RESEARCH

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THIS WEEK'S RESEARCH QUESTIONS

249 How effective are home based cardiac rehabilitation programmes compared with supervised programmes at special centres?

250 Do obese adolescents eat less and lose more weight than controls when using a device that shows how much and how quickly they eat?

251 Does stopping smoking in early stage lung cancer improve prognosis?

252 Is cardiac stress testing before elective non-cardiac surgery associated with improved postoperative survival and hospital stay?

253 Does routine screening for postnatal depression in primary care represent value for money for the NHS?

Treatment of childhood obesity by retraining eating behaviour

In this trial by Anna Ford and colleagues (p 250), obese 9-17 year olds were randomly allocated to standard care (advice on exercise and diet) or to advice plus use of a Mandometer, a computerised device that gives real time feedback during meal times. It plots a graph showing the rate at which food disappears from the plate compared with the ideal rate programmed in by a food therapist. After a year, children in the Mandometer group had significantly lower average body mass index and body fat scores than those in the standard care group, and were eating less and more slowly. "Mandometer therapy," say the authors, "seems to be a useful addition to the rather sparse options for treating adolescent obesity effectively."

KAROLINSKA INSTITUTET

This paper was covered by media worldwide, including *Scientific American*, *The Hindustan Times*, and *Visit Bulgaria*. The *Washington Post*'s health bloggers asked "Can a computerized nag help fight the obesity epidemic? A new British study indicates it could" (http://voices.washingtonpost.com/checkup/2010/01/computerized_nag_fights_obesit.html), whereas the *Sydney Morning Herald* commented, perhaps unfairly, "Teenagers are famous for not wanting to do what people tell them, but evidently they are prepared to make an exception for a machine" (http://www.smh.com.au/lifestyle/wellbeing/food-machine-takes-aim-at-child-obesity-20100106-lt9a.html).

Home based cardiac rehabilitation

More than two thirds of people in the United Kingdom who survive a heart attack turn down invitations to cardiac rehabilitation classes, which are mostly held in hospitals, gyms, and community leisure centres. They say they're too busy, don't like groups, or can't get to or can't park at hospitals. Rehabilitation at home might be a good alternative, but does it work? Yes, say Hasnain Dalal and colleagues, whose Cochrane review of 12 studies with nearly 2000 patients (p 249) finds that home and centre based forms of cardiac rehabilitation seem to be equally effective at improving clinical outcomes and health related quality of life. Given that home programmes were also associated with better adherence and no greater cost, patients should be offered this option. Dr Dalal tells us that his team is now trying to develop appropriate rehabilitation programmes for people with heart failure.

Influence of smoking cessation after diagnosis of early stage lung cancer

A Parsons and colleagues' systematic review of 10 cohort studies finds that it's well worth giving up smoking if you have early stage lung cancer (p 251). They estimate that 70% of 65 year olds with this disease who quit smoking will survive five years, compared with 33% of those who continue to smoke. Editorialists Tom and Janet Treasure (p 223) discuss the study's limitations and acknowledge that some doctors "discuss smoking habits with all patients and caution against smoking. Others think it is inhuman to dwell on the matter—that it adds to feelings of guilt and takes away a life long comfort from the dying patient." But they're firmly in favour of supporting patients' attempts to quit at any time of life.

RESEARCH ONLINE: For these and other new research articles see http://www.bmj.com/channels/research.dtl

Myocardial infarction and stroke associated with diuretic based two drug antihypertensive regimens

Current US guidelines recommend low dose diuretics as first line pharmacological treatment for uncomplicated hypertension, but many patients need a second drug as well. Inbal Boger-Megiddo and colleagues urge caution about one such combination, diuretics plus calcium channel blockers, because this regimen is associated with a higher risk of myocardial infarction than the other commonly used two drug combinations (doi:10.1136/bmj.c103).

C PEDRAZZINI/SPL

Use of angiotensin receptor blockers and risk of dementia in a predominantly male population

This paper (*BMJ* 2010;340:b5465), which featured in a recent *BMJ* podcast (http://podcasts.bmj.com/bmj/2010/01/15/disaster-and-dementia/), has prompted much debate (http://www.bmj.com/cgi/eletters/340/jan12_1/b5465). Benjamin Wolozin, the lead author, has responded to most of the criticisms and adds, "We really wanted to compare all of the ARBs [angiotensin receptor blockers], but unfortunately not all the ARBs are on the VA [Veterans Affairs health system] formulary, so we could not look at other ARBs such as telmisartan, olmesartan, and eprosartan. However, we are currently working on a follow-up study using information from the California databases (with very promising results)."

What has academic primary care research done for us?

Chris del Mar's provocative editorial on the value of primary care research (*BMJ* 2009;339:b4810) continues to cause ripples. Domhnall MacAuley, primary care editor, blogs about reactions among members of the *BMJ*'s primary care advisory group (http://blogs.bmj.com/bmj/2010/01/11/domhnall-macauley-achievements-of-academic-primary-care-in-the-last-decade/).

Home based versus centre based cardiac rehabilitation: Cochrane systematic review and meta-analysis

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STUDY QUESTION

Are home based cardiac rehabilitation programmes comparable with supervised centre based cardiac rehabilitation programmes in terms of effects on mortality, morbidity, health related quality of life, and modifiable cardiac risk factors in patients with coronary heart disease?

SUMMARY ANSWER

Home and centre based forms of cardiac rehabilitation seem to be equally effective in improving clinical and quality of life outcomes in patients with a low risk of further events after myocardial infarction or revascularisation.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Less than 40% of people who survive a heart attack in the UK participate in cardiac rehabilitation. Home and centre based forms of cardiac rehabilitation seem to be equally effective in improving clinical and quality of life outcomes. The choice of participating in a supervised centre based or an evidence based, home based programme such as the "Heart Manual" should reflect the preference of the individual patient.

Selection criteria for studies

Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library, Medline, Embase, CINAHL, and PsycINFO were searched for studies published in all languages from 2001 to January 2008. We included all randomised controlled trials that compared centre based cardiac rehabilitation with home based programmes in adults with acute myocardial infarction, angina, or heart failure and those who had undergone coronary revascularisation.

Primary outcomes

Mortality (cardiac and overall), morbidity (reinfarction, revascularisation, and admission to hospital associated with cardiac disease), exercise capacity, modifiable coronary risk factors (smoking behaviour, blood lipid concentrations, and blood pressure), health related quality of life, adverse events, adherence to the intervention, use of health services, and cost effectiveness.

Main results and role of chance

We included 12 trials with 1938 participants. Most studies recruited patients with a low risk of further events after myocardial infarction or revascularisation. No difference was seen between home based and centre based cardiac rehabilitation in terms of mortality (relative risk 1.31 (95% confidence interval 0.65 to 2.66)), cardiac events, exercise capacity (standardised mean difference −0.11 (−0.35 to 0.13)), modifiable risk factors (weighted mean difference: systolic blood pressure 0.58 mm Hg (−3.29 to 4.44 mm Hg), total cholesterol −0.13 mmol/l (−0.31 to 0.05 mmol/l), low density lipoprotein cholesterol −0.15 mmol/l (−0.31 to 0.01 mmol/l), relative risk for proportion of smokers at follow-up 0.98 (0.73 to 1.31)), or quality of life, with the exception of high density lipoprotein cholesterol (−0.06 mmol/l (−0.11 to −0.02 mmol/l). Adherence was superior for the patients who participated in the home based programme. No consistent difference was seen in the healthcare costs of the two forms of cardiac rehabilitation.

Bias, confounding, and other reasons for caution

Several studies failed to give enough detail for us to assess the potential risk of bias. Reporting of details of the generation and concealment of random allocation sequence was particularly poor.

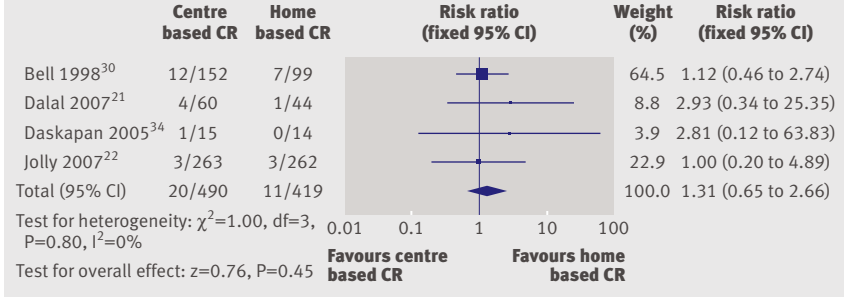
Study funding/Potential competing interests

The study was funded by a grant from the National Institute for Health Research Cochrane Heart Programme, UK, and co-financed by the European Union under Transparency of the National Health System Drug Reimbursement Decisions project, Poland. RST was also partly funded by South West Primary Care Trust.

Competing interests

KJ was the first author of the previous systematic review of home versus centre based cardiac rehabilitation and principal investigator of the Birmingham rehabilitation uptake maximisation study (BRUM). HMD was principal investigator on the Cornwall Heart Attack Rehabilitation Management Study (CHARMS) and was invited to become an honorary medical consultant for the Heart Manual programme after this paper was submitted. RST was a coauthor of the previous systematic review of home based versus centre based cardiac rehabilitation and a co-investigator of the BRUM and CHARMS.

MORTALITY AT 3-12 MONTHS OF FOLLOW-UP



Treatment of childhood obesity by retraining eating behaviour: randomised controlled trial

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bmj.com
Author Julian Shield discusses his research in a *BMJ* podcast. http://podcasts.bmj.com/bmj/

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STUDY QUESTION

Can eating behaviour in adolescents with obesity be modified with the use of a feedback device (Mandometer) to slow down speed of food consumption and thus improve weight loss within a treatment programme?

SUMMARY ANSWER

Adolescents in the Mandometer group consumed food more slowly, ate smaller portions, and had a greater reduction in body mass index standard deviation score (BMI SDS) than controls. This device is a useful adjunct to standard lifestyle modification in treating obesity in adolescents.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

The prevalence of adolescent obesity is increasing, and speed of eating has been linked to obesity risk. Interventions specifically addressing eating behaviours associated with obesity such as speed of food consumption might be valuable in combating obesity.

Design

Participants were randomised to our standard nutritional and exercise based educational programme or to the same programme with adjunctive Mandometer therapy. Randomisation lists were prepared by an independent statistician by using computer generated random numbers and stratified by sex, age, and baseline BMI SDS. With the Mandometer device, participants received daily, real time visual and aural feedback on speed of eating during their main meal of the day, to allow them to gradually learn to eat slower. Both arms received advice on healthy eating and increased physical activity as per standard obesity clinic care.

Participants and setting

One hundred and six newly referred obese adolescents (BMI >95th centile) aged >9 and <18 with minimal or no learning difficulties and no underlying medical problem seen in a hospital based obesity clinic.

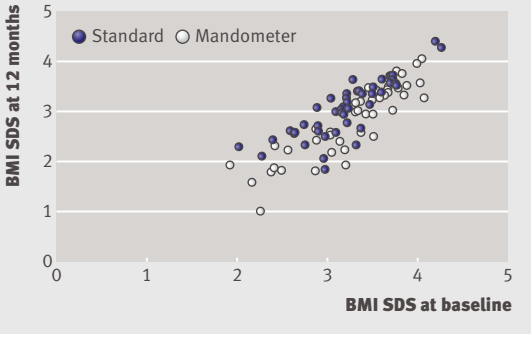
Primary outcome

Change in BMI SDS at the end of the intervention (12 months) and at 18 months (six months after the end of therapy with no contact between clinical staff and patient in that period).

Main results and the role of chance

With the last available data on all participants, those in the Mandometer group had significantly lower mean BMI SDS at 12 months (a reduction from 3.29 to 2.93) compared with standard care (from 3.21 to 3.07) (baseline adjusted mean difference 0.24, 95% confidence interval 0.11 to 0.36). Similar results were obtained when analyses included only the 91 who attended per protocol (adjusted mean 0.27, 0.14 to 0.41; P<0.001), with the difference maintained at 18 months (0.27, 0.11 to 0.43; P=0.001) (n=87). The mean self determined meal size in the Mandometer group fell by 45 g (7 g to 84 g). Mean body fat SDS adjusted for baseline levels was significantly lower at 12 months (0.24, 0.10 to 0.39; P=0.001).

BMI SDS IN BOTH GROUPS AT BASELINE AND 12 MONTHS



Bias, confounding, and other reasons for caution

We could not blind participants but retention in both arms (86%) was good. This was a pragmatic trial comparing our standard multi-component clinical service with that of Mandometer therapy, but there were more points of contact in the Mandometer arm, which might have had some influence on outcome.

Generalisability to other populations

At one year, mean change in BMI SDS of −0.4 for Mandometer therapy is encouraging as other obesity interventions have recorded much smaller changes over this period. Though we explored the use of this device in adolescents, further studies are warranted in younger children and adults and as a weight maintenance device after interventions such as laparoscopic gastric banding surgery, when adjustment of speed of eating and portion size can be extremely important.

Study funding/potential competing interests

This study was funded by the BUPA Foundation. The Mandometer devices were loaned to the research team at no cost. CB and PS each have 28.35% stock in Mando Group AB. Mandometer AB, a fully owned subsidiary of Mando Group AB, holds the intellectual property rights to Mandometer. JPHS (on two occasions) and MAS (one occasion) were funded by Mando Group AB for attending investigator meetings in Stockholm. ALF stayed at the Mandometer Clinic for 11 weeks to be trained in the use of Mandometer and was funded by Mando Group AB during her training.

Trial registration number

ClinicalTrials.gov NCT00407420.

Influence of smoking cessation after diagnosis of early stage lung cancer on prognosis: systematic review of observational studies with meta-analysis

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EDITORIAL by Treasure and Treasure

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STUDY QUESTION

Does stopping smoking after being diagnosed as having early stage lung cancer improve prognosis?

SUMMARY ANSWER

In patients with both early stage non-small cell lung cancer and limited stage small cell lung cancer, quitting smoking was associated with an improved prognosis.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Smoking increases the risk of developing a primary lung tumour, but whether stopping smoking after a diagnosis of lung cancer improves outcomes is not known. For early stage tumours, smoking cessation is associated with a substantial reduction in the risk of death; most of this benefit is likely to be due to reduced cancer progression rather than a reduction in cardiorespiratory deaths.

Selection criteria for studies

We searched CINAHL (from 1981), Embase (from 1980), Medline (from 1966), Web of Science (from 1966), and CENTRAL (from 1977) to December 2008 and the reference lists of included studies. Criteria for inclusion were randomised controlled trials or longitudinal observational studies that had measured the effect of quitting smoking after diagnosis of lung cancer on all cause mortality, cancer specific mortality, second primary tumour, or recurrence, regardless of stage at presentation or histology of tumour.

Primary outcome(s)

The primary outcome was all cause mortality.

Main results and role of chance

We found no randomised controlled trials of smoking cessation interventions in patients with lung cancer that had measured prognostic outcomes, so all included studies were observational. Also, no studies included data on the effect of smoking on cancer specific mortality. We identified 10 studies to be included in the review. In nine included studies most patients were diagnosed as having early stage disease, so the results of this review reflect the association between smoking and prognosis in early stage lung cancer. Continued smoking was associated with a significantly increased risk of all cause mortality in early stage non-small cell lung cancer (hazard ratio 2.94, 95% confidence interval 1.15 to 7.54) and in limited stage small cell lung cancer (1.86, 1.33 to 2.59). Life table modelling based on these data estimated 33% five year survival in 65 year old patients with early stage non-small cell lung cancer who continued to smoke compared with 70% in those who quit. In limited stage small cell lung cancer, an estimated 29% of continuing smokers would survive for five years compared with 63% of those who quit, on the basis of data from this review.

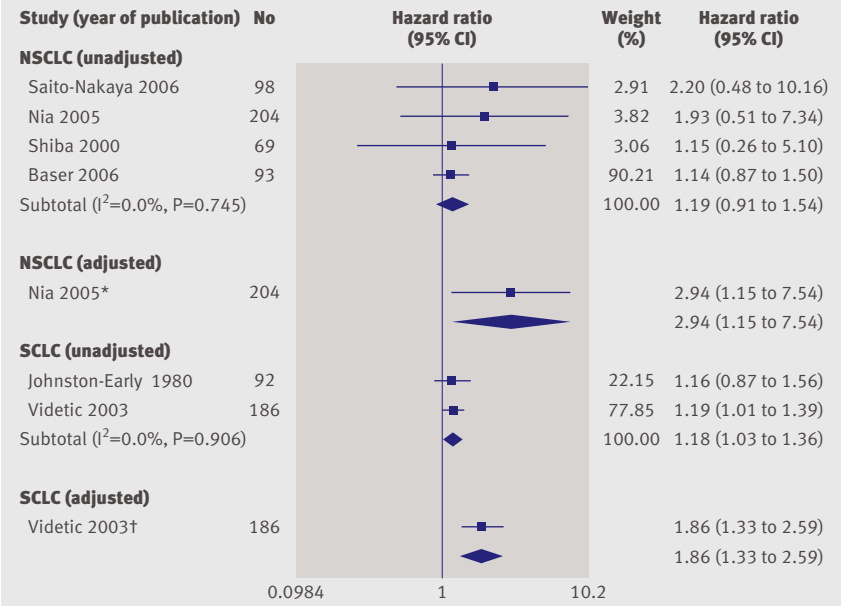
Bias, confounding, and other reasons for caution

This review was based on observational studies, which are subject to uncontrolled confounding, so the relation seen may not be causal. However, adjustment for confounding factors resulted in a strengthening of the association between smoking and mortality.

Study funding/potential competing interests

The work was undertaken by the UK Centre for Tobacco Control Studies, a UKCRC Public Health Research centre of excellence. Funding came from the British Heart Foundation, Cancer Research UK, Economic and Social Research Council, Medical Research Council, and National Institute for Health Research, under the auspices of the UK Clinical Research Collaboration. PA and AD are supported by National Institute for Health Research career scientist fellowship awards. PA has done consultancy work for the manufacturers of smoking cessation drugs. AP has been reimbursed by Pfizer for attending a conference.

EFFECT OF CONTINUED SMOKING IN EARLY STAGE NON-SMALL CELL AND SMALL CELL LUNG CANCER ON RISK OF ALL CAUSE MORTALITY COMPARED WITH QUITTING AT DIAGNOSIS



NSCLC=non-small cell lung cancer; SCLC=small cell lung cancer.
*Adjusted for age, sex, type of operation, histology, postoperative radiotherapy, N status, T status, and previous malignancies.
†Adjusted for sex, age, and volume of limited disease.

Non-invasive cardiac stress testing before elective major non-cardiac surgery: population based cohort study

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STUDY QUESTION

Is preoperative non-invasive cardiac stress testing before elective intermediate to high risk non-cardiac surgery associated with improved postoperative survival and hospital stay?

SUMMARY ANSWER

Patients who underwent preoperative stress testing showed a small improvement in one year survival and reduced hospital stay; however, the improvement in survival was only seen in patients with one or more risk factors for perioperative cardiac complications, whereas survival was slightly decreased in patients without risk factors.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Although stress testing can risk stratify surgical patients for perioperative cardiac complications, its effects on postoperative outcomes have been unclear. This study has shown that cardiac stress testing is associated with improved postoperative one year survival and reduced hospital stay in patients with clinical risk factors for perioperative cardiac complications, but with reduced survival in patients without risk factors.

Participants and setting

Residents of Ontario, Canada who were aged 40 years or older and underwent elective intermediate to high risk non-cardiac surgical procedures were included in this population based study.

Design, size, and duration

This was a retrospective cohort study, performed between 1 April 1994 and 31 March 2004, of 23 991 (8.9%) patients who underwent stress testing within six months before surgery and 247 091 who did not. Propensity score methods were used to match 23 060 patients who underwent testing to 23 060 otherwise similar individuals who did not. This analysis adjusted extensively for both demographic and clinical characteristics.

Main results and the role of chance

Within the matched cohort, 1622 (7.0%) patients who underwent testing and 1738 (7.5%) who did not died within one year after surgery. This difference corresponded to a hazard ratio of 0.92 (95% confidence interval 0.86 to 0.99; P=0.03), and a number needed to treat to prevent mortality at one year of 221 (95% CI 111 to 16 067). Testing was also associated with a reduction in mean hospital stay (mean difference −0.24 days, 95% CI −0.07 to −0.43; P<0.001) but not in the rate of postoperative wound infections (relative risk 1.00, 0.94 to 1.07; P=0.89), which is an outcome where no differences would be expected. In an analysis of subgroups defined by Revised Cardiac Risk Index (RCRI) class, testing was associated with harm in low risk patients (RCRI 0 points: hazard ratio 1.35, 95% CI 1.05 to 1.74), but with benefit in patients who were at intermediate risk (RCRI 1-2 points: 0.92, 95% CI 0.85 to 0.99) or high risk (RCRI 3-6 points: 0.80, 95% CI 0.67 to 0.97) for cardiac complications.

Bias, confounding, and other reasons for caution

Given that this study used administrative healthcare data, the possibility of unmeasured residual confounding cannot be excluded. In addition, our data sources could not account for individuals who underwent preoperative coronary revascularisation on the basis of high risk findings on preoperative stress testing but subsequently died before their planned non-cardiac surgeries. Such deaths are rare, however, and unlikely to significantly affect the overall results.

Generalisability to other populations

These results can be reasonably extrapolated to individuals undergoing major elective non-cardiac surgery in healthcare systems that are similar to that in Ontario, Canada.

Study funding/potential competing interests

The study was supported in part by the Institute for Clinical Evaluative Sciences, which is itself supported in part by the Ontario Ministry of Health and Long-Term Care. We have no competing interests.

ONE YEAR ALL CAUSE MORTALITY IN PATIENTS WHO UNDERWENT PREOPERATIVE CARDIAC STRESS TESTING COMPARED WITH THOSE WHO DID NOT

	Hazard ratio (95% CI)	Absolute difference (95% CI)
Entire matched cohort	0.92 (0.86 to 0.99)	NNT 221 (111 to 16 067)
Revised Cardiac Risk Index class*		
0 points	1.35 (1.05 to 1.74)	NNH 179 (97 to 1090)
1-2 points	0.92 (0.85 to 0.99)	NNT 156 (79 to 6127)
3-6 points	0.80 (0.67 to 0.97)	NNT 38 (21 to 315)

*Composed of six equally weighted risk factors: ischaemic heart disease; congestive heart failure; cerebrovascular disease; diabetes mellitus; renal insufficiency; and high risk surgery (intra-abdominal, intrathoracic, or suprainguinal vascular procedures).
Abbreviations: NNH, number needed to harm; NNT, number needed to treat.

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Screening for postnatal depression in primary care: cost effectiveness analysis

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STUDY QUESTION

Does routine screening for postnatal depression in primary care represent value for money for the NHS?

SUMMARY ANSWER

Formal identification methods for postnatal depression are not a cost effective use of NHSresources.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Fewer than half of cases of postnatal depression are detected by primary healthcare professionals in routine clinical practice. Recent NICE guidance recommended the use of brief case finding questions (the Whooley questions) to identify possible postnatal depression. Routine screening for postnatal depression, however, does not seem to represent value formoney for the NHS, even with the use of a confirmatory test for those identified as depressed. Our conclusions are primarily driven by the costs of managing women incorrectly diagnosed as depressed.

RESULTS OF BASE CASE ANALYSIS (NON-DOMINATED STRATEGIES ONLY)

Strategy	Mean costs	ICER
Routine care only	£49.29	Not applicable
EPDS cut point:		
16	£73.49	£41 103
14	£94.21	£49 928
12	£109.95	£56 697
11	£118.82	£113 411
10	£140.44	£120 968
9	£156.95	£245 210
8	£187.32	£272 463

Main results

No formal methods for identification of postnatal depression were cost effective under a conventional willingness to pay threshold of £20 000-30 000 per quality adjusted life year (QALY). Adoption of the Edinburgh postnatal depression scale (EPDS) with a cut point of 16 was the least costly and effective formal identification method, with an estimated incremental cost effectiveness ratio (ICER) of £41 103 per additional QALY compared with routine care alone. Strategies adopting formal identification methods with higher specificity (that is, higher cut points) were associated with more favourable incremental cost effectiveness ratios.

Design

Cost effectiveness analysis with a decision model of alternative methods of screening for depression, including standardised postnatal depression and generic depression instruments. A decision tree considered the full treatment pathway from the possible onset of postnatal depression through identification, treatment, and possible relapse.

Sources of effectiveness

A hypothetical population of women assessed for postnatal depression either via routine care only or supplemented by use of formal identification methods six weeks postnatally, as recommended in recent guidelines.

Data sources

The performance of screening instruments was derived from a systematic review and bivariate meta-analysis at a range of instrument cut points. Estimates of other parameters were derived from literature sources and relevant databases. Costs were expressed in 2006-7 prices and the impact on health outcomes expressed in terms of QALYs. The time horizon of the analysis was one year.

Results of sensitivity analysis

While sensitivity analysis indicated that the cost of managing incorrectly identified depression was an important driver of the model, formal identification approaches did not seem to be cost effective at any feasible estimate of this cost.

Limitations

The analysis was conducted only from the perspective of the NHS and personal social services, and the model focused on the costs and health outcomes associated solely with the mother. There were limited published data available for estimating particular parameters, including the probability that postnatal depression was identified via routine care at six weeks, the risk of relapse, and the utility weights. In the absence of a suitable alternative, we used the QALY to ensure comparability between the interventions considered here and those outside mental health; the potential insensitivity of the QALY in this context, however, should be considered in the interpretation of the results. Finally, there were moderate to high levels of heterogeneity between studies; we consequently used random effects meta-analysis to incorporate the additional uncertainty caused by that heterogeneity in the test performance results for each instrument.

Study funding/potential competing interests

The authors are independent of the study funders, the NIHR Health Technology Assessment (HTA) Programme.

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