

Self-assessment of Health Status and Mortality in Middle-Aged British Men

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In a prospective study of 7725 middle-aged British men, 357 of whom died in an average follow-up period of four years, self-assessment of health status was strongly associated with mortality. Men who reported poor health had an eight-fold increase in total mortality compared with those reporting excellent health. Those perceiving fair or poor health were older, more likely to be manual workers and cigarette smokers, more likely to be thin and to be heavy drinkers or to have given up drinking in the past five years. They were also more likely to recall multiple diagnoses and to be on regular medication. Half of those with poor perceived health had chest pain on exertion (angina), one-third had experienced severe chest pain (possible myocardial infarction) half were breathless on exertion and 80% had been off work for more than a month in recent years.

At all age levels between 45 and 64 years, and in both manual and non-manual workers, mortality was twice as high in men reporting fair or poor health than in men reporting excellent or good health. In both men with and without recall of at least one major diagnosis, fair or poor perceived health was associated with a two fold increase in age-adjusted mortality rate. In both groups this increased mortality was to a large extent accounted for by the increase in the prevalence of adverse characteristics such as regular medication, chest pain, breathlessness and current smoking. Self-assessment of health status appears to be a good measure of current physical health and risk of death. It could be useful in both clinical and epidemiological situations.

There is considerable interest in the individual's assessment of his own health status, both because it might be a useful measure in assessing the overall health of an individual or a community and because of the current concern with behavioural and psychosocial factors in the incidence, prognosis and mortality in chronic disease. The possibility that social isolation, employment-related stress, depression, personality characteristics or adverse life events may influence the development and course of disease is widely accepted. In addition, several studies have suggested that self-perception of health may have an influence on mortality independent of objective measures of ill-health.¹⁻³ Although these same studies have shown strong relationships between perceived health status and objective measures of ill-health, these relationships have apparently not been fully explained by the objective measures of ill-health. This paper examines the relationship between perceived health status and

mortality in a cohort of middle-aged British men in order to determine the degree to which self-assessment of health status depends on the presence of physical illness and to assess the usefulness of perceived health status as a measure of risk of death in individuals.

SUBJECTS AND METHODS

In 1978–1980, 7735 men aged 40–59 were selected at random from general practices in 24 towns in England, Wales and Scotland for a prospective study of cardiovascular disease (The British Regional Heart Study; BRHS). The criteria for selecting the towns, general practices and the subjects as well as the methods of data collection have been reported.⁴ Research nurses administered to each man a standard questionnaire (Q1) which included questions on smoking habits, alcohol intake, chest pain, breathlessness and medical history. A number of physical measurements, including height, weight and blood pressure, were made and blood was taken for measurement of biochemical and haematological variables. Five years later (1983–1985), a similar questionnaire (Q5) was sent to all sur-

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viving men and detailed information obtained on changes in smoking behaviour, present and past drinking habits, history of chest pain, medical history, employment status and perceived health status. This report is concerned with the 98% of available survivors ($n = 7275$) who completed the fifth-year questionnaire. The men were asked 'How would you describe your health status at present?—excellent, good, fair or poor'. Information on perceived health status was not provided by 69 men.

Age

The men were divided into four age-groups based on age at Q5 i.e. 45–49, 50–54, 55–59, 60–64 years.

Smoking

From the combined information at screening and five years later the men were classified as those who had never smoked, ex-cigarette smokers (including those who had given up in the five years since screening) and current cigarette smokers at Q5.

Social Class

The longest held occupation of each man was recorded at screening and the men were grouped into one of six social classes: I, II and III non-manual, and III manual, IV and V (manual).

Body Mass Index (BMI)

At Q5 the men were asked to state their weight in pounds and kilograms and BMI was calculated for each man based on their reported weight and on measured height at initial screening. Obesity is defined as $\geq 28 \text{ kg/m}^2$.⁵

Diagnoses and Treatment

Men were asked to recall whether they had ever been told by a doctor that they had any of the 12 major specified conditions listed on the questionnaire (Q5); ischaemic heart disease (angina, heart attack, coronary thrombosis or myocardial infarction), 'other heart trouble', high blood pressure, stroke, gout, diabetes, gall bladder disease, thyroid disease, arthritis, bronchitis, asthma, and peptic ulcer. In addition, there was an open question on 'other conditions including surgery', which included cancer, other cardiovascular disease (CVD) and mental illness. The men were also asked details of any regular medical treatment. When comparing men with and without a major diagnosis (Tables 7 and 8) the 12 specified conditions as well as cancer, other CVD and mental illness are included.

Chest Pain

The prevalence of chest pain (Q5) was assessed by the

WHO (Rose) standardized chest pain questionnaire for angina or possible myocardial infarction.^{6,7}

Breathlessness

Questions on breathlessness were not asked at Q5. However, since breathlessness is a valuable measure of ill health and is a symptom which is more likely to increase with time than to disappear, we have used breathlessness assessed at Q1. The men were asked three questions at screening regarding breathlessness: (1) Do you get short of breath walking with people your own age on level ground?, (2) On walking up hills or stairs, do you get more breathless than people your own age?, (3) Do you ever have to stop walking because of breathlessness? Each affirmative answer scored 1, giving a possible score of 0–3, hereafter referred to as no breathlessness, mild, moderate and severe breathlessness.

Mortality

After the initial examination, all men, whether or not they had evidence of ischaemic heart disease or other diseases at the first examination, were followed up for all cause mortality and for cardiovascular morbidity.⁸ Information on death was collected through the established 'tagging' procedures provided by the National Health Service Registers in Southport (England and Wales) and Edinburgh (Scotland). Coding of cardiovascular (ICD 390–459) and non-cardiovascular deaths (the rest) was based on the 9th Revision of the International Classification of Disease codes provided by OPCS on the death certificates. For all ischaemic heart disease deaths clinical or post mortem evidence was obtained from the general practice or hospital records. As this report is concerned only with the 7275 men who completed the fifth-year questionnaire, mortality data on follow-up since the fifth-year questionnaire is presented, a mean follow-up period of four years (range 3–5 years).

Statistical Methods

Chi-squared tests were used to assess the association between perceived health status and mortality. Tests for trend was carried out fitting health status continuously as 1, 2, 3 and 4. Multiple logistic regression was used to obtain age-adjusted mortality rates and to assess the association between health status and mortality adjusted for the various variables. The model assumes that the relative odds increases exponentially with diminishing health status and that no interactions are present between health status and the other variables included in the model. In order to address the possibility of interactions, in some of the analyses the

association between health status and mortality has been examined separately by age, social class and presence of recall of doctor diagnoses.

RESULTS

During the mean follow-up time of four years after the fifth-year questionnaire there were 357 deaths from all causes. Of these 173 (49%) were cardiovascular, comprising 145 ischaemic heart disease, 16 stroke and 12 other cardiovascular causes. There were 184 non-cardiovascular deaths including 138 from cancer. Data on perceived health were not available for four men who died. On the mailed questionnaire (Q5) the men recorded their current health status as excellent—21%, good—56%, fair—20% or poor—3%.

Perceived Health and Mortality

The crude mortality rates increased significantly with diminishing perception of health status (Table 1). Those who reported poor health had more than an eightfold increase in total mortality rate compared to those who reported excellent health. Those who reported fair or poor health had a significantly higher mortality than those who reported excellent or good health ($p < 0.001$) and this was seen for both cardiovascular (CVD) and non-cardiovascular (non-CVD) deaths ($p < 0.001$ and $p < 0.01$ respectively).

Perceived Health and Associated Variables

Self-assessment of health status was examined in relation to demographic variables and factors known to be associated with mortality (Table 2). Compared with those who reported excellent or good health, those who perceived fair or poor health were older, more likely to be manual workers and current smokers. They were more likely to be obese or thin, to be heavy drinkers or to have given up drinking within the preceding five years. They were also less likely to be married. All of the above findings were statistically significant ($p < 0.01$).

Perceived Health and Recall of Diagnosis

The percentage of men free of major diagnosis

decreased markedly ($p < 0.0001$) with perception of fair/poor health (Table 3). Indeed, only 9% of people who reported poor health were free of a major diagnosed illness compared to 75% of those who reported excellent health. Men who perceived poor health were also more likely to recall multiple diagnoses and were very likely to be on regular medication. For every specified major diagnosis, as well as for other cardiovascular disease, cancer, mental illness and 'other conditions' there was a progressive increase in the percentage of men with recall of a doctor diagnosis as one moved from excellent to poor perceived health ($p < 0.0001$). This increase was particularly marked for IHD, 'other heart trouble', stroke, arthritis, bronchitis and mental illness.

Self perceived Health and Medication

Of those who reported poor health, 89% were on regular medication compared to 9% of those who reported excellent health (Table 3). The prevalence of tranquilliser and diuretics use in men who reported poor health was 20 times that in men who reported excellent health (21% versus 0.7% and 20% versus 1.1% respectively). Antihypertensive treatment was also strongly associated with poor health perception (22.5% versus 3%).

Perceived Health, Symptoms and Sickness Absence

Those who perceived fair/poor health had a strikingly higher proportion of men with symptoms of chest pain on exertion (angina) as determined on the WHO chest pain questionnaire (Table 4). Over 50% of those who perceived poor health had chest pain on exertion compared to only 1% in those who reported excellent health. The prevalence of a previous episode of severe chest pain (possible myocardial infarction) and symptoms of breathlessness were also significantly higher in those who reported poor health than in those who reported excellent health. They were also more likely to report having had illness or injury which had put

TABLE 1 *Perceived health status and unadjusted mortality rates/1000/year over four years average follow-up. Number of deaths in brackets. Tests for trend: Total $\chi^2 = 141.8$, $p < 0.0001$; CVD $\chi^2 = 90.41$, $p < 0.0001$; Cancer $\chi^2 = 26.62$, $p < 0.0001$; Other $\chi^2 = 29.31$, $p < 0.0001$*

| Causes of death | | Perceived health status | | | |
|-----------------|-------|-------------------------|----------------|----------------|---------------|
| | | Excellent (1516) | Good (4013) | Fair (1477) | Poor (200) |
| Total | (353) | 5.5 (33) | 9.0 (144) | 23.7 (140) | 45.0 (36) |
| CVD | (173) | 1.3 (8) | 4.5 (71) | 13.5 (80) | 17.5 (14) |
| Cancer | (135) | 4.0 (23) | 3.5 (54) | 7.3 (43) | 18.8 (15) |
| 'Other' | (45) | 0.2 (2) | 1.0 (19) | 2.9 (17) | 8.7 (7) |

TABLE 2 *Percentage in perceived health status group with specific characteristics at Q5*

| Characteristics (Q5) | Perceived health status | | | |
|---------------------------------------|-------------------------|------|------|------|
| | Excellent | Good | Fair | Poor |
| Age 60–64 years | 17.7 | 23.8 | 35.0 | 33.7 |
| Manual | 43.7 | 55.0 | 72.1 | 74.8 |
| Current smokers | 22.6 | 31.3 | 40.6 | 50.8 |
| Obese (≥ 28 kg/m ²) | 17.9 | 21.9 | 25.2 | 25.8 |
| Thin (< 20 kg/m ²) | 1.2 | 1.5 | 4.0 | 10.5 |
| Heavy drinkers | 2.9 | 4.1 | 4.9 | 6.2 |
| Given up alcohol | 3.6 | 4.7 | 7.5 | 18.0 |
| Married | 91.2 | 88.5 | 84.0 | 81.5 |

TABLE 3 Perceived health status and percentage in each group with recall of doctor-diagnosed diseases and medication at Q5. IHD = ischaemic heart disease; BP = blood pressure

| Doctor-diagnosed disorders (Q5) | Perceived health status | | | |
|---------------------------------|-------------------------|------|------|------|
| | Excellent | Good | Fair | Poor |
| No recall of disease (3620) | 75.1 | 54.4 | 19.1 | 9.0 |
| ≥ 3 diagnoses (380) | 1.2 | 2.7 | 13.3 | 28.5 |
| Regular medication (2269) | 9.1 | 25.0 | 64.2 | 89.0 |
| IHD (610) | 1.7 | 4.9 | 21.9 | 33.5 |
| 'Other heart trouble' (191) | 0.9 | 1.8 | 5.2 | 14.5 |
| High BP (1054) | 7.0 | 13.3 | 24.3 | 26.0 |
| Stroke (95) | 0.2 | 0.7 | 3.5 | 5.5 |
| Diabetes (155) | 1.0 | 1.6 | 4.5 | 4.5 |
| Peptic ulcer (399) | 2.5 | 5.1 | 9.2 | 9.5 |
| Gout (282) | 3.1 | 3.8 | 4.8 | 5.5 |
| Gall bladder (147) | 1.2 | 2.0 | 2.6 | 5.5 |
| Thyroid (64) | 0.4 | 1.0 | 1.1 | 2.0 |
| Arthritis (958) | 4.5 | 11.8 | 24.8 | 25.0 |
| Bronchitis (1002) | 6.1 | 10.9 | 27.0 | 37.5 |
| Asthma (255) | 1.7 | 3.0 | 6.1 | 10.0 |
| Other CVD (104) | 0.9 | 1.2 | 2.4 | 4.0 |
| Cancer (37) | 0.3 | 0.4 | 0.9 | 3.0 |
| Mental illness (114) | 0.5 | 1.2 | 3.2 | 6.0 |
| 'Other conditions' (2042) | 16.6 | 21.9 | 26.7 | 35.5 |

them off work for more than a month and to have had such absences from work far more frequently than men who reported excellent or good health. All of these findings were statistically significant ($p < 0.0001$).

Age, Perceived Health and Mortality

The men were divided into three age groups (44–54, 55–59 and 60–64 years) and then into two health status groups: those who assessed their health as excellent or good and those who assessed their health as fair or poor. The association between perceived health and mortality was then examined by the three age groups (Table 5). The relationship between perceived health and mortality was similar in all age groups, with those who felt fair or poor having more than a twofold increase in mortality rate for cardiovascular, cancer and other causes.

Social Class, Perceived Health and Mortality

The association between perceived health and mortality was examined separately in manual and non-manual workers adjusting for age (Table 6). The relationship was similar in both groups.

Perceived Health, Diagnosis and Mortality

Since perceived health status was strongly associated with recall of doctor diagnosis (Table 3) we have examined the relationship between health perception and mortality in those who had recall of at least one major

diagnosis likely to be associated with increased mortality (any of the 12 specified major diagnoses or cancer, other cardiovascular conditions or mental illness) and those who had none of these major diagnoses (Table 7). In both groups those who assessed their health as fair or poor had a significant increase in mortality rate even after adjusting for age ($p < 0.001$ and $p < 0.05$ respectively). The higher mortality rates seen in those with a major diagnosis possibly reflects the nature and severity of the underlying disease. However, even within the individual major diseases, perceived health status was associated with differences in total mortality rate (data not presented). In men with a recall of a doctor diagnosis of ischaemic heart disease the difference in total mortality rate between those who perceived excellent or good health and those who perceived fair or poor health (35 versus 44/1000/year) was not significant. In all the other individual major diagnoses, once men with ischaemic heart disease had been excluded, those with fair or poor perception of health had a significant increase (2–5 fold) in total mortality rate.

Characteristics of Men with and without Recall of a Major Diagnosis

We have examined the characteristics of those who perceived excellent or good health and those who perceived fair or poor health separately in men with at least one major diagnosis (as defined previously) and in men who had no recall of a major diagnosis, in order to assess the factors influencing perception of health status and risk of death (Table 8). In both groups of men those who perceived fair or poor health were more likely to be on medication and had a higher prevalence of 'other conditions' (non-specific conditions excluding the 12 specified conditions and cancer, mental illness and other CVD diseases) (Table 3). They had more evidence of chest pain on exercise

TABLE 4 Percentage in perceived health status group with chest pain, breathlessness and sickness absence

| Condition | Perceived health status | | | |
|--------------------------------------|-------------------------|------|------|------|
| | Excellent | Good | Fair | Poor |
| Chest pain questionnaire | | | | |
| Angina (756) | 0.9 | 5.7 | 29.1 | 53.4 |
| Possible myocardial infarction (332) | 0.9 | 2.3 | 12.7 | 20.0 |
| Breathlessness (All) (630) | 4.8 | 12.4 | 33.5 | 48.3 |
| Mild (314) | 3.4 | 8.4 | 14.5 | 14.6 |
| Moderate (223) | 0.9 | 2.9 | 10.6 | 13.6 |
| Severe (223) | 0.4 | 1.1 | 9.0 | 20.1 |
| Absence from work | | | | |
| ≥ 1 month (1628) | 10.0 | 19.2 | 46.9 | 79.1 |
| ≥ 3 times (271) | 0.4 | 1.6 | 12.1 | 38.4 |

TABLE 5 Age, perceived health status and mortality rates/1000/year. Number of men and deaths in brackets

| Cause of death | Age (years) and perceived health status | | | | | |
|----------------|---|--------------------|-----------------------------|--------------------|-----------------------------|--------------------|
| | 44-54 | | 55-59 | | 60-64 | |
| | Excellent or good (2981) | Fair/poor (580) | Excellent or good (1323) | Fair/poor (514) | Excellent or good (1225) | Fair/poor (583) |
| Total | 3.8 (46) | 13.3 (31) | 9.8 (52) | 23.8 (49) | 16.3 (79) | 41.3 (96) |
| CVD | 1.9 (22) | 6.5 (15) | 4.5 (24) | 13.8 (28) | 6.8 (33) | 21.9 (51) |
| Cancer | 1.6 (20) | 6.0 (14) | 3.8 (20) | 6.8 (14) | 7.5 (37) | 12.9 (30) |
| 'Other' | 0.3 (4) | 0.9 (2) | 1.5 (8) | 3.2 (7) | 2.0 (9) | 6.5 (15) |

(angina) than those who reported excellent or good health, were far more likely to be cigarette smokers, and to have had a possible myocardial infarction. Breathlessness was more frequent in those with fair or poor health status and they were more likely to have had a major sickness absence and to have given up drinking within the preceding five years. In those with a major diagnosis, after adjusting for these adverse characteristics e.g. prevalence of medication, 'other conditions', current smoking, giving up drinking, angina, myocardial infarction, breathlessness and sickness absence, the more than twofold difference in risk of death (2.5: confidence intervals 1.9, 3.3) was reduced (1.5: confidence intervals 1.1, 2.0), although the difference was still significant ($p = 0.01$). The higher mortality rates present after adjustment may reflect the nature and severity of the underlying major diseases. Indeed in the 3620 men without a specific major diagnosis after adjusting for these adverse characteristics the relative risk of 1.8 (1.1, 3.1) was reduced to 1.3 (0.7, 2.4) and was no longer statistically significant.

Perceived Health and Medication

It was evident that being on regular medication had a strong association with perceived health, both in those with and without recall of a major diagnosis (Table 8). Indeed, the phenomenon was perhaps even more

striking in those without a major diagnosis. For most major diagnoses, the proportion of men perceiving fair or poor health was twice as great among those on regular medication, reflecting either the increased severity of the disease in those put on treatment or possibly, the side-effects of medication.

DISCUSSION

In this study of middle-aged British men, perceived health status was a significant predictor of mortality, which increased strikingly with decreasing health status. Those who rated their health as fair or poor had more than a twofold increase in mortality from all causes, cardiovascular disease, cancer and other causes compared to those who rated their health as excellent or good irrespective of age or social class. The finding that perceived health status is strongly associated with mortality outcome is consistent with other studies which have examined the relationship.¹⁻³

Perceived Health Status and Recall of Doctor Diagnoses

Extensive research on the determinants of health perception has shown it to be strongly correlated with objective health measures as well as with psychosocial factors.⁹⁻¹² Several of these studies have indicated that socio-medical factors and objective physical performance were better determinants of poor health per-

TABLE 6 Perceived health status and age-adjusted mortality rates/1000/year by social class. Number of men and deaths in brackets

| Causes of death | Social class | | | |
|-----------------|-----------------------------|-----------------------|-----------------------------|------------------------|
| | Non-manual | | Manual | |
| | Excellent or good (2654) | Fair or poor (461) | Excellent or poor (2866) | Fair or poor (1212) |
| Total | 7.3 (70) | 26.5 (54) | 10.0 (106) | 22.5 (122) |
| CVD | 3.3 (30) | 13.8 (28) | 4.8 (49) | 12.3 (66) |
| Cancer | 3.3 (32) | 10.0 (21) | 4.3 (44) | 6.8 (37) |
| 'Other' | 0.9 (8) | 2.2 (5) | 1.3 (13) | 3.5 (19) |

TABLE 7 Perceived health status and age-adjusted mortality rates/1000/year in men with recall of at least one major diagnosis including cancer, other cardiovascular disease (CVD) and mental illness and in men without such recall

| Causes of death | Recall of doctor diagnosis | | | |
|-----------------|-----------------------------|------------------------|-----------------------------|-----------------------|
| | Major diagnosis | | No major diagnosis | |
| | Excellent or good (2209) | Fair or poor (1377) | Excellent or good (3320) | Fair or poor (300) |
| Total | 11.8 (97) | 27.8 (161) | 6.3 (80) | 11.0 (15) |
| CVD | 6.3 (51) | 15.3 (88) | 2.3 (28) | 4.3 (6) |
| Cancer | 4.0 (33) | 8.5 (50) | 3.5 (44) | 5.8 (8) |
| 'Other' | 2.1 (13) | 3.0 (23) | 0.6 (8) | 0.7 (1) |

ception than psychosocial factors. In the present study perception of fair and in particular poor health, was strongly associated with presence of underlying disease likely to increase the mortality rate. Indeed 91% of those who reported poor health had a major illness and the majority of the remainder had significant symptoms of ill-health e.g. angina, possible myocardial infarction or breathlessness. The specific conditions most strongly associated with perceiving fair or poor health were heart conditions, stroke and bronchitis—all smoking-related and all associated with an increased risk of death.

Age and Social Class

Several studies have indicated that health perception may be different in younger and older people or in different social class groups. The association between health perception and mortality in this study was seen in both manual and non-manual workers and was similar in all age groups within the 45 to 64 year range. This age range represents a 'working' adult population and it appears that self-assessment of health in this population is determined predominantly by physical illness. Much research on self-rated health status has focused on the elderly^{9,10} in whom expectations of health may be different and in whom perceptions of

health status have other implications. Nevertheless, studies of self-rated health and mortality in the elderly has shown perception of health to be a strong predictor of mortality.^{2,3}

Perceived Health Status and Mortality

Some studies on self-rated health have shown perceived health status to be an independent predictor of mortality even after controlling for objective measures of health.¹⁻³ This was not evident in the present study. When the men were divided into those with and without any major diagnoses, among those without major diagnosis poorer health perception was associated with a nearly twofold increase in mortality after adjusting for age. However, although they had no recall of major diagnoses, these men had characteristics which were likely to increase their risk of death. They were more likely to be on regular medication and to have symptoms of angina, possible myocardial infarction and breathlessness. Very few people who reported poor or fair health had absence of important symptoms or of characteristics associated with ill-health e.g. sickness absence, cigarette smoking. Indeed after taking these factors into account the nearly twofold increase in risk was reduced to 1.3. In men with disease, the more than twofold increase in risk of mortality was reduced to 1.5

TABLE 8 Characteristics at Q5 (except for breathlessness) according to perception of health in men with recall of a major diagnosis including cancer, other cardiovascular disease (CVD) and mental illness (n = 3586) and in men with no such diagnosis (n = 3620)

| Characteristics (Q5) | Recall of ≥1 major diagnosis (3586) | | No recall of a major diagnosis (3620) | |
|--------------------------------|--|------------------------|--|-----------------------|
| | Excellent or good (2209) | Fair or poor (1377) | Excellent or good (3320) | Fair or poor (300) |
| Regular medication | 40.4 | 75.2 | 8.0 | 31.0 |
| 'Other conditions' (OC) | 26.4 | 34.4 | 25.3 | 48.0 |
| OC + treatment | 10.8 | 25.6 | 4.7 | 23.3 |
| Angina | 20.5 | 54.5 | 1.7 | 13.5 |
| Possible myocardial infarction | 3.5 | 15.6 | 0.8 | 4.3 |
| Current smokers | 36.9 | 52.6 | 29.5 | 48.3 |
| Breathlessness (all grades) | 14.7 | 38.6 | 7.3 | 23.0 |
| Off work ≥ 1 month | 23.0 | 46.1 | 12.0 | 33.5 |
| Given up drinking | 3.8 | 7.3 | 5.1 | 8.8 |

after taking into account these factors, indicating that the increased mortality risk in those who perceived fair or poor health is to a large extent accounted for by these factors. The higher mortality rate still seen even after adjusting for these variables is likely to reflect the nature and severity of the underlying disease. It was observed that life-threatening diseases were most strongly associated with poorer health perception. Indeed, among men with recall of ischaemic heart disease mortality rates were high irrespective of the level of perceived health. In addition those with diseases and on medication were more likely to perceive poorer health than those with disease but not on treatment, reflecting the severity of disease and/or the side-effects of medication. Those prospective studies that have considered physical health status at baseline as a potential confounder have simply standardized for presence and type of disease in multivariate analyses and have not examined the relationship between self-perception and mortality stratified by those with and without disease.¹⁻³ Thus severity or degree of illness may not have been taken into account. In addition, with one exception, these studies have concentrated on the elderly i.e. 65 years and over and determinants of health perception in the elderly may well be different.

In those studies suggesting an independent effect of perceived health status on mortality, various explanatory mechanisms have been invoked.¹ Several studies have shown strong positive associations between mortality and psychosocial factors such as mental illness, depression or lack of social support.^{14,15} The present study was not specifically designed to address this issue and our data cannot wholly preclude an independent effect of adverse self-perception on mortality. However, there is strong indication that health perception in these middle-aged British men is predominantly determined by physical illness and that the association between health perception and mortality is likely to reflect the burden of underlying disease. The consistent finding of higher mortality associated with poorer health perception has significant implication for epidemiological research. The results from this study strongly suggest that a simple question on perceived health status is a useful indicator of health status in middle-aged men and appears to reflect their current health status. It could also be used in conjunction with objective health measures in clinical assessment, as it provides information which may not be revealed by objective measurements.

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