Positive and negative affect and risk of coronary heart disease: Whitehall II prospective cohort study

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ABSTRACT

Objective To examine the associations between positive and negative affect and subsequent coronary heart disease events independently of established risk factors.

Design Prospective cohort study with follow-up over 12 years.

Setting 20 civil service departments originally located in London.

Participants 10 308 civil servants aged 35-55 years at entry into Whitehall II study in 1985.

Main outcome measures Fatal coronary heart disease, clinically verified incident non-fatal myocardial infarction, and definite angina (n=619, mean follow-up 12.5 years).

Results In Cox regression analysis adjusted for age, sex, ethnicity, and socioeconomic position, positive affect (hazard ratio=1.01, 95% confidence interval 0.82 to 1.24) and the balance between positive and negative affect, referred to as the affect balance score (hazard ratio=0.89, 0.73 to 1.09), were not associated with coronary heart disease. Further adjustment for behaviour related risk factors (smoking, alcohol consumption, daily fruit and vegetable intake, exercise, body mass index), biological risk factors (hypertension, blood cholesterol, diabetes), and psychological stress at work did not change these results. However, participants in the highest third of negative affect had an increased incidence of coronary events (hazard ratio=1.32, 1.09 to 1.60), and this association remained unchanged after adjustment for multiple confounders.

Conclusions Positive affect and affect balance did not seem to be predictive of future coronary heart disease in men and women who were free of diagnosed coronary heart disease at recruitment to the study. A weak positive association between negative affect and coronary heart disease was found and needs to be confirmed in further studies.

INTRODUCTION

Several prospective studies have found anxiety, hostility/anger, and depression to be associated with an increased risk of coronary heart disease in healthy participants.[1-3] As the relative importance of these three negative emotions on risk of coronary heart disease remains largely undefined,[4 5] they have been hypothesised to be the components of a single underlying factor, labelled negative affect. Negative affect refers to "stable and pervasive individual differences in mood and self-concept characterised by a general disposition to experience a variety of aversive emotional states."[3 6] High negative affect has been described as a general tendency to report "distress, discomfort, dissatisfaction, and feelings of hopelessness over time and regardless of the situation," and low negative affect is characterised by "calmness and serenity."[6 7]

Research suggests that positive affect and negative affect are two independent systems and that positive affect is not simply the opposite of negative affect or an absence of negative affect.[7 8] High positive affect refers to a general tendency to experience a "state of high energy, full concentration, and pleasurable engagement," whereas low positive affect is characterised by "sadness and lethargy."[6 7]

In this report from the Whitehall II study, we examine the independent associations of both negative affect and positive affect with subsequent coronary heart disease after taking account of established risk factors among participants followed up over 12 years. In addition, we examine whether the balance between positive and negative affect is associated with subsequent coronary heart disease.

METHODS

The Whitehall II study, established in 1985, is a longitudinal study to examine the socioeconomic gradient in health and disease among 10 308 civil servants (6895 men and 3413 women).[9] All civil servants aged 35-55 years in 20 London based departments were invited to participate by letter, and 73% agreed. Baseline examination (phase 1) took place during 1985-8 and involved a clinical examination and a self administered questionnaire.

Measures

We assessed positive affect and negative affect by using the Bradburn affect balance scale,[10] a measure of psychological wellbeing. The affect balance scale consists of 10 items, five of which are used to assess positive affect (Cronbach's α=0.80) and the other five to assess negative affect (Cronbach's α=0.67). Scores for each subscale range from 0 to 15; higher scores

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indicate higher positive affect or higher negative affect. The affect balance score is calculated by subtracting the negative affect score from the positive affect score and adding a constant of 15 to avoid negative values. The affect balance score ranges from 0 (lowest affect balance) to 30 (highest affect balance). We divided each scale into low, middle, and high exposure on the basis of the distribution in the total study population. Only 75% of participants were asked to complete the affect balance scale at phase 1, as this measure was introduced after the start of the baseline survey. Where phase 1 data were missing, we used positive and negative affect scores at phase 2 (1989-90).

We assessed the incidence of coronary heart disease from phase 2 to phase 7 (2003-4), a mean follow-up of 12.5 (SD 3.8) years. Coronary heart disease included fatal coronary heart disease, first non-fatal myocardial infarction, or first "definite" angina (see bmj.com).

Table 1 | Age and sex adjusted associations between covariates and coronary heart disease among 8918 participants (619 events)

	Risk of coronary heart disease	
Variables	No events/No participants	Hazard ratio (95% CI)
Employment grade:		
High	208/2704	1
Middle	283/4370	1.05 (0.88 to 1.26)
Low	128/1844	1.29 (1.00 to 1.66)
Ethnicity:		
White	531/8134	1
Other	88/784	1.88 (1.50 to 2.36)
Hypertension:		
No	425/7273	1
Yes	194/1645	1.85 (1.55 to 2.19)
Smoking status:		
Never smoker	286/4461	1
Ex-smoker	206/2893	1.02 (0.85 to 1.22)
Current smoker	127/1564	1.42 (1.15 to 1.75)
Alcohol consumption:		
Low	519/7515	1
Moderate	87/1198	1.09 (0.87 to 1.37)
High	13/205	1.07 (0.62 to 1.86)
Exercise:		
≥1.5 h/week	105/1659	1
<1.5 h/week	514/7259	1.14 (0.92 to 1.41)
Daily fruits and vegetables:		
Yes	354/5260	1
No	265/3658	1.13 (0.96 to 1.32)
Body mass index:		
<20	14/539	1
20-24.9	291/4960	1.87 (1.09 to 3.20)
25-29.9	250/2850	2.60 (1.51 to 4.45)
≥30	64/569	3.81 (2.13 to 6.80)
Diabetes:		
No	610/8837	1
Yes	9/81	1.54 (0.79 to 2.98)
Job strain:		
No	537/7859	1
Yes	82/1059	1.23 (0.98 to 1.56)
Blood cholesterol (mmol/l):		
<6.2	288/5424	1
≥6.2	331/3494	1.55 (1.32 to 1.82)

Statistical analyses

We assessed differences in positive affect, negative affect, and affect balance scores as a function of sociodemographic characteristics and traditional coronary heart disease risk factors by using one way analysis of variance, with a linear trend fitted across the hierarchical variables. We used Cox regression to assess the age and sex adjusted association between various covariates and coronary heart disease (see bmj.com).

RESULTS

Of the 9745 participants with no history of clinically validated coronary heart disease at phase 2, 9568 (98.1%) completed the positive affect subscales and 9605 (98.6%) completed the negative affect subscales, either at phase 1 or phase 2. Among the 8918 participants with complete data on positive and negative affect and all covariates, 619 coronary events were documented between phases 2 and 7.

Table 1 shows the age and sex adjusted associations between all of the covariates and coronary heart disease events. Examination of the interactions between sex and the affect variables in relation to coronary heart disease showed no evidence of sex differences. Therefore, we combined men and women in the subsequent multivariate analyses.

Associations of positive affect, negative affect, and affect balance score with coronary heart disease

Table 2 shows the six serially adjusted Cox regression models designed to estimate the associations of affect measures with coronary heart disease. We found no association between higher positive affect scores and the incidence of coronary heart disease (hazard ratio 1.01, 95% confidence interval 0.82 to 1.24) in the analysis adjusted for age, sex, socioeconomic position, and ethnicity (model 1) or after further adjustment (models 2 to 6). However, participants with negative affect scores in the highest third had a slightly higher risk (hazard ratio 1.32, 1.09 to 1.60) of coronary heart disease (model 1). Further serial adjustment showed no substantial change in this association. Finally, participants with affect balance scores in the highest third had a lower, but statistically non-significant, risk (hazard ratio 0.89, 0.73 to 1.09) of coronary heart disease, which was little affected by adjustments.

DISCUSSION

The finding showing negative affect as an independent predictor of coronary heart disease incidence is consistent with some epidemiological investigations on negative emotions and coronary

heart disease. A recent review of negative emotions, measured as anxiety, hostility/anger, and depression, supports their status as risk factors for coronary heart disease.[1 11-14] According to a recent meta-analysis of 21 aetiological studies and 34 prognostic studies, depressive symptoms are associated with an 80% excess risk of developing coronary heart disease or dying from coronary heart disease.[15] The magnitude of the association between negative affect and coronary heart disease in our study is small and needs to be replicated in studies using measures of both positive and negative affect.

Further research is needed to examine the precise mechanisms through which negative affect might increase the risk of coronary heart disease. As negative affect is thought to subsume high negative emotions such as anxiety and depression,[6 16] it may be linked to coronary heart disease through physiological (cardiovascular and neuroendocrine) responses related to these emotions.[5 17-20] Negative affect could also be linked to coronary heart disease through health related behaviours.[11] In our study, negative affect was not associated with hypertension, higher body mass index, or self reported diabetes and was inversely associated with blood cholesterol concentration, suggesting that these factors are not major mediators for the association seen. The association between negative affect and coronary heart disease was not attenuated after adjustment for behavioural factors; thus stable differences in these factors do not seem to be likely mediators.

Lack of a robust association between positive affect and reduced risk of coronary heart disease in our study is in contrast to some previous reports. An upsurge in interest in positive affect or happiness and its association with health has occurred recently.[21 22] In one study, low level of positive affect was associated with increased 10 year total mortality in older adults.[23] A major limitation of that study was the assessment of positive affect, done using the Center for Epidemiologic Studies of Depression scale. This scale, a measure of depression, may not reliably

Table 2 | Associations between positive affect, negative affect, and affect balance scores in thirds and coronary heart disease (number of events/number of participants=619/8918*)

	Hazard ratio (95% CI)		
Scores in thirds	Positive affect	Negative affect	Affect balance
Model 1†			
Lowest	1	1	1
Middle	1.19 (0.98 to 1.44)	1.12 (0.92 to 1.36)	0.97 (0.80 to 1.17)
Highest	1.01 (0.82 to 1.24)	1.32 (1.09 to 1.60)	0.89 (0.73 to 1.09)
Model 2‡			
Lowest	1	1	1
Middle	1.18 (0.97 to 1.43)	1.13 (0.93 to 1.37)	0.97 (0.80 to 1.18)
Highest	1.01 (0.82 to 1.25)	1.33 (1.10 to 1.61)	0.89 (0.72 to 1.09)
Model 3§			
Lowest	1	1	1
Middle	1.22 (1.01 to 1.48)	1.15 (0.94 to 1.39)	0.98 (0.81 to 1.19)
Highest	1.02 (0.83 to 1.26)	1.37 (1.13 to 1.66)	0.89 (0.73 to 1.09)
Model 4¶			
Lowest	1	1	1
Middle	1.20 (0.99 to 1.46)	1.11 (0.92 to 1.35)	0.98 (0.81 to 1.19)
Highest	1.03 (0.83 to 1.27)	1.30 (1.07 to 1.50)	0.91 (0.74 to 1.11)
Model 5**			
Lowest	1	1	1
Middle	1.22 (1.01 to 1.48)	1.15 (0.94 to 1.40)	1.00 (0.82 to 1.21)
Highest	1.04 (0.85 to 1.29)	1.36 (1.12 to 1.65)	0.91 (0.74 to 1.12)
Model 6††			
Lowest	1	1	–
Middle	1.26 (1.04 to 1.53)	1.16 (0.95 to 1.41)	–
Highest	1.10 (0.89 to 1.36)	1.39 (1.14 to 1.69)	–

* No of events/No (percentage) participants for lowest, middle, and highest scores thirds were 183/2746 (30.8), 257/3403 (38.2), and 179/2769 (31) for positive affect; 208/3135 (35.2), 197/2856 (32), and 214/2927 (32.8) for negative affect; and 200/2817 (31.6), 236/3357 (37.6), and 183/2744 (30.8) for affect balance.
†Hazard ratio adjusted for age, sex, socioeconomic position, and ethnicity.
‡Model 1 additionally adjusted for health related behaviours (body mass index, smoking status, exercise, daily fruit and vegetable intake, alcohol consumption).
§Model 1 additionally adjusted for biological risk factors (blood cholesterol, diabetes, hypertension).
¶Model 1 additionally adjusted for psychosocial stress at work.
**Model 1 + model 2 + model 3 + model 4.
††Model 5 additionally adjusted for positive or negative affect.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Psychological factors are seen as important predictors of coronary heart disease; negative affectivity may underlie these associations

No large scale study has examined the association between negative affect and coronary heart disease

Whether positive emotions might have a protective role in the development of coronary heart disease remains unclear

WHAT THIS STUDY ADDS

Negative affect was a weak predictor of incident coronary heart disease in men and women who were free of diagnosed coronary heart disease at recruitment to the study

This association was not accounted for by established coronary risk factors

No support was found for associations of positive affect and affect balance with coronary heart disease

distinguish between low positive affect and high negative affect. Another study, also in older adults, found that positive affect had a protective association with stroke.[24] In that study, the analysis was controlled for depressive symptoms but not for the other components of negative affect, and thus whether the observed association was independent of the effect of negative affect remains unclear. Moreover, the measure of stroke was self reported, without corroboration from medical reports. As positive and negative affect may be related to response styles, a subjective component in the outcome measure may introduce subjectivity bias that could artificially inflate associations.

Limitations

Interpretation of our findings should be considered within the context of the study limitations. Firstly, as coronary heart disease develops during a long time span, higher levels of negative affect in the long term rather than the short term are assumed to influence the incidence of coronary heart disease. However, the relative temporal stability of negative affect scores between the two phases was only moderate in this study (test-retest reliability over three years=0.5). This suggests the presence of a certain amount of variability in negative affect levels over time and implies that we might have underestimated the cumulative impact of high negative affect on incidence of coronary heart disease. On the other hand, the lack of stability and the relatively low internal consistency coefficient, which was slightly below the conventional threshold of 0.7 for the negative affect scale, call into question what precisely the scale measures. These factors are likely to have influenced our results, and we cannot eliminate the possibility that negative affect might in part represent a marker of changing risk exposures rather than being solely a stable disposition to experience aversive emotional states. However, the proportional hazards assumption held in the Cox regression, suggesting relatively stable effects of negative affect over the follow-up period.

A second limitation involves modelling potential biological and behavioural confounders as time independent covariates. Thus, we did not assess the possible impact of changes in these factors on the risk of coronary heart disease events. Thirdly, our cohort of civil servants did not include blue collar workers and unemployed people and is thus not representative of the general population, which may limit the generalisability of our findings.

Conclusions

Data from a large occupational cohort provide no evidence for associations between positive affect or affect balance and coronary heart disease in men and women who were free of diagnosed coronary heart disease at recruitment to the study. However, we found negative affect to be weakly predictive of incident coronary heart disease events, independently of sociodemographic characteristics, conventional risk factors, and job strain. Further research is needed to examine whether our findings are generalisable to other populations as well as to disentangle the potential pathways that may link negative affect to coronary heart disease.

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Alternative approaches to endoscopic ablation for benign enlargement of the prostate: systematic review of randomised controlled trials

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ABSTRACT

Objective To compare the effectiveness and risk profile of newer methods for endoscopic ablation of the prostate against the current standard of transurethral resection.

Design Systematic review and meta-analysis.

Data sources Electronic and paper records in subject area up to March 2006.

Review methods We searched for randomised controlled trials of endoscopic ablative interventions that included transurethral resection of prostate as one of the treatment arms. Two reviewers independently extracted data and assessed quality. Meta-analyses of prespecified outcomes were done using fixed and random effects models and reported using relative risk or weighted mean difference.

Results We identified 45 randomised controlled trials meeting the inclusion criteria and reporting on 3970 participants. The reports were of moderate to poor quality, with small sample sizes. None of the newer technologies resulted in significantly greater improvement in symptoms than transurethral resection at 12 months, although a trend suggested a better outcome with holmium laser enucleation (random effects weighted mean difference −0.82, 95% confidence interval 1.76 to 0.12) and worse outcome with laser vaporisation (1.49, −0.40 to 3.39). Improvements in secondary measures, such as peak urine flow rate, were consistent with change in symptoms. Blood transfusion rates were higher for transurethral resection than for the newer methods (4.8% *v* 0.7%) and men undergoing laser vaporisation or diathermy vaporisation were more likely to experience urinary retention (6.7% *v* 2.3% and 3.6% *v* 1.1%). Hospital stay was up to one day shorter for the newer technologies.

Conclusions Although men undergoing more modern methods of removing benign prostatic enlargement have similar outcomes to standard transurethral resection of prostate along with fewer requirements for blood transfusion and shorter hospital stay, the quality of current evidence is poor. The lack of any clearly more effective procedure suggests that transurethral resection should remain the standard approach.

INTRODUCTION

Transurethral resection of the prostate has been the standard endoscopic technique for ablation of benign prostate tissue, and improvements in optics, diathermy, and anaesthesia have reduced treatment related morbidity to a relatively low level.[1] Despite this, transurethral resection requires technical skill, carries some risks, and does not improve symptoms in all men.[2] Alternative endoscopic procedures have been developed using other energy sources, such as lasers to ablate tissue by resection or vaporisation. We carried out a systematic review to determine whether newer

procedures are better than transurethral resection for improvements in urinary symptoms or reduced risk of adverse events.

METHODS

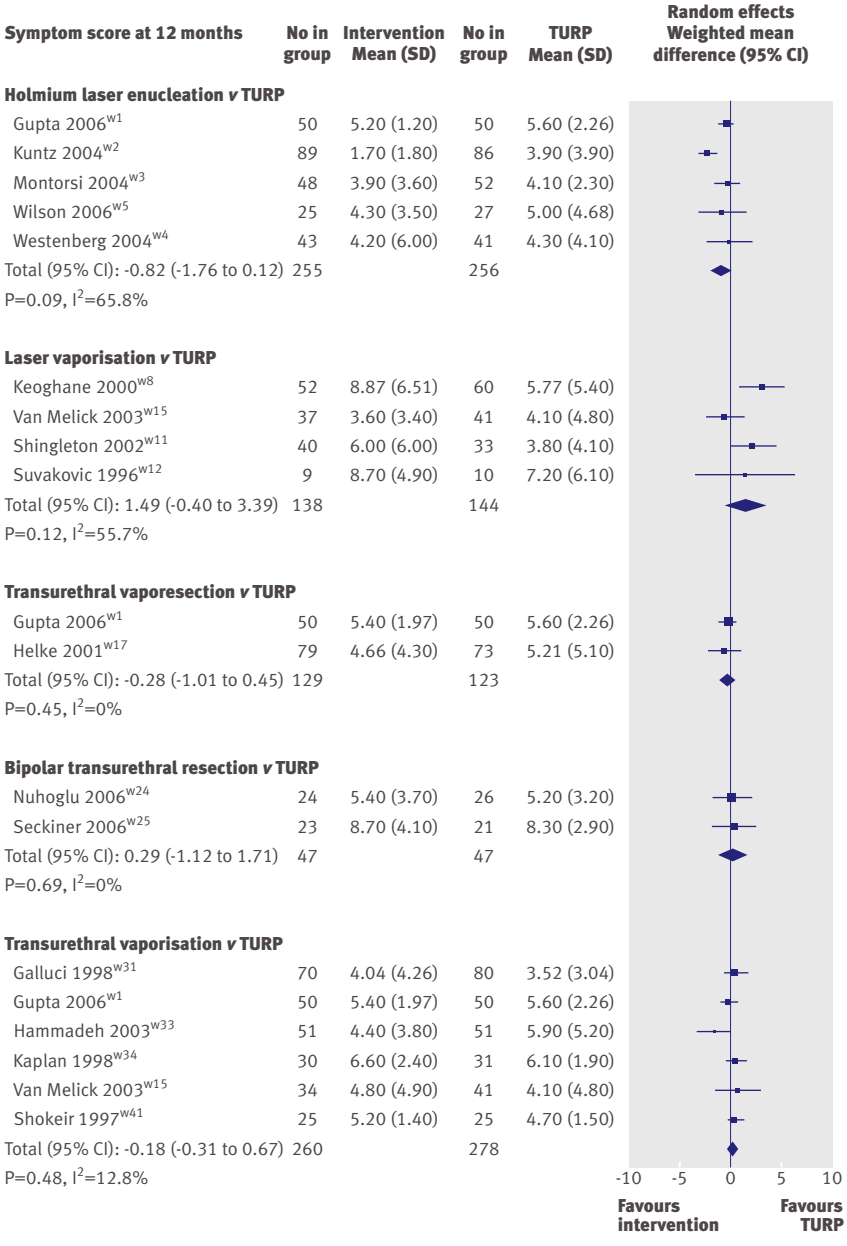
To identify reports of relevant randomised controlled trials we searched several databases (see bmj.com) and the proceedings of recent conferences in urology. We defined ablative endoscopic treatments as those that resulted in immediate removal of tissue, usually by resection or vaporisation, and did not include delayed tissue necrosis. We also scanned the reference lists of included studies for more studies. Two reviewers (TL, Angela Coutts, or Susan Wong) independently screened the titles and abstracts of identified papers and obtained full text copies of potentially relevant studies. We included randomised controlled trials if they assessed endoscopic ablative interventions and included transurethral resection as one of the treatment arms (see bmj.com).

The primary outcome measure was change in symptom score at 12 months after surgery, measured by the international prostate symptom score or the American Urological Association symptom index—we combined the results from trials using these instruments. These instruments assess the rate of four voiding symptoms and three storage symptoms on a scale from 0 (not present) to 5 (severe), with severity of symptoms defined as mild, moderate, or severe.

Secondary outcomes were blood transfusion, urinary incontinence, urinary retention, urinary tract infection, loss of ejaculation, erectile dysfunction, quality of life, peak urine flow rate, duration of operation, length of hospital stay, and reoperation.

Two reviewers independently assessed the quality and characteristics of the studies. For trials with multiple publications we included only the most complete report for each outcome.

For meta-analysis we combined data on dichotomous outcomes using the Mantel-Haenszel relative risk method. For continuous outcomes we used the inverse variance weighted mean difference method and 95% confidence intervals. We used a random effects model for symptom score and peak urine flow rate because of statistical heterogeneity, explored by χ^2 tests and I^2 statistics. We used RevMan 4.2.8 for meta-analyses.



Meta-analyses of symptom scores 12 months after endoscopic techniques for ablation of benign enlargement of prostate. TURP=transurethral resection of prostate

RESULTS

Forty five randomised controlled trials of 47 comparisons (3970 participants) were eligible for inclusion (see bmj.com). These trials[w1-w45] were of moderate or poor quality; only six (13%) explicitly stated that an intention to treat analysis was done and in three of these the analysis was compromised by failure to include all participants in each arm at follow-up assessments.[w8 w30 w45] The study setting and baseline characteristics of patients varied across trials.

Quantitative data synthesis

Symptom scores—The results from studies reporting changes in symptom score at 12 months showed significant heterogeneity, and hence random effect meta-analyses were done (figure). Larger mean changes were reported after holmium laser enucleation in all five trials with suitable data (weighted mean difference −0.82, 95% confidence interval −1.76 to 0.12; P=0.09).[w1-w5] In contrast, of four trials on laser vaporisation[w8 w11 w12 w15] three[w8 w11 w12] favoured transurethral resection (1.49, −0.40 to 3.39; P=0.12). No evidence was found of differences for transurethral vaporesection, bipolar transurethral resection, or transurethral vaporisation.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Transurethral resection of the prostate is the standard surgical procedure for benign prostatic enlargement

Transurethral resection provides a consistent, high likelihood of improvement, but is associated with relatively high risk of adverse events

A range of newer alternative ablative procedures has been tried in clinical practice

WHAT THIS STUDY ADDS

Newer ablative procedures for benign prostatic enlargement tested show similar improvement of symptoms as transurethral resection, with some evidence of fewer adverse effects

Holmium laser enucleation is a more promising alternative to transurethral resection but needs further evaluation

Peak urine flow rate—The results for peak urine flow rate at 12 months were generally consistent with those for symptom scores. Compared with transurethral resection higher rates were reported for holmium laser enucleation (weighted mean difference 1.48 ml/s, 95% confidence interval 0.58 to 2.40; P=0.002) and lower rates for laser vaporisation (−2.02, −4.75 to 0.81; P=0.15); overall no differences were found after the other procedures, but heterogeneity was present between the individual trials (see bmj.com).

Quality of life—When reported, quality of life was mainly rated from 0 (good) to 6 (poor). No differences in improvements in quality of life scores were detected, but confidence intervals were wide.

Blood transfusion—Meta-analyses showed evidence of a lower rate of blood transfusion after holmium laser enucleation (relative risk 0.27, 95% confidence interval 0.07 to 0.95; P=0.04), laser vaporisation (0.14, 0.05 to 0.42; P=0.004), and transurethral vaporisation (0.18, 0.07 to 0.46; P<0.001) compared with transurethral resection, whereas no significant difference was found for transurethral vaporesection and bipolar transurethral resection (see bmj.com). Combining data for all newer interventions showed an absolute risk reduction from 4.8% to 0.7%.

Urinary retention—The risk of postoperative urinary retention requiring recatheterisation was higher after laser vaporisation and transurethral vaporisation than after transurethral resection (11.3% *v* 3.8%, relative risk 2.89, 1.53 to 6.29; 8.9% *v* 2.5%, 3.10, 1.53 to 6.29), whereas no differences were seen with holmium laser enucleation and bipolar transurethral resection (see bmj.com).

Strictures—The rate of strictures during follow-up after holmium laser enucleation, transurethral vaporesection, bipolar transurethral resection, and transurethral vaporisation was similar to that after transurethral resection. Strictures were less common after laser vaporisation (relative risk 0.54, 95% confidence interval 0.32 to 0.90; P=0.02) than after transurethral resection, with a consistent effect seen in six[w6-w9 w13 w14] of nine studies reporting this outcome.

Incontinence—Men undergoing laser vaporisation had a higher risk of urinary incontinence (relative risk 2.24, 1.03 to 4.88; P=0.04) but the difference was seen in only one trial,[w15] with high rates in both groups.

Urinary tract infection—No evidence was found of differences in the occurrence of urinary tract infections.

Sexual dysfunction—Loss of ejaculation was less often experienced by sexually active men undergoing laser vaporisation (relative risk 0.22, 0.13 to 0.39; P<0.001) or transurethral vaporisation (0.78, 0.64 to 0.95; P<0.01) than transurethral resection. The risk of erectile dysfunction was higher for sexually active men undergoing laser vaporisation (8.89, 1.29 to 61.37), whereas the other interventions showed similar rates to transurethral resection (see bmj.com). The confidence interval was, however, large.

Descriptors of care—Only holmium laser enucleation showed a difference in duration of surgery compared with transurethral resection, taking on average 17 minutes longer (95% confidence interval 13.45 to 20.47). Hospital stay was shorter by one day or less for all the interventions compared with transurethral resection (see bmj.com). The need for a second procedure during follow-up was more common after laser vaporisation than after transurethral resection (9.3% *v* 5.4%; relative risk 1.68, 95% confidence interval 0.97 to 2.63; P=0.04). No evidence was found of differences in reoperation rate between transurethral resection and the other ablative procedures, but confidence intervals were wide (see bmj.com).

DISCUSSION

In this systematic review we considered data from 3970 participants across 45 randomised controlled trials of moderate to poor quality. We found no evidence of a difference in outcomes for symptoms using any of the newer technologies for endoscopic ablation of benign enlargement of the prostate over transurethral resection at 12 months, although there was a trend favouring holmium laser enucleation and against laser vaporisation. Patterns of improvement in peak urine flow rate were consistent with change in symptoms. Blood transfusion rates were higher for transurethral resection than for the newer methods, with the exception of bipolar transurethral resection. Men undergoing laser or diathermy vaporisation were more likely to experience urinary retention. Hospital stay was up to one day shorter for the newer technologies.

The included trials identified were not powered to detect differences in the low rates of mortality and major morbidity associated with transurethral resection and therefore we have used proxy variables. The significant reduction in the risk of transfusion seen with the newer techniques reflects better haemostatic properties of the energy sources used. Although the relative risk reduction is considerable, the absolute benefit is small and its clinical importance could be challenged. The other key outcome was the need for reoperation as a result of complications. The short term nature of the trials is a problem though, with rates equivalent to transurethral

resection being documented at 12 months probably reflecting treatment for complications rather than inadequate response. Therefore vaporisation procedures generally show slightly higher rates. These studies do not tell us about the long term need for retreatment, which for transurethral resection is well characterised at between 0.5% and 1% per year of follow-up for up to 15 years. The risk of other complications that may cause permanent disability, such as incontinence, do not seem to be substantially altered in the short term using the new technologies; however, confidence intervals were wide and important differences cannot be ruled out.

A reduction in hospital stay is one area of achievement for the newer endoscopic ablative treatments, on average saving one bed day. It could be argued, however, that managed care pathways are shortening hospital stay for all procedures, and in consequence the cost saving may be small.[3]

Strengths and limitations of the review

Several limitations must be noted when interpreting the results of this review. Heterogeneity in results for the primary outcome measure of reduction in symptom score presented problems in deriving a valid meta-analysis, therefore we used a random effects model. Clinical reasons for this heterogeneity include differences in baseline score for symptoms between studies and failure to control for other variables that may result in greater improvement in symptoms, such as prostate volume and urodynamic obstruction.

It is possible we might have missed data owing to non-publication or non-appearance on the search. Over half of the reports that met the initial inclusion criteria were only in abstract form. The exclusion of these studies prevented estimation of publication bias. The reasons why so many trials were reported only as abstracts were unclear and may change the direction of effect.

The moderate to poor methodological quality of the studies and the high number of comparisons diluted the opportunities for meta-analysis. The confidence intervals around estimates of differences were often wide and this may have resulted in a failure to detect clinically important differences.[4 5] The comparisons were against the standard of transurethral resection and therefore this limited our ability to assess how newer ablative treatments performed against each other. Study inclusion criteria such as prostate size also varied between the trials, which questions the generalisability of the findings. This was exacerbated by variation and evolution in operative technique and treatment protocols between studies investigating the same basic technology. These variations were of particular concern for studies of laser technology where wavelength and power settings and site and duration of laser application varied.

In the United Kingdom about 50% of endoscopic prostatectomies are carried out for indications other than lower urinary tract symptoms, predominantly urinary retention. Exclusion of such patients from the included trials makes it difficult to extrapolate the findings to these circumstances.

Most of the included trials were poorly reported.[4 6] Reporting of allocation concealment was unclear in 74% of the included studies and 14% used an inadequate approach for concealment of randomisation. This increases the risk of selection bias and may generate biased estimates of treatment effects.[7 8]

Many studies failed to report point estimates and measures of variability.[9]

Some procedures such as transurethral vaporisation of the prostate have been abandoned despite a reasonable evidence base for their efficacy. In contrast, techniques using more recent technology have now entered routine use without adequate published evidence of safety and cost effectiveness. In addition, the standard of transurethral resection of prostate has improved with more uniform outcomes and fewer adverse effects.

Conclusions

On the basis of current evidence it is not possible to reliably identify the most promising tissue ablative intervention for benign enlargement of the prostate. Transurethral resection of the prostate continues to be effective although it is associated with potentially significant morbidity. Of all the newer technologies assessed in this study, holmium laser enucleation seems to have the most promise. Nevertheless, the quality of the available evidence is poor.

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Mental capacity to make decisions on treatment in people admitted to psychiatric hospitals: cross sectional study

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ABSTRACT

Objective To estimate the prevalence of mental capacity to make decisions on treatment in people from different diagnostic and legal groups admitted to psychiatric hospital.

Design Cross sectional study.

Setting General adult acute psychiatric inpatient units.

Participants 350 consecutive people admitted to psychiatric wards from the community over 16 months.

Main outcome measure Mental capacity assessed by clinical interview and the MacArthur competence assessment tool for treatment.

Results Estimates of mental capacity were obtained on 97% (n=338) of the 350 people admitted. Of those an estimated 60% (95% confidence interval 55% to 65%) lacked mental capacity to make decisions on treatment. This proportion varied according to diagnosis, ranging from 97% (n=36) in people with mania to 4% (n=24) in people with personality disorder. Mental incapacity was common in patients admitted informally to the psychiatric wards (n=188; 39%, 32% to 46%). Incapacity and detention are closely associated under non-capacity based mental health law.

Conclusions Mental incapacity to make decisions on treatment is common in people admitted to psychiatric wards from the community but cannot be presumed. It is usual in those detained under the Mental Health Act and common in those admitted voluntarily.

INTRODUCTION

The concept of mental capacity is central to modern medical law and applies to people with mental disorder. Its significance is linked to the principle of autonomy, which demands that an individual's autonomous decisions relating to the acceptance and refusal of medical treatment be respected.[1 2] Provision for those who lack mental capacity exists in many developed legal systems. However, such provision typically stands alongside separate legal provisions, not capacity based, for the involuntary treatment of mental disorder. This dual legislative approach to people with mental disorder has raised ethical concerns about respect for the principle of autonomy and practical concerns about which legislative framework such people come under.[3] Relevant, good quality studies in this area are limited.[4 5] We describe the frequency of capacity to decide on key treatment decisions in adults consecutively admitted to a psychiatric hospital, and in diagnostic and legal (informal compared with involuntarily detained) subgroups.

METHODS

We included people consecutively admitted to three general adult psychiatric wards, serving a deprived inner city area, at the Maudsley Hospital, London between February 2006 and June 2007. Admitted people were identified by regular examination of electronic medical records and consultations with ward nursing staff. We excluded those from other catchment areas or transferred from other inpatient facilities.

Patients were approached for a research interview. Those assenting were given full details of the study. Written consent was obtained. We stopped the interview if there was any change in choice, or resistance. Patients were offered £5 (€6.3; $9.8) for their time. Trained senior house officers who cared for the patients assessed the mental capacity of all people admitted. Non-consenting people or those who did not speak English were assessed only by psychiatric trainees. Assessments of mental capacity were done as close to admission as possible.

Assessment of mental capacity

From the medical records we obtained information on the patient's presenting problems, diagnosis (international classification of diseases, 10th revision), and treatment plan. We rated the global assessment of functioning using the *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition). The clinical researcher (GSO) clarified whether the main decision on treatment was stabilisation with drugs, or admission to a place of safety or for assessment. If the treatment decision was stabilisation with drugs then the assessment of mental capacity centred on the decision to take the prescribed drug or not. If the treatment decision was admission to a place of safety or for assessment then the assessment of mental capacity was to decide whether to come into hospital or not.

Assessments by clinical researcher

Judgments on mental capacity were based on a clinical assessment (review of notes and clinical interview) and the administration of the MacArthur competence assessment tool for treatment.[6 7] This instrument is a semistructured interview that provides disclosures of relevant information to patients about their illness, treatment options, and the risks and benefits of those options. The assessor evaluated the capacity for four abilities relating to the disclosures: understanding, appreciation, reasoning, and expressing a choice. These abilities map onto those regarded as relevant by the Mental Capacity Act 2005.

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We modified the MacArthur competence assessment tool for treatment for this study. When the principal decision on treatment concerned stabilisation with drugs, patients were given a disclosure about "no drugs" as the alternative to the "recommended" drugs, rather than other options for drugs. When the principal decision on treatment concerned admission to hospital for safety or assessment, patients were given disclosures about the options of being an inpatient or not. Each disclosure comprised information about the option and the risks and benefits. These changes did not alter the structure of the MacArthur competence assessment tool for treatment. Previous studies have shown excellent inter-rater reliability ($\kappa > 0{\cdot}8$) for the MacArthur competence assessment tool for treatment used in this way.[58]

Assessments by psychiatric trainees

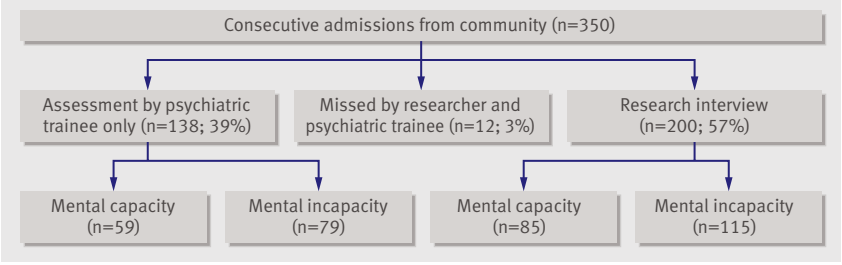
Ten psychiatric trainees took part in the study. They were given information on the assessment of mental capacity and received a one hour training session. They were asked to give an opinion on mental capacity to make the key treatment decision on the basis of the patient's presentation at the first interview. This ensured that the treatment decision assessed by the psychiatric trainee was the same as the clinical researcher's and that the assessment was as close to admission as possible.

Statistical analysis

Analyses were done using Stata 9·2. We estimated the prevalence of mental incapacity in different groups, with 95% confidence intervals. We compared the opinions of the psychiatric trainees with those arising from the research interview, the interview being regarded as the ideal method. We calculated sensitivities and specificities accordingly. Assuming these to be the same for patients seen only by the psychiatric trainees we calculated the expected numbers of patients the clinical researcher would have judged to lack mental capacity in the group seen by the psychiatric trainees. This allowed an estimation of capacity in close to the full sample.

RESULTS

The figure shows the flow of participants through the study. Overall, 350 people were admitted from the community. Two hundred (57%) were assessed using the MacArthur competence assessment tool for treatment and 325 (93%) were assessed by psychiatric trainees, of whom 138 (39%) were assessed only by psychiatric



Flow of patients through study

Table 1 | Personal, clinical, and legal characteristics of people admitted to psychiatric wards and assessed for mental capacity to make decisions on treatment. Values are numbers (percentages) unless stated otherwise

Variable	Sample (n=350)
Mean (SD) age (years)	38 (11.4)
Men	202 (58)
Ethnicity	
White European	157 (44)
Black African	80 (23)
Black Caribbean	62 (18)
Black other	19 (5)
Other ethnic minority group	32 (9)
Accommodation:	
Living with partner or family	120 (34)
Living alone independently	143 (41)
Supported accommodation	53 (15)
No fixed abode	23 (7)
Unknown	11 (3)
Mean (SD) education (years) since age 10	7.0 (3.0)
Occupation:	
Employed	60 (17)
Student	10 (3)
Not economically active	274 (78)
Unknown	6 (2)
Marital status:	
Single	291 (83)
Married or partner	59 (17)
Median No of years of contact with psychiatric service (interquartile range)	7 (3-18)
No of previous psychiatric admissions:	
0	86 (25)
1	85 (24)
2-5	95 (27)
>5	79 (23)
Unknown	5 (1)
Main diagnosis*:	
Organic brain syndrome	5 (1)
Schizophrenia	84 (25)
Schizoaffective disorder	20 (6)
Psychotic episode	77 (22)
Bipolar affective disorder—manic episode	36 (10)
Bipolar affective disorder—depression episode	8 (2)
Depression	71 (20)
Post-traumatic stress disorder	5 (1)
Personality disorder	25 (7)
Other	19 (5)
Alcohol or drug dependent	43 (12)
Prominent recent history of cannabis use	79 (23)
Recent history of alcohol misuse	85 (24)
Recent other substance misuse	49 (14)
Legal status:	
Informal	197 (56)
Civil detention for assessment (section 2)†	64 (18)
Civil detention for treatment (section 3)†	53 (15)
Emergency detention of inpatient (section 5 (2))†	32 (9)
Emergency detention of outpatient (section 4)†	3 (1)
Criminal court order	1 (0.3)

*International classification of diseases, 10th revision.
†Mental Health Act 1983.

Table 2 | Estimates of prevalence of mental incapacity by diagnosis* and legal status

Sample	No	Prevalence (%) of incapacity (95% CI)
All patients	338	60 (55 to 65)
Psychotic illness	175	75 (68 to 81)
Schizophrenia	80	81 (71 to 89)
Bipolar affective disorder—mania	36	97 (86 to 100)
Bipolar affective disorder—depression	8	25 (3 to 65)
Depression	67	31 (20 to 44)
Personality disorder	24	4 (0 to 21)
Informal admission	188	39 (32 to 46)
Detained	150	86 (79 to 91)

*International classification of diseases, 10th revision.

trainees; 12 admissions (3%) were missed by the clinical researcher and psychiatric trainees.

Table 1 shows the personal, clinical, and legal characteristics of the people admitted. The clinical interviews were held 0 to 8 days after admission (median 2 days, interquartile range 1-3).

Table 2 shows the prevalence of incapacity to make decisions, by diagnosis and legal status. Using sensitivities and specificities of the psychiatric trainees as a test for the research interviewer's ideal in each diagnostic group, and assuming these to be the same for patients seen only by the psychiatric trainees, the prevalence of mental incapacity in the total group (n=338, 97% of total number of admissions) was estimated to be 60% (95% confidence interval 55% to 65%). Most of the detained patients lacked mental capacity.

DISCUSSION

Lack of mental capacity to make decisions on treatment is common (60%) but cannot be presumed in people admitted to psychiatric hospital. It is higher than in patients admitted to a general hospital in the same geographical area.[9] The prevalence of mental incapacity varied according to diagnosis, with high rates for people with mania and schizophrenia but lower rates for people with depression and personality disorder.

Previous studies used convenience samples or did not include an overall judgment of mental capacity for clinically significant decisions.[5] Many studies have low participation rates, potentially creating a non-representative sample. Our study overcame these problems, since we achieved a participation rate of 57% for the full interview, but gained information on nearly all participants, using the psychiatric trainees' assessments. One limitation of the study is that the reported frequencies were from people admitted to psychiatric wards in an urban hospital and may not generalise to non-urban psychiatric settings.

Two fifths of patients admitted voluntarily to psychiatric wards lacked mental capacity. In England and Wales this group is already covered by the Mental Capacity Act 2005, and once the 2007 amendments are fully implemented any "deprivation of liberty" will have to comply with the requirements. The prevalence of mental incapacity in those detained under the Mental Health Act 1983 (not capacity based) is high (86%) but not invariable. For inpatients who lack mental capacity the Mental Capacity Act 2005 now provides an alternative statutory framework to the Mental Health Act 1983 for the provision of psychiatric care in England and Wales. Thus to facilitate informed choice between the two acts and in light of the high prevalence of mental incapacity to make decisions in psychiatric inpatients, including those voluntarily admitted, assessment of mental capacity and best interests should become a core part of inpatient psychiatric assessment. Navigating the two legal frameworks, based on different principles, however, is likely to prove complicated.

WHAT IS ALREADY KNOWN ON THIS TOPIC

The relation between mental capacity and involuntary psychiatric treatment is ethically controversial but little studied

Mental capacity can be reliably measured

WHAT THIS STUDY ADDS

Most patients detained under the Mental Health Act 1983 lack mental capacity to make decisions on treatment

A significant proportion of people informally admitted lack mental capacity to make decisions on treatment

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Competing interests: GR chaired the expert committee on the review of the Mental Health Act 1983. GR, GS, and ASD have given views to parliamentary committees over reform of the Mental Health Act 1983 when mental capacity has been a central issue. These authors have differing views about mental capacity as a basis for mental health law. GR and GS are in favour of capacity based mental health law. ASD is against. MH has acted as an expert witness on cases where mental capacity has been under dispute.

Ethical approval: This study was approved by the joint South London and Maudsley and the Institute of Psychiatry NHS research ethics committee.

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Multiple vaccinations, health, and recall bias within UK armed forces deployed to Iraq: cohort study

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ABSTRACT

Objective To assess the relation between self reported number of vaccinations received and health, and between numbers of vaccinations recorded from individuals' medical records and health.

Design First phase of a cohort study.

Setting UK armed forces personnel.

Participants 4882 randomly selected military personnel deployed to Iraq since 2003 and a subset of 378 whose vaccination records were accessed.

Main outcome measures Psychological distress, fatigue, symptoms of post-traumatic stress disorder, health perception, and multiple physical symptoms.

Results Personnel who reported receiving two or more vaccinations on a single day were more likely to report symptoms of fatigue (adjusted risk ratio 1.17, 95% confidence interval 1.05 to 1.30), show caseness according to the general health questionnaire (1.31, 1.13 to 1.53), and have multiple physical symptoms (1.32, 1.08 to 1.60). These associations were no longer significant when number of vaccinations recorded in individuals' medical records was used as the independent variable.

Conclusions Multiple vaccinations given to personnel in the UK armed forces in preparation for deployment to Iraq are not associated with adverse health consequences when vaccinations are recorded objectively from medical records. Adverse health consequences associated with self reported multiple vaccinations could be explained by recall bias.

INTRODUCTION

Several studies have found an association between self reported multiple vaccinations in service personnel deployed to the 1991 Gulf war and ill health in Gulf war veterans.[1-6] While multiple vaccinations were associated with the onset of symptoms, they were not a risk factor for the continuation of poor health.[7] Researchers, however, did not have contemporaneous vaccination records. Other studies that did not find such an association[8 9] have led to concern over the validity of earlier findings.

We examined the impact of receiving multiple vaccinations on health within two samples: one in which receipt of vaccinations was self reported and the other (a subset of the first) in which vaccinations were confirmed from individuals' medical records. This allowed us to observe the effects on health of receipt of multiple vaccinations and the influence of recall bias.

METHODS

Sampling—We conducted a cross sectional study of the UK armed forces from June 2004 to March 2006. Two groups of personnel randomly selected from UK armed forces were surveyed: the first had deployed to the 2003 Iraq war, and the second group had not.[10] We restricted the current analyses to participants who had deployed either during the Iraq war or had subsequently deployed to Iraq. Data were collected through detailed questionnaires. Participants were asked "What was the maximum number of any vaccines that you received in one day in preparation for your deployment?"

Health measures—Our outcome variables included a range of health measures: a 13 item fatigue scale, a general health questionnaire (GHQ-12), a 53 item physical symptom checklist, self perception of health with a single item from the SF-36, and symptoms of post-traumatic stress disorder measured with a 17 item checklist (PCL-C). See bmj.com.

Receipt of vaccinations taken from medical records—We randomly selected a subset of 10% of our sample to assess agreement between the number of self reported vaccinations received on a single day and what was recorded in their medical records. A member of the research team visited military medical centres, collected data on vaccination, and recorded the maximum number of vaccinations received on a single day before deployment from 31 July 2002 to 31 March 2006. To avoid missing data, we accessed deployment medical records as well as standard medical records.

Analysis—We used weighted κ statistics to assess the level of agreement between self reported number of vaccinations received during one day and the number recorded within a participant's medical records. We identified sociodemographic differences between those whose records were checked and those in the full sample. Regression models were fitted to calculate risk ratios between health outcomes and self reported receipt of multiple vaccinations on one day and health outcomes and receipt of multiple vaccinations on one day according to medical records. This analysis was repeated between self reported receipt and health in the subsample whose records had been accessed. Analyses were weighted according to sampling fractions and adjusted for service, rank, sex, age, medical fitness and enlistment status.

RESULTS

The participation rate was 61% (n=10 272). Some 4882 participants had deployed either during the invasion of

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Iraq or on subsequent operations to Iraq and had answered the question pertaining to the maximum number of vaccinations received on one day. Of these, 14% were in the navy, 68% in the army, and 18% in the air force; 16% were officers; 8% were women; and 10% were in the reserves. The median age was 32.2 years (interquartile range 26.4-38.2). An intensive follow-up study of non-responders found no significant differences in health between responders and non-responders.

From our selected subsample we were able to access the records of 420 individuals. The medical records for 378 of these individuals recorded that they had received one or more vaccinations and form the basis of our analysis. Within this group, for 303 individuals we had both self reported and medical records vaccination data. For these 303 individuals we assessed the level of agreement between self reported receipt of multiple vaccinations received on one day and what was recorded in the medical records. The κ score was 0.04 (95% confidence interval −0.02 to 0.12), indicating poor agreement.

Among individuals whose records were checked, more were in the army and nearly all were regular personnel compared with the full sample, in which 90% were regular personnel. Also, individuals whose records were checked were marginally younger. We investigated the relation between self reported receipt of no more than one vaccination or two or more vaccinations on one day and adverse health (table). After adjustment, we found significant associations between receipt of two or more vaccinations on one day and caseness for fatigue (odds ratio 1.17, 95% confidence interval 1.05 to 1.30), common mental disorder (1.31, 1.13 to 1.53), and multiple physical symptoms (1.32, 1.08 to 1.60).

We repeated the analysis using the number of vaccinations recorded from participants' medical records, and found no health differences between individuals whose medical records indicated they had received no more than one and those who had received two or more vaccinations on a single day.

When we restricted analysis of self reported number of vaccinations to those individuals whose records had also been checked, after adjustment, we found significant associations between receipt of two or more vaccinations and caseness for fatigue (1.57, 1.06 to 2.33) and common mental disorder (1.89, 1.08 to 3.30).

DISCUSSION

In this study of personnel deployed to Iraq we found that recall of the number of vaccinations received on a single day cannot be considered reliable. This is not the case for individual vaccinations, but recall bias seems to mediate an association between self reported uptake of multiple vaccinations and experiencing poorer health. Such associations were no longer significant, however, when we repeated the analyses using receipt of vaccinations recorded from an individual's medical records rather than self report. In view of these findings,

Health comparisons between individuals according number of vaccinations received on single day and self reported vaccination, vaccination in medical records, and subsample of self reports with medical records also checked. Figures are numbers (percentage*) of participants

	Received no more than 1 vaccination in 1 day	Received ≥2 vaccinations in 1 day	Risk ratio (95% CI)	
			Unadjusted	Adjusted†
Self reported vaccination				
Fatigue case	366/1266 (29)	1036/2893 (35)	1.23 (1.11 to 1.35)	1.17 (1.05 to 1.30)
Common mental disorder (GHQ-12)	199/1272 (16)	635/2901 (21)	1.37 (1.18 to 1.58)	1.31 (1.13 to 1.53)
Multiple physical symptoms	125/1289 (10)	406/2924 (14)	1.41 (1.17 to 1.71)	1.32 (1.08 to 1.60)
Health perception	134/1277 (10)	359/2914 (12)	1.13 (0.94 to 1.37)	1.02 (0.84 to 1.24)
PTSD (PCL-C)	43/1265 (3)	130/2893 (4)	1.23 (0.87 to 1.73)	0.98 (0.69 to 1.39)
Medical records of vaccination				
Fatigue case	66/216 (31)	45/158 (29)	0.94 (0.68 to 1.29)	0.92 (0.66 to 1.28)
Common mental disorder (GHQ-12)	49/217 (23)	24/159 (15)	0.67 (0.43 to 1.04)	0.73 (0.47 to 1.14)
Multiple physical symptoms	21/218 (10)	15/160 (9)	0.98 (0.52 to 1.84)	1.07 (0.58 to 1.97)
Health perception	28/216 (13)	10/159 (6)	0.49 (0.24 to 0.97)	0.54 (0.27 to 1.08)
PTSD (PCL-C)	11/214 (5)	6/158 (4)	0.74 (0.28 to 1.96)	0.81 (0.31 to 2.15)
Self report and medical records				
Fatigue case	26/118 (22)	63/181 (35)	1.58 (1.07 to 2.35)	1.57 (1.06 to 2.33)
Common mental disorder (GHQ-12)	14/118 (12)	41/183 (22)	1.89 (1.07 to 3.32)	1.89 (1.08 to 3.30)
Multiple physical symptoms	7/119 (6)	19/184 (10)	1.76 (0.70 to 4.06)	1.81 (0.79 to 4.15)
Health perception	9/117 (8)	21/183 (12)	1.50 (0.71 to 3.16)	1.46 (0.69 to 3.13)
PTSD (PCL-C)	3/116 (3)	8/182 (4)	1.70 (0.46 to 6.31)	1.60 (0.44 to 5.55)

GHQ=general health questionnaire; PTSC=post-traumatic stress checklist.
*Percentages adjusted to take account of sampling fractions.
†Adjusted for age, sex, service, rank, fitness to deploy, and regular/reservist status.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Several studies have implicated multiple vaccinations as a risk factor for the excess ill health observed in Gulf war veterans

Previous studies have relied on retrospective self report of vaccination

WHAT THIS STUDY ADDS

Although self reported multiple vaccines were associated with illness, there was no such association when multiple vaccinations were ascertained from contemporaneous medical records

Earlier associations between self reported receipt of multiple vaccinations and illness were probably caused by recall bias

we conclude that there is no evidence that receiving multiple vaccinations has resulted in adverse health for UK service personnel deployed to Iraq since 2003.

Strengths and weaknesses

One strength of this study was that we were able to analyse data from both self reported measures and medical records. This allowed us to ascertain both the effects of vaccinations on health and the possible impact of recall bias. Our sample was randomly selected and representative of the UK armed forces.

There were sociodemographic differences between the full sample and the subset of people whose medical records were accessed. We adjusted our current analyses for regular or reserve status. Finally, we recognise the self reported measure of multiple vaccinations used in this paper was crude (one question), and data were collected between two and three years after participants had received vaccinations. This might mean that individuals' responses about receipt of multiple vaccinations were more prone to recall bias than one might normally expect. While this might limit our findings that used self reported measures of vaccination uptake, data collected from medical records would be unaffected.

Conclusions

Receipt of multiple vaccinations in UK armed forces personnel before the 2003 Iraq war has not resulted in adverse health. Recall bias was evident with self reported measures of receipt of vaccinations.

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All Greek to me

The patient and I were talking in circles. She was a Greek woman in her 70s, the widow of an English man. She was extremely anxious about her recent admission to hospital with an episode of pyelonephritis and was exhorting me to do more tests on her kidneys. I was trying to explain that, now her infection had been treated and her ultrasound scan and recent renal function tests were normal, there was no need for any further investigations.

She did not seem convinced: "But surely there must have been something wrong for a very long time doctor." There was no note of blame in her voice despite my apparent failure to have diagnosed a serious problem over the many years we had known each other. She had come in to the consultation bearing a box of chocolates and had agreed to let my GP registrar sit in.

"Tell me what you understand has been the problem with your kidneys," I suggested.

"Well, the problem is nephritis, an infection of the kidney, and it has been there a long time."

The words "a long time" had been repeated, and slowly the penny began to drop.

"What is the name of your problem?" I asked.

"Paleonephritis."

I wrote down the words "paleo" and "pyelo" and explained that pyelo is the medical term for part of the kidney. My patient laughed, my registrar looked relieved, and I mentally thanked my son, who at the age of 5 had shown a great interest in dinosaurs and paleoanthropology.

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"Paleo" is a Greek term meaning ancient or old.

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