# Psychosocial interventions for smoking cessation in patients with coronary heart disease (Review)

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[Intervention Review]

# Psychosocial interventions for smoking cessation in patients with coronary heart disease

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## ABSTRACT

### Background

Quitting smoking improves prognosis after a cardiac event, but many patients continue to smoke, and improved cessation aids are urgently required.

### Objectives

To assess the effectiveness of psychosocial interventions such as behavioural therapeutic intervention, telephone support and self-help interventions in helping people with coronary heart disease (CHD) to quit smoking.

### Search strategy

The Cochrane Central Register of Controlled Trials (issue 2 2003), MEDLINE, EMBASE, PsycINFO and PSYNDEX were searched from the start of the database to August 2003. Results were supplemented by cross-checking references, and handsearches in selected journals and systematic reviews.

### Selection criteria

Randomised controlled studies (RCTs) in patients with CHD with a minimum follow-up of 6 months. After initial selection of the studies three trials with methodological flaws (e.g. high drop out) were excluded.

### Data collection and analysis

Abstinence rates were computed according to an intention to treat analysis if possible, or if not on follow-up results only.

### Main results

We found 16 RCTs meeting inclusion criteria. Interventions consist of behavioural therapeutic approaches, telephone support and self-help material and were either focused on smoking cessation alone or addressed several risk factors. The trials mostly included older male patients with CHD, predominantly myocardial infarction. Overall there was a positive effect of interventions on abstinence after 6 to 12 months (odds ratio (OR) 1.66, 95% confidence interval (CI) 1.25 to 2.22), but substantial heterogeneity between trials. Studies with validated assessment of smoking status at follow-up had lower efficacy (OR 1.44, 95% CI 0.99 to 2.11) than non-validated trials


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(OR 1.92, 95% CI 1.26 to 2.93). Studies were clustered by intervention strategy and intensity of the intervention. Clustering reduced heterogeneity, although many trials used more than one type of intervention. The ORs for different strategies were similar (behavioural therapies OR 1.69, 95% CI 1.33 to 2.14; telephone support OR 1.58, 95% CI 1.28 to 1.97; self-help OR 1.48, 95% CI 1.11 to 1.96). More intense interventions showed increased quit rates (OR 1.98, 95% CI 1.49 to 2.65) whereas brief interventions did not appear effective (OR 0.92, 95% CI 0.70 to 1.22). Two trials had longer term follow-up, and did not show any benefits after 5 years.

**Authors' conclusions**

Psychosocial smoking cessation interventions are effective in promoting abstinence at 1 year, provided they are of sufficient duration. Further studies, with longer follow-up, should compare different psychosocial intervention strategies, or the addition of a psychosocial intervention strategy to pharmacological therapy (e.g. nicotine replacement therapy) compared with pharmacological treatment alone.

## PLAIN LANGUAGE SUMMARY

**Psychosocial smoking cessation interventions such as behavioural counselling, telephone support and self-help interventions are effective in helping people with coronary heart disease stop smoking**

Smoking is a risk factor for coronary heart disease and stopping smoking lowers that risk. Psychosocial smoking cessation interventions such as behavioural therapy, telephone support and self-help materials are effective in helping coronary heart disease patients to stop smoking, if they are provided for over 1month. We found evidence that psychosocial interventions increased quit rates after 6 months. Most trials used a mixture of different intervention strategies, therefore no single strategy showed superior efficacy.

## BACKGROUND

Smoking is a major risk factor for coronary heart disease (CHD). Compared to non-smokers the odds ratio (OR) for myocardial infarction is about 2.5, and for cardiovascular disorders overall the OR is about 2 (Cook 1986; Jacobs 1999; Kawachi 1994; Keil 1998; Njolstad 1996; Nyboe 1991; Prescott 1998; Shaper 1985; Tunstall-Pedoe 1997; Willett 1987; Woodward 1999). Furthermore after a cardiac event smokers are two times more likely to get restenosis or to die from a cardiovascular disease (Cullen 1997; Fulton 1997; Kawachi 1993; Kawachi 1994; Kuller 1991; Luoto 1998; Tverdal 1993; Willett 1987). A recent systematic review in patients with CHD estimated a reduction in mortality risk of 36% in 3-5 years after quitting smoking (Critchley 2003). Non-fatal myocardial infarction also occurs less often in smokers who quit after their first cardiac event (OR 0.62, 95% CI 0.46 to 0.83) (Barth 2007). However, many smokers do not quit, even after a CHD diagnosis (Critchley 2003), and it is critical to summarise available evidence regarding the effectiveness of different intervention strategies for smoking cessation in this patient group.

Several intervention strategies in healthy people have shown encouraging results in systematic reviews. Simple, brief advice from a physician to quit can increase odds of quitting by over 70% (OR 1.74, 95% CI 1.48 to 2.05) (Lancaster 2004) compared with no intervention. Group behaviour therapy has been shown to double success (OR 1.97, 95% CI 1.57 to 2.48) (Stead 2005) compared with self-help interventions and is more effective than no intervention. One systematic review found that more intense interventions did not improve abstinence rates (Lancaster 2005a), however, another review found that telephone counselling was more effective than less intense interventions such as self-help (Stead 2006). Self-help interventions may increase quit rates compared with no intervention but the effect is likely to be small (Lancaster 2005b), and there is no evidence they have any additional effects in combination with counselling.

Rigotti has demonstrated the efficacy of smoking cessation interventions for hospitalised patients and stressed the importance of at least one follow-up contact to maintain abstinence (Rigotti 2007). Another review showed that nursing interventions resulted in improved abstinence rates compared with no intervention (Rice 2004), and showed comparable results in hospitalized and healthy people. These various treatment strategies can be summarised as psychosocial interventions and can be differentiated from psychopharmacological or substance replacement treatment strate-


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gies (e.g. antidepressants, nicotine replacement). A recent review in patients with chronic obstructive pulmonary disorders did not find a beneficial effect of psychosocial interventions on smoking abstinence, but few studies were included (van der Meer 2001). A recent review of smoking cessation interventions in CHD patients did not find any benefits. However, this review included only 12 studies, which had been previously included in published systematic reviews (Wiggers 2003). Although both psychosocial (n = 10) and pharmacological interventions (n = 2) were included, literature searching was not comprehensive. Integration of the studies was descriptive simply counting positive and negative results and the review was unable to assess possible dose-response relationships or influence of study quality. For cardiac patients, psychosocial interventions to quit smoking are recommended along with nicotine replacement therapies and bupropion (ACC/AHA 2002; DeBacker 2003; Ockene 1997). Yet, there is no clear evidence that psychosocial interventions in patients with CHD are efficacious, whether more intense interventions improve quit rates, or which components of intervention programs result in better abstinence rates.

## OBJECTIVES

This review aimed to evaluate psychosocial intervention strategies for smoking cessation in patients with coronary heart disease, with four specific objectives.

1. To examine the efficacy of psychosocial interventions for smoking cessation in patients with coronary heart disease in short term (6 to 12 month follow-up) and long term (more than 12 months).

2. To compare different psychosocial intervention types (e.g. telephone support) to stop smoking in patients with coronary heart disease.

3. To assess the dose-response relationship: Are brief interventions as effective as more intense interventions?

4. To examine methodological criteria which may moderate the efficacy of smoking cessation interventions in patients with coronary heart disease (validation versus self-report of abstinence).

## METHODS

### Criteria for considering studies for this review

#### Types of studies

We included randomised controlled trials studying the efficacy of psychosocial interventions for smoking cessation in CHD patients with an assessment of study outcome at least 6 months after baseline assessment of smoking status. Acceptable study designs were:
a) psychosocial interventions to no such interventions;
b) psychosocial interventions to other psychosocial interventions; and
c) psychosocial interventions to the same psychosocial interventions of different intensity.

#### Types of participants

Patients with CHD - myocardial infarction, coronary artery bypass surgery, percutaneous transluminal coronary angioplasty (International Classification of Diseases 9 codes 410-414). Studies including patients with other diseases were accepted, provided at least 80% of patients had CHD. CHD patients with other comorbidities were included if the diagnosis of CHD was proven. Patients had to be smokers at baseline. Initial smoking status was assessed either by self-report or by additional validation measures. Hospital populations with mixed somatic events (for example pulmonary diseases and cancer) were excluded. Trials were also excluded if there was not sufficient information available about the patient's somatic diagnoses.

#### Types of interventions

The psychosocial intervention could be provided in two ways; either as a separate psychosocial intervention with a main focus on smoking cessation or as a part of a more comprehensive cardiac rehabilitation programme addressing also other risk factors also (such as diet). Any psychosocial intervention with the goal to change smoking behaviour in CHD patients was of interest. If the intervention strategy was solely based on a pharmacological or a nicotine replacement approach, the study was excluded. Interventions could be delivered initially during hospital admission or after hospital admission to ex-patients. The interventions may be provided in group or individual settings. Interventions that incorporated counselling, support and advice, with or without provision of written materials were included.

#### Types of outcome measures

Abstinence by self-report or validated (e.g. carbon monoxide) measurement at a minimum of 6 months. The outcome is dichotomous (abstinent versus smoking). We did not extract data on the number of cigarettes smoked per day, as there is little evidence that smoking reduction alters the risk of future cardiac events or mortality.

### Search methods for identification of studies

**Electronic searches**


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We searched the Cochrane Central Register of Controlled Trials (CENTRAL) on *The Cochrane Library* (issue 2, 2003), EMBASE (until 1998), MEDLINE (1966-2003), PsycINFO (until week 34, 2003), PSYNDEX (1977-June 2003). No limitations were set to randomised controlled trials. The search strategy for CENTRAL on *The Cochrane Library* is shown below, search strategies for other databases are in additional tables 1 to 4.

#1 HEART DISEASES (exp MeSH)
#2 CORONARY ARTERY BYPASS (exp MeSH)
#3 angina*
#4 cabg
#5 (coronary near bypass*)
#6 (coronary near disease*)
#7 MYOCARDIAL INFARCTION (exp MeSH)
#8 (myocard* near infarct*)
#9 (heart near infarct*)
#10 chd
#11 (heart next disease*)
#12 (cardiac next disease*)
#13 acs
#14 ami
#15 (cardiac next inpatient*)
#16 (cardiac next patient*)
#17 (heart next patient*)
#18 (heart next inpatient*)
#19 (#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9)
#20 (#10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18)
#21 (#19 or #20)
#22 SMOKING CESSATION (exp MeSH)
#23 (smoking near cessation)
#24 (smoking near cease*)
#25 (smoking near quit*)
#26 antismoking
#27 (anti next smoking)
#28 (smoking near giv*)
#29 (smoking near stop*)
#30 (#22 or #23 or #24 or #25 or #26 or #27 or #28 or #29)
#31 (#21 and #30)

Additionally we searched all databases on *The Cochrane Library* for reviews on smoking cessation

**Handsearching**

We searched for trials included in other reviews (Lancaster 2005a; Rigotti 2007; Stead 2005; Stead 2006; Wiggers 2003) and handsearched relevant journals from 1998 to 2003 (Annals of Internal Medicine, Archives of Internal Medicine, British Medical Journal, Psychology and Health, Health Psychology, Tobacco Control). Additionally we looked through the reference lists of the initially identified trials. We asked experts from the German Statusconference on Psychocardiology for information on other trials (see http://portal.uni-freiburg.de/psychokardio/). We did not search for ongoing studies, abstracts, and unpublished studies.

## Data collection and analysis

**Data extraction and coding**

Data were independently extracted by two people (JBA and Corina Güthlin). Data on setting, CHD diagnosis or procedure, number of subjects, sex, age, and length of follow up were extracted. Five types of interventions were coded; behavioural therapeutic approaches (BT); phone support (Ph); additional self-help intervention (SH); multi-risk factor interventions (MR); specific interventions for smoking cessation (see Charactersitics of included studies table).

***Treatment duration***

We assessed duration of treatment as in another review (Rigotti 2007) and coded this as follows:

1) Single initial contact lasting <= 1 hour, no follow-up support;
2) One or more contacts in total > 1 hour, no follow-up support;
3) Any initial contact plus follow-up <=1 month;
4) Any initial contact plus follow-up > 1 month and <= 6 month; and
5) Any initial contact plus follow-up > 6 month.

***Methodological quality***

We coded biochemical validation of smoking status as 0=no and 1=yes; this validated assessment of abstinence was a very relevant methodological aspect of included studies.

Quality of randomisation and allocation concealment was not coded because of lack of data in most of the trials.

**Data analysis**

We analysed data on both an intention-to-treat (ITT) and a follow-up basis. A conservative model classified persons without information about smoking status at follow-up as smokers (ITT analysis). A second model included only participants with follow-up information on smoking status. The latter model results in higher rates of abstinence in experimental and control group (termed 'optimistic model'). We present data of the conservative analysis (ITT) in preference, and only used data from the optimistic model if the ITT analysis was not possible. As a sensitivity analysis, we performed meta-analysis only including those trials where we could calculate the more conservative ITT analysis. We performed three sub-group analyses:

- Trials with validated smoking status at follow-up were compared to non-validated trials.
- Trials grouped by type of intervention.
- Trials with a treatment duration of less than 1 month versus studies with an intervention of 1 month or more.

Odds ratios with 95% confidence intervals were calculated for the pooled estimates. An OR > 1 indicates superiority of the intervention group over usual care and vice versa. Heterogeneity was assessed by examining forest plots of trials, by calculating chi squared heterogeneity test, and $I^2$ statistics. The chi squared value tests for statistically significant heterogeneity between trials; higher $I^2$


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values indicate greater variability between trials than would be expected by chance alone (range 0-100%) (Higgins 2003). A random-effects model for pooling the studies was employed because of expected heterogeneity in the primary studies (DerSimonian and Laird method) (Deeks 1999). Significant chi squared values indicate heterogeneity and therefore the pooled effect sizes must be interpreted with caution.

# RESULTS

## Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

The combination of the hits in the databases searched and additional citations found by scanning references in relevant Cochrane Reviews, other meta-analyses, and journals resulted in 2012 hits. After exclusions on the basis of title and abstract, 520 papers were assessed for inclusion. Of these only 241 studied an intervention for smoking cessation in cardiac patients. First we excluded all studies without a randomised controlled design (n = 145). For the exclusion of other non-relevant studies (n=71) the reason for exclusion is detailed in the characteristics of excluded studies table. A further three studies were excluded using post hoc exclusion criteria. Feeney 2001 had a drop out > 50% of randomised patients (OR 48.17 95% CI 6.42 to 361.51); Lisspers 1999 was excluded because assessment of smoking status was made after cardiac procedure had been performed, which risks confounding non-smokers with those who quit around the time of the procedure (OR 24.20, 95% CI 0.93 to 629.32); and Mitsibounas 1992 reported a statistically significant difference in patient characteristics (age/sex) between the intervention and control groups at baseline (OR 16.00, 95% CI 2.73 to 93.62). Four papers are awaiting assessment as we could not access the papers (Becker 2003; Boulay 2001; Enriquez-Puga 2001; Puente-Silva 1989).

The remaining 18 reports of 16 trials were included in the review (Allen 1996; Burt 1974; Carlsson 1997; CASIS 1992; DeBusk 1994; Dornelas 2000; Hajek 2002; Heller 1993; Ortigosa 2000; Quist-Paulsen 2003; Reid 2003; Rigotti 1994; Sivarajan 1983; Taylor 1990; van Elderen (group); van Elderen (phone)). Seven studies were carried out in Europe (1 Sweden, 2 United Kingdom, 2 Netherlands, 1 Norway, 1 Spain), seven were from the USA, one from Australia and one from Canada. The papers were mainly published in English (15), one was written in Spanish (Ortigosa 2000). All trials compared a specific smoking cessation intervention with a usual care condition, had comparable groups at study entry, had lower than 50% drop out rates and assessed smoking status before a cardiac event or procedure. 1323 patients were randomised to the usual care group and 1354 received a special psychosocial intervention. As expected, 70 to 90% of the patients were male, mean age was relatively young, 50 to 60 years.The patients suffered predominantly from myocardial infarction or had invasive interventions (bypass surgery, stent). The intervention strategies employed were behavioural therapeutic interventions (10 studies), and self-help programmes (11 studies). Additional phone support was provided in 11 trials. Nine studies reported interventions aimed specifically at smoking cessation, seven studies employed multi-risk strategies. Behavioural therapeutic interventions were either provided in a group setting or as individual counselling. The aim was to identify cues related to smoking, or more generally stress reduction and relaxation techniques. Other components included preparation for relapse or specific motivational techniques based on the transtheoretical model (Prochaska 1986) or the strategy of motivational interviewing (Rollnick 1997). Self-help interventions consisted of information booklets, audio- or videotapes. Information booklets which simply described risk factors were not considered self-help interventions. No studies were available for the comparison of different psychosocial interventions or of psychosocial intervention with different intensity.

## Risk of bias in included studies

All studies assessed abstinence 12 months after the initial intervention, except two (Heller 1993; Sivarajan 1983), which assessed abstinence after 6 months. Two trials also provided data on a long-term follow up after 5 years (CASIS 1992; Rigotti 1994). Seven of the 16 trials validated self-reported abstinence. In five trials data for the 'optimistic model' was reported (n=462), 11 trials provided sufficient data for an ITT analysis (n=2215). Unfortunately, it was impossible to extract detailed information on the randomisation procedure from most of the trials. Only four trials used adequate allocation concealment (Allen 1996; Dornelas 2000; Hajek 2002; Reid 2003).

## Effects of interventions

Psychosocial smoking cessation interventions were effective in achieving smoking abstinence in CHD patients, compared with usual care. In all trials, patients receiving the specific psychosocial intervention had more than a 60% higher odds of quitting (OR 1.66, 95% CI 1.25 to 2.22). There was considerable heterogeneity between individual studies (chi² 42.68; df 15, P < 0.0002, $I^2$ 64.9%) (comparison 01 01). Therefore the overall result has to be interpreted with caution. There were considerable differences between trials in the proportion of abstinent patients at follow-up: Taylor 1988 achieved 70% abstinence in the intervention group but Ortigosa 2000 report the same number of patients abstinent without intervention. Hajek 2002 report the lowest abstinence rates in the patients receiving psychosocial intervention (39%) and Carlsson 1997 report the lowest values for control group patients (25%).


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The pooled ORs suggest that psychosocial interventions can greatly increase odds of quitting compared with usual care, but the heterogeneity in the results needed further exploration. The quality of the trials may partly explain this heterogeneity. Allocation concealment has been shown empirically to influence trial results (Jüni 2001). Few studies reported adequate allocation concealment. We pooled results for these studies, but results of the combined effect measure must be interpreted with caution, due to the limited statistical power (Allen 1996; Dornelas 2000; Hajek 2002; Reid 2003). The non-significant OR of trials using adequate allocation concealment was 1.10 (95% CI 0.75 to 1.60). The largest trial with adequate allocation concealment was also a brief intervention (Hajek 2002), which we found not to be effective (comparison 01 02). The pooled OR for allocation concealed trials appears lower than for all trials, but due to limited number of studies it is impossible to assess whether this is due to higher quality (allocation concealment), or the brevity of the intervention.

Sensitivity analysis of only trials using ITT analysis showed less benefit than all trials combined, but remained clinical important (nearly a 50% increase in odds of quitting) and statistically significant (OR 1.47, 95% CI 1.10 to 1.96) but considerable heterogeneity remained (chi² 25.27, df 10, P < 0.005, $I^2$ 60.4%) (comparison 01 03).

**Sub-group analyses**

***Trials validating smoking status***

Trials which validated self-reported smoking status showed lower quit rates than trials where measurement was not validated. If trials with validated abstinence are pooled, the OR falls from 1.92 (95% CI 1.26 to 2.93) for non-validated trials to 1.44 (95% CI 0.99 to 2.11) for validated measures (comparison 02 01).

***Types of intervention***

We found no clear evidence that any treatment strategy was more efficacious than others, but heterogeneity was reduced within the intervention cluster. Behavioral therapeutic interventions showed a significant effect on abstinence (OR 1.69, 95% CI 1.33 to 2.14) with lower heterogeneity (I² 23.5%) (comparison 03 01). Telephone support was also effective (OR 1.58, 95% CI 1.28 to 1.97) and trials reasonably consistent (I² 9.9%) (comparison 03 02). However, as most behavioural therapy trials also used telephone support as an intervention strategy, it is difficult to separate the effects of these two types of interventions. Two trials used solely a behavioural therapeutic approach without additional phone contacts (Sivarajan 1983; van Elderen (group)). One trial used telephone support without behavioural therapeutic techniques (Ortigosa 2000). Interventions using self-help materials showed comparable effectiveness (OR 1.48, 95% CI 1.11 to 1.96) (comparison 03 03). Stratification of trials using self-help materials reduced heterogeneity only slightly ($I^2$ 56.2%). We also considered the specificity of the intervention (smoking cessation alone compared with a multi-risk factor intervention). No difference was found between multi-risk factor interventions (OR 1.73, 95% CI 1.27 to 2.35) and specific cessation intervention (OR 1.63, 95% CI 1.08 to 2.46) (comparison 03 04). While the heterogeneity in specific intervention trials increased ($I^2$ 77.8%) the results of multi-risk factor intervention trials were statistically homogenous ($I^2$ 0%).

***Duration of the intervention***

We found clear evidence that brief interventions (i.e. no follow-up contact or within 4 weeks after initial intervention) were not effective (Hajek 2002; Heller 1993; Ortigosa 2000; Rigotti 1994) (OR 0.92, 95% CI 0.70 to 1.22, I² 0%) (comparison 04 01). When CHD patients were treated with interventions including follow-up contacts after the initial period of 1 month, the odds of quitting increased substantially (OR 1.98, 95% CI 1.49 to 2.65, I² 50.3%) (comparison 04 01). There was less heterogeneity between trial results when clustered by intensity of the intervention.

**Long-term follow-up**

We found no evidence for efficacy of smoking cessation interventions in the long-term. Due to high drop-out rates after 5 years, an analysis for people available at follow-up and an ITT analysis were performed. Neither the optimistic model (OR 1.32, 95% CI 0.78 to 2.24) nor the ITT analysis (OR 1.23, 95% CI 0.79 to 1.93) showed superior efficacy to a control group (comparisons 05 01 and 05 02, respectively).

A potential problem with all systematic reviews is publication bias. Our literature search was comprehensive, prepared and partly carried out by the Cochrane Heart Group (UK). Additionally, we investigated publication bias using a funnel plot. The results appear reasonably symmetric which is an indicator of a publication of the studies independent of the study result (Figure 1). There may be a slight tendency for larger trials to show smaller benefits; but larger studies may have interventions with shorter duration and hence smaller effect sizes.


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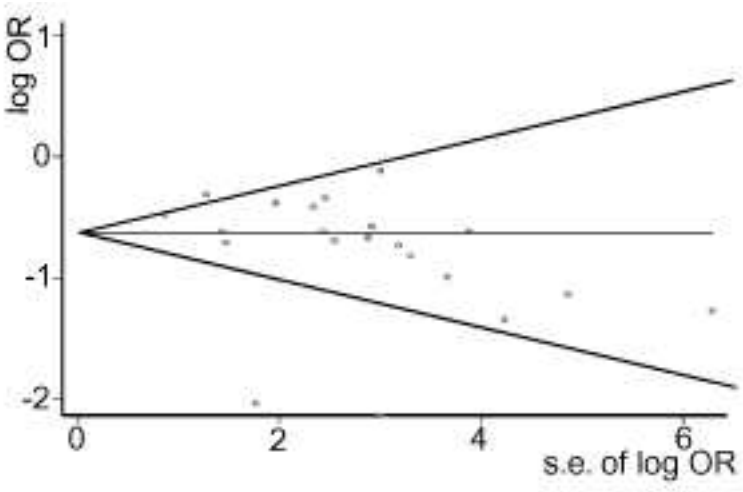
**Figure 1. Funnel plot**




## DISCUSSION

We found support for the efficacy of smoking cessation interventions with more than 1 month duration, but brief interventions without some follow-up contact were not effective. We were unable to determine the minimum number of contacts needed. More detailed conclusions about effective intervention strategies are obscured by the fact that a mixture of different intervention measures were included in many trials. Interventions using telephone support, behavioural therapies, and self-help were all effective. Some interventions focussed only on smoking cessation, but others addressed smoking as part of a multiple risk factor intervention programme (generally a 'cardiac rehabilitation programme'). There was no difference in the odds of quitting for multiple risk factor cardiac rehabilitation programmes, compared with interventions focussing only on smoking cessation. 'Cardiac rehabilitation' programmes may vary in their components, but generally include a graded exercise programme and may also include advice and support from a range of health professionals (such as dieticians, behavioural change specialists etc). It is difficult to distinguish between the effects of the smoking cessation component of these programmes, and the general support and encouragement that may be given by other health professionals. Some trials employ nicotine replacement therapy (NRT) as additional cessation strategies, which we could not control for. In one trial, more patients in the psychosocial intervention group received NRT compared to the usual care group (DeBusk 1994). Other trials did not report use of NRT.

Our findings are contrary to a recently published review on smoking cessation interventions in CHD patients which found no benefits (Wiggers 2003). The difference may be due to more comprehensive literature searching in our review, whereas Wiggers et al aggregated 12 primary studies listed in already existing Cochrane reviews. Another difference is the methodology of the reviews. Wiggers et al counted 'positive' and 'negative' results, whereas we performed a meta-analytic pooling. The important advantage of a meta-analytic approach is the weighting of studies by sample size and event rate.

One possible threat to our results might be methodological flaws in the primary studies. Validation of abstinence was reported in primary studies, and associated with lower efficacy. The OR of quitting in validated trials was only of borderline statistical significance; however these validated trials also included many with only a brief intervention. Despite the high validity of self reported smoking status in the general population (Patrick 1994) the validation of smoking status should be recommended in efficacy trials with coronary heart disease patients (Woodward 1992).

## AUTHORS' CONCLUSIONS

### Implications for practice

After a cardiac event about 30% to 50% of smokers with CHD quit without professional help. Additional psychosocial interventions show a superior quitting rate compared to standard care. Interventions for smoking cessation in CHD patients should last for more than 1 month. Brief interventions may not be effective. The overall effect of psychosocial smoking cessation interventions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in CHD patients can be expressed by the number needed to treat statistics with a figure of 9.7. This means about 10 patients had to be treated for one person to be abstinent from tobacco after 1 year.

### Implications for research

Trial procedures and quality should be described in more detail, according to CONSORT guidelines (Begg 1996). Also more details on the duration and intensity of the intervention (total duration, number of sessions, numbers of pages in leaflets etc) are needed. The validation of smoking status was not a standard procedure in the trials as only seven described using any measure of biochemical validation. Further trials should validate smoking status objectively.

Studies comparing different psychosocial interventions or psychosocial intervention of different intensity are lacking. Hence future research should focus on the comparison of different smoking cessation strategies in CHD patients (Schmitz 1999). It is still unclear whether individual counseling or group counseling are more beneficial in CHD patients. Also recent results of reviews show limited effects of stage based smoking cessation interventions ( Riemsma 2003; vanSluis 2004). More detailed studies will be useful to identify components of successful intervention strategies. This approach will require fewer studies but with larger sample sizes to demonstrate relatively small, but clinically important differences between strategies. Future trials should compare the additional benefits of combining NRT and psychosocial rehabilitation, compared with NRT or psychosocial interventions alone.

## ACKNOWLEDGEMENTS

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Rigotti NA, Munafo MR, Murphy MFG, Stead L. Interventions for smoking cessation in hospitalised patients. *Cochrane Database of Systematic Reviews* 2007, Issue 3.[Art. No.: CD001837. DOI: 10.1002/14651858.CD001837.pub2]

**Rollnick 1997**
Rollnick S, Butler CC, Stott N. Helping smokers make decisions: the enhancement of brief intervention for general medical practice. *Patient Education and Counseling* 1997;**31**(3):191–203.

**Shaper 1985**
Shaper AG, Pocock SJ, Walker M, Philips AN, Whitehead TP, MacFarlane PW. Risk factors for ischemic heart disease: the prospective phase of British Regional Heart Study. *Journal of Epidemiology and Community Health* 1985;**39**(3):197–209.

**Stead 2005**
Stead L, Lancaster T. Group behaviour therapy programmes for smoking cessation. *Cochrane Database of Systematic Reviews* 2005, Issue 2.[Art. No.: CD001007. DOI: 10.1002/14651858.CD001007.pub2]

**Stead 2006**
Stead L, Lancaster T, Perera R. Telephone counselling for smoking cessation. *Cochrane Database of Systematic Reviews* 2006, Issue 3.[Art. No.: CD002850. DOI: 10.1002/14651858.CD002850.pub2]

**Tunstall-Pedoe 1997**
Tunstall-Pedoe H, Woodward M, Tavendale R, A′ Brook R, McCluskey MK. Comparison of the prediction by 27 different factors of coronary heart disease and death in men and women of the Scottish Heart Health Study: cohort study. *BMJ* 1997;**315** (7110):722–9.

**Tverdal 1993**
Tverdal A, Thelle D, Stensvold I, Leren P, Bjartveit K. Mortality in relation to smoking history: 13 years follow-up of 68,000 Norwegian men and women 35-49 years. *Journal of Clinical Epidemiology* 1993;**46**(5):475–87.

**van der Meer 2001**
van der Meer RM, Wagena EJ, Ostelo RWJG, Jacobs JE, von Schayck CP. Smoking cessation for chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews* 2001, Issue 1.[Art. No.: CD002999. DOI: 10.1002/14651858.CD002999]

**vanSluis 2004**
van Sluijs EM, van Poppel MN, van Mechelen W. Stage-based lifestyle interventions in primary care. Are they effective?. *American Journal of Preventive Medicine* 2004;**26**(4):330–43.

**Wiggers 2003**
Wiggers LC, Smets EM, de Haes JC, Peters RJ, Legemate DA. Smoking cessation interventions in cardiovascular patients. *European Journal of Vascular & Endovascular Surgery* 2003;**26**: 467–75.

**Willett 1987**
Willett WC, Green A, Stampfer MJ, Speizer FE, Colditz GA, Rosner B, et al.Relative and absolute excess risks of coronary heart disease among women who smoke cigarettes. *New England Journal of Medicine* 1987;**317**(21):1303–9.

**Woodward 1992**
Woodward M, Tunstall-Pedoe H. Biochemical evidence of persistent heavy smoking after a coronary diagnosis despite self-reported reduction: analysis from the Scottish Heart Health Study. *European Heart Journal* 1992;**13**(2):160–5.

**Woodward 1999**
Woodward M, Moohan M, Tunstall-Pedoe H. Self-reported smoking, cigarette yields and inhalation biochemistry related to the incidence of coronary heart disease: results from the Scottish Heart Health Study. *Journal of Epidemiology & Biostatistics* 1999;**4**(4): 285–95.

* *Indicates the major publication for the study*


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## CHARACTERISTICS OF STUDIES

### Characteristics of included studies *[ordered by study ID]*

**Allen 1996**

| | |
|---|---|
| Methods | OM |
| Participants | 138 women who underwent first-time CABG at a hospital.<br>IG: 14 smokers<br>CG: 11 smokers |
| Interventions | Usual care: patient education and instructions for exercise.<br>Psychosocial intervention: nurse-directed multimodal behavioural program based on social cognitive theory (videotape, workbook, counselling). Started with discharge from hospital, two updates 1 and 2 months later<br>(BT, Ph, SH, MR, Intensity 4) |
| Outcomes | Follow-up at 12 months (abstinence self report) |
| Notes | IG: OM = 64.3%<br>CG: OM = 54.5% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Yes | A - Adequate |

**Burt 1974**

| | |
|---|---|
| Methods | OM |
| Participants | 280 men in a coronary care unit with AMI<br>IG: 125 smokers<br>CG: 98 smokers |
| Interventions | Usual care: conventional advice to stop smoking by physician.<br>Psychosocial intervention: information about the effects of smoking by physician and nurse, reinforced by a booklet about coronary-risk factors. Continued in follow-up clinic and through a community nurse.<br>(Specific, Intensity 5) |
| Outcomes | Follow-up at 12 months (abstinence self-report) |
| Notes | IG: OM = 63.2%<br>CG: OM = 27.5% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|


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**Burt 1974** (*Continued*)

| | | |
|---|---|---|
| Allocation concealment? | No | C - Inadequate |

**Carlsson 1997**

| | |
|---|---|
| Methods | OM |
| Participants | 168 patients with AMI admitted to the coronary care unit at Malmö General Hospital<br>IG: 32 smokers<br>CG: 35 smokers |
| Interventions | Usual care: two visits to general practitioner.<br>Psychosocial intervention: nurse-directed secondary prevention unit after the usual follow-up schedule: education and counselling (individual and group sessions) about smoking, exercise, nutrition for about 9 hours and exercise training 2-3 times per week. Visits to cardiologist after 2, 3, 6 months and to nurse after 3, 5, 6, 9, 12 months.<br>(MR, Intensity 5) |
| Outcomes | Follow-up at 12 months (abstinence self-report) |
| Notes | IG: OM = 50%<br>CG: OM = 25.7% |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**CASIS 1992**

| | |
|---|---|
| Methods | OM, ITT |
| Participants | 267 smokers with CAD of 3 hospitals who scheduled for coronary arteriography<br>IG: 135 smokers<br>CG: 132 smokers |
| Interventions | Usual care: brief advice from physician to stop smoking.<br>Psychosocial intervention: intervention provided by trained behaviourally oriented health educators: in-patient counselling session (30 min), outpatient counselling visits and telephone calls (at 1and 3 weeks, abstinent smokers at 3 months, relapsed smokers at 2 and 4 months), outpatient group program, self-help materials.<br>(BT, Ph, SH, Specific, Intensity 4) |
| Outcomes | Follow-up at 6, 12 and 60 months (validation by saliva samples) |
| Notes | IG: OM = 57.3%<br>ITT = 34.8% |


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**CASIS 1992** (*Continued*)

| | |
|---|---|
| | CG: OM = 47.4%<br>ITT = 28% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**DeBusk 1994**

| | |
|---|---|
| Methods | OM |
| Participants | 585 patients with AMI in five medical centres<br>IG: 131 smokers<br>CG: 120 smokers |
| Interventions | Usual care: counselling on dietary change, lipid lowering therapy, and on demand smoking cessation interventions.<br>Psychosocial intervention: physician-directed, nurse-managed, home-based case-management system ( behavioural intervention, telephone and mail contact) in addition to the usual care. Started in the hospital and finished 12 months later.<br>(BT, Ph, SH, MR, Intensity 5) |
| Outcomes | Follow-up at 6 and 12 months (abstinence validated) |
| Notes | IG: OM = 70.2%<br>CG: OM = 53.3% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**Dornelas 2000**

| | |
|---|---|
| Methods | OM, ITT |
| Participants | 100 smokers with AMI admitted to hospital<br>IG: 54 smokers<br>CG: 46 smokers |
| Interventions | Usual care: verbal and written recommendation to watch education video of AHA.<br>Psychosocial intervention: bedside cessation counselling (motivation for cessation, relapse prevention) delivered by a psychologist based on the transtheoretical model.<br>Seven telephone calls at 1, 4, 8, 12, 16, 20, 26 weeks<br>(BT, Ph, Specific, Intensity 4) |


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**Dornelas 2000** (*Continued*)

| | | |
|---|---|---|
| Outcomes | Follow-up at 6 and 12 months (validation by a significant other) | |
| Notes | IG: OM = 70%<br>ITT = 51.8%<br>CG: OM = 40%<br>ITT = 34.8% | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Allocation concealment? | Yes | A - Adequate |

**Hajek 2002**

| | | |
|---|---|---|
| Methods | OM, ITT | |
| Participants | 540 patients in hospitals in UK with MI and CABG<br>IG: 274<br>CG: 266 | |
| Interventions | Usual care: verbal advice to stop smoking and booklet "Smoking and your heart".<br>Psychosocial intervention: in 17 hospitals patients motivated to stop smoking received intervention. Education with booklet (Smoking and your Heart) from the British Heart Foundation. Short quiz on contents of the booklet; support of other cardiac patient is arranged by nurse Duration about 34min (SH, Specific, Intensity 1) | |
| Outcomes | Follow-up at 6 weeks and 12 months (validated) | |
| Notes | IG: OM = 39%<br>ITT = 36%<br>CG: OM = 43%<br>ITT = 41% | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Allocation concealment? | Yes | A - Adequate |

**Heller 1993**

| | |
|---|---|
| Methods | OM |
| Participants | 450 patients with AMI discharged from the hospital<br>IG: 66 smokers<br>CG: 73 smokers |


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**Heller 1993** (*Continued*)

| | |
|---|---|
| Interventions | Usual care: no specific information given<br>Psychosocial intervention: letter to the subjects' GP, three mail-out packages for the subjects (information about nutrition, smoking, walking programme) and monthly newsletters.<br>(SH, MR, Intensity 1) |
| Outcomes | Follow-up at 6 months (abstinence self-report) |
| Notes | IG: OM = 65%<br>CG: OM = 53% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | No | C - Inadequate |

**Ortigosa 2000**

| | |
|---|---|
| Methods | OM, ITT |
| Participants | 90 patients with myocardial infarction in hospital in Spain<br>IG: 43 smokers<br>CG: 47 smokers |
| Interventions | Usual care: advice only.<br>Psychosocial intervention: advice by doctor immediately after admission to hospital (10 minutes). Additional enhancement of motivation by nurses and phone contacts (after 2, 3, 4 weeks).<br>(Ph, Specific, Intensity 3) |
| Outcomes | Follow-up at 1, 3 and 12 months (validated) |
| Notes | IG: OM = 62%<br>ITT = 61%<br>CG: OM = 69%<br>ITT = 66% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |


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**Quist-Paulsen 2003**

| | |
|---|---|
| Methods | OM, ITT |
| Participants | Patients in hospital (reasons myocardial infarction, angina pectoris, coronary artery bypass surgery)<br>IG: 118 smokers<br>CG: 122 smokers |
| Interventions | Usual care: no specific intervention.<br>Psychosocial intervention: group intervention with nurses (twice a week). Booklet with emphasis on health benefits from smoking cessation. Also fear arousing message about death rates of persistent smokers. Advice not to smoke during hospital stay and motivation for NRT if needed additional phone contacts (5 times) in 5 months after hospital stay.<br>(BT, Ph, SH, Specific, Intensity 4) |
| Outcomes | Follow-up 12 months (validated) |
| Notes | IG: OM = 57%<br>ITT = 48%<br>CG: OM = 37%<br>ITT = 36% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**Reid 2003**

| | |
|---|---|
| Methods | ITT |
| Participants | Patients in hospital in Canada (reasons: angiography, PTCA, Myocardial infarction, coronary artery bypass surgery.<br>IG: 126 smokers<br>CG: 128 smokers |
| Interventions | Usual care: no additional intervention after discharge.<br>Psychosocial intervention: assessment of smoking status after 4 weeks. Abstinent patients were reinforced. Those still smoking were offered support by nurse (3 sessions with 20minutes in 8 weeks) and additionally nicotine patch therapy<br>(BT, Ph, SH, Specific, Intensity 4) |
| Outcomes | Follow-up at 3 and 12 months (not validated self-report) |
| Notes | IG: ITT = 39%<br>CG: ITT = 36% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|


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**Reid 2003** (*Continued*)

| | | |
|---|---|---|
| Allocation concealment? | Yes | A - Adequate |

**Rigotti 1994**

| | |
|---|---|
| Methods | ITT |
| Participants | 93 patients (smokers) scheduled for CABS in the postoperative cardiac surgery unit at Massachusetts General Hospital<br>IG: 44 smokers<br>CG: 43 smokers |
| Interventions | Usual care: Brief advice not to smoke within a group session.<br>Psychosocial intervention:<br>Nurse-based smoking cessation and relapse prevention programme adapted from the American Lung Association's "In Control" programme: three-counselling sessions, videotape, family members were included. Phone call 1 week after discharge by nurse.<br>(BT, Ph, SH, Specific, Intensity 3) |
| Outcomes | Follow-up at 2, 4, 8, 12 months and 5 years (validation by saliva cotinine) |
| Notes | IG: ITT = 43%<br>CG: ITT = 44% |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**Sivarajan 1983**

| | |
|---|---|
| Methods | OM, ITT |
| Participants | 258 patients hospitalised with AMI<br>IG1: 43 smokers<br>IG2: 39 smokers<br>CG: 37 smokers |
| Interventions | Usual care: conventional medical and nursing management.<br>Psychosocial intervention: two intervention groups - EG1: exercise only (for 12 weeks, weekly clinic visits); EG2: exercise, teaching and counselling ( 8 group sessions about risk factors, diet, exercise, stress management etc, individual counselling if needed). Data only of EG 2 used for analysis.<br>(BT, SH, MR, Intensity 4) |
| Outcomes | Follow-up at 3 and 6 months (abstinence self-report) |


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**Sivarajan 1983** (*Continued*)

| | |
|---|---|
| Notes | IG: OM = 48%<br>ITT = 33%<br>CG: OM = 58%<br>ITT = 37% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**Taylor 1990**

| | |
|---|---|
| Methods | OM |
| Participants | 173 patients (smokers) admitted to hospital with AMI<br>IG: 72 smokers<br>CG: 58 smokers |
| Interventions | Usual care: no specific instruction to stop smoking. 10% participated in non smoking classes.<br>Psychosocial intervention: nurse-managed intervention based on social learning theory: manual "Staying Free", 2 audio tapes for relaxation. Telephone contact after discharge (6 times), counselling after relapse. (BT, Ph, SH, Specific, Intensity 4) |
| Outcomes | Follow-up at 6 and 12 months (biochemical validation) |
| Notes | IG: OM = 70%<br>CG: OM = 44% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Yes | A - Adequate |

**van Elderen (group)**

| | |
|---|---|
| Methods | OM |
| Participants | Of 477 patients with CHD after discharge from hospital 258 were included.<br>Diagnosis: MI (144), CABS (42), PTCA (10), other (21)<br>IG: 64 smokers<br>CG: 64 smokers |
| Interventions | Usual care: standard rehabilitation with medical care and physical training.<br>Psychosocial intervention: health education programme "Heart and Health" based on Ellis' Rational Emotive Therapy (ABCDE model): information about heart disease, risks, diet, exercise, identification |


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**van Elderen (group)** (*Continued*)

| | |
|---|---|
| | and modification of irrational beliefs.<br>8 weekly group sessions (2h) for the patients and their partners, one follow-up session at 2 months.<br>(BT, MR, Intensity 4) |
| Outcomes | Follow-up at 3 and 12 months (abstinence self-report) |
| Notes | IG: OM = 62%<br>CG: OM = 50% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**van Elderen (phone)**

| | |
|---|---|
| Methods | OM |
| Participants | 60 patients admitted to hospital with AMI<br>IG: 15 smokers<br>CG: 16 smokers |
| Interventions | Usual care: standard medical care.<br>Psychosocial intervention: health education and counselling programme: two nurse-based counselling sessions, two group health education sessions (medication, aetiology of MI, risk factors, anxiety, depression etc). Weekly telephone contacts by nurse after discharge for 6 weeks.<br>(Ph, SH, MR, Intensity 4) |
| Outcomes | Follow-up after intervention, at 8 weeks and 1 year (abstinence self-report) |
| Notes | IG: OM = 60%<br>CG: OM = 37% |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

OM = optimistic model; ITT = intent to treat analysis; CABG = coronary artery bypass surgery; CAD = coronary artery disease; AMI = acute myocardial infarction; CG = control group; IG = experimental intervention group; GP = general practitioner

Duration of treatment is coded as follows (intensity):
coding 1: single initial contact lasting <= 1 hour, no follow-up support
coding 2: one or more contacts in total > 1 hour, no follow-up support
coding 3: any initial contact plus follow-up <=1 month
coding 4: any initial contact plus follow-up > 1 month and <= 6 month


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coding 5: any initial contact plus follow-up > 6 month.
Number in notes section show abstince rates in percent

## Characteristics of excluded studies *[ordered by study ID]*

| | |
|---|---|
| Andersen 2002 | Patients with other disease, or healthy subjects |
| Baughman 1982 | No intervention specified or no specific smoking cessation intervention |
| Belson 2002 | Heterogeneity in diagnosis included / no assessment of smoking status |
| Bolman 2002 | Follow up too short |
| Brenner 1989 | No intervention specified or no specific smoking cessation intervention / no assessment of smoking status |
| Byfield 2001 | Patients with other disease, or healthy subjects / no assessment of smoking status |
| Campbell 1996 | Heterogeneity in diagnosis included |
| Campbell 1998a | No clear diagnosis of CHD |
| Campbell 1998b | No clear diagnosis of CHD |
| Circo 1985 | Follow up too short |
| Connett 1984 | No information about diagnosis included |
| Cook 1989 | No data reported |
| Cupples 1999 | Patients with other heart disease |
| Eaker 1982 | Patients with other disease, or healthy subjects |
| Engblom 1992 | no intervention specified or no specific smoking cessation intervention |
| Erdman 1983 | No intervention specified or no specific smoking cessation intervention |
| Feeney 2001 | Drop out > 50% |
| Finnegan 1985 | Cross sectional analysis, not sufficient data / no intervention specified or no specific smoking cessation intervention |
| Fletcher 1987 | No intervention specified or no specific smoking cessation intervention / no comparison of smoking status feasible |
| Fortmann 1994 | No intervention specified or no specific smoking cessation intervention / no comparison of usual care and specific psychosocial intervention |
| Frasure-Smith 1997 | No comparison of smoking status feasible |


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(*Continued*)

| | |
|---|---|
| Fredrickson 1995 | Patients with other disease, or healthy subjects / no intervention specified or no specific smoking cessation intervention / follow up too short |
| Hall 1983 | Heterogeneity in diagnosis included |
| Haskell 1994 | No possibility to include data in meta-analysis |
| Hjermann 1986 | Heterogeneity in diagnosis included |
| Horlick 1984 | No comparison of smoking status feasible |
| Houston-Miller 1997 | Heterogeneity in diagnosis included |
| Jones 1996 | No intervention specified or no specific smoking cessation intervention / no assessment of smoking status |
| Joseph 1996 | No intervention specified or no specific smoking cessation intervention |
| Kallio 1981 | Follow up too short |
| Knutsen 1991 | Patients with other disease, or healthy subjects |
| Kornitzer 1980 | Patients with other disease, or healthy subjects |
| Kornitzer 1989 | Patients with other disease, or healthy subjects / no comparison of smoking status feasible |
| Kristeller 1993 | No comparison of smoking status feasible |
| Kuller 1991 | Heterogeneity in diagnosis included / no intervention specified or no specific smoking cessation intervention |
| Lancaster 1999 | Patients with other disease, or healthy subjects |
| Lisspers 1999 | Assessment of smoking status was made after cardiac procedure had been performed |
| Marra 1985 | No intervention specified or no specific smoking cessation intervention |
| Mayou 2002 | No intervention specified or no specific smoking cessation intervention / no comparison of smoking status feasible |
| McHugh 2001 | No assessment of smoking status |
| Meland 1999 | Cross sectional analysis, not sufficient data |
| Mitsibounas 1992 | Statistically significant difference in patient characteristics at baseline between intervention and control groups |
| Murchie 2003 | No clear diagnosis of CHD |


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(*Continued*)

| | |
|---|---|
| Nisbeth 2000 | Patients with other disease, or healthy subjects |
| Ornish 1990 | No comparison of smoking status feasible / no assessment of smoking status |
| Patel 1985 | No information about diagnosis included / no comparison of smoking status feasible |
| Prieme 1998 | Patients with other disease, or healthy subjects / cross sectional analysis, not sufficient data /no intervention specified or no specific smoking cessation intervention / no assessment of smoking status |
| Rice 1994 | Heterogeneity in diagnosis included |
| Risser 1990 | Patients with other disease, or healthy subjects |
| Rose 1978 | Patients with other disease, or healthy subjects |
| Rose 1982 | Patients with other disease, or healthy subjects |
| Rose 1992 | Patients with other disease, or healthy subjects |
| Sanders 1989 | No information about diagnosis included |
| Schmitz 1999 | No comparison of usual care and specific psychosocial intervention |
| Simon 2003 | Heterogeneity in diagnosis included |
| Sippel 1999 | Heterogeneity in diagnosis included |
| Steptoe 1999 | Other heart diseases / patients with other disease, or healthy subjects |
| Steptoe 2001 | Other heart diseases / patients with other disease, or healthy subjects |
| Stewart 1999 | Other heart diseases / no intervention specified or no specific smoking cessation intervention |
| Suurkula 1996 | Heterogeneity in diagnosis included |
| Taylor 1988 | No intervention specified or no specific smoking cessation intervention |
| Taylor 1997 | No assessment of smoking status |
| Tiffany 1986 | Patients with other disease, or healthy subjects |
| Tonnesen 1999 | Other heart diseases |
| Tonstad 2003 | Heterogeneity in diagnosis included / no intervention specified or no specific smoking cessation intervention |
| Toobert 1998 | No comparison of smoking status feasible |


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(*Continued*)

| | |
|---|---|
| Toobert 2000 | No comparison of smoking status feasible |
| Tzivoni 1998 | Cross sectional analysis, not sufficient data /no intervention specified or no specific smoking cessation intervention |
| Vedin 1976 | No intervention specified or no specific smoking cessation intervention |
| Wallner 1999 | No intervention specified or no specific smoking cessation intervention / no assessment of smoking status |
| Waters 1996 | No intervention specified or no specific smoking cessation intervention |
| Wewers 1994 | Heterogeneity in diagnosis included |
| Whitlock 1997 | Heterogeneity in diagnosis included / no information about diagnosis included |


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## DATA AND ANALYSES

### Comparison 1. Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials)

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Abstinence 6 to 12 months (ITT preferred and OM) | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 2 Abstinence 6 to 12 months (ITT preferred and OM) | 4 | 919 | Odds Ratio (M-H, Random, 95% CI) | 1.10 [0.75, 1.60] |
| 3 Abstinence 6 to 12 months (ITT only) | 11 | 2215 | Odds Ratio (M-H, Random, 95% CI) | 1.47 [1.10, 1.96] |

### Comparison 2. Sensitivity analysis validation (abstinence 6 to 12 months)

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Abstinence at 6 to 12 months | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 1.1 no validation | 9 | 1028 | Odds Ratio (M-H, Random, 95% CI) | 1.92 [1.26, 2.93] |
| 1.2 validation | 7 | 1649 | Odds Ratio (M-H, Random, 95% CI) | 1.44 [0.99, 2.11] |

### Comparison 3. Grouped by type of intervention (6 to 12 months)

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Abstinence 6 to 12 months BEHAVIORAL THERAPY | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 1.1 Behavioral therapeutic approach | 10 | 1610 | Odds Ratio (M-H, Random, 95% CI) | 1.69 [1.33, 2.14] |
| 1.2 No behavioral therapeutic approach | 6 | 1067 | Odds Ratio (M-H, Random, 95% CI) | 1.68 [0.83, 3.39] |
| 2 Abstinence 6 to 12 months TELEPHONE SUPPORT | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 2.1 Telephone support | 11 | 1635 | Odds Ratio (M-H, Random, 95% CI) | 1.58 [1.28, 1.97] |
| 2.2 No telephone support | 5 | 1042 | Odds Ratio (M-H, Random, 95% CI) | 1.88 [0.84, 4.23] |
| 3 Abstinence 6 to 12 months SELF HELP MATERIALS | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 3.1 SELF HELP MATERIALS provided | 11 | 2166 | Odds Ratio (M-H, Random, 95% CI) | 1.48 [1.11, 1.96] |
| 3.2 No self help materials | 5 | 511 | Odds Ratio (M-H, Random, 95% CI) | 2.24 [1.15, 4.36] |


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| | | | | |
|---|---|---|---|---|
| 4 Abstinence 6 to 12 months Specific vs. Multi-Risk-Factor Intervention | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 4.1 Specific smoking cessation intervention | 9 | 1974 | Odds Ratio (M-H, Random, 95% CI) | 1.63 [1.08, 2.46] |
| 4.2 Multicomponent intervention | 7 | 703 | Odds Ratio (M-H, Random, 95% CI) | 1.73 [1.27, 2.35] |

**Comparison 4. Sensitivity analysis brief / intense intervention (6 to 12 months)**

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Abstinence 6 to 12 months all studies | 16 | 2677 | Odds Ratio (M-H, Random, 95% CI) | 1.66 [1.25, 2.22] |
| 1.1 brief intervention | 4 | 833 | Odds Ratio (M-H, Random, 95% CI) | 0.92 [0.70, 1.22] |
| 1.2 high intensity intervention | 12 | 1844 | Odds Ratio (M-H, Random, 95% CI) | 1.98 [1.49, 2.65] |

**Comparison 5. Efficacy of psychosocial interventions on long term abstinence (five years)**

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Abstinence five years (OM only) | 2 | 226 | Odds Ratio (M-H, Random, 95% CI) | 1.32 [0.78, 2.24] |
| 2 Abstinence five years (ITT only) | 2 | 348 | Odds Ratio (M-H, Random, 95% CI) | 1.23 [0.79, 1.93] |


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## Analysis 1.1. Comparison 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials), Outcome 1 Abstinence 6 to 12 months (ITT preferred and OM).

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials)

Outcome: 1 Abstinence 6 to 12 months (ITT preferred and OM)

| Study or subgroup | Treatment n/N | Control n/N | Odds Ratio M-H,Random,95% CI | Weight | Odds Ratio M-H,Random,95% CI |
|---|---|---|---|---|---|
| Allen 1996 | 9/14 | 6/11 | | 2.4 % | 1.50 [ 0.30, 7.53 ] |
| Burt 1974 | 79/125 | 27/98 | | 7.5 % | 4.52 [ 2.55, 8.01 ] |
| Carlsson 1997 | 16/32 | 9/35 | | 4.5 % | 2.89 [ 1.03, 8.07 ] |
| CASIS 1992 | 47/135 | 34/132 | | 7.9 % | 1.54 [ 0.91, 2.61 ] |
| DeBusk 1994 | 78/131 | 57/121 | | 8.1 % | 1.65 [ 1.00, 2.72 ] |
| Dornelas 2000 | 28/54 | 16/46 | | 5.8 % | 2.02 [ 0.90, 4.53 ] |
| Hajek 2002 | 99/274 | 108/266 | | 9.3 % | 0.83 [ 0.58, 1.17 ] |
| Heller 1993 | 34/52 | 38/64 | | 6.1 % | 1.29 [ 0.61, 2.76 ] |
| Ortigosa 2000 | 26/43 | 31/47 | | 5.5 % | 0.79 [ 0.33, 1.86 ] |
| Quist-Paulsen 2003 | 57/118 | 44/122 | | 8.0 % | 1.66 [ 0.99, 2.78 ] |
| Reid 2003 | 49/126 | 46/128 | | 8.0 % | 1.13 [ 0.68, 1.89 ] |
| Rigotti 1994 | 27/44 | 23/43 | | 5.5 % | 1.38 [ 0.59, 3.24 ] |
| Sivarajan 1983 | 13/39 | 14/37 | | 5.0 % | 0.82 [ 0.32, 2.10 ] |
| Taylor 1990 | 51/86 | 26/87 | | 7.1 % | 3.42 [ 1.82, 6.41 ] |
| van Elderen (group) | 46/66 | 32/70 | | 6.5 % | 2.73 [ 1.35, 5.53 ] |
| van Elderen (phone) | 9/15 | 6/16 | | 2.9 % | 2.50 [ 0.59, 10.62 ] |
| **Total (95% CI)** | **1354** | **1323** | | **100.0 %** | **1.66 [ 1.25, 2.22 ]** |

Total events: 668 (Treatment), 517 (Control)

Heterogeneity: $Tau^2 = 0.20$; $Chi^2 = 42.68$, df = 15 (P = 0.00018); $I^2 = 65\%$

Test for overall effect: Z = 3.48 (P = 0.00051)



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## Analysis 1.2. Comparison 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials), Outcome 2 Abstinence 6 to 12 months (ITT preferred and OM).

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials)

Outcome: 2 Abstinence 6 to 12 months (ITT preferred and OM)

| Study or subgroup | Treatment n/N | Control n/N | Odds Ratio M-H,Random,95% CI | Weight | Odds Ratio M-H,Random,95% CI |
|---|---|---|---|---|---|
| Allen 1996 | 9/14 | 6/11 | | 5.1 % | 1.50 [ 0.30, 7.53 ] |
| Dornelas 2000 | 28/54 | 16/46 | | 17.0 % | 2.02 [ 0.90, 4.53 ] |
| Hajek 2002 | 99/274 | 108/266 | | 46.0 % | 0.83 [ 0.58, 1.17 ] |
| Reid 2003 | 49/126 | 46/128 | | 31.9 % | 1.13 [ 0.68, 1.89 ] |
| **Total (95% CI)** | **468** | **451** | | **100.0 %** | **1.10 [ 0.75, 1.60 ]** |

Total events: 185 (Treatment), 176 (Control)

Heterogeneity: $Tau^2 = 0.05$; $Chi^2 = 4.52$, df = 3 (P = 0.21); $I^2 = 34\%$

Test for overall effect: Z = 0.48 (P = 0.63)



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## Analysis 1.3. Comparison 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials), Outcome 3 Abstinence 6 to 12 months (ITT only).

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 1 Efficacy of psychosocial interventions on abstinence (6 to 12 months; all trials)

Outcome: 3 Abstinence 6 to 12 months (ITT only)

| Study or subgroup | Treatment n/N | Control n/N | Odds Ratio M-H,Random,95% CI | Weight | Odds Ratio M-H,Random,95% CI |
|---|---|---|---|---|---|
| CASIS 1992 | 47/135 | 34/132 | | 10.5 % | 1.54 [ 0.91, 2.61 ] |
| DeBusk 1994 | 78/131 | 57/121 | | 10.9 % | 1.65 [ 1.00, 2.72 ] |
| Dornelas 2000 | 28/54 | 16/46 | | 7.2 % | 2.02 [ 0.90, 4.53 ] |
| Hajek 2002 | 99/274 | 108/266 | | 13.1 % | 0.83 [ 0.58, 1.17 ] |
| Ortigosa 2000 | 26/43 | 31/47 | | 6.7 % | 0.79 [ 0.33, 1.86 ] |
| Quist-Paulsen 2003 | 57/118 | 44/122 | | 10.7 % | 1.66 [ 0.99, 2.78 ] |
| Reid 2003 | 49/126 | 46/128 | | 10.8 % | 1.13 [ 0.68, 1.89 ] |
| Rigotti 1994 | 27/44 | 23/43 | | 6.7 % | 1.38 [ 0.59, 3.24 ] |
| Sivarajan 1983 | 13/39 | 14/37 | | 6.0 % | 0.82 [ 0.32, 2.10 ] |
| Taylor 1990 | 51/86 | 26/87 | | 9.2 % | 3.42 [ 1.82, 6.41 ] |
| van Elderen (group) | 46/66 | 32/70 | | 8.3 % | 2.73 [ 1.35, 5.53 ] |
| **Total (95% CI)** | **1116** | **1099** | | **100.0 %** | **1.47 [ 1.10, 1.96 ]** |

Total events: 521 (Treatment), 431 (Control)

Heterogeneity: $Tau^2 = 0.14$; $Chi^2 = 25.27$, df = 10 (P = 0.005); $I^2 = 60\%$

Test for overall effect: Z = 2.59 (P = 0.0097)



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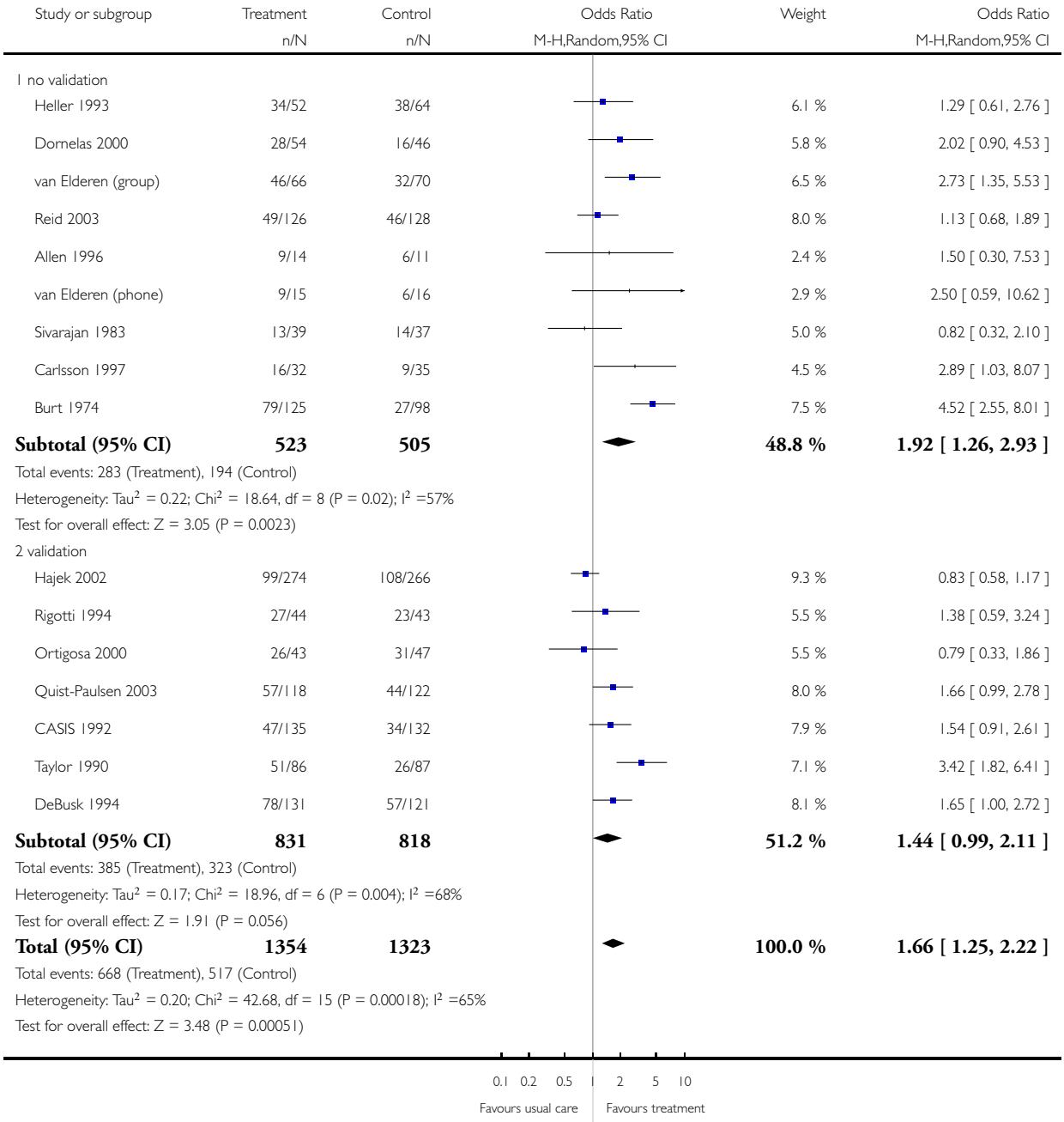
## Analysis 2.1. Comparison 2 Sensitivity analysis validation (abstinence 6 to 12 months), Outcome 1 Abstinence at 6 to 12 months.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 2 Sensitivity analysis validation (abstinence 6 to 12 months)

Outcome: 1 Abstinence at 6 to 12 months





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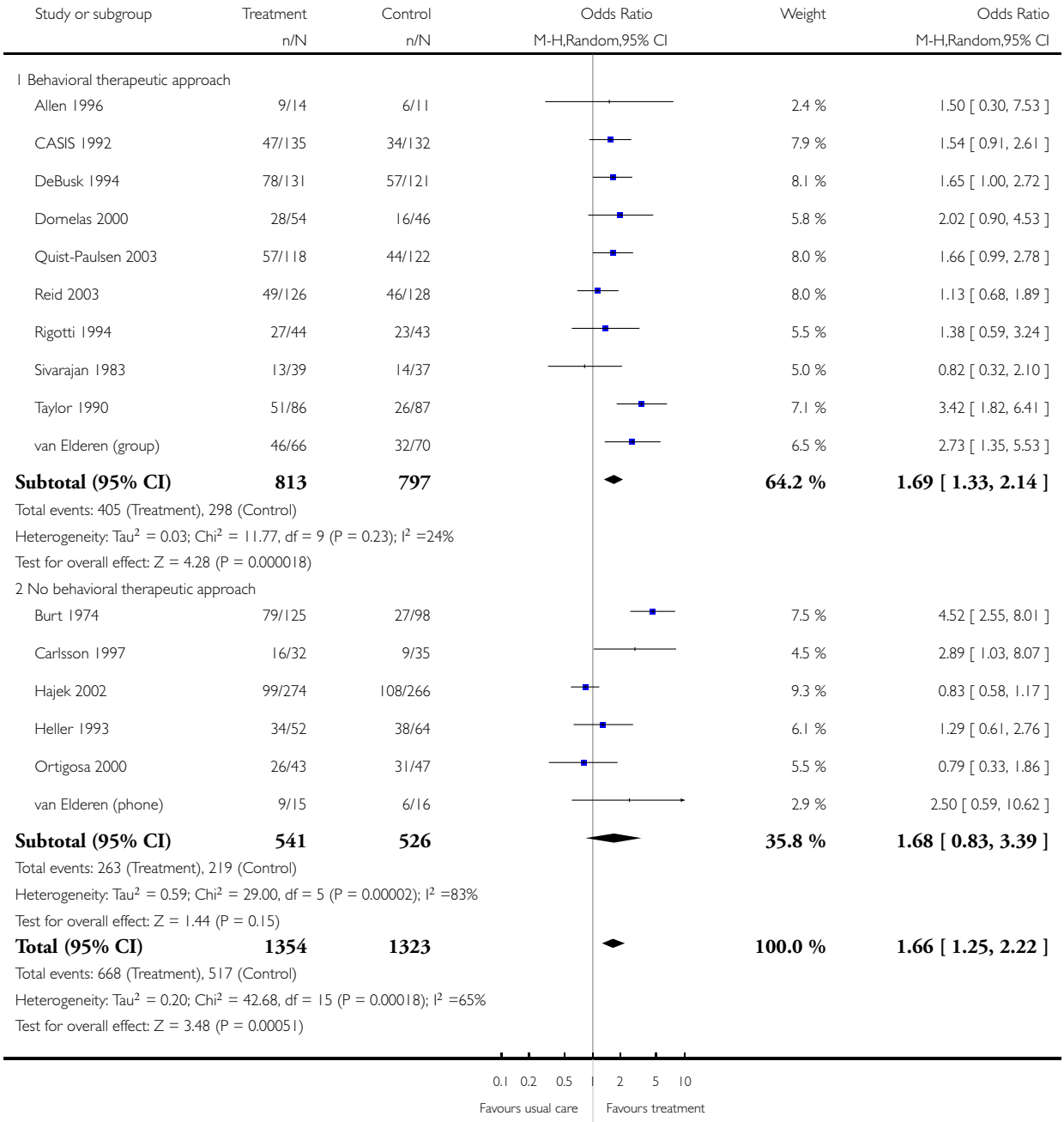
## Analysis 3.1. Comparison 3 Grouped by type of intervention (6 to 12 months), Outcome 1 Abstinence 6 to 12 months BEHAVIORAL THERAPY.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 3 Grouped by type of intervention (6 to 12 months)

Outcome: 1 Abstinence 6 to 12 months BEHAVIORAL THERAPY





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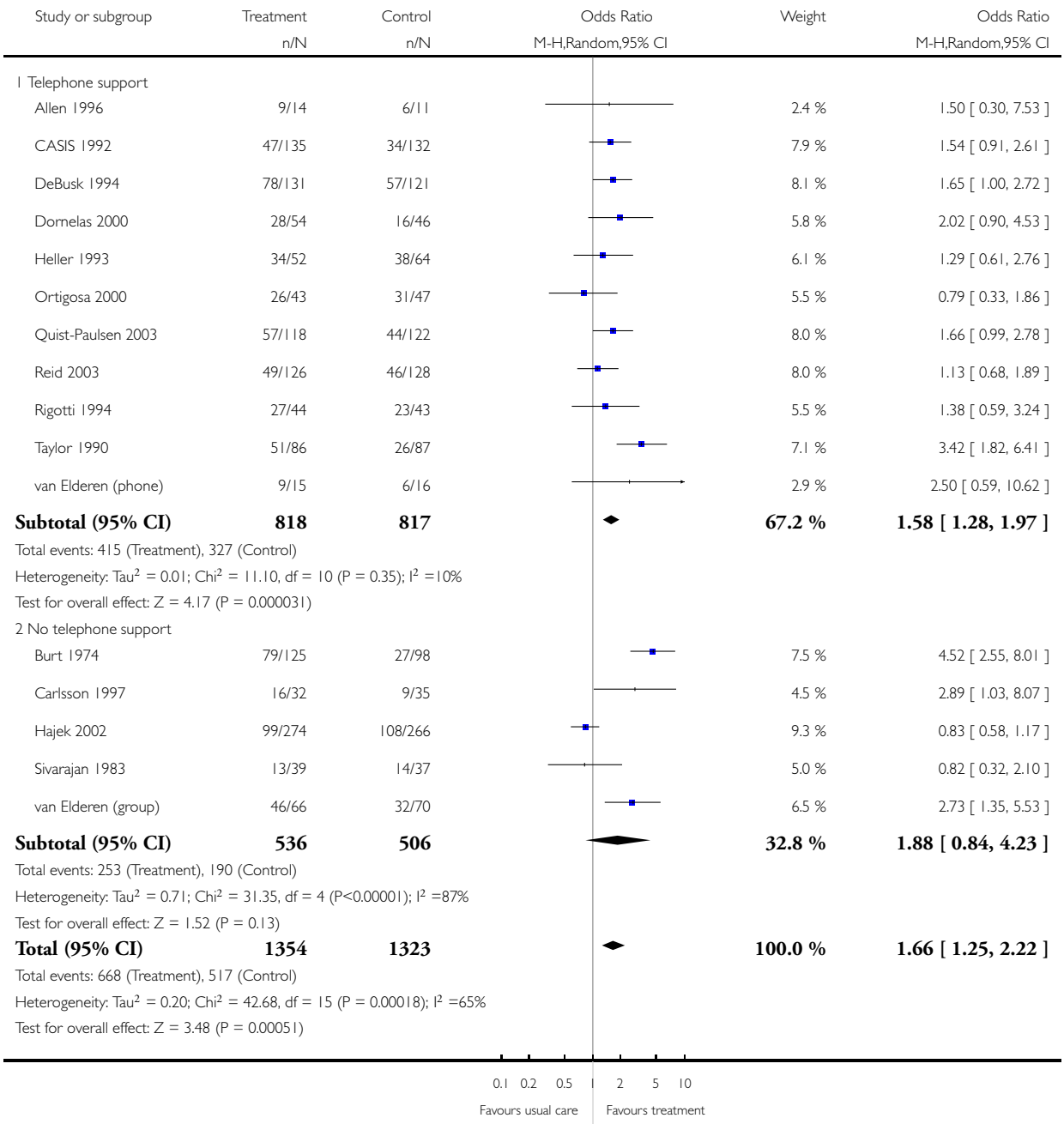
## Analysis 3.2. Comparison 3 Grouped by type of intervention (6 to 12 months), Outcome 2 Abstinence 6 to 12 months TELEPHONE SUPPORT.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 3 Grouped by type of intervention (6 to 12 months)

Outcome: 2 Abstinence 6 to 12 months TELEPHONE SUPPORT





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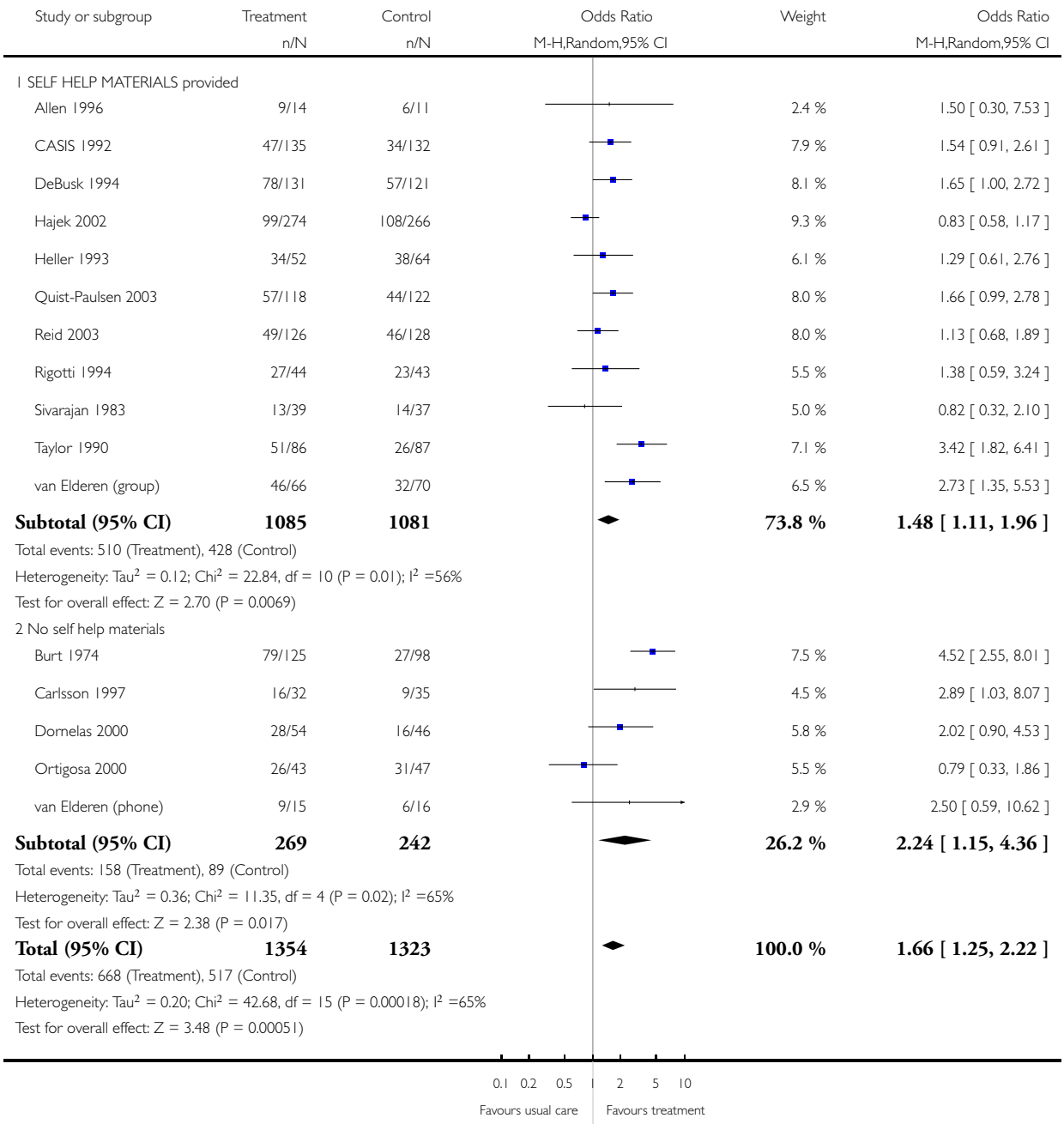
### Analysis 3.3. Comparison 3 Grouped by type of intervention (6 to 12 months), Outcome 3 Abstinence 6 to 12 months SELF HELP MATERIALS.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 3 Grouped by type of intervention (6 to 12 months)

Outcome: 3 Abstinence 6 to 12 months SELF HELP MATERIALS





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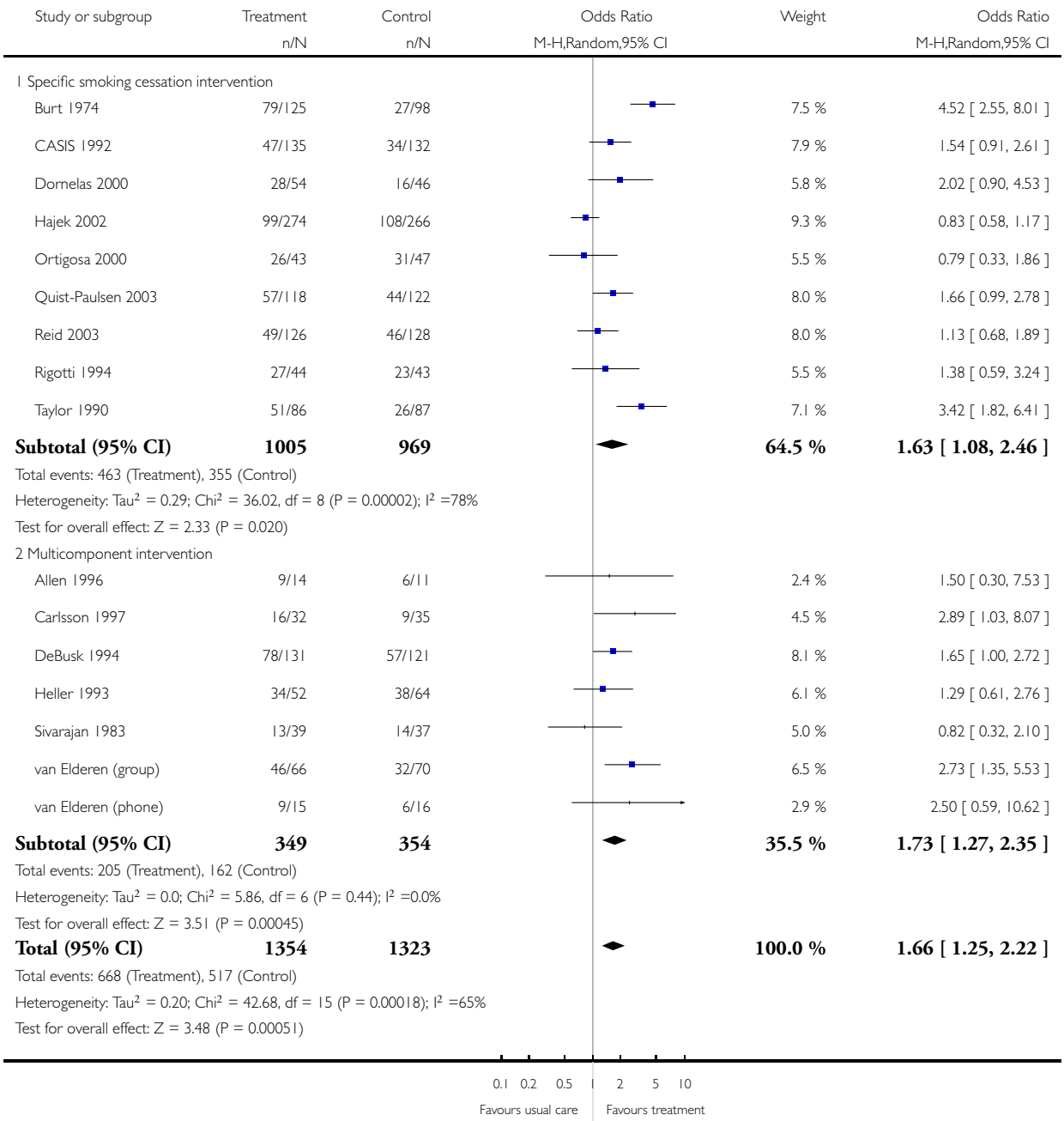
## Analysis 3.4. Comparison 3 Grouped by type of intervention (6 to 12 months), Outcome 4 Abstinence 6 to 12 months Specific vs. Multi-Risk-Factor Intervention.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 3 Grouped by type of intervention (6 to 12 months)

Outcome: 4 Abstinence 6 to 12 months Specific vs. Multi-Risk-Factor Intervention





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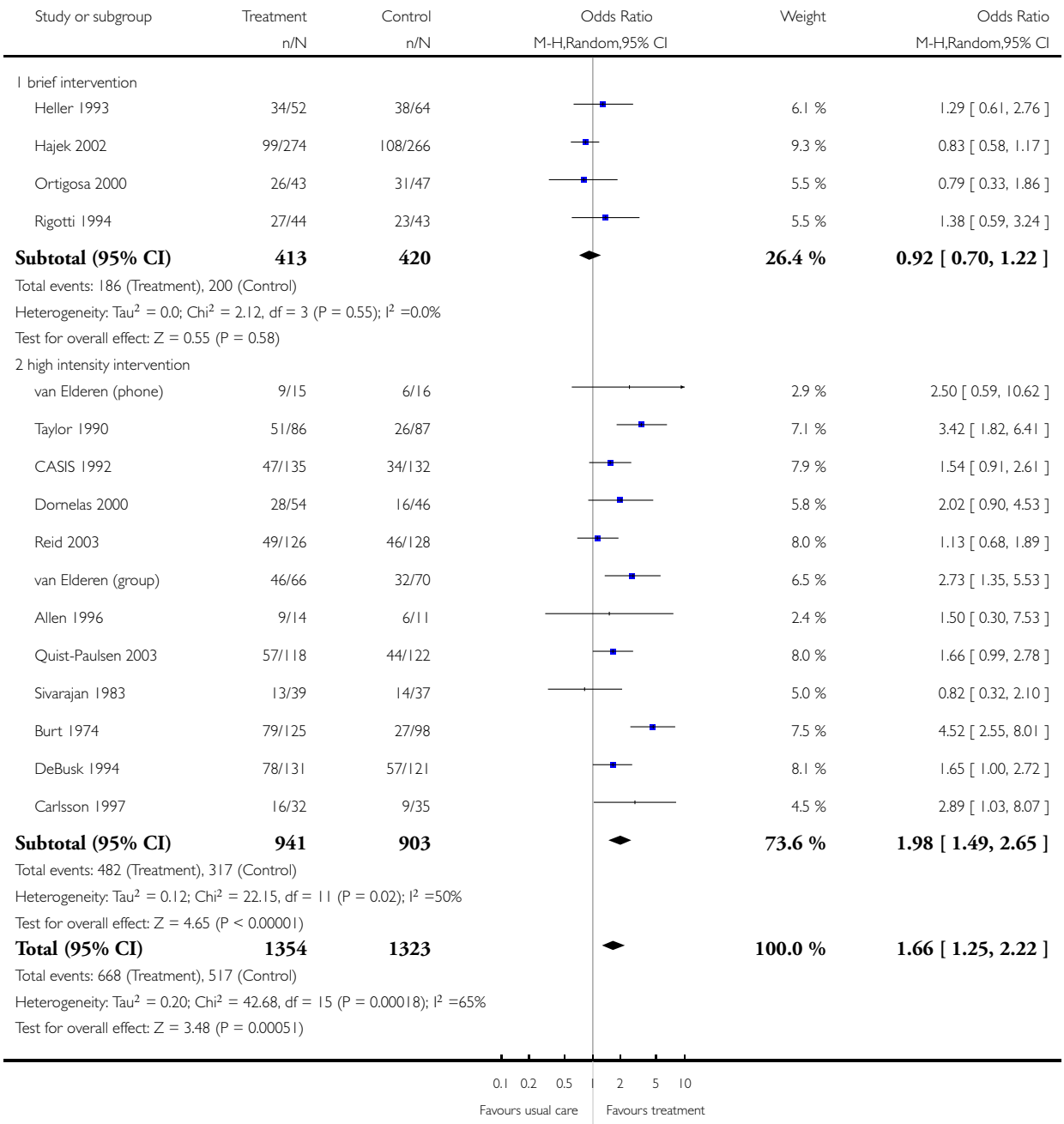
## Analysis 4.1. Comparison 4 Sensitivity analysis brief / intense intervention (6 to 12 months), Outcome 1 Abstinence 6 to 12 months all studies.

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 4 Sensitivity analysis brief / intense intervention (6 to 12 months)

Outcome: 1 Abstinence 6 to 12 months all studies





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### Analysis 5.1. Comparison 5 Efficacy of psychosocial interventions on long term abstinence (five years), Outcome 1 Abstinence five years (OM only).

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 5 Efficacy of psychosocial interventions on long term abstinence (five years)

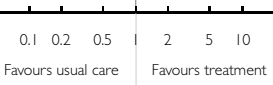
Outcome: 1 Abstinence five years (OM only)

| Study or subgroup | Treatment n/N | Control n/N | Odds Ratio M-H,Random,95% CI | Weight | Odds Ratio M-H,Random,95% CI |
|---|---|---|---|---|---|
| CASIS 1992 | 47/82 | 37/78 | | 70.7 % | 1.49 [ 0.80, 2.78 ] |
| Rigotti 1994 | 15/33 | 15/33 | | 29.3 % | 1.00 [ 0.38, 2.64 ] |
| **Total (95% CI)** | **115** | **111** | | **100.0 %** | **1.32 [ 0.78, 2.24 ]** |

Total events: 62 (Treatment), 52 (Control)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.46$, df = 1 (P = 0.50); $I^2 = 0.0\%$

Test for overall effect: Z = 1.05 (P = 0.29)




### Analysis 5.2. Comparison 5 Efficacy of psychosocial interventions on long term abstinence (five years), Outcome 2 Abstinence five years (ITT only).

Review: Psychosocial interventions for smoking cessation in patients with coronary heart disease

Comparison: 5 Efficacy of psychosocial interventions on long term abstinence (five years)

Outcome: 2 Abstinence five years (ITT only)

| Study or subgroup | Treatment n/N | Control n/N | Odds Ratio M-H,Random,95% CI | Weight | Odds Ratio M-H,Random,95% CI |
|---|---|---|---|---|---|
| CASIS 1992 | 47/133 | 37/128 | | 74.2 % | 1.34 [ 0.80, 2.27 ] |
| Rigotti 1994 | 15/44 | 15/43 | | 25.8 % | 0.97 [ 0.40, 2.34 ] |
| **Total (95% CI)** | **177** | **171** | | **100.0 %** | **1.23 [ 0.79, 1.93 ]** |

Total events: 62 (Treatment), 52 (Control)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.40$, df = 1 (P = 0.53); $I^2 = 0.0\%$

Test for overall effect: Z = 0.92 (P = 0.36)



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## WHAT'S NEW

Last assessed as up-to-date: 2 October 2007.

| | | |
|---|---|---|
| 9 September 2008 | Amended | Converted to new review format. |

## HISTORY

Review first published: Issue 1, 2008

| | | |
|---|---|---|
| 3 October 2007 | New citation required and conclusions have changed | Substantive amendment |

## CONTRIBUTIONS OF AUTHORS

JBa performed initial searches for studies, assessed studies for inclusion, carried out data extraction and edited review.

JC gave advice on statistical procedures, and edited review

JBe edited review

## DECLARATIONS OF INTEREST

None known.

## SOURCES OF SUPPORT


### Internal sources

- Department of Rehabilitation Psychology, Germany.
- Wissenschaftliche Gesellschaft University of Freiburg, Germany.

### External sources

- No sources of support supplied



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## NOTES

Used abbreviations

AMI: acute myocardial infarction

AP: angina pectoris

BIOSIS: Database on life science and biomedical research (www.biosis.org)

CABG: coronary artery bypass graft

CHD: coronary heart disease

CI: confidence interval

EMBASE: Database with biomedical and pharmacological information (www.embase.com)

ICD: International Classification of Diseases

ITT: Intention to treat analysis

Medline: database of the U.S. National Library of Medicine

MI: myocardial infarction

MeSH; Medical subject heading

N: Number of studies

n: Number of patients

OR: Odds ratio

OM: Optimistic model

PsycINFO: database of the American Psychological Association

PSYNDEX: database of the Center for Psychological Information and Documentation at the University of Trier, Germany

PTCA: percutaneous transluminal coronary angioplasty

## INDEX TERMS

### Medical Subject Headings (MeSH)

*Behavior Therapy; Coronary Disease [*rehabilitation]; Myocardial Infarction [rehabilitation]; Patient Education as Topic; Randomized Controlled Trials as Topic; Self Care; Smoking [*adverse effects; psychology]; Smoking Cessation [*psychology]

### MeSH check words

Humans


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