University of Plymouth

PEARL **https://pearl.plymouth.ac.uk**

Faculty of Health: Medicine, Dentistry and Human Sciences School of Psychology

2018-02-01

Psychological interventions for coronary heart disease: Cochrane systematic review and meta-analysis.

Richards, SH

http://hdl.handle.net/10026.1/10789

10.1177/2047487317739978
European Journal of Preventive Cardiology
SAGE Publications

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

Table 1. Potential explanatory variables explored in univariate meta-regression

Variable	Levels*
Targeting of psychological interventions	'non-selected population (including not reported)', 'population with clinically established psychological disorder'
Mode of intervention delivery	'individual (including not reported)', 'group or mix of individual & group'
Family involvement in intervention	'no (including not reported)', 'yes'
Cardiac risk factor education included as part of the intervention	'no (including not reported)', 'yes'
Behaviour change for cardiac risk factors included as part of the intervention	'no (including not reported)', 'yes'
Psychological treatment targets	
Depression	'no (including not reported)', 'yes'
Anxiety	'no (including not reported)', 'yes'
Stress management	'no (including not reported)', 'yes'
Type A behaviour	'no (including not reported)', 'yes'
Psychological components	
Relaxation	'no (including not reported)', 'yes'
Cognitive techniques	'no (including not reported)', 'yes'
Emotional support and/or client-led discussion	'no (including not reported)', 'yes'
Adjunct pharmacology	'no (including not reported)', 'yes'

* First level coded '0', second level coded '1' in regression models

Table 2. Study, participant, and intervention characteristics

Study characteristics (35 Studies)	**n studies**
Study location	
Europe	19
North America	12
Australia	4
China	1
Median sample size (range)	123 (42, 2481)
Duration of follow-up, months (range)*	12 (6, 128)
Median duration of follow-up, months (range)*	12 (6, 128)
Population characteristics	
Median of study mean ages, years (range)	59.6 (53, 67)
Median proportion of males (range)	77 (0, 100)
Cardiac indication on referral, %	
MI	65.7
Revascularisation procedure	27.4
Psychological disorder present at baseline	
All sample (inclusion criterion)	12
Mixed (observed, not required)‡	11
None (exclusion criterion)	3
Not reported	11
Intervention characteristics	
Setting†	

Hospital	9
Clinic	7
Home-based	4
Mixed (inpatient, other support)	2
Not reported	13
Median treatment contact hours (range)	12 (2, 96)
Mode of delivery	
Group	20
Individual (including not reported)	10
Mixed (group/individual)	5
Family involvement with treatment	
Yes	11
Not reported	24
Psychological treatment aims/components	
Multiple aims/components	23
Single aim/component	12
Treatment aims	
Stress	22
Depression	17
Anxiety	16
Type A behaviour (including anger/hostility)	12
Improving disease adjustment	11
Treatment components	
Relaxation techniques	20

Self-awareness and self-monitoring	20
Cognitive challenge or restructuring	19
Emotional support or client-led discussion	15
Treatment co-interventions	
Behavioral change for cardiac risk factors	19
Awareness of cardiac risk factors	16
Psycho-pharmacological prescribing	3

* The length of follow-up of clinical events; psychological outcomes were often followed-up for shorter periods within the overall assessment schedule.

† Clinical settings can include cardiac rehabilitation units, hospital out-patient clinics or community centres.

‡ Includes 2 studies where the inclusion criterion was a confirmed psychopathology and/or another indicating condition.

Table 3. Results from the pooled analysis of mortality and cardiovascular morbidity

Outcome (median follow-up)	Number of Participants (Studies)	Number of events		RR (95% CI)	Statistical Heterogeneity I^2 (p-value)	GRADE Quality of Evidence
		Intervention	Comparator			
Total mortality (13 months)	7776 (23)	319/3899	352/3877	0.90 (0.77, 1.05)	2% (0.43)	Moderate*
Cardiovascular mortality (57 months)	4792 (11)	140/2561	161/2231	0.79 (0.63, 0.98)	0% (0.76)	Low*†
Revascularisation (CABG/PCI) (12 months)	6822 (13)	395/3429	412/3393	0.94 (0.81, 1.11)	8% (0.36)	Moderate*
Non-fatal MI (30 months)	7845 (13)	340/4114	355/3731	0.82 (0.64, 1.05)	41% (0.07)	Low*‡

*Random sequence generation, allocation concealment or blinding of outcome assessors poorly described in ≥50% of included studies.

†Egger tests suggests evidence of asymmetry. ‡ 95% confidence intervals includes both no effect and appreciable benefit or harm (i.e. 95% confidence interval <0.75 or >1.25).

GRADE: moderate = further research is very likely to have an important effect in confidence of the estimated effect, and may change the estimate; low = further research is very likely to have an important effect in confidence in the estimated effect and is likely to change the estimate.

Table 4. Results from the pooled analysis psychological outcomes

Outcome (median follow-up)	Number of Participants (Studies)	SMD (95% CI) (Intervention – Comparator)	Statistical Heterogeneity I^2 (p-value)	GRADE Quality of Evidence
Depression (12 months)	5829 (19)	-0.27 (-0.39, -0.15)	69% (<0.001)	++-- Low*‡
Anxiety (12 months)	3165 (12)	-0.24 (-0.38, -0.09)	47% (0.03)	++-- Low*†
Stress (12 months)	1255 (8)	-0.56 (-0.88, -0.24)	86% (0.<0.001)	+--- Very low*‡§

* Random sequence generation, allocation concealment or blinding of outcome assessors were poorly described in ≥50% of included studies.

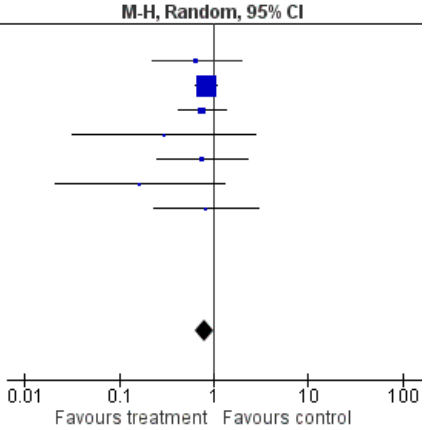
† Egger tests suggests evidence of asymmetry. ‡ Moderate heterogeneity (I^2 >50%). § 95% CIs around the SMD did not include the value of a +5 at either lower or upper limits (indicative of clinical significance).

GRADE: moderate = further research is very likely to have an important effect in confidence of the estimated effect, and may change the estimate; low = further research is very likely to have an important effect in confidence in the estimated effect and is likely to change the estimate; very low quality= the estimate is very uncertain.

Figure 1. Forest plot of psychological intervention versus usual care: cardiovascular mortality

Study or Subgroup	Treatment Events	Treatment Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Blumenthal 2016	0	76	0	75		Not estimable
Burell 1996	5	128	8	133	4.1%	0.65 [0.22, 1.93]
ENRICHD Investigators 2000	96	1238	115	1243	72.6%	0.84 [0.65, 1.09]
Friedman 1982	28	592	17	270	14.3%	0.75 [0.42, 1.35]
Gulliksson 2011	1	192	3	170	1.0%	0.30 [0.03, 2.81]
Van-Dixhoorn 1999	5	76	7	80	4.0%	0.75 [0.25, 2.27]
Rakowska 2015	1	41	6	40	1.1%	0.16 [0.02, 1.29]
Schneider 2012	4	99	5	102	3.0%	0.82 [0.23, 2.98]
Merswolken 2011	0	30	0	32		Not estimable
Neves 2009	0	40	0	41		Not estimable
Roncella 2013	0	49	0	45		Not estimable
Total (95% CI)		**2561**		**2231**	**100.0%**	**0.79 [0.63, 0.98]**
Total events	140		161			

Heterogeneity: Tau² = 0.00; Chi² = 3.35, df = 6 (P = 0.76); I² = 0%
Test for overall effect: Z = 2.10 (P = 0.04)

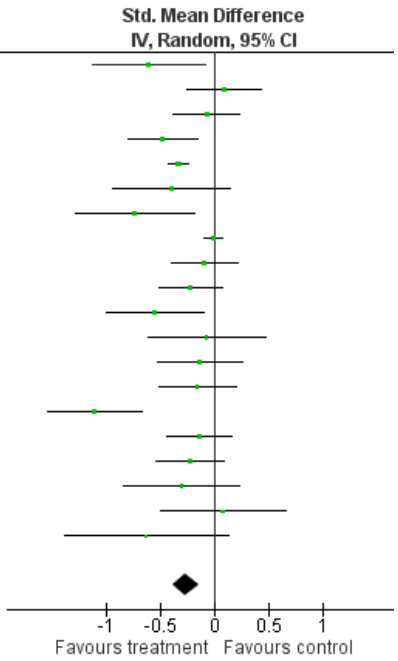


Legend: Reproduced from Richards *et al* (2017)[8]

Figure 2. Forest plot of psychological intervention versus usual care: depression

Study or Subgroup	Treatment Mean	Treatment SD	Treatment Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Black 1998	-5.4	9.68	30	-0.2	7.12	30	3.5%	-0.60 [-1.12, -0.09]
Burgess 1987	0.3	7.511	68	-0.3	6.144	68	5.5%	0.09 [-0.25, 0.42]
Claesson 2005	-1.63	9.09	80	-1.03	7.31	86	6.0%	-0.07 [-0.38, 0.23]
Davidson 2010	13.2	9.58	80	17.7	9.18	77	5.8%	-0.48 [-0.79, -0.16]
ENRICHD Investigators 2000	-7.6	8.8	916	-4.7	8.6	869	9.2%	-0.33 [-0.43, -0.24]
Freedland 2009	7.7	6.48	42	10.3	6.63	20	3.3%	-0.39 [-0.93, 0.14]
Freedland 2009	5.5	6.4	41	10.3	6.63	20	3.2%	-0.73 [-1.28, -0.18]
Jones 1996	-0.05	2.85	1060	-0.01	2.98	1068	9.3%	-0.01 [-0.10, 0.07]
Koertge 2008	-2.3	5.07	87	-1.8	5.58	82	6.0%	-0.09 [-0.40, 0.21]
Lie 2007	2.7	3.1	93	3.5	4	92	6.2%	-0.22 [-0.51, 0.07]
McLaughlin 2005	-2.4	5.43	45	0.1	2.87	35	4.1%	-0.55 [-1.00, -0.10]
Merswolken 2011	-0.4	2.8	25	-0.2	2.7	27	3.2%	-0.07 [-0.62, 0.47]
Michalsen 2005	-2.9	4.7	48	-2.2	5.5	53	4.8%	-0.14 [-0.53, 0.26]
O'Neil 2015	-5.13	14.88	61	-2.37	19.18	60	5.2%	-0.16 [-0.52, 0.20]
Roncella 2013	6	1.25	49	8	2.25	45	4.3%	-1.10 [-1.54, -0.67]
Schneider 2012	-0.25	6.57	85	0.686	6.56	93	6.1%	-0.14 [-0.44, 0.15]
Sebregts 2005	-1.6	4.93	83	-0.6	3.78	75	5.9%	-0.23 [-0.54, 0.09]
Stern 1983	-1.94	6.6	31	0.04	6.2	25	3.4%	-0.30 [-0.83, 0.23]
Turner 2013	17.4	10.3	20	16.6	10.5	27	3.0%	0.08 [-0.50, 0.65]
Turner 2014	11.95	7.87	14	18	10.61	15	2.0%	-0.63 [-1.37, 0.12]
Total (95% CI)			**2958**			**2867**	**100.0%**	**-0.27 [-0.39, -0.15]**

Heterogeneity: Tau² = 0.04; Chi² = 61.06, df = 19 (P < 0.00001); I² = 69%
Test for overall effect: Z = 4.33 (P < 0.0001)

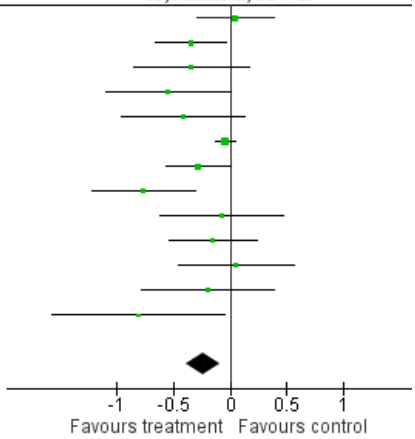


Legend: Reproduced from Richards *et al* (2017)[8]

Figure 3. Forest plot of psychological intervention versus usual care: anxiety

Study or Subgroup	Treatment Mean	Treatment SD	Treatment Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Burgess 1987	-0.5	6.86	68	-0.8	6.16	68	9.7%	0.05 [-0.29, 0.38]
Davidson 2010	6.7	4.31	80	8.35	5.19	77	10.3%	-0.34 [-0.66, -0.03]
Elderen 1994	-2.51	8.77	30	0.79	10.32	30	5.7%	-0.34 [-0.85, 0.17]
Freedland 2009	9.1	8.96	41	14.2	9.95	20	5.2%	-0.54 [-1.09, 0.00]
Freedland 2009	10.1	9.72	42	14.2	9.95	20	5.3%	-0.41 [-0.95, 0.12]
Jones 1996	-0.04	2.9	1060	0.09	3.14	1068	19.3%	-0.04 [-0.13, 0.04]
Lie 2007	3.1	3.6	93	4.2	4.2	92	11.2%	-0.28 [-0.57, 0.01]
McLaughlin 2005	-2.2	2.75	45	-0.1	2.72	35	6.6%	-0.76 [-1.22, -0.30]
Merswolken 2011	-2	2.3	25	-1.8	2.8	27	5.2%	-0.08 [-0.62, 0.47]
Michalsen 2005	-4.5	8.2	48	-3.3	7.6	53	8.1%	-0.15 [-0.54, 0.24]
Stern 1983	-0.71	5.5	38	-1	5.5	25	5.8%	0.05 [-0.45, 0.56]
Turner 2013	8.4	4.9	20	9.4	5.1	27	4.7%	-0.20 [-0.78, 0.38]
Turner 2014	6.93	3.38	14	10.04	4.06	15	3.0%	-0.81 [-1.57, -0.04]
Total (95% CI)			**1604**			**1557**	**100.0%**	**-0.24 [-0.38, -0.09]**

Heterogeneity: Tau² = 0.03; Chi² = 22.56, df = 12 (P = 0.03); I² = 47%
Test for overall effect: Z = 3.25 (P = 0.001)

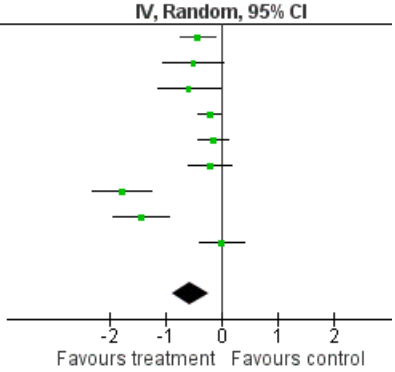


Legend: Reproduced from Richards *et al* (2017)[8]

Figure 4. Forest plot of psychological intervention versus usual care: stress

Study or Subgroup	Treatment Mean	Treatment SD	Treatment Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Claesson 2005	-6.3	9.2	77	-2.8	6.7	82	12.0%	-0.43 [-0.75, -0.12]
Freedland 2009	14.6	7.78	41	18.6	7.96	20	9.8%	-0.50 [-1.05, 0.04]
Freedland 2009	14	7.68	41	18.6	7.96	20	9.8%	-0.58 [-1.13, -0.04]
Gallacher 1997	-9	21.8	184	-4.2	22.2	194	12.9%	-0.22 [-0.42, -0.02]
Koertge 2008	34	7.8	113	35.3	8.7	122	12.5%	-0.16 [-0.41, 0.10]
Michalsen 2005	-3.58	7.1	48	-2.08	6.6	53	11.3%	-0.22 [-0.61, 0.17]
Neves 2009	23.4	4.1	40	31.5	4.9	41	10.1%	-1.77 [-2.29, -1.26]
Rakowska 2015	22.02	1.93	41	24.69	1.76	40	10.3%	-1.43 [-1.92, -0.94]
Roncella 2013	5	1.25	49	5	1	45	11.2%	0.00 [-0.40, 0.40]
Total (95% CI)			**634**			**617**	**100.0%**	**-0.56 [-0.88, -0.24]**

Heterogeneity: Tau² = 0.20; Chi² = 55.74, df = 8 (P < 0.00001); I² = 86%
Test for overall effect: Z = 3.41 (P = 0.0007)



Legend: Reproduced from Richards *et al* (2017)[8]