Meta-analysis of Randomized Control Trials Addressing Brief Interventions in Heavy Alcohol Drinkers

Alev I. Wilk, MD, Norman M. Jensen, MD, MS, Thomas C. Havighurst, MS

OBJECTIVE: **To assess the effectiveness of brief interventions in heavy drinkers by analyzing the outcome data and methodologic quality.**

DESIGN: **(1) Qualitative analysis of randomized control trials (RCTs) using criteria from Chalmers' scoring system; (2) calculating and combining odds ratios (ORs) of RCTs using the One-Step (Peto) and the Mantel-Haenszel methods.**

STUDY SELECTION AND DATA ANALYSIS: **A MEDLINE and PsycLIT search identified RCTs testing brief interventions in heavy alcohol drinkers. Brief interventions were less than 1 hour and incorporated simple motivational counseling techniques much like outpatient smoking cessation programs. By a single-reviewer, nonblinded format, eligible studies were selected for adult subjects, sample sizes greater than 30, a randomized control design, and incorporation of brief alcohol interventions. Methodologic quality was assessed using an established scoring system developed by Chalmers and colleagues. Outcome data were combined by the One-Step (Peto) method; confidence limits and χ^2 test for heterogeneity were calculated.**

RESULTS: **Twelve RCTs met all inclusion criteria, with an average quality score of 0.49 ± 0.17. This was comparable to published average scores in other areas of research (0.42 ± 0.16). Outcome data from RCTs were pooled, and a combined OR was close to 2 (1.91; 95% confidence interval 1.61–2.27) in favor of brief alcohol interventions over no intervention. This was consistent across gender, intensity of intervention, type of clinical setting, and higher-quality clinical trials.**

CONCLUSIONS: **Heavy drinkers who received a brief intervention were twice as likely to moderate their drinking 6 to 12 months after an intervention when compared with heavy drinkers who received no intervention. Brief intervention is a low-cost, effective preventive measure for heavy drinkers in outpatient settings.**

KEY WORDS: **meta-analysis; qualitative analysis; randomized control trial; heavy drinking; brief clinical interventions.**
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A significant number of North Americans drink excessive amounts of alcohol. Although excessive alcohol use is often socially accepted behavior, there is a notable increased risk of workforce dysfunction, motor vehicle accidents, injuries, marital discord, family dysfunction, alcohol-related disease, and death.[1] Average daily alcohol consumption above two or three drinks has been shown to result in subjective complaints, physical findings, alcohol-related problems, and alcohol dependence.[2,3] These consequences of excessive alcohol use are seen in the primary care and hospital settings with prevalence rates approaching 20% to 40%.[4–8]

Excessive drinking behavior, often described as problem drinking, heavy drinking, or at-risk drinking, is generally not associated with alcohol dependence such as major withdrawal symptoms, tolerance, complete loss of control, or preoccupation with drinking.[9] The definition of excessive or problem drinking is imprecise and often depends on not only quantity and frequency of alcohol consumed but also individual characteristics such as gender, age, weight, and comorbid conditions.[10] The Institute of Medicine reports that up to 20% of the U.S. population are problem drinkers as compared with only 5% who are severely dependent alcoholics.[11] Survey data comparing problem drinkers with more severely alcohol-dependent individuals suggest that problem drinkers are generally younger, have a shorter problem drinking history, are better educated, have greater employment stability and social resources, and consist of a greater proportion of women.[12]

In response to a high degree of alcohol-related morbidity and mortality, the medical profession has focused primarily on the medical sequelae of patients with significant alcohol dependence. In addition, traditional intensive alcohol inpatient programs were the mainstay in the treatment of most alcohol disorders. Little attention was given to early intervention programs and treatment of nondependent or mildly dependent drinkers.[13] This has led to efforts in earlier identification and intervention, as well as expansion of techniques and goals. Brief interventions as short as 10 to 15 minutes have been introduced as viable treatment options. These types of interventions incorporate simple motivational techniques much like outpatient smoking-cessation programs. In addition, treatment goals consisting of controlled, moderate drinking instead of alcohol abstinence have reportedly become viable options and outcomes in treatment of nondependent heavy or problem drinkers.[14,15]

This review critiques and summarizes randomized control trials (RCTs) testing brief alcohol interventions. A standardized method is used to grade methodologic strengths and weaknesses of selected trials included in the analysis. Outcome data are pooled using statistical methods.

METHODS

Identification and Selection of Articles

Computer-based bibliographic databases (MEDLINE and PsycLIT) were accessed and searched in years 1966 to

Received from the Section of General Internal Medicine, Department of Medicine, and Department of Biostatistics, University of Wisconsin Medical School, Madison.

Address correspondence and reprint requests to Dr. Wilk at her current address: AHEC Medicine Service, Wake Medical Center, 3024 New Bern Ave., Suite 301, Raleigh, NC 27610-1255.

1995. MeSH headings (alcoholism or alcohol drinking) and title words (problem drinking, intervention, clinical trials, treatment, and outcome) were used interchangeably. Numerous combinations were searched including alcoholism and intervention, alcohol drinking and intervention, problem drinking and intervention, alcoholism and clinical trials, and alcohol drinking and clinical trials. Bibliographies of relevant articles and of research experts in the field (Drs. Thomas Babor and William Miller) were reviewed.

After titles and abstracts were reviewed by a single-reviewer format, all articles with the following parameters were retrieved: (1) clear focus on alcohol abuse or dependence or on heavy drinking; (2) focus on intervention and outcome; (3) publication in English; (4) human subjects, aged 19 to 65 years and older; and (5) the study design of a prospective clinical trial. If the abstract and title were unclear as to the study design used, the article was retrieved for clarification.

Retrieved articles were evaluated to determine eligibility for qualitative and quantitative analyses. Inclusion criteria included a study design that is truly a randomized trial, a control group that receives no alcohol-related treatment or intervention, a sample size greater than 30, and a brief intervention that is motivational with a self-help orientation. Articles that did not include original clinical data, such as reviews or editorials, were excluded.

Qualitative Analysis of Articles

The quality of selected RCTs was assessed using a scoring method previously reported by Chalmers and colleagues,[16] and previously applied to a number of studies of different chronic diseases.[17–20] Among the categories included in the scoring system were selection criteria, rejection log (patients screened and rejected), testing of randomization, blinding of assessors, biological equivalents (γ-glutamyltransferase [GGT] aspartate amino transferase, and mean corpuscular volume blood levels and blood pressure), statistical analyses, handling of withdrawals, and data presentation. Certain categories were excluded owing to the nature of brief alcohol interventions such as blinding of patients to the intervention, controlling placebo appearance and taste, testing compliance, and statistical discussion of side effects.

Scores assigned to each item were judgmental approximations as suggested by Chalmers (see Appendix A). The scoring method has been applied to more than 400 articles with a reported mean score of 0.42 ± 0.16 (SD) out of a possible 1.00.[21] Therefore, the qualitative analysis in this article allowed for subgroup quantitative analysis of selected RCTs that achieved an equal or greater score.

Quantitative Analysis of Articles

To estimate the likelihood that heavy drinkers moderated their drinking after a brief alcohol intervention, odds ratios (ORs) of the individual clinical trials were calculated when possible, and then combined using the One-Step (Peto) method.[22] Results are expressed as the OR (treatment to control) for achieving alcohol moderation 6 or 12 months after intervention. In addition, a test-based 95% confidence interval (CI) for each OR was computed. Subgroup analyses of gender, number of intervention sessions, type of clinical setting (outpatient vs inpatient), and high-quality clinical trials were conducted. Because of the potential for bias in the Peto method, all ORs and combined ratios were verified using the Mantel-Haenszel technique. In addition, the χ^2 test for heterogeneity[23] was performed for all summary OR estimates so that any significant statistical heterogeneity between studies may be detected and addressed. Also, an analysis was done to test the differences between different subgroups of data using the following Z statistic:

$$Z = \frac{[\ln \mathrm{OR}(\mathrm{group\ 1}) - \ln \mathrm{OR}(\mathrm{group\ 2})]}{[\mathrm{var}\ (\ln \mathrm{OR}(1)) + \mathrm{var}\ (\ln \mathrm{OR}\ (2))]^{1/2}}$$

RESULTS

Literature Search

A total of 5,896 articles were initially identified with the greater majority consisting of cross-sectional studies and follow-up studies of individual treatment programs. The list was refined to 99 references, and of these trials, 12 were selected for further analysis.[24–35] The remaining 87 trials were rejected for the following reasons: 38 were comparison trials of different types of interventions without control groups[36–73]; 21 lacked a control group[74–94]; 15 incorporated other therapies (intensive inpatient therapy, hypnotic therapy, aversion therapy, biofeedback, aerobic exercise)[95–109]; and the remaining 13 for other reasons (e.g., retrospective analysis, lack of randomization).[110–122]

General characteristics of the selected 12 clinical trials, summarized in Tables 1 and 2, reveal diversity in study population, inclusion and exclusion criteria, intervention intensity, follow-up rates, outcome measures, and methodologic quality scores. A total of 3,948 heavy or problem drinkers were randomized to a brief intervention or to no intervention. Overall, sample sizes of individual trials ranged from 47 (single-center study) to 1,119 (multicenter study). Study samples reflected three distinct populations including outpatients,[24–29,34,35] inpatients,[30,31] and the general population.[32,33] Nine studies included patients who were drinking more than 20 to 35 drinks per week. Other inclusion criteria were elevated GGT levels,[28,32,33] a positive CAGE (≥2) or MAST questionnaire,[24,30] and scales of alcohol-related problems.[27,31] Though all trials appeared to target the less severely alcohol-affected population, 5 specifically stated exclusion of patients with severe alcohol dependence; 5 stated exclusion of patients with a previous history of advice to change drinking patterns; and 4 stated exclusion of patients with serious medical and psychiatric disorders.

Table 1. Characteristics of Randomized Controlled Trials for Brief Intervention in Alcohol Use

Article, Year	Population	Inclusion Criteria*	Exclusion Criteria	Intervention
Wallace et al.,[24] 1988	*n* = 909, 47 outpatient practices	≥35 U/wk male ≥21 U/wk female CAGE ≥ 2	Serious illness, prior advice, GGT > 150 U/L	Brief advice, 1–4 follow-up sessions
Anderson and Scott,[26] 1992	*n* = 154, male, 7 outpatient practices	≥35 U/wk	Prior advice, GGT > 105 U/wk	Brief advice (10 min), no follow-up sessions
Scott and Anderson,[34] 1991	*n* = 72, female, 7 outpatient practices	≥21 U/wk	Prior advice, GGT > 150 U/wk	Brief advice (10 min), no follow-up sessions
Babor and Grant,[25] 1994	*n* = 1,119, 8 outpatient centers	≥25–29 U/wk or binging† male ≥17–19 U/wk or binging female	Alcohol dependence, severe mental illness, liver disease, homeless, prior advice	Simple advice, brief counseling (15 min), no follow-up sessions
Heather et al.,[27] 1987	*n* = 104, 8 outpatient practices	>35 U/wk male >20 U/wk female and/or alcohol-related problems	Alcohol dependence, severe mental illness, liver disease	Brief advice, no follow-up sessions
Persson and Magnusson,[28] 1989	*n* = 78, 5 outpatient practices	>20 U/wk male >15 U/wk female, GGT > 60	Alcohol dependence, prior treatment, other drug abuse	Brief advice, >5 follow-up sessions
Maheswaran et al.,[29] 1992	*n* = 47, male, hypertension clinic	>20 U/wk	Diastolic blood pressure > 105, diabetes, alcohol dependence, prior advice	Brief advice (10–15 min), multiple follow-up sessions
Richmond et al.,[35] 1995	*n* = 378, outpatient practices	≥35 U/wk male ≥21 U/wk female	Alcohol dependence, pregnancy, major mental illness, current or prior treatment	Brief advice (15 min), 1–4 follow-up sessions
Kristenson et al.,[33] 1983	*n* = 473, male residents of Malmö, Sweden	GGT > 83	Hypertension, diabetes, high cholesterol, GGT > 200	Brief advice, multiple follow-up sessions
Nilssen,[32] 1991	*n* = 338, residents of Tromso, Norway	GGT > 50 male GGT > 45 female 1 bottle wine in one sitting	Alcoholism, hepatobiliary disease, major psychiatric disorder, GGT > 200	Brief advice, multiple follow-up sessions
Antti-Poika et al.,[30] 1988	*n* = 120, male, injured inpatients	MAST > 7	Severe head injuries	Brief advice, 1–3 follow-up sessions
Chick et al.,[31] 1985	*n* = 156, male, inpatients	>50 U/wk alcohol-related problems	No fixed abode, dementia, terminally ill, previous referral to psychiatrist	Brief advice (60 min), no follow-up sessions

**U indicates 1 standard drink = 12 g absolute alcohol = 12 oz beer = 6 oz wine = 1.5 oz sprits; GGT, γ-glutamyltransferase.*
†Three to five drinks in one sitting.

The intervention common to all trials was described as *short, motivational counseling sessions* that included feedback and education in the harm of heavy drinking and advice to moderate drinking to low-risk, problem-free levels. Although the intervention was described as brief, some authors specified 10 to 15 minutes and others as much as 60 minutes. In addition, follow-up sessions after the initial intervention varied from zero to three sessions suggesting differences in intensity of interventions.

Quality Scores Using the Chalmers' Scoring System

An overall quality score reflecting both methodologic design and statistical analysis of the 12 trials was 0.49 ± 0.17 (range 0–1.0; 1 SD). Quality scores using the same scoring system in other therapeutic clinical trials are comparable.

When specific categories and RCT success in methodologic design and statistical analysis were examined, the majority of RCTs met essential requirements in the following categories: selection criteria (100%), intervention description (100%), and biological equivalents (83%). Half the selected RCTs adequately reported pretreatment variables and rejection logs. Selected RCTs fared less well in categories of reporting withdrawals (25%), randomization methods (42%), blinded assessments (42%), testing adequacy of blinding (17%) and previous estimates of sample size (42%). The majority of trials adequately reported test statistics and probability levels; however, few reported confidence limits and few received credit for proper handling of withdrawals, type II error calculations, and proper retrospective analysis. Complete analysis of withdrawals was reported by four trials in which data were analyzed multiple ways (intention to treat and discarded withdrawals). The remaining studies simply discarded the withdrawals and therefore discounted an end result. Of the two negative trials, one noted type II error and the presence of small sample sizes. However, an estimation of a posterior β value was not done. Half the clinical trials addressed retrospective data analysis that included inadequacies in randomization, dropouts, or presence of selection biases. These areas were discussed to some degree; however, the total determination of these problems and their effect on outcomes was generally incomplete.

Despite the above-mentioned inadequacies, the majority of trials achieved quality scores equivalent to pub-

Table 2. Randomized Controlled Trial Outcomes and Quality Scores

Article, Year	Follow-up Rate	Outcome*	Conclusion	Methods Quality Score	Statistical Analysis Score	Overall Quality Score
Wallace et al.,[24] 1988	12 mo 85%	↓ Alcohol use IG 45%; CG 27%	(+) Effect	0.78	0.73	0.76
Anderson and Scott,[26] 1992	12 mo 65%	↓ Alcohol use IG 18%; CG 5%	(+) Effect	0.67	0.73	0.69
Scott and Anderson,[34] 1991	12 mo 69%	↓ Alcohol use IG 27%; CG 26%	No Effect	0.67	0.70	0.68
Babor and Grant,[25] 1994	6 mo 88%	↓ Alcohol use IG 25%; CG 15%	(+) Effect	0.50	0.73	0.59
Heather et al.,[27] 1987	6 mo 88%	↓ Alcohol use IG 15%; CG 9%	No Effect	0.55	0.20	0.47
Persson and Magnusson,[28] 1989	24 mo 68%	Sick days IG 25–14; CG 31–56	(+) Effect	0.31	0.41	0.38
Maheswaran et al.,[29] 1992	8 wk 87%	↓ Alcohol use IG 50%; CG 0%	(+) Effect	0.58	0.23	0.48
Richmond et al.,[35] 1995	12 mo 69%	↓ Alcohol use IG 25%; CG 21%	No Effect	0.78	0.73	0.76
Kristenson et al.,[33] 1983	48 mo 76%	Sick days IG 24–29; CG 25–52; Mortality CG/IG = 2	(+) Effect	0.43	0.20	0.42
Nilssen,[32] 1991	12 mo 95%	GGT: CG > IG	(+) Effect	0.31	0.20	0.29
Antti-Poika et al.,[30] 1988	6 mo 74%	30% ↓ in alcohol use and 20% ↓ GGT: IG 45%; CG 20%	(+) Effect	0.27	0.23	0.28
Chick et al.,[31] 1985	12 mo 83%	50% ↓ in alcohol use and no alcohol-related deaths IG 52%; CG 34%	(+) Effect	0.38	0.20	0.31

**IG indicates intervention group; CG, control group; GGT, γ-glutamyltransferase (U/L).*

lished rates. Selected RCTs that achieved an overall quality score greater than or equal to previously published scores (0.42) were further summarized in the subgroup analysis as higher-quality clinical trials.

Odds Ratios and Pooling of Odds Ratios

Eight RCTs (70% of the total randomized study population) reported outcome data that allowed calculation of individual ORs whose range was 1.09 to 3.20 (Table 3 and Fig. 1). A pooled OR of the eight RCTs showed that heavy drinkers who received brief motivational interventions were close to two times more likely to decrease and moderate their drinking compared with those who received no intervention (OR 1.95; 95% CI 1.66–2.30). Despite inclusion of low-quality RCTs in the pooled OR, no significant heterogeneity was detected (Table 4). A subanalysis of the six high-quality RCTs (scores 0.42 or greater) revealed little difference in the summary OR (1.91; 95% CI 1.61–2.27) and still no significant heterogeneity. Specific subcategories of heavy drinkers were also analyzed and included intensity of intervention, gender, and type of patient population (Fig. 2). Calculated ORs suggest a greater likelihood of alcohol moderation with greater intensity of intervention (OR 2.12 for >1 session compared with OR 1.83 for 1 session), female gender (OR 2.42 for women compared with OR 1.90 for men), and the intervention in the inpatient setting (OR 2.41 for inpatient compared with OR 1.91 for outpatient), although none of these comparisons was significant by Z statistic (p values .37, .24, and .43,

Table 3. Randomized Controlled Trials: Percentage Moderation and Odds Ratios in Treatment and Control Groups

Article	End of Treatment	Treatment Group Drinking Moderation (%)	Control Group Drinking Moderation (%)	Odds Ratio (95% Confidence Interval)
Wallace et al.[24]	12 mo	201/448 (45)	122/459 (27)	2.22 (1.69–2.91)
Anderson and Scott[26]	12 mo	14/80 (18)	4/74 (5)	3.20 (1.20–8.54)
Scott and Anderson[34]	12 mo	9/33 (27)	10/39 (26)	1.09 (0.38–3.09)
Babor and Grant[25]	6 mo	391/758 (52)	134/361 (37)	1.79 (1.39–2.30)
Heather et al..[27]	6 mo	9/59 (15)	3/32 (9)	1.66 (0.47–5.89)
Antti-Poika et al.[30]	6 mo	22/49 (45)	8/40 (20)	3.01 (1.25–7.25)
Chick et al.[31]	12 mo	34/69 (49)	20/64 (31)	2.10 (1.05–4.19)
Richmond et al.[35]	12 mo	34/136 (25)	13/61 (21.3)	1.22 (0.60–2.48)

Table 4. Benefit of Brief Intervention Versus No Intervention by Combined Ratios According to Gender, Intervention Intensity, and Clinical Setting

Comparison of Studies	Number of Studies	Treatment Group Drinking Moderation (%)	Control Group Drinking Moderation (%)	Odds Ratio (95% Confidence Interval)	Test for Heterogeneity (χ^2, *p*)
All trials	8	714/1632 (43.8)	314/1130 (27.8)	1.95 (1.66–2.30)	6.23, .51
Quality trials	6	658/1514 (43.5)	286/1026 (27.9)	1.91 (1.61–2.27)	5.19, .51
Gender					
Female	3	158/317 (49.8)	66/241 (27.4)	2.42 (1.70–3.45)	4.16, .12
Male	5	513/1120 (45.8)	232/796 (29.1)	1.90 (1.57–2.31)	5.64, .23
Intensity of counseling					
1 session	5	457/999 (45.7)	171/570 (30)	1.83 (1.46–2.28)	2.42, .66
>1 session	3	257/633 (40.6)	143/560 (26)	2.12 (1.66–2.70)	3.04, .22
Clinical setting					
Outpatient	6	658/1514 (43.5)	286/1026 (27.9)	1.91 (1.61–2.27)	5.19, .39
Inpatient	2	56/118 (47.5)	28/104 (26.9)	2.41 (1.40–4.15)	0.40, .53

respectively). All OR calculations were repeated using the Mantel-Haenszel method, and results were nearly equal in all analyses.

DISCUSSION

We have shown in this meta-analysis of RCTs that heavy drinkers receiving brief interventions were two times more likely to moderate their drinking when compared with drinkers receiving no intervention. To date, the literature has not contained a published meta-analysis of clinical trials in alcohol outcomes research using the described quality scoring system. The pooled ORs calculated from trials were consistently close to 2 and included 70% of all reported randomized heavy drinkers in the 12 selected RCTs. Despite great variation in trial characteristics, there was no statistical evidence of heterogeneity and little difference in ORs when high-quality trials were compared with low-quality trials.

Qualitative analysis of the selected RCTs revealed varying levels of methodologic and analytic rigor. Though mean scores of methodology were comparable to those for previously published clinical reviews and analyses, variability and potentially serious flaws were present in a number of randomized trials. This was especially evident in the randomization process, wherein only one trial re-

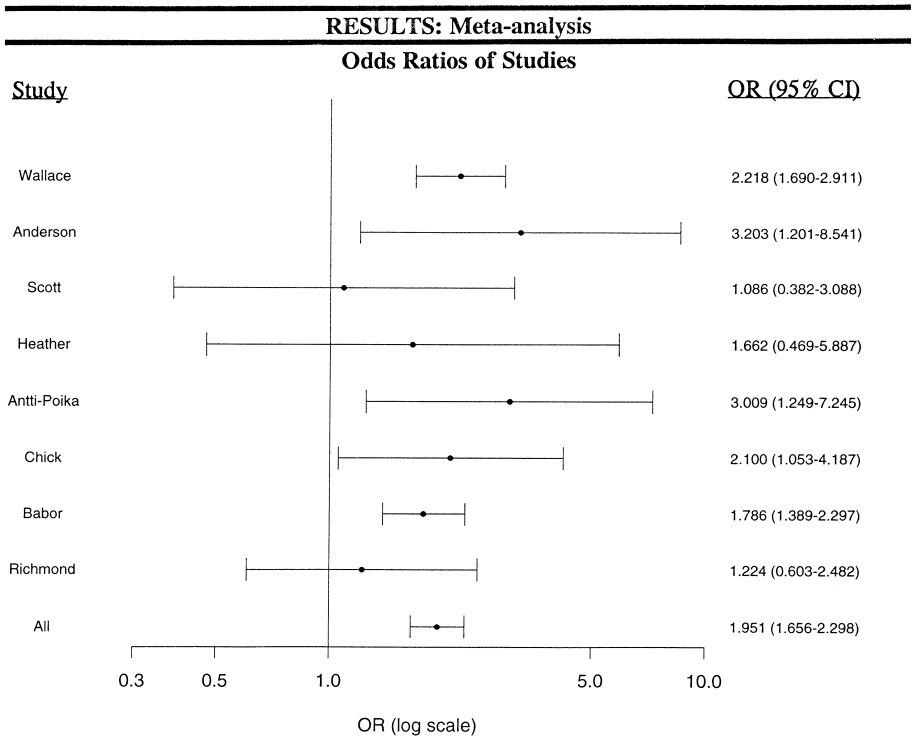

FIGURE 1. Eight randomized control trials whose outcome data allowed calculation of individual odds ratios.

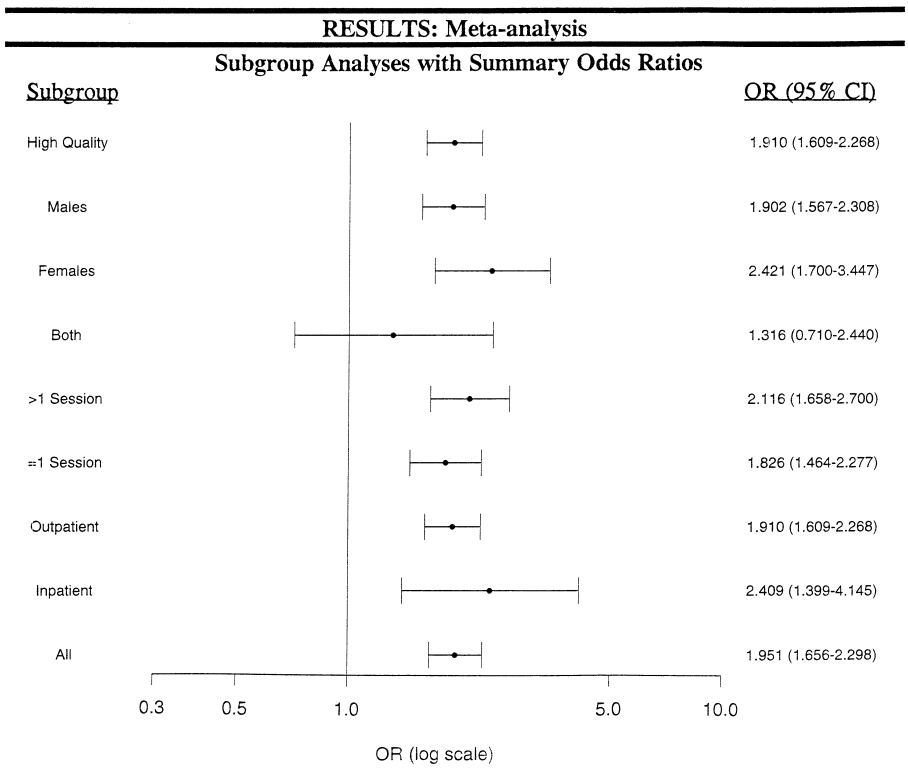

FIGURE 2. Analysis of specific subcategories of heavy drinkers.

ceived full credit.[25] Details of randomization such as measures in concealment of treatment allocation, measures to generate an allocation schedule, and measures to implement blinding were not adequately reported in the remaining trials. Thus, although randomization was key to the strength of these RCTs, authors often provided inadequate details in their assignment of participants to intervention and control groups. Therefore the risk of larger estimates in treatment effects for the majority of trials is relatively high.[123,124] Previous reports suggest that ORs of effect can be exaggerated by as much as 17% to 40% depending on the particular methodologic flaw.[125] More than half of the selected trials tested the success of their randomization process by comparing baseline variables in control and treatment groups and found insignificant differences. This represents some reassurance of successful randomization, but does not entirely exclude the possibility of exaggerated ORs and treatment effects.

There were potential limitations with regard to the RCT selection process. Though MEDLINE and PsycLIT databases were extensively reviewed back to 1966, unpublished trials would have been missed. In particular, unpublished negative trials could have been excluded for review thus biasing the review to positive outcomes. However, unpublished results may also be less reliable and therefore detrimental to the final analysis. Furthermore, the process of review was limited by a single-reviewer format with no blinding to author or institution.

Generalizability of our results must be limited to less severely affected drinkers who exhibit little or no alcohol dependence. More severely affected individuals with evidence of loss of control, tolerance, or withdrawal symptoms would in fact be at risk for withdrawal, or failure, if brief intervention were the sole treatment. Therefore, brief alcohol interventions must be applied carefully to the drinking population who may exhibit early medical or psychosocial complications but do not have alcohol dependence. To aid the primary care physician in screening and intervening in heavy or problem drinkers, the algorithm in Figure 3 is recommended. Generalizability of results to patients in the United States is perhaps limited by the greater majority of trials conducted in populations outside the United States. Presently, up to five ongoing alcohol brief intervention trials are being conducted in the United States, and results are pending their completion.

Finally, although our results show a strong positive impact of brief alcohol interventions, we are still limited in our knowledge of alcohol treatment outcomes in other significant areas: cost-effectiveness, hard endpoints such as mortality and morbidity, long-term effects of treatment, and health care utilization. Though none of the clinical trials directly addressed cost, brief alcohol intervention compared with all other available alcohol intervention programs has been shown to be the least expensive.[126,127] Holder and coworkers estimate that the expense of brief alcohol intervention is somewhat less than $100.[126] In regard to mortality and morbidity rates, drinking moderation and problem-free drinking tend to lead to a decrease in alcohol-related disease and improved health and well-being. However, only one RCT reported results suggestive

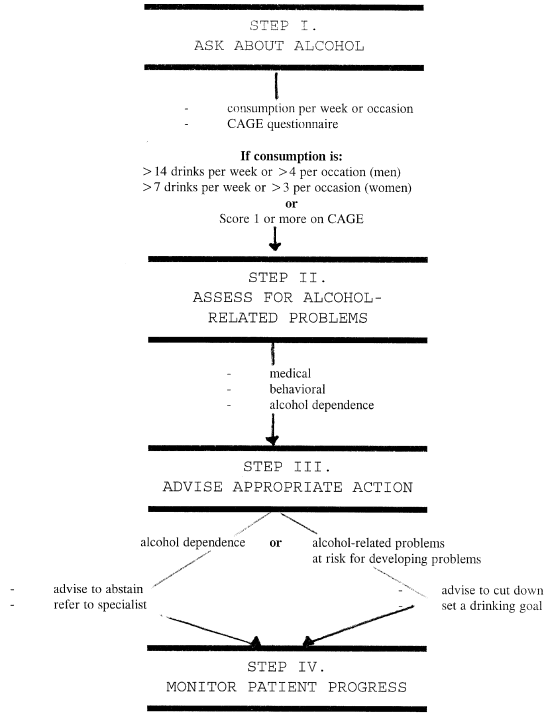

FIGURE 3. Algorithm for screening problem drinkers. (Adapted from The Physician's Guide to Helping Patients with Alcohol Problems. Bethesda, Md: National Institute in Alcohol Abuse and Alcoholism; 1995. NIH publication 95-3769.)

of lower mortality and morbidity rates in the group receiving brief interventions.[33] Other outcomes such as work performance, family relationships, and overall quality of life were not consistently addressed and shown to improve with brief interventions. In addition, though collateral data are key to validating self-reported alcohol consumption, biomedical markers (GGT, MCV, AST) do not consistently reflect heavy or severity of drinking. Therefore, other collateral or supporting outcome measures such as the CAGE questionnaire and confirmatory reports by close contacts need to be consistently included.

It will also be important to test whether health care utilization improves with brief interventions. There is some suggestion in Persson's trial[28] that a subgroup of intervention clients did decrease health care costs; however, the sample size was small in this study. There is a clear need in clinical trials addressing heavy drinking or problem drinking for standardized outcome measures that include function and quality of life, over 5 to 10 years after treatment maneuvers. The measures may include various domains of health status, such as global, physical, social, and psychological health.

In summary, low-cost, brief interventions in heavy drinking within the primary care setting work with twice the likelihood of alcohol moderation. Future studies should focus on training clinicians to alter their interventional behavior, screen carefully for alcoholism, and incorporate brief interventions in patients with heavy or problem drinking but without alcoholism and severe dependence.

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APPENDIX A

*Modified Scoring System: T.C. Chalmers and Colleagues[16]**

Categories	Total Possible Points
Unblinded evaluation	
1. Selection criteria	3
2. Reject log	3
3. Withdrawals	3
4. Intervention definition	3
5. Randomization blinding	4
6. Blinding of physicians to therapy	12
7. Blinding of physicians to results	4
8. Prior estimate of sample size	3
9. Testing randomization (pretreatment variables)	3
10. Testing blinding	3
11. Biological equivalent	3
Methods total	**44**
Unblinded analysis data	
1. On major end points	3
2. Posterior β estimate for negative trials	3
3. Statistical inference: confidence limits	2
4. Statistical inference: life-table (when applicable)	2
5. Statistical inference: regression analysis	2
6. Proper retrospective analysis	2
7. Blinding of statistician	2
8. Multiple looks considered	3
Statistical analytic score	**19**
Data presentation	
1. Dates of starting and ending	2
2. Results of prerandomization: data analysis	2
3. Tabulation of events employed as end points for each treatment	2
4. Timing of events	4
Data presentation score	**10**

**Total score: (0.60 × methods score) + (0.30 × statistical score) + (0.10 × data presentation score).*