

# Screening and referral for brief intervention of alcohol-misusing patients in an emergency department: a pragmatic randomised controlled trial



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## Summary

**Background** Alcohol misuse is highly prevalent among people attending emergency departments, but the effect of intervention by staff working in these departments is unclear. We investigated the effect of screening and referral of patients found to be misusing alcohol while attending an emergency department.

**Methods** We undertook a single-blind pragmatic randomised controlled trial. Patients received either an information leaflet or an information leaflet plus an appointment with an alcohol health worker. Outcome data were collected by patient interview and examination of hospital records at 6 and 12 months.

**Findings** 599 patients were randomised over a 12-month period. At 6 months, those referred to an alcohol health worker were consuming a mean of 59.7 units of alcohol per week compared with 83.1 units in the control group ( $t -2.4$ ,  $p=0.02$ ). At 12 months those referred were drinking 57.2 units per week compared with 70.8 in controls ( $t -1.7$ ,  $p=0.09$ ). Those referred to the alcohol health worker had a mean of 0.5 fewer visits to the emergency department over the following 12 months (1.2 compared with 1.7,  $t -2.0$ ,  $p=0.046$ ). Differences in quality of life were not found.

**Interpretation** Opportunistic identification and referral for alcohol misuse in an emergency department is feasible, associated with lower levels of alcohol consumption over the following 6 months, and reduces reattendance at the department. Short-term reductions in alcohol consumption associated with referral for brief intervention for alcohol misuse benefit patients and reduce demand for accident and emergency department services.

## Introduction

Over 14 million people a year are treated in emergency departments (EDs) in England.<sup>1</sup> In view of the strong association between alcohol misuse and health related problems such as accidental injury and violence, it is not surprising that alcohol misuse is more prevalent among people attending EDs than among the general population. As many as one in three attendees have consumed alcohol immediately before their presentation, and more than two-thirds of attendances after midnight may be alcohol related.<sup>2</sup>

Descriptive studies of people offered brief interventions for alcohol misuse in EDs suggest that such interventions might be of benefit.<sup>3</sup> However, EDs are busy environments with high patient turnover—these and other factors make intervention in this setting a difficult task. A previous attempt to do a randomised trial in an ED was abandoned due to low levels of screening and uptake of interventions.<sup>4</sup> In later studies, investigators have attempted to overcome these problems by deploying trained researchers in an ED to screen patients and deliver interventions.<sup>5,6</sup> Findings of these studies have demonstrated the efficacy of brief interventions, but not the effectiveness. The effect of screening and referral by ED staff has not been investigated in a randomised trial. We therefore aimed to assess the effect of this intervention on alcohol consumption, reattendance at the ED, and quality of life.

We used a pragmatic approach to investigate the effects of a form of screening and intervention that has been successfully incorporated into routine clinical practice.

## Methods

### Patients

We conducted a single blind, pragmatic randomised controlled trial among patients attending St Mary's Emergency Department between March, 2001 and April, 2002. St Mary's Hospital serves an inner London population of 450 000 residents that are on average younger, more mobile, and more ethnically diverse than in other parts of Britain.<sup>7</sup> Patients were selectively screened for alcohol misuse as part of routine practice in the department, which involves ED doctors screening patients at the end of the consultation using the Paddington alcohol test (PAT).<sup>8</sup> All new doctors in the department are provided with a 1-hour teaching session on the importance of alcohol misuse and how to use the PAT as part of their induction programme. The test takes less than a minute to complete and has high sensitivity and specificity compared with screening tools that take longer to complete.<sup>9</sup> Any man drinking more than eight units of alcohol in any one session at least once a week, any woman drinking more than six units of alcohol in any one session, and any person who believes their attendance in the ED could be related to alcohol are PAT positive (judged to be misusing alcohol).<sup>10</sup> Previous

research at St Mary's showed that the number of people who are screened can be increased by targeting those who present with conditions that are most often associated with alcohol misuse. Doctors are encouraged to screen anyone they feel may be consuming an excess of alcohol, and are asked to screen all those who present with any of the following nine conditions: falls, collapse, head injury, assault, gastrointestinal problems, unwell, psychiatric problems, cardiac symptoms, and accidents. Patients presenting with these problems account for over three-quarters of all alcohol-misusing patients who attend the department.<sup>11</sup>

In addition to being PAT positive, study patients had to be alert and orientated, aged 18 or over, able to speak English sufficiently well to complete study questionnaires, and resident within Greater London. Those already in contact with alcohol services, those already included in the study, and those requesting help with alcohol problems were excluded. All excluded patients were offered an appointment with the alcohol health worker as per usual practice.<sup>3</sup>

### Procedures

Individuals found to be drinking excessively were told that they were consuming alcohol at a level that might be detrimental to their health and asked if they would be willing to receive brief intervention.<sup>12</sup> Those who accepted this offer were given written information about the study and asked to provide oral informed consent. Because patients had little time to make this decision, we attempted to contact all patients during the following 7 days to confirm their willingness to take part in the study. Those who said they did not want to take part were excluded from follow-up assessments. We obtained approval from the local research ethics committee before the start of the study.

Equal numbers of patients were randomised to experimental and control treatment on the basis of simple random sampling using lists derived from a computer program. Opaque envelopes marked with a unique patient identification number were prepared according to the randomisation list. Each envelope contained a copy of a health information leaflet, *Think about drink*.<sup>13</sup> This leaflet included contact details of national helplines, to which we added contact details for local alcohol support agencies. In addition to the leaflet, each envelope also contained either an appointment card asking the patient to reattend for an appointment with the alcohol health worker (experimental treatment) or a blank card of the same dimensions and weight (control treatment). The ED doctor added the start time and date of the next available appointment with an alcohol health worker to the card.

All three alcohol health workers involved in the study were experienced mental health nurses who had undertaken specific training in counselling people who misuse alcohol, and had at least 5 years' experience of

working with people with alcohol problems. Patients who attended an appointment received about 30 min of assessment and discussion of current and previous drinking. Alcohol health workers interact with people in a non-confrontational and patient-centred manner. During the course of the assessment patients may resolve ambivalence regarding their drinking and determine appropriate action. However in cases where the patient does not display insight into the consequences of their alcohol use, the alcohol health worker may offer feedback about safe amounts of drinking and suggest a range of strategies aimed at reducing alcohol consumption. In order to check that treatment provided by alcohol health workers conformed to these standards during the course of the trial, a researcher who was not involved in collection of follow-up data examined a random sample of 50 sets of notes made by an alcohol health worker. Evidence of assessment of drinking history, current patterns of consumption and information about or referral to other services was determined.

In order to recruit study patients without impeding the work of ED doctors we limited collection of baseline data to demographic and clinical details that are collected as part of routine assessment (age, sex, presenting complaint, and data from the PAT). Follow-up interviews were done either by telephone or in person by a researcher blind to allocation status, 6 months and 12 months after randomisation. At 6 months we used the PAT and form 90-AQ<sup>14</sup> to assess alcohol consumption over the previous 3 months, and the general health questionnaire<sup>15</sup> to assess general mental health. At 12 months we used the PAT, form 90-AQ, the time line follow back assessment, and the steady pattern grid<sup>16</sup> to obtain a more detailed measure of alcohol consumption, and form EQ-5D<sup>17</sup> to measure health-related quality of life. Reattendance at the department was investigated with local electronic records. When all other data had been obtained, alcohol health worker records were examined to find out whether patients had attended their appointment.

### Sample size and data analysis

In the absence of data from ED-based trials, we used data from a primary care-based study<sup>18</sup> to calculate sample size. In that study, 57% of people received most of the planned intervention, and we estimated that in our study only 45% of people would do so. We therefore powered our study to examine a smaller difference in alcohol consumption at 12 months of 55.6 units a week among controls and 46.2 units among those in the experimental group, with SD of 28.5. A total sample of 388 patients was needed to have 90% power of detecting a difference of this magnitude using a 0.05% level of statistical significance. In anticipation of 30% loss to follow-up, we increased the sample size to 555.

All data were analysed at a single point at the end of the trial. Baseline data on alcohol consumption, measured

with the PAT, and other routine data were used to ascertain whether study groups differed at entry to the trial. We then used data from the form 90-AQ and steady pattern grid to calculate mean weekly alcohol consumption, drinks per drinking day, and percentage days abstinent over a 13-week period measured at 6 months and 12 months. We anticipated that these would not be normally distributed. Despite the skewed distribution of outcome data, we used ordinary parametric tests because this has the advantage of enabling inferences to be made about the arithmetic mean.<sup>19</sup> Non-parametric bootstrapping was used to assess the robustness of confidence intervals to non-normality of these outcome measures.<sup>20</sup> Univariate tests were used to examine differences in alcohol consumption between those randomised to experimental or control treatment on an intention to treat basis. Regression analysis was then used to adjust for any differences in baseline alcohol consumption or other potential confounding factors. Multivariate models were built using forward stepwise regression. Differences in secondary outcome measures were examined in the same way. Data were analysed with SPSS (version 11.0).

**Role of the funding source**

The sponsor of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

**Results**

The trial profile is shown in the figure. Most of those who did not meet inclusion criteria either requested to see an alcohol health worker or resided outside Greater London. 468 (78.1%) of the patients randomised were male, and ages ranged from 18 to 90 years (mean 44 years). Characteristics of patients randomised to the control and experimental treatment groups are presented in table 1.

At 6-month follow up, 363 interviews were completed. Additional resources enabled us to complete 384 interviews at 12 months of follow-up (64.1% of the randomised patients, 70.6% of those who agreed to be followed up). The rate of follow-up in each group was similar—65.8% of those in the experimental group and 63.5% of those in the control group. Characteristics of patients who were and were not followed up at 12 months are shown in table 2. Those not followed-up were significantly more likely to believe that their initial AED attendance was related to alcohol consumption, but no other significant differences were noted. To test blinding, researchers were asked to predict the randomisation status of a sample of 48 patients after they had completed the 12-month follow up. The correct condition was forecast in 41.6% of cases.

The records of alcohol health workers showed that 84 (29.3%) of patients randomised to the experimental group attended an appointment. Of the random sample of alcohol health worker notes, 50 (100.0%) detailed current

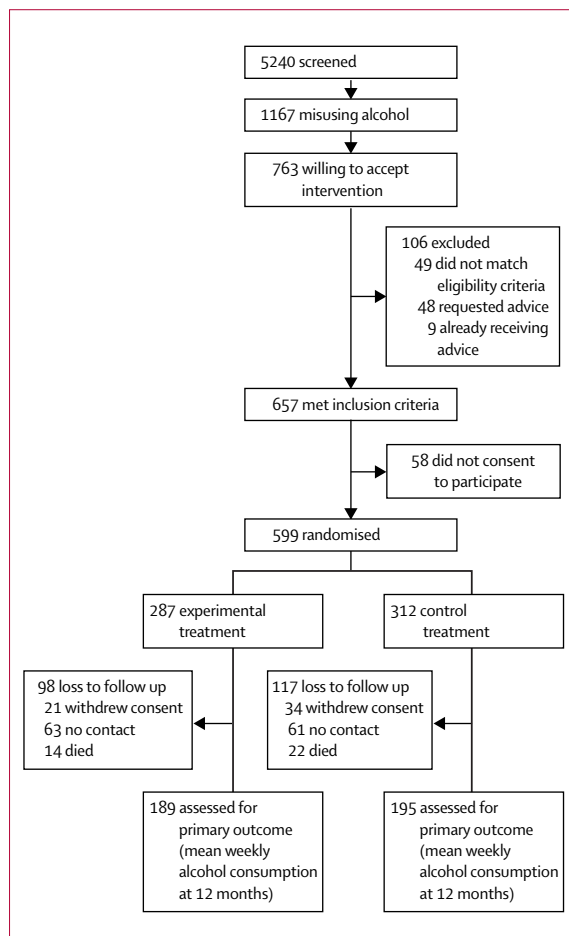


Figure: Trial profile

	Controls (n=312)	Experimental group (n=287)	Difference in means or proportions (95% CI)
Mean age in years (SD)	44.5 (14.3)	43.1 (14.4)	-1.4 (-3.8 to 0.9)
Male sex	248 (79.5%)	220 (76.7%)	-2.8 (-9.5 to 3.8)
Presenting condition			
Fall	56 (17.9%)	39 (13.6%)	-4.3 (-10.2 to 1.5)
Collapse	41 (13.1%)	42 (14.6%)	1.5 (-4.1 to 7.0)
Head injury	12 (3.8%)	21 (7.3%)	3.5 (-0.2 to 7.2)
Assault	39 (12.5%)	26 (9.1%)	-3.4 (-8.4 to 1.5)
Gastrointestinal	39 (12.5%)	34 (11.8%)	-0.7 (-5.9 to 4.6)
Unwell	35 (11.2%)	48 (16.7%)	5.5 (-0.1 to 11.1)
Psychiatric	27 (8.7%)	26 (9.1%)	0.4 (-4.2 to 5.0)
Cardiac	23 (7.4%)	19 (6.6%)	-0.8 (-4.8 to 3.3)
Accident	21 (6.7%)	9 (3.1%)	-3.6 (-7.0 to -0.2)
Other	19 (6.1%)	23 (8.0%)	1.9 (-2.2 to 6.0)
Mean units consumed during drinking session (SD)	20.9 (13.4)	21.5 (13.9)	0.6 (-1.6 to 2.8)
Believed initial ED attendance related to drinking*	162 (71.7%)	141 (65.9%)	-5.8 (-14.4 to 2.9)

Table 1: Baseline characteristics by randomisation group

Data are number (%) unless otherwise stated. \*n=440.

patterns of alcohol consumption, 49 (98.0%) described the patient's drinking history, and 41 (82.0%) documented information given and/or referral to other services.

Study outcomes among those who were and were not referred to an alcohol health worker are presented in table 3. The distribution of measures of alcohol consumption at 6 and 12 months was positively skewed. Log and square root transformation of data were unsuccessful, but comparison findings from non-parametric bootstrapping and parametric *t* tests showed the robustness of confidence intervals to non-normality. At 6 months, patients in the experimental group were drinking fewer mean units of alcohol per week than those in the control group ( $t=-2.4$ ,  $p=0.02$ ). At 12 months, those in the experimental group were still drinking less than controls, but this difference was no longer significant ( $t=-1.7$ ,  $p=0.09$ ). Univariate analysis showed that two other factors were associated with lower mean weekly alcohol consumption at 12 months. Women consumed less alcohol than men (47.9 units compared with 69.1,  $F=7.4$ ,  $p=0.007$ ), and lower amounts of consumption at baseline were associated with lower amounts at follow up ( $r=0.32$ ,  $p<0.0001$ ). Inclusion of these factors in a multivariate model did not have a significant effect on the relation between alcohol consumption and randomisation status.

Patients in the experimental arm of the trial made, on average, 0.5 fewer visits to the local ED during the year after randomisation. 378 participants provided additional information about attendances at EDs other than St Mary's. Mean attendance at other EDs was 0.17 visits during the year after randomisation in controls and 0.09 in the experimental group ( $t=1.60$ ,  $p=0.11$ ). We noted no differences in general mental health and quality of life between the groups.

Data were then re-analysed to examine outcome measures among those who did and did not attend an appointment with an alcohol health worker. At 6 months, people who attended an appointment were drinking a mean of 14 fewer units of alcohol per week than those who did not attend an appointment, including controls (60.1 units vs 74.0 units,  $F=1.02$ ,  $p=0.31$ ). We noted no difference in mean weekly alcohol consumption at 12 months between people who attended an appointment with an alcohol health worker and those who did not

	Followed up (n=384)		Not followed up (n=215)	Difference in means or proportions* (95% CI)
	Controls (n=195)	Experimental group (n=189)		
Mean age in years (SD)	43.4 (14.3)	44.5 (13.9)	43.7 (15.6)	-0.2 (-2.3 to 2.6)
Male sex	155 (79.5%)	138 (73.0%)	175 (81.4%)	5.1 (-1.6 to 11.8)
Presenting Condition				
Fall	32 (16.4%)	26 (13.8%)	38 (17.7%)	2.9 (-3.4 to 9.1)
Collapse	31 (15.9%)	25 (13.2%)	27 (12.6%)	-2.0 (-7.7 to 3.6)
Head Injury	9 (4.6%)	13 (6.8%)	11 (5.1%)	-0.6 (-4.4 to 3.1)
Assault	24 (12.4%)	20 (10.5%)	21 (9.8%)	-1.7 (-6.8 to 3.4)
Gastrointestinal	22 (11.3%)	20 (10.5%)	30 (14.0%)	2.8 (-2.9 to 8.4)
Unwell	21 (10.8%)	28 (14.7%)	34 (15.8%)	3.0 (-7.0 to 1.1)
Psychiatric	18 (9.3%)	19 (10.0%)	16 (7.4%)	-2.2 (-6.8 to 2.4)
Cardiac	17 (8.8%)	14 (7.4%)	11 (5.1%)	-3.0 (-7.0 to 1.1)
Accident	11 (5.7%)	7 (3.7%)	12 (5.6%)	0.9 (-2.8 to 4.6)
Other	10 (4.6%)	17 (9.0%)	15 (7.0%)	0.0 (-4.3 to 4.2)
Mean units consumed during drinking session (SD)	21.8 (14.0)	20.3 (13.5)	21.4 (12.8)	0.3 (-2.6 to 2.0)
Believed initial ED attendance related to drinking†	102 (69.9%)	88 (61.1%)	113 (74.8%)	9.1 (0.3 to 17.9)‡

Data are number (%) unless otherwise stated. \*Between groups followed up and not followed up. †n=440. ‡p=0.022

Table 2: Baseline characteristics of patients who were and were not followed up at 12 months

(63.3 units vs 64.2 units). The addition of other factors associated with lower alcohol consumption at follow-up in a multivariate analysis had little effect on the strength of the association between attendance at an appointment with an alcohol health worker and measures of alcohol consumption.

## Discussion

Our findings show that in people who were identified as misusing alcohol while attending an ED, referral for brief intervention was associated with lower alcohol consumption at 6 months compared with the simple provision of a health information leaflet. Alcohol consumption was also lower in the experimental group at 12 months, but the difference was no longer significant due to a fall in alcohol consumption among controls. This finding contrasts with other studies of brief intervention, in which reductions in alcohol consumption have been short lived.<sup>21</sup> We recorded lower levels of reattendance in the ED in people referred for brief intervention than in controls. With a mean reduction of 0.5 ED visits per person in the experimental group, it would be necessary to refer two people in order to avoid one visit to the ED—

Outcome measure	6 months (n=363)			12 months (n=384)		
	Experimental group (n=174)	Controls (n=189)	Difference in means (95% CI)	Experimental group (n=189)	Controls (n=195)	Difference in means (95% CI)
Mean weekly units of consumption	59.7 (72.6)	83.1 (109.0)	-23.4 (-42.4 to -4.1)*	57.2 (68.4)	70.8 (88.8)	-13.6 (-29.50 to 2.19)
Mean units consumed per drinking day	13.0 (12.4)	17.1 (17.0)	-4.1 (-7.2 to -1.1)†	13.1 (11.1)	16.0 (15.6)	-2.9 (-5.60 to -0.16)‡
Mean proportion days abstinent	46.1% (36.8)	41.9% (34.8)	4.2§ (-3.2 to 11.6)	48.0% (33.0)	44.6% (35.7)	3.4§ (-3.50 to 10.2)
Mean number of attendances at local ED	N/A	N/A	N/A	1.2 (2.4)	1.7 (3.4)	-0.5 (-0.02 to -1.1)¶
Mean score on GHQ	3.7 (3.7)	3.4 (3.5)	0.25 (-0.5 to 1.0)	N/A	N/A	N/A
Mean EQ-5D single score	N/A	N/A	N/A	0.69 (0.34)	0.71 (0.33)	0.02 (-0.09 to 0.05)

SD shown in parentheses. \*p=0.02. †p=0.009. ‡p=0.038. §Difference in proportions. ¶p=0.046. N/A=no data obtained.

Table 3: Alcohol consumption at follow-up

ie, nine people needed to be screened and two referred for brief intervention in order to avoid one visit to the department over the following 12 months. Lower levels of alcohol consumption in the group referred for brief intervention were not associated with differences in mental health or quality of life.

Although current service provision in Britain and elsewhere means that most people who misuse alcohol and attend an ED receive no special treatment, we thought it would be unethical to randomise control patients to no intervention in a department where intervention has been offered for more than 15 years.<sup>22</sup> Our control patients were provided with a health information leaflet that included contact details for local alcohol services. Previous research has shown beneficial effects of educational information on alcohol consumption.<sup>23</sup> By comparing two forms of active intervention we are likely to have underestimated the effect that referral for brief intervention would have if compared with usual treatment in most other EDs.

In this pragmatic trial we aimed to maximise generalisability by minimising exclusion criteria and use of ED staff to recruit patients. This approach enabled us to recruit a broad range of patients, but had two limitations. First, the baseline data we obtained was limited, meaning that we were unable to investigate changes in outcome measures. Although data from baseline PAT provided evidence that the groups had similar alcohol consumption before randomisation, differences in other study outcomes might have been present at the start of the trial. Second, follow-up proved difficult. Previous studies in EDs have reported follow-up rates of less than 60%.<sup>3,24</sup> Our reliance on doctors in the ED to recruit patients led to 34 people (5.7%) who did not reside in London being inappropriately randomised into the trial. Our decision to seek confirmation of consent to follow-up interviews might have further reduced the follow-up rate, although we felt this was a necessary step to ensure ethical standards of recruitment.

Screening and referral for alcohol misuse result in additional costs to health services. Our finding that referral for brief intervention results in reduced reattendance at the ED is in accord with those of previous studies,<sup>25</sup> and suggests that intervention can also result in direct cost savings. In addition to clinical outcomes reported in the present paper, we are investigating the cost-effectiveness of the intervention in a parallel study.

Although referral for an appointment with an alcohol health worker was associated with reduced levels of alcohol consumption at 6 months, we did not find a significant reduction in the amount of alcohol consumed by those who attended an appointment compared with those who did not attend. It is unclear why levels of alcohol consumption among those who were referred, but did not attend an appointment with an alcohol health worker, were lower than those in the control arm of the trial. Patients who were given an appointment received a more explicit message from the

ED doctor that they should think about reducing their alcohol consumption.<sup>12,26</sup> We have also shown that the attendance rate for brief intervention is dependent on the time delay for the appointment.<sup>27</sup>

Screening and referral for brief intervention for alcohol misuse in an ED is associated with reduced alcohol consumption and reattendance in the emergency department. Identification and referral of patients attending an ED who are misusing alcohol provides an opportunity to help patients develop insight into the consequences of their drinking and promote improved health.<sup>28</sup>

#### Contributors

The trial was initiated by M J Crawford and R Touquet who, with C Drummond, S Byford, and J A Henry, designed the trial. The trial was coordinated by R Patton who, with B Reece, A Brown and B Barrett, helped to refine study methods and contributed to the collection of data. R Patton and M J Crawford analysed the data. All authors met regularly as members of the trial steering group, and all contributed to trial management. All trial contributors had a role in interpretation of results and approved the final report. M J Crawford is the guarantor.

#### Conflict of interest statement

We declare that we have no conflict of interest.

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