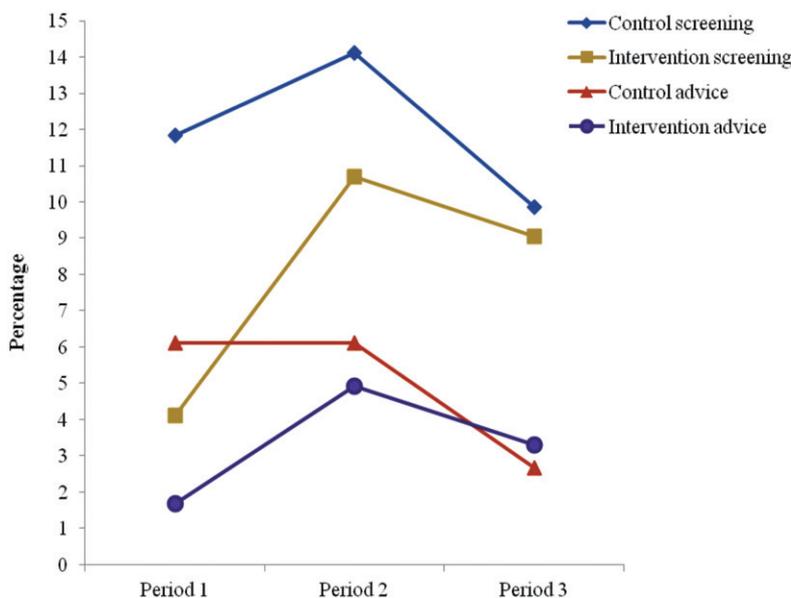
The information obtained from the medical records about the proportion of at-risk patients screened for or

given advice about alcohol is shown in Fig. 2. At post-measurement, the intervention GPs did not perform significantly better compared to the control group (between groups). The results remained the same when corrected for pre-measurement, age and degree of participation.

As shown in Fig. 2, a more active screening role during the intervention period was found for both groups, being stronger for the intervention group. At 1-year follow-up (T1), both groups became less active; this waning of active behaviour was stronger in the control group. At T1, the intervention group performed better

Table 2 Baseline characteristics of participating general practitioners (GPs), expressed as mean (standard deviation) or absolute numbers (percentage).

Characteristic	Control group (n = 52)	Intervention group (n = 50)	Non-responders (n = 744)
Male gender	30 (57.7%)	37 (74.0%)	478 (65.4%)
Mean age at start of study	49.4 (SD 7.4) [#]	45.3 (SD 6.9) [#]	48.1 (SD 8.0)
Working hours: average percentage of full-time work	0.81 (SD 0.21)	0.84 (SD 0.19)	0.80 (SD 0.21)
Average case-load per GP	2135 (SD 786)	2158 (SD 627)	2153 (SD 689)
Working area			
• Rural	• 15 (29%)	• 16 (32%)	• 148 (20%)
• Urbanized rural	• 15 (29%)	• 18 (36%)	• 306 (41%)
• Urban	• 11 (21%)	• 4 (8%)	• 142 (19%)
• Big city	• 11 (21%)	• 12 (24%)	• 145 (20%)
Practice type			
• Solo	• 25 (48%)	• 18 (36%)	• 193 (26%) [#]
• Duo	• 18 (35%)	• 21 (42%)	• 216 (29%) [#]
• Group	• 4 (8%)	• 6 (12%)	• 213 (29%) [#]
• Health centre	• 2 (4%)	• 5 (10%)	• 79 (11%) [#]
• Other	• 3 (6%)	• 0 (0%)	• 42 (6%) [#]
Average hours of training in alcohol problems before start of study	0.4 (SD 1)	0.5 (SD 1.1)	NM
Number of patients included			NM
• At risk	• 396 (11.6%)	• 369 (12.7%)	
• Not at risk	• 3022 (88.4%)	• 2531(87.3%)	

SD: standard deviation; NM = not measured. [#]P < 0.05.**Figure 2** Percentage of patients at risk screened or given advice by the general practice teams for control and intervention group per period, according to the medical records

compared to baseline (absolute average improvement rates: screening 5% and advice-giving 2%), as opposed to the control group, which performed less well (absolute decrease for both screening and advice-giving rates: 3%). These changes in screening and advice-giving behaviour in time were not significant (within-group analysis). Additionally, the results for the whole sample, including the patients not at risk (AUDIT < 8), were comparable (not shown).

The self-administered questionnaire produced data only at T0 and T1. Both groups screened less 1 year after the intervention, this decrease being more pronounced in the control group than in the intervention group (Table 3). Analysis of covariance showed that, after correction for baseline performance, age and degree of participation, no significant effects were found on self-reported screening and counselling behaviour 1 year after the intervention.

Table 3 General practitioners' (GPs') reported screening and counselling for problematic alcohol [mean values with standard deviation (SD)].

	Control (n = 41 GPs)	Intervention (n = 47 GPs)	P-value
GPs reported screening T0	17.9 (SD 23.8)	15.2 (SD 10.9)	0.05
GPs reported screening T1	9.5 (SD 8.1)	11.6 (SD 8.0)	0.60
GPs reported counselling T0	3.3 (SD 2.6)	3.2 (SD 2.5)	0.78
GPs reported counselling T1	4.4 (SD 3.9)	5.0 (SD 5.2)	0.57

As measured by the self-administered questionnaire at baseline (T0) and 1-year follow-up (T1); answers were frequency per month for screening and frequency per year for counselling.

DISCUSSION

Our aim was to assess the effect of a tailored multi-faceted improvement programme on GPs' behaviour towards prevention of hazardous and harmful alcohol consumption. Despite this relatively intensive programme aimed at provider, organization and patient, we did not find significant differences in change between the intervention and control groups.

Strengths and limitations

At the beginning, the recruitment of practices was somewhat slow and we had to invite more practices than anticipated. Therefore, we had to recruit in three waves instead of one, which affected the time path and planning, which we were not able to extend. Recruitment problems seem to be an increasing international challenge: it has proved more difficult to recruit and retain GPs for clinical trials [24–27]. The degree of participation in the training sessions and visits was frugal: only 20 practices met the minimal demands made on enrolment. Tightening the planning could have had an impact on the GPs' participation. Furthermore, the programme was tailored to GPs' needs and attitudes, which were meant to be discussed during the first training session and visit. A large number of GPs did not attend these first activities, even though the content of these sessions was clarified in advance. They might have interpreted the tailored part too freely. Although we managed to include enough practices in the trial, we did not achieve the anticipated 32 practices to complete the programme. We acknowledge that the sampling process and poor participation rate might have tempered the effects of our intervention, as the tailored elements could not be executed optimally. None the less, our findings reflect the effects of such a programme when conducted in a naturalistic setting. Although medical record reviewing is disputable as a solo method [28,29], we combined the results with the results of the self-administered questionnaires. Both methods show a positive but not significant effect of the intervention. A striking difference is that the intervention GPs reported that they screened less at T1 than at T0. A

possible explanation is that our intervention failed to alter attitude, in particular role security. Attitude is a well-known determinant of behaviour [7,30,31] and of implementation of SBI in general practice [32]. At follow-up, the average scores on role security (including role adequacy and role legitimacy) deteriorated; we saw a decrease of 0.6 in the intervention group on a seven-point Likert scale. This suggests that our training increased role insecurity instead of improving role security. This might be explained by the fact that only a minority of GPs attended the second and third educational training sessions which, in particular, addressed role security. The effects of our quality improvement programme on GPs' attitudes is beyond the scope of this paper, and is intended to be discussed fully in another paper (Van Beurden, personal communication). Anderson *et al.* [33] also found that training and support did not necessarily increase role security, analysis at the individual GP level showing that role security for GPs who were already role-insecure actually deteriorated.

Non-responding GPs differed significantly in practice type. This can be explained by the restriction, at enrolment, that the entire practice should engage in the programme which, of course, is achieved more easily in smaller practices. Without this demand, probably more GPs from group practices would have enrolled. This would have resulted in more GPs (and practices) being exposed to the programme. This is supported by the participation rates of GPs working in group practices, as about 45% of GPs within a group practice met our initial inclusion criteria while their colleagues failed to attend at least one educational training session and visit. However, later on (not fitted within the time path of this project), the effect of the programme may be passed to colleagues, or the educated GP could act as a 'specialist' in the practice to whom colleagues can refer problematic drinkers for brief intervention. However, the under-representation of the group practices in our study, the disappointing recruitment and the laborious participation indicate that it will be difficult to motivate large groups of GPs, in particular those working in group practices, to engage in an intensive multi-faceted programme. At the same time,

group practices become more common in primary health care in many countries. In the Netherlands the proportion of GPs working in solo-, duo- and group practices was 25, 30 and 45% in 2006 and 20, 29 and 52% in 2009 [34]. Therefore, we cannot simply generalize our results to the total Dutch general practice population.

Implications

Longer follow-up and monitoring of new behaviour

In contrast to our findings, previous studies (Funk *et al.* [14]; Anderson *et al.* [11]) using a multi-component programme found small to moderate effects on SBI. These significant outcomes were, however, all measured during a 12-week intervention period. These studies do not report if changes in SBI were sustained. In our study we also observed increased SBI rates in the short term, but these improvements in SBI rates did not persist in the long term. This is in line with the transtheoretical model of (health) behaviour change, which describes the process of adoption of new behaviour [35]. The model suggests that 6 months to 5 years are required for the maintenance of new behaviour to be integrated into daily routines without the risk of reversion to previous behaviour. It therefore seems reasonable to include a longer period to monitor the new behaviour.

Adjustment of expectations

Implementation studies have found an increase in SBI rates of 13%, ranging from 8 to 18% [4]. At 1-year follow-up we found improvement rates of 5% (screening) and 2% (brief advice). We think that the moderate participation rate of GPs in the training sessions and visits could have had an impact on the SBI rates. None the less, more recent literature indicates medians of behavioural improvement in general from educational training [36,37] and from outreach visits [38] of around 6%, although GPs may have specific issues when dealing with alcohol prevention [9].

Evidence for the effectiveness of SBI is beyond doubt [39–42]. Although the implementation effects are somewhat small, every GP is capable of reaching a fair number of patients with alcohol problems (in the Netherlands 200–250 patients, on average, per full-time general practice). Moreover, the number needed to treat is eight [43], so even small effects become clinically relevant when alcohol consumption reduces; this may have large impacts on the burden of disease and on society as whole (i.e. reduction of accidents, injuries and violence).

If these lower percentages are actually a better estimation, our power calculation would have yielded a bigger sample size and, if achieved, the results could have been stronger.

Designing an improvement programme

Aalto *et al.* concluded that besides attitudes, knowledge and skills, other still unknown factors may hinder the widespread implementation of brief interventions [44]. Comparable to our outcomes, they found that the management of hazardous and harmful alcohol consumption by primary health-care professionals did not change during a 3-year project, although a mixture of strategies was implemented.

The relatively poor participation rates in our study raise questions about the feasibility of extensive multi-faceted improvement programmes in general practice. Babor & Higgins-Biddle suggested that dissemination of screening and brief interventions among GPs should be embedded within the more general context of preventive health-care services and that cooperation among a wide variety of organizations, including government agencies, consumers, health management organizations, philanthropies and the media, should be part of it [45]. Ampt *et al.* recommended, among other things, community awareness to promote life-style behavioural risk factor counselling by GPs [46]. Moreover, patient awareness or empowerment via personal feedback can be raised through patient-directed interventions such as mass media campaigns, local health workers, schools and anonymous online treatments [47–50]. E-learning is an upcoming and proven approach of medical education, which has practical advantages [51–53].

Although we were not able to analyse the contribution of separate elements within our programme, perhaps it would be better to use a stepped approach to start with strategies that are easily carried out, followed by more intensive strategies to maintain or improve further the newly adopted behaviour when necessary. Educational training and visits can be utilized, but should be embedded within educational programmes for GPs, organized preferably by local or regional organizations. In the Netherlands, regional primary care organizations offer annual training programmes to general practices about a variety of subjects. These organizations performed small-scale pilot projects to stimulate alcohol SBI among GPs. They found that it was feasible to attract sufficient participants in quality improvement programmes, although implementation and sustainability again proved to be more complex [54].

Future research

Although our training sessions were focused primarily on the physician, we also tried to involve other practice staff members in order to enhance their role in the care for patients with alcohol problems. We succeeded in only 15% of the practices. Nurses, for example, still seem to be an unexploited resource [55]. In the Netherlands,

introduction of primary-care mental health workers can provide an extra instrument for delivering alcohol counselling. This resource is also being exploited and evaluated in other countries [56]. In future programmes, more attention should be paid to these supporting staff members.

As suggested by others [44,45,57,58], the best method for engaging GPs more in the prevention of alcohol problems through SBI remains a challenge. We believe that in future research more attention should be paid to the effectiveness of repeatedly raising awareness through the above-mentioned media and organizations, instead of intensive implementation strategies. A stepped approach, in which different strategies are used consecutively instead of simultaneously, may also be appropriate.

Finally, the best way to monitor and deal with the attitudes of GPs towards patients with alcohol problems during implementation studies should be a focus of future research.

CONCLUSIONS

A tailored, multi-faceted programme aimed at improving GP management of patients with hazardous and harmful alcohol consumption failed to show an effect. None the less, due to the position of GPs in health care, general practice seems well placed for screening and counselling for alcohol problems. Although GPs could be engaged in the short term, the implementation and sustainability of SBI in daily practice proved to be more complex. It remains a challenge to design an effective improvement programme which urges GPs to identify at-risk patients before actual health problems may occur, and subsequently to intervene in an appropriate manner. Smaller-scale stepped approaches seem more feasible to deal with the low GP participation rates.

Clinical trial registration

ClinicalTrials.gov Identifier: NCT00298220.

Declarations of interest

None declared.

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References

1. Rehm J., Mathers C., Popova S., Thavorncharoensap M., Teerawattananon Y., Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 2009; **373**: 2223–33.
2. World Health Organization (WHO). Reducing risks, promoting healthy life. The World Health Report. Geneva: WHO; 2002.
3. World Health Organization (WHO). Global Status Report on Alcohol 2004. Geneva: WHO; 2004.
4. Anderson P. The effectiveness of general practitioners' advice in reducing the risk of alcohol. In: Lawrence M., Neil A., Fowler G., Mant D., editors. *Prevention of Cardiovascular Disease: An Evidence-Based Approach*, 2nd edn. Oxford: Oxford University Press; 1996, p. 81–92.
5. Fleming M. E., Mundt M. P., French M. T., Manwell L. B., Stauffacher E. A., Barry K. L. Benefit–cost analysis of brief physician advice with problem drinkers in primary care settings. *Med Care* 2000; **38**: 7–18.
6. Fleming M. E., Mundt M. P., French M. T., Manwell L. B., Stauffacher E. A., Barry K. L. Brief physician advice for problem drinkers: long-term efficacy and benefit–cost analysis. *Alcohol Clin Exp Res* 2002; **26**: 36–43.
7. Spandorfer J. M., Israel Y., Turner B. J. Primary care physicians' views on screening and management of alcohol abuse: inconsistencies with national guidelines. *J Fam Pract* 1999; **48**: 899–902.
8. Babor T. E., Higgins-Biddle J., Dauser D., Higgins P., Burleson J. A. Alcohol screening and brief intervention in primary care settings: implementation models and predictors. *J Stud Alcohol* 2005; **66**: 361–8.
9. Kaner E. F., Heather N., McAvoy B. R., Lock C. A., Gilvarry E. Intervention for excessive alcohol consumption in primary health care: attitudes and practices of English general practitioners. *Alcohol Alcohol* 1999; **34**: 559–66.
10. Poplas S. T., Kersnik J., Kolsek M. Why do general practitioners not screen and intervene regarding alcohol consumption in Slovenia? A focus group study. *Wien Klin Wochenschr* 2010; **122**: 68–73.
11. Anderson P., Laurant M., Kaner E., Wensing M., Grol R. Engaging general practitioners in the management of hazardous and harmful alcohol consumption: results of a meta-analysis. *J Stud Alcohol* 2004; **65**: 191–9.
12. Grol R., Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003; **362**: 1225–30.
13. Anderson P., Jane-Llopis E. How can we increase the involvement of primary health care in the treatment of tobacco dependence? A meta-analysis. *Addiction* 2004; **99**: 299–312.

14. Funk M., Wutzke S., Kaner E., Anderson P., Pas L., McCormick R. *et al.* A multi country controlled trial of strategies to promote dissemination and implementation of brief alcohol intervention in primary health care: findings of a WHO collaborative study. *J Stud Alcohol* 2005; **66**: 379–88.
15. Meerkerk G. J., Aarns T., Dijkstra R. H., Weisscher P., Njoo K., Boomsma L. J. NHG-Standaard Problematisch alcoholgebruik [Guideline of the Dutch College of General Practitioners on problematic alcohol consumption.]. *Huisarts Wet* 2005; **48**: 284–5.
16. Aertgeerts B., Buntinx F., Ansoms S., Fevery J. Screening properties of questionnaires and laboratory tests for the detection of alcohol abuse or dependence in a general practice population. *Br J Gen Pract* 2001; **51**: 206–17.
17. Anderson P., Gual A., Colom J. *Alcohol and Primary Health Care: Clinical Guidelines on Identification and Brief Interventions*. Barcelona: Department of Health of the Government of Catalonia; 2005.
18. Gual A., Anderson P., Segura L., Colom J. *Alcohol and Primary Health Care: Training Programme on Identification and Brief Interventions*. Barcelona: Department of Health of the Government of Catalonia; 2005.
19. Anderson P., Clement S. The AAPPQ revisited: the measurement of general practitioners' attitudes to alcohol problems. *Br J Addict* 1987; **82**: 753–9.
20. Miller W. R., Rollnick S. *Motivational Interviewing, Preparing People to Change Addictive Behavior*. New York: Guilford Press; 1991.
21. Rubak S., Sandbaek A., Lauritzen T., Christensen B. Motivational interviewing: a systematic review and meta-analysis. *Br J Gen Pract* 2005; **55**: 305–12.
22. Babor T. F., Higgins-Biddle J. C., Saunders J. B., Monteiro M. G. *The Alcohol Use Disorders Identification Test Guidelines for use in primary care*. Geneva: WHO; 2001.
23. Littell R. C., Milliken G. A., Stroup W. W., Wolfinger R. D. *SAS System for Mixed Models*, 3rd edn. Cary, NC: SAS Institute, Inc.; 1999.
24. Franke L., Kommers T., Van Weel E., Lucasson P., Beek M., Van den Hoogen H. *et al.* General practice registrars and research—attitudes toward participation. *Aust Fam Physician* 2008; **37**: 276–9.
25. Leatham C. S., Cupples M. E., Byrne M. C., O'Malley M., Houlihan A., Murphy A. W. *et al.* Identifying strategies to maximise recruitment and retention of practices and patients in a multicentre randomised controlled trial of an intervention to optimise secondary prevention for coronary heart disease in primary care. *BMC Med Res Methodol* 2009; **9**: 40. doi 10.1186/1471-2288-9-40
26. Van der Wouden J. C., Blankenstein A. H., Huibers M. J., Van der Windt D. A., Stalman W. A., Verhagen A. P. Survey among 78 studies showed that Lasagna's law holds in Dutch primary care research. *J Clin Epidemiol* 2007; **60**: 819–24.
27. Veitch C., Hollins J., Worley P., Mitchell G. General practice research. Problems and solutions in participant recruitment and retention. *Aust Fam Physician* 2001; **30**: 399–406.
28. Hrisos S., Eccles M. P., Francis J. J., Dickinson H. O., Kaner E. F., Beyer F. *et al.* Are there valid proxy measures of clinical behaviour? A systematic review. *Implement Sci* 2009; **4**: 37. doi 10.1186/1471-2288-9-40
29. Spies T. H., Mokkink H. G. A., De Vries Robbe P. E., Grol R. P. T. M. Which data source in clinical performance assessment? A pilot study comparing self-recording with patient records and observation. *Int J Qual Health Care* 2004; **16**: 65–72.
30. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991; **50**: 179–211.
31. Damoiseaux V., van der Molen H. T., Kok G. J. *Gezondheidsvoorlichting en gedragsverandering [Health Education and Behavioral Change]*. Assen: Van Gorcum; 1993.
32. Nygaard P., Paschall M. J., Aasland O. G., Lun K. E. Use and barriers to use of screening and brief interventions for alcohol problems among Norwegian general practitioners. *Alcohol Alcohol* 2010; **45**: 207–12.
33. Anderson P., Kaner E., Wutzke S., Funk M., Heather N., Wensing M. *et al.* Attitudes and managing alcohol problems in general practice: an interaction analysis based on findings from a WHO collaborative study. *Alcohol Alcohol* 2004; **39**: 351–6.
34. Hingstman L., Kenens R. J. Cijfers uit de registratie van huisartsen peiling 2009 [Numbers from the registration of GPs -measurement 2009]. Utrecht: NIVEL; 2009.
35. Prochaska J. O., Velicer W. F. The transtheoretical model of health behavior change. *Am J Health Promot* 1997; **12**: 38–48.
36. Forsetlund L., Bjørndal A., Rashidian A., Jamtvedt G., O'Brien M. A., Wolf F. *et al.* Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev* 2009; (2): CD003030. doi: 10.1002/14651858.CD003030.pub2.
37. Chossis I., Lane C., Gache P., Michaud P. A., Pecoud A., Rollnick S. *et al.* Effect of training on primary care residents' performance in brief alcohol intervention: a randomized controlled trial. *J Gen Intern Med* 2007; **22**: 1144–9.
38. O'Brien M. A., Rogers S., Jamtvedt G., Oxman A. D., Odgaard-Jensen J., Kristoffersen D. T. *et al.* Educational outreach visits: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev* 2007; (4): CD000409. doi: 10.1002/14651858.CD000409.pub2
39. Bertholet N., Daeppen J. B., Wietlisbach V., Fleming M., Burnand B. Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis. *Arch Intern Med* 2005; **165**: 986–95.
40. Kaner E. F., Beyer F., Dickinson H. O., Pienaar E., Campbell E., Schlesinger C. *et al.* Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database Syst Rev* 2007; (2): CD004148. doi: 10.1002/14651858.CD004148.pub3
41. Moyer A., Finney J. W., Swearingen C. E., Vergun P. Brief interventions for alcohol problems: a meta-analytic review of controlled investigations in treatment-seeking and non-treatment-seeking populations. *Addiction* 2002; **97**: 279–92.
42. Whitlock E. P., Polen M. R., Green C. A., Orleans T., Klein J. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med* 2004; **140**: 557–68.
43. Scottish Intercollegiate Guidelines Network (SIGN). *The Management of Harmful Drinking and Alcohol Dependence in Primary Care. A National Clinical Guideline*. 2003. Edinburgh: Scottish Intercollegiate Guidelines Network.
44. Aalto M., Pekuri P., Seppa K. Primary health care professionals' activity in intervening in patients' alcohol drinking during a 3-year brief intervention implementation project. *Drug Alcohol Depend* 2003; **69**: 9–14.

45. Babor T. F., Higgins-Biddle J. C. Alcohol screening and brief intervention: dissemination strategies for medical practice and public health. *Addiction* 2000; **95**: 677–86.
46. Ampt A. J., Amoroso C., Harris M. F., McKenzie S. H., Rose V. K., Taggart J. R. Attitudes, norms and controls influencing lifestyle risk factor management in general practice. *BMC Fam Pract* 2009; **10**: 59. doi: 10.1186/1471-2296-10-59
47. Apollonio D. E., Malone R. E. Turning negative into positive: public health mass media campaigns and negative advertising. *Health Educ Res* 2009; **24**: 483–95.
48. Perkins H. W., Craig D. W. A successful social norms campaign to reduce alcohol misuse among college student-athletes. *J Stud Alcohol* 2006; **67**: 880–9.
49. Stafstrom M., Ostergren P. O., Larsson S., Lindgren B., Lundborg P. A community action programme for reducing harmful drinking behaviour among adolescents: the Trelleborg Project. *Addiction* 2006; **101**: 813–23.
50. Riper H., Kramer J., Conijn B., Smit F., Schippers G., Cuijpers P. Translating effective web-based self-help for problem drinking into the real world. *Alcohol Clin Exp Res* 2009; **33**: 1401–8.
51. Cook D. A., Levinson A. J., Garside S., Dupras D. M., Erwin P. J., Montori V. M. Internet-based learning in the health professions: a meta-analysis. *JAMA* 2008; **300**: 1181–96.
52. Kulier R., Coppus S. E., Zamora J., Hadley J., Malick S., Das K. *et al.* The effectiveness of a clinically integrated e-learning course in evidence-based medicine: a cluster randomised controlled trial. *BMC Med Educ* 2009; **9**: 21. doi: 10.1186/1472-6920-9-21
53. Riper H., van Straten A., Keuken M., Smit F., Schippers G., Cuijpers P. Curbing problem drinking with personalized-feedback interventions: a meta-analysis. *Am J Prev Med* 2009; **36**: 247–55.
54. Risselada A., Schoenmakers T. M. Vroegsignalering, behandeling en verwijzing van problematische drinkers in de Rotterdamse huisartsenpraktijk [*Early identification, treatment and referral of hazardous and harmful alcohol consumers in general practices in Rotterdam. Evaluation of a pilot project.*]. Evaluatie van een pilot project. 2010. Rotterdam: IVO.
55. Johansson K., Bendtsen P., Akerlind I. Early intervention for problem drinkers: readiness to participate among general practitioners and nurses in Swedish primary health care. *Alcohol Alcohol* 2002; **37**: 38–42.
56. Harkness E. F., Bower P. J. On-site mental health workers delivering psychological therapy and psychosocial interventions to patients in primary care: effects on the professional practice of primary care providers [Review]. *Cochrane Database Syst Rev* 2009; (1): CD000532. doi:10.1002/14651858.CD000532.pub2.
57. Andreasson S., Hjalmarsson K., Rehnman C. Implementation and dissemination of methods for prevention of alcohol problems in primary health care: a feasibility study. *Alcohol Alcohol* 2000; **35**: 525–30.
58. Shakeshaft A., Clifford A., Shakeshaft M. Reducing alcohol related harm experienced by Indigenous Australians: identifying opportunities for Indigenous primary health care services. *Aust NZ J Public Health* 2010; **34**: S41–5.