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Poor self-rated health and its associations with somatisation in two Australian national surveys

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ABSTRACT

Objectives: It is hypothesised that across two national surveys poor self-rated health will be independently associated with somatisation and will result in high rates of service use after adjusting for established diagnoses.

Design: Two cross-sectional population-based surveys were conducted in 1997 and 2007. The use of both surveys allowed replication of results.

Setting: Australia.

Participants: The 1997 and 2007 National Surveys of Mental Health and Well-Being were based on stratified, multistage area probability samples of persons living in private dwellings in Australia. The 1997 survey included 10 641 respondents aged 18–75 years, a response rate of 78%. The 2007 survey included 8841 respondents aged 16–85 years, a response rate of 60%.

Main outcome measures: Self-rated health.

Results: Approximately 15% of the Australian population rated their health as fair or poor in both surveys. The independent relationship between self-rated health and somatisation was replicated across both surveys in multivariate analyses. Individuals with negative self-rated health were 4.1 times as likely to screen positive for health anxiety (OR 4.1, 95% CI 2.8 to 5.9) and 3.4 times as likely to be diagnosed with neurasthenia (OR 3.4, 95% CI 2.2 to 5.2), when compared with individuals who rated their health positively. Individuals with negative self-rated health were also more likely to use health services after controlling for demographics and mental and physical illness.

Conclusions: These results confirm both of the study hypotheses: (1) that negative self-rated health was powerfully and independently associated with somatisation and (2) that this relationship manifested itself in high rates of service use, even after adjusting for an extensive range of demographics and psychiatric and physical conditions.

ARTICLE SUMMARY

Article focus

- The current study tests the relationship between self-rated health and somatisation, specifically neurasthenia and health anxiety, in two national surveys of the Australian population conducted in 1997 and 2007.

Key messages

- Negative self-rated health was powerfully and independently associated with somatisation.
- Negative self-rated health was associated with general health service use, hospitalisation and medication use, even after adjusting for an extensive range of psychiatric and physical conditions.

Strengths and limitations of the study

- The use of the two Australian national surveys conferred many advantages in terms of replication, sample representativeness, fully structured diagnoses of all the common psychiatric disorders, extensive assessment of service utilisation and the inclusion of a broad range of other clinical measures.
- The study relied on subjective rather than objective assessments of physical morbidity.
- Health anxiety was based on screening questions rather than a full diagnostic assessment.
- The surveys were cross sectional in nature, precluding an investigation of the direction of the relationships identified in the current study.

INTRODUCTION

Rating your health as excellent, very good, good, fair or poor seems a simple concept that is unlikely to contain surprises, but ratings of health as fair or poor are predictors of morbidity and mortality after adjusting for clinical health status.[1] Self-ratings of overall health are only modestly correlated with clinical assessments of medical status, but appear more closely related to psychiatric illness and aspects of personality such as neuroticism.[2–4] These findings are surprising given the evidence that suggests that respondents mainly have physical health problems in mind when asked to rate their global health status.[5] Thus, while the decision to rate global health positively or negatively is driven by psychological factors, it appears that respondents mainly consider physical health problems when

rating their global health status. These findings suggest that a dysfunctional preoccupation with physical health and disease-related concerns (termed 'somatisation' for ease of reading) may be particularly salient in the interpretation of global ratings of health status. Consistent with this hypothesis, hypochondriasis, somatisation and limitations in activities of daily living explain much of the variance in patient reports of overall health status.[4]

The current study tests the relationship between self-rated health and somatisation, specifically neurasthenia and health anxiety, in two national surveys of the Australian population conducted in 1997 and 2007. The strength of the current study therefore lies in the ability to replicate the findings across two large, epidemiological datasets that included structured diagnoses of the major mental disorders and similar measures of other clinical, demographic and service use variables. It is hypothesised that across both surveys: (1) poor self-rated health will be powerfully and independently associated with neurasthenia and health anxiety and (2) that this association will also manifest itself in high rates of reassurance seeking, reflected by high rates of service use independent of established psychiatric and physical diagnoses. To our knowledge, these hypotheses have not been tested using representative, population-based samples and never within the context of fully structured diagnoses of major psychiatric disorders.

METHOD

Sample

The 1997 and 2007 National Surveys of Mental Health and Well-Being (NSMHWB) were based on stratified, multistage area probability samples of persons living in private dwellings in Australia, excluding very remote dwellings.[6 7] The 1997 survey included 10 641 respondents aged 18–75 years, representing a response rate of 78%. Characteristics of non-responders were not explicitly examined in the 1997 survey. The 2007 survey included 8841 respondents aged 16–85 years, representing a response rate of 60%. A small, non-random follow-up study of the 2007 survey indicated that while the response rate had little effect at the aggregate level, there may have been some underestimation in the prevalence estimates for mental disorders in men and young people. The age and gender characteristics of both samples were weighted to match the age and gender distributions in Australia. Both surveys were designed to provide accurate estimates of the population prevalence of selected major mental disorders and the related service utilisation. The Australian Bureau of Statistics (ABS), the national government statistics agency, conducted both the 1997 and 2007 surveys. It provided an ethical review and approval for the surveys, including voluntary recruitment, rigorous confidentiality provisions and written informed consent. ABS operates under Australian National Legislation that mandates strict provisions for the ethical conduct of the agency's research. The methods for both surveys have been discussed in more detail elsewhere.[6 7]

Measures

The dependent variable in the current study was self-rated health, while the main independent variables were neurasthenia, health anxiety and service use (including medication use). In order to investigate the independence of the relationships between self-rated health and somatisation, several possible covariates were also examined. These included demographics and psychiatric disorders which have been shown to be related to health anxiety in a previous study of the 2007 NSMHWB,[8] as well as physical disorders to ensure that any relationships identified were not simply a reflection of actual health status.

Independent variable

Self-rated health

For the 1997 survey, each respondent was administered the 12-item Short Form Health Survey (SF-12), a widely used measure of health and well-being.[9] The first item of SF-12 required the respondent to rate their health in general, with responses categorised as 'excellent', 'very good', 'good', 'fair' or 'poor'. This question informs the physical component scale of SF-12[10] and, for the purposes of the current study, constituted the main outcome variable for the 1997 survey. In the 2007 NSMHWB, respondents were asked to rate their overall physical and mental health in two separate questions, with responses to both questions categorised as above. Given that the item used in the 1997 survey is weighted heavily towards physical well-being, the query regarding self-rated physical health was selected as the main outcome variable for the 2007 survey. Respondents were to rate their physical health before they were asked to rate their mental health in the 2007 survey. In both surveys, the questions regarding self-rated health were administered before questions about mental disorders and service use. To ensure sufficient power to detect differences in statistical analyses, the main outcome variables for both surveys were dichotomised into negative ('fair' or 'poor') and positive ('good', 'very good' and 'excellent') self-rated health. Grouping of these responses in such a manner is common practice in the self-rated health literature due to the similar survival probabilities within these collapsed categories.[11]

Dependent variables

Health anxiety and neurasthenia

The 1997 survey included a module on the International Classification of Diseases, 10th Revision (ICD-10) diagnosis for neurasthenia.[12] Meanwhile, the 2007 survey collected additional information on health anxiety.[8 13] The respondents were first asked whether they had ever worried a lot about serious illness, despite having reassurance from a doctor or medical specialist. If endorsed, the respondents were asked whether they

ever had a period of worry like this that lasted for 6 months or longer in the previous 12 months. These screening questions are most consistent with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) diagnosis of hypochondriasis,[14] addressing criteria A, B and E for this disorder. In the current study, it was not possible to address the criteria related to differential diagnosis (criteria C and F), or establish clinically significant impairment or distress specific to this disorder (criterion D). Consistent with a previous study of the 2007 NSMHWB, we refer to these questions as a screener for health anxiety, rather than as a proxy diagnosis of hypochondriasis.

Service use

In the 1997 survey, respondents were asked whether they had consulted with the following health professionals in the 12 months prior to the interview: general practitioners, radiologists, pathologists, physicians or other medical specialists, surgical specialists or gynaecologists, psychiatrists, psychologists, social workers or welfare officers, drug and alcohol counsellors, other counsellors, nurses, mental health teams, chemists for professional advice, ambulance officers or other health professionals. In the 2007 survey, respondents were asked about consultations with the following health professionals in the 12 months prior to the interview: general practitioners, psychiatrists, psychologists, mental health nurses, other professionals providing specialist mental health services, specialist doctors or surgeons, other professionals providing general services and complementary or alternative therapists. For both surveys, these service providers were dichotomised into general health service providers (ie, general practitioners and specialist doctors) and mental health service providers (ie, psychiatrists and psychologists). In both surveys, respondents were also asked about hospitalisations (overnight admissions) in the 12 months prior to the interview.

Related to service use, the current study also investigated the relationship between medication use and self-rated health. In the 1997 survey, the respondents were asked about their use of 23 separate medications in the 12 months prior to the interview, including pain relievers, sleeping tablets, prescription medications with abuse potential and medications for psychiatric illness. In the 2007 survey, respondents were asked about their use of medications in the 2 weeks prior to the interview, including sleeping tablets/capsules, tablets/capsules for anxiety or nerves, tranquillisers, antidepressants, mood stabilisers and other medications for mental health. For both surveys, respondents using one or more medications were compared with those who had used none.

Covariates

Twelve-month ICD-10 psychiatric disorders

Psychiatric diagnoses were assessed using the Composite International Diagnostic Interview (CIDI V.2.1 in 1997 and V.3.0 in 2007).[15 16] Both surveys included fully structured ICD-10 12-month diagnoses[17] of panic disorder, agoraphobia, social phobia, generalised anxiety disorder, obsessive compulsive disorder, post-traumatic stress disorder, major depression, dysthymia, bipolar disorder, alcohol use disorders (dependence and harmful use) and substance use disorders (dependence and harmful use). For both surveys, 12-month ICD-10 diagnoses were coded as absent or present based on standard CIDI diagnostic algorithms that fully operationalised ICD-10 inclusion and exclusion criteria, as well as ICD-10 hierarchical decision rules. The 1997 survey also included a screener for personality disorders (composed of screening questions for 12-month ICD-10 paranoid, schizoid, dissocial, emotionally unstable, histrionic, anankastic, anxious and dependent personality disorders). In the current analyses, individuals who screened positive for one or more personality disorders were compared with those who did not.

Physical disorders

The 1997 survey included information on self-reported physical disorders: asthma, chronic bronchitis, anaemia, high blood pressure, heart trouble, arthritis, kidney disease, diabetes, cancer, stomach or duodenal cancer, gallbladder or liver trouble and hernia or rupture. The chronicity of these conditions was not recorded. In the 2007 survey, a wider range of self-reported physical conditions were recorded: asthma, cancer, stroke, gout, rheumatism, arthritis, diabetes, heart or circulatory conditions, hay fever, sinusitis, emphysema, bronchitis, anaemia, epilepsy, oedema, hernias, kidney problems, migraine, psoriasis, stomach ulcer, thyroid trouble, tuberculosis and back or neck problems. In the 2007 survey, these conditions were only recorded if the respondent had experienced them for a period of 6 months or longer, thereby taking into account chronicity. For both surveys, respondents reporting one or more physical conditions were compared with those who reported none.

Demographics

For both surveys, the demographic variables of interest were sex, age (34 years and younger, 35–64 years, 65 years and over), country of birth (Australia, other English-speaking countries and non-English-speaking countries), marital status (married, separated/widowed/divorced and never married), education (post high school and no post high school education), employment (employed, unemployed or not in the labour force) and current smoking status (present or absent).

Statistical analysis

Weighted means, frequencies and logistic regressions were computed using Statistical Analysis System (SAS) Survey Procedures in SAS V.9.2,[18] which adjusted for the characteristics of the complex survey design using jackknife repeated replication methods for variance estimation. In order to select an appropriate multivariate model, the univariate relationships between self-rated

health and the covariates of interest were investigated. In this initial phase, a comparatively liberal, unadjusted p value of 0.05 was selected despite multiple comparisons, because the aim was to adjust for all possible covariates that may explain the relationships between self-rated health, somatisation and service use in multivariate analysis. Those covariates that were significantly related to self-rated health were included in multivariate models investigating the relationships between self-rated health, somatisation and service use. To control for multiple comparisons, a more conservative p value of 0.01 was selected for use in the multivariate analyses.

RESULTS

Prevalence of negative self-rated health

A total of 14.6% (SE=0.4) of respondents reported that their health was 'fair' or 'poor' in the 1997 survey, while 14.8% (SE=0.5) responded similarly in the 2007 survey. In both samples, approximately 30% of those with negative self-rated health reported one or more ICD-10 12-month mental disorder, compared with approximately 17% of those with positive self-rated health. Of those with negative self-rated health, 5.4% were diagnosed with ICD-10 neurasthenia in the 1997 survey, while 14.8% screened positive for health anxiety in the 2007 survey. Physical conditions were common among individuals reporting negative self-rated health (approximately 72% in the 1997 survey and 88% in the 2007 survey).

Univariate relationships between self-rated health and the covariates of interest

There were consistencies between the two surveys in terms of the relationships between negative self-rated health and the demographic variables of interest (table 1). When compared with individuals with positive self-rated health, those with negative self-rated health were more likely to be: older, separated/widowed/divorced, educated to the high school level only, not in the labour force and current regular smokers (see table 1 for relevant ORs for both surveys). As can be seen from table 2, the univariate associations between negative self-rated health and all covariates of interest were statistically significant in both surveys.

Multivariate relationships between self-rated health, somatisation and service use

Multivariate logistic regressions which included the effects of demographics, any physical condition and all ICD-10 psychiatric disorders were then conducted. After adjusting for the other variables in the model, individuals with negative self-rated health in the 1997 survey were 3.4 (OR 3.4, 95% CI 2.2 to 5.2; p<0.01) times more likely to meet criteria for neurasthenia, and 4.1 (OR 4.1, 95% CI 2.8 to 5.9; p<0.01) times more likely to meet criteria for health anxiety in the 2007 survey (table 3). In both surveys, after adjusting for demographics, any physical condition and all ICD-10 psychiatric disorders, individuals with negative self-rated health were more likely to have been hospitalised overnight and to have used mental health medications when compared with those with positive self-rated health. The multivariate relationship between self-rated health and the other service use variables (mental health service use and/or general health service use) was only statistically significant in the 1997 survey.

DISCUSSION

These results confirm both the study hypotheses: (1) that negative self-rated health was powerfully and independently associated with somatisation and (2) that negative self-rated health was associated with high rates of service use, even after adjusting for an extensive range of demographics, psychiatric and physical conditions. The current study provided a strong test of these hypotheses by replicating these findings in two epidemiological surveys of the Australian population.

Limitations

The use of the two Australian national surveys conferred many advantages in terms of replication, sample representativeness, fully structured diagnoses of all the common psychiatric disorders and extensive assessment of service. However, the surveys focused on mental health rather than physical health, which meant that objective assessments of physical morbidity were not available. However, others have found very little discrepancy between self-reported physical conditions and physician reported medical histories,[3] and most previous research investigating the correlates of negative self-rated health have relied upon similar self-reported measures of physical health problems.[1] Health anxiety in the 2007 survey was based on screening questions rather than on a full diagnostic assessment,[8] while personality disorders in the 1997 survey were also based on screening questions. Both surveys were cross sectional in nature, precluding an investigation of the direction of the relationships identified in the current study. To our knowledge, no prospective examination of self-rated health and somatisation has been undertaken, and the current results suggest that this may be a fruitful avenue for future research.

The majority of individuals with poor self-rated health reported the presence of at least one of the major physical conditions enquired about in either survey. These findings suggest that, in most cases, negative ratings of health may be partly justified in terms of physical illness. However, self-rated health was also related to somatisation, even after adjusting for physical illness and other psychiatric illnesses, suggesting that the perception of global self-rated health is also independently influenced by psychological factors. This finding is consistent with previous research.[2 4] One of the distinguishing features of somatisation is a pathological preoccupation with health and disease-related concerns, and negative self-rated health in the absence of physical and psychiatric diagnoses may reflect this aspect of somatisation.

Table 1 Univariate relationships between demographics and self-rated health in the 1997 (n=10 641) and 2007 (n=8841) Australian National Surveys of Mental Health and Well-Being

	1997 National Survey of Mental Health and Well-Being			2007 National Survey of Mental Health and Well-Being		
	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Poor self-rated health vs good self-rated health (ref) OR (95% CI)	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Poor self-rated health vs good self-rated health (ref) OR (95% CI)
Sex						
Male	51.9 (1.1)	48.8 (0.2)	Ref	50.5 (1.9)	49.5 (0.4)	Ref
Female	48.1 (1.1)	51.2 (0.2)	0.9 (0.8 to 1.0)*	49.5 (1.9)	50.5 (0.4)	1.0 (0.8 to 1.1)
Age (years)						
18–34	19.4 (1.2)	36.8 (0.3)	Ref	18.6 (1.4)	36.0 (0.3)	Ref
35–64	49.9 (1.3)	50.4 (0.3)	1.9 (1.6 to 2.2)*	57.0 (2.0)	50.6 (0.4)	2.2 (1.7 to 2.7)*
65–85	30.7 (1.1)	12.8 (0.3)	4.6 (3.8 to 5.5)*	24.4 (1.2)	13.4 (0.2)	3.5 (2.9 to 4.3)*
Country of birth						
Australia	72.1 (1.7)	75.3 (0.5)	Ref	73.3 (2.0)	72.8 (0.8)	Ref
Other English speaking countries	10.4 (0.9)	11.5 (0.4)	0.9 (0.8 to 1.2)	11.3 (1.4)	11.3 (0.4)	1.0 (0.7 to 1.3)
Other non-English speaking countries	17.5 (1.1)	13.1 (0.5)	1.4 (1.2 to 1.7)*	15.4 (1.8)	15.9 (0.8)	1.0 (0.7 to 1.3)
Marital status						
Married/de facto	62.1 (1.1)	65.7 (0.7)	Ref	54.4 (1.8)	52.8 (0.7)	Ref
Separated/ widowed/divorced	21.6 (1.2)	12.2 (0.3)	1.9 (1.6 to 2.2)*	21.6 (1.4)	13.3 (0.4)	1.6 (1.3 to 1.9)*
Never married	16.2 (1.2)	22.1 (0.5)	0.8 (0.7 to 0.9)*	24.0 (1.5)	34.0 (9.7)	0.7 (0.6 to 0.8)*
Education						
Higher education	34.7 (1.6)	49.6 (0.7)	Ref	56.2 (2.1)	56.3 (0.6)	Ref
No higher education	65.3 (1.6)	50.4 (0.7)	1.8 (1.6 to 2.1)*	53.8 (2.1)	43.7 (0.6)	1.5 (1.3 to 1.8)*
Employment						
Employed	33.6 (1.6)	68.6 (0.5)	Ref	45.5 (1.6)	68.7 (0.3)	Ref
Unemployed	5.6 (0.6)	3.9 (0.2)	3.0 (2.3 to 3.9)*	1.9 (0.5)	2.7 (0.1)	1.1 (0.6 to 1.9)
Not in labour force	60.8 (1.7)	27.5 (0.5)	4.5 (3.9 to 5.3)*	52.6 (1.6)	28.6 (0.3)	2.8 (2.4 to 3.2)*
Regular smoker (current)	30.7 (1.0)	21.9 (0.6)	1.6 (1.4 to 1.8)*	25.1 (1.8)	17.1 (0.7)	1.6 (1.3 to 2.0)*

*Statistically significant at p<0.05.

Table 2 Univariate relationships between physical and psychiatric disorders and self-rated health in the 1997 (n=10 641) and 2007 (n=8841) Australian National Surveys of Mental Health and Well-Being

	1997 National Survey of Mental Health and Well-Being			2007 National Survey of Mental Health and Well-Being		
	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Poor self-rated health vs good self-rated health (ref) OR (95% CI)	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Poor self-rated health vs good self-rated health (ref) OR (95% CI)
Physical disorders						
Any physical disorder	72.0 (1.2)	32.7 (0.6)	5.3 (4.6 to 6.0)*	87.9 (1.4)	65.6 (0.8)	3.8 (2.9 to 5.0)*
12-month ICD-10 psychiatric disorders						
Panic disorder	2.8 (0.5)	0.9 (0.1)	3.3 (2.1 to 5.3)*	5.6 (0.9)	2.0 (0.2)	2.8 (2.0 to 4.0)*
Agoraphobia	3.3 (0.4)	0.7 (0.1)	4.7 (3.1 to 7.1)*	7.8 (1.2)	1.9 (0.2)	4.3 (2.9 to 6.3)*
Social phobia	5.0 (0.6)	2.4 (0.2)	2.2 (1.7 to 2.8)*	11.6 (1.4)	3.6 (0.2)	3.5 (2.6 to 4.7)*
Generalised anxiety disorder	7.8 (0.8)	2.2 (0.2)	3.7 (3.1 to 4.5)*	6.0 (0.7)	2.1 (0.3)	2.9 (2.0 to 4.2)*
Obsessive compulsive disorder	0.7 (0.2)	0.3 (0.1)	2.8 (1.4 to 5.6)*	3.5 (0.7)	1.6 (0.2)	2.1 (1.3 to 3.4)*
Post-traumatic stress disorder	6.8 (0.7)	2.6 (0.2)	2.7 (2.1 to 3.5)*	11.1 (1.1)	5.6 (0.3)	2.1 (1.6 to 2.7)*
Major depression	13.2 (0.9)	5.6 (0.3)	2.6 (2.1 to 3.1)*	7.5 (1.0)	1.9 (0.3)	4.2 (2.8 to 6.3)*
Dysthymia	4.1 (0.7)	0.8 (0.1)	5.1 (3.4 to 7.8)*	4.7 (0.7)	0.7 (0.1)	7.1 (4.5 to 11.1)*
Bipolar disorder	–	–	–	4.9 (0.7)	1.2 (0.2)	4.1 (2.7 to 6.2)*
Alcohol use disorder	7.0 (0.5)	6.3 (0.3)	1.1 (0.9 to 1.4)	5.8 (0.9)	4.1 (0.4)	1.4 (1.0 to 2.2)*
Substance use disorder	3.5 (0.5)	1.9 (0.2)	2.0 (1.4 to 2.8)*	3.0 (0.6)	1.2 (0.1)	2.6 (1.5 to 4.4)*
Any personality disorder	12.4 (1.0)	5.4 (0.3)	2.5 (2.0 to 3.0)*	–	–	–

*Statistically significant at p<0.05.
ICD-10, International Classification of Diseases, 10th Revision.

Table 3 Univariate and multivariate relationships between somatisation and service use and self-rated health in the 1997 (n=10 641) and 2007 (n=8841) Australian National Surveys of Mental Health and Well-Being

	1997 National Survey of Mental Health and Well-Being				2007 National Survey of Mental Health and Well-Being			
	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Univariate Poor self-rated health vs good self-rated health (ref) OR (95% CI)	Multivariate Poor self-rated health vs good self-rated health (ref) Adjusted OR (95% CI)	Negative self-rated health Weighted prevalence, per cent (SE)	Positive self-rated health Weighted prevalence, per cent (SE)	Univariate Poor self-rated health vs good self-rated health (ref) OR (95% CI)	Multivariate Poor self-rated health vs good self-rated health (ref) Adjusted OR (95% CI)
Somatisation								
Neurasthenia	5.4 (0.6)	0.8 (0.1)	7.1 (4.8 to 10.6)*	3.4 (2.2 to 5.2)**	–	–	–	–
Health anxiety	–	–	–	–	14.8 (1.4)	2.4 (0.2)	7.1 (5.3 to 9.6)*	4.1 (2.9 to 5.9)**
Service use in past 12 months								
Mental health service	10.5 (0.9)	4.1 (0.3)	2.7 (2.1 to 3.6)*	2.5 (1.8 to 3.4)**	13.1 (1.5)	6.3 (0.4)	2.3 (1.7 to 3.0)*	1.3 (0.9 to 1.8)
General health service	93.5 (0.5)	84.2 (0.5)	2.7 (2.3 to 3.2)*	1.9 (1.6 to 2.4)**	90.9 (1.4)	81.5 (0.9)	2.3 (1.6 to 3.2)*	1.5 (1.0 to 2.2)
Mental or general health service	93.8 (0.5)	84.5 (0.5)	2.8 (2.3 to 3.4)*	2.0 (1.6 to 2.4)**	91.3 (1.3)	82.0 (0.9)	2.3 (1.6 to 3.3)*	1.5 (1.0 to 2.2)
Hospitalisations	25.4 (1.1)	10.6 (0.3)	2.9 (2.5 to 3.3)*	2.2 (1.9 to 2.7)**	18.5 (1.4)	9.0 (0.5)	2.3 (1.9 to 2.8)*	1.5 (1.2 to 1.9)**
Medications	38.5 (1.5)	13.5 (0.5)	4.0 (3.5 to 4.7)*	2.7 (2.3 to 3.2)**	24.1 (1.4)	9.5 (0.6)	3.0 (2.5 to 3.7)*	1.7 (1.3 to 2.1)**

Multivariate analysis adjusting for demographics, any physical condition and ICD-10 psychiatric disorders.
*Statistically significant at p<0.05.
**Statistically significant at p<0.01.
ICD-10, International Classification of Diseases, 10th Revision.

The current study also indicated that, independent of physical and psychiatric conditions, individuals with poor self-rated health used health services and medications at particularly high rates. High rates of service use independent of actual physical and mental problems need to be addressed. Given the relationship between negative self-rated health and somatisation, the high rates of service use among individuals with negatively perceived health may reflect reassurance seeking, a symptom central to hypochondriasis and related psychiatric disorders. Consistent with the current findings, previous research has found that negative self-rated health, as well as somatisation, hypochondriasis and medically unexplained physical symptoms, all contribute disproportionately to the growing demand for health services.[19] However, individuals presenting with these symptoms and disorders are also more likely to be dissatisfied with the services provided.[20 21] With regard to hypochondriasis specifically, high rates of service use result in consultations that are unsatisfactory and exasperating for both the doctor and the patient.[22] This tension most likely arises because patients are seeking physical explanations for their concerns, which are largely psychological in nature. Treatment of health anxiety has not been rewarding for either party, with anger on the patient's part that cure is not forthcoming and frustration on the clinician's part that reassurance and good advice are not beneficial. Consultations are often fraught. Patient and physician education regarding the psychological nature of health-related concerns, and the direction of patients to appropriate treatment options with minimal clinician involvement, may lessen such tensions in doctor–patient relationships. Internet-delivered cognitive behavioural therapy is effective for internalising disorders generally,[23–25] and has been shown to be effective for health anxiety specifically.[26 27] Internet-delivered cognitive behavioural therapy, which can be administered at low cost and with minimal clinician involvement, may be one way around the problems in the interaction between doctors and patients.

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Competing interests None.

Patient consent Obtained.

Ethics approval The Australian Bureau of Statistics.

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Data sharing statement The data for the 1997 and 2007 NSMHWB are public access files that can be accessed through consultation with the Australian Bureau of Statistics.

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