Original Article

Variables Determining Perceived Global Health Ranks: Findings from a Population-based Study

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Abstract

Objective: To assess variables associated with different perceived global health ranks in an older population. Materials and Methods: The Blue Mountains Eye Study was a population-based survey of residents aged ≥49 years in an area west of Sydney, Australia. Questions relating to demographic and socioeconomic indicators, limitations of daily living activities, medical history, hearing problems, exercise, smoking and alcohol consumption were asked in a standardised questionnaire at interview. Comprehensive eye examinations were performed. Self-rated health was assessed from a standard question and categorised as excellent, good, fair or poor. Associations were assessed using logistic regression models. Results: After exclusions, 714/3589 (19.9%) participants rated their health as excellent, 1969 (54.9%) as good, 766 (21.3%) as fair and 140 (3.9%) as poor. A wide array of study variables assessed showed significant associations with self-rated health. Compared with a self-ranking of good or excellent health, variables significantly associated in a multivariate model with a rank of poor health included: regular use of community support services, more than one hospital admission in the last 12 months, perceived inability to go out alone, difficulty walking, or history of angina, asthma or cancer. Variables significantly associated with a rank of fair health were broader and included socioeconomic status, sensory impairment, tinnitus, many chronic diseases and negative health behaviours, including smoking and heavy alcohol consumption. Conclusions: Our findings suggest that different sets of variables may influence people to rank their global health at different perceived levels.

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Key words: Blue Mountains Eye Study, Community support services, Cross-sectional study, Self-rated health, Sensory impairment

Introduction

In 1982, Mossey and Shapiro first demonstrated that global self-rating of health was a better predictor of 7-year survival than medical records or self-reports of medical conditions in participants of the Manitoba Longitudinal Study.[1,2] Since then, many population-based longitudinal studies have confirmed that global self-rated health remains an independent predictor of mortality, after adjusting for other factors known to predict mortality.[2] This finding has been consistently reported across many different populations.[3-14] Poor self-rated health has also been reported as a risk factor for hospital admission and nursing home placement.[15] Even among healthy and high-functioning elderly persons aged in their seventies, poor self-rated health remains a strong predictor of mortality and hospital or nursing home utilisation over a 3-year follow-up period.[16] A similar predictive value from self-rated health for mortality and use of health care services has also been reported in younger, middle-aged populations.[17,18]

What determines the self-ranking of health? When people are asked: "How would you rate your health in general: excellent, good, fair or poor?", there is no unique referent for comparison. Even though a comparison can be made with the age peers, the referent used by different individuals may vary. The specific referents used by individuals vary by age.[19] Persons with different ages, gender, race and

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educational backgrounds were reported to rate their health status differently.[20-23] In older groups, physical health or the presence of chronic disease seemed to have a greater influence on the ranking than among younger adults.[20,21] In a longitudinal study of correlates with self-rated health in Australian women, Shadbolt[23] found that changes in self-assessed health were sensitive to chronic disease, and participants' self-ratings of health predicted subsequent diagnosis of chronic disease. However, the components included in a global self-ranking of health appear to involve more than just physical health and physical functions and are likely to be a multi-dimensional conceptual measure.[24-26] The components underlying self-rated health status and what people focus on in assessing their global health remain unclear.[23]

To our knowledge, few studies have assessed the potential contribution of sensory function impairment to the ranking of poor or fair self-rated health.[26,27] No previous studies have reported whether variables associated with self-rated health differ for poor and fair self-rankings of health. Despite the apparent usefulness of this measure, there have been only a few reports of self-rated health in large Australian population samples, including 2 recent studies[23,24] of 291 and 1687 women, respectively, and 1 study of a general older population sample of 1050 persons.[14]

The Blue Mountains Eye Study collected information about demography, socioeconomic status, medical history, need for help in performing daily living activities, physical and sensory functioning (particularly vision and hearing impairment) as well as health risk behaviours. We aimed in this report to assess the broad range of factors, including sensory impairment, that may be associated with self-ranking of health. We also wished to explore whether factors influencing a rank of either poor or fair were similar. This information could provide valuable insights about self-ranking of health.

Materials and Methods

Conceptual Framework and Hypotheses

Why do some older persons rate their global health as poor while others rate it as fair? Does the difference reflect purely the magnitude of the deterioration or does it reflect different aspects of dissatisfaction in a person's life? If the former, then we should expect to find a similar set of associated factors for poor and fair health ratings with the only difference being the magnitude of association. If the latter, then we should expect to find somewhat different sets of associations with the 2 ratings of reduced perceived health.

The conceptual framework for studies of the determinants of medical care utilisation by Andersen and Newman[28,29] was modified and used to guide the selection of potential associated factors with self-rated health. The original framework includes 3 study factor types: predisposing factors (e.g., age, education, living status), enabling factors (e.g., financial status or paying resource for use of services) and need factors (e.g., disabilities, impairments, health status). We have omitted enabling factors but have included health risk behaviours, such as smoking and heavy consumption of alcohol, as potential associated factors.

Study Population and Study Factors

The Blue Mountains Eye Study was a population-based survey of vision and common eye diseases in residents of a defined area, west of Sydney. The area, which comprises 2 postcodes, 2780 (Katoomba, Leura) and 2782 (Wentworth Falls), has a stable population fairly representative of Australia for ethnicity and measures of socioeconomic status,[30] but older compared with the New South Wales state average. The study was approved by the Western Sydney Area Human Ethics Committee and written, informed consent was obtained from all participants. Following a door-to-door census, all permanent residents of the 2 postcodes with birthdates prior to 1 January 1 1943 were invited to attend a detailed eye examination at the Blue Mountains District Hospital. Of 4433 age-eligible residents, 3654 (82.4%) participated from 1992 to 1994. The response rate was 87.9% after excluding people who died or left the area during the period of the survey and so could not be seen.

A standard questionnaire was administered by trained interviewers when participants attended the eye examination. Self-rated health status was assessed by asking a question with 4 possible answers:

For someone of your age, how would you rate your overall health – Would you say it is: excellent, good, fair, or poor?

Social-demographic measures were assessed and defined dichotomously. Average or high educational qualification was defined in persons with a trade certificate or higher qualification, using the Australian Standard Classification of Occupations.[31] Occupational prestige was assessed from participants' principal occupation using the Daniel Occupational Prestige Scale.[32] For scores below or equal to 4.0, occupational prestige was categorised as "average or high"; higher scores than 4.0 were categorised as "low". Scores in this population ranged from 1.4 to 6.7. Subjects were asked whether they owned or rented their home, and whether they lived alone, or with a spouse or with another person. A past history of angina, acute myocardial infarct, stroke, hypertension, diabetes, cancer, arthritis, gout and thyroid conditions was recorded. Participants were also asked whether they had been admitted to hospital in the last 12 months and whether they had a hearing problem. Smoking

status and alcohol consumption were assessed in detail. People who currently smoked were compared to ex- and never-smokers. Heavy drinkers (average consumption >4 drinks per day) were compared to persons who had none, light or moderate alcohol consumption. Walking exercise during the past 2 weeks was assessed.

Limitation in performing daily activities was assessed by asking questions about whether the participants felt able to go out alone or regularly used any community support services, including "Meals-on-Wheels", Home Care, or regular home visits by a community nurse. We assumed some limitation in performing daily living activities in persons who regularly used any community support services.

During the examination, height, weight and blood pressure were measured. Body mass index was calculated using the formula: weight (kg) / height (m)^2. Any difficulty in walking or use of a cane, walker or wheelchair at the clinic visit was assessed by 1 examiner and categorised as "walking disability". Best-corrected visual acuity was measured using a LogMAR chart after subjective refraction.[33] Visual acuity in each eye was recorded as the number of letters read correctly; from 0 (<6/60) to 70 (6/3). Visual impairment was defined using the best-corrected visual acuity of the better eye. Visual impairment was defined as none if vision (Snellen equivalent) was better than 6/12, mild if vision was 6/12 to 6/18 and moderate or severe when vision was 6/24 or worse. Moderate to severe visual impairment was compared to no or mild visual impairment in this report.

Statistical Analysis

Statistical analyses included chi-square statistic, Mantel-Henzsel tests for trend and logistic regression. Self-rated health was the outcome variable. Chi-square tests were used to assess whether the 4 ranks of self-rated health were linear or whether a sensitive cut point was present to partition the outcome variable dichotomously. For this purpose, the 4 ranks were dichotomised using 3 different cut points: poor vs other ranks, poor or fair vs good or excellent, and other ranks vs excellent. Age was also dichotomised into 3 different comparisons (<60 vs other ages, <70 vs other ages and <80 vs other ages) to assess age trends with the 4 ranks of self-rated health. Associations between self-rated health and each study variable were initially assessed in age-sex adjusted logistic regression models. Three multivariate logistic regression models were then constructed using backward and stepwise procedures, to assess factors significantly associated with: 1) poor compared to good or excellent self-rated health, 2) fair compared to good or excellent self-rated health, and 3) poor compared to fair self-rated health only. Interaction terms were examined with no significant interactions found in the 3 final logistic regression models. Odds ratios (OR), 95% confidence intervals (CI), adjusted R^2 and goodness-of-fit statistics from the logistic regression models are presented.

Results

After excluding 65 people with missing data on self-rated health status, 3589 participants (98.2%) were included in the analysis, including 714 (19.9%) participants who rated their health as excellent, 1969 (54.9%) as good, 766 (21.3%) as fair and 140 (3.9%) as poor. The age-gender specific proportions of different ranks are shown in Table 1 and Figure 1. A significant Mantel-Henzsel chi-square test for trend (P <0.001) was present across the 4 ranks of self-rated health for each age group in both men and women. However, there were no gender differences in self-ranking of health for any age group.

In the univariate analyses (age-gender adjusted), apart from gender and history of thyroid disease, all of the study variables assessed showed a significant association with self-rated health, with significant trends across the 4 ranks

Table 1. Prevalence Rates of Self-rated Health Status by Age and Gender in the Blue Mountains Eye Study population

	Self-rated health status (n = 3589)*			
	n (%)			
Age (y)	**Excellent (19.9)**	**Good (54.8)**	**Fair (21.3)**	**Poor (3.9)**
Male and Female				
<60 (n = 1011)	235 (23.2)	555 (54.9)	195 (19.3)	26 (2.6)
60-69 (n = 1291)	263 (20.4)	721 (55.9)	258 (20.0)	49 (3.8)
70-79 (n = 943)	152 (16.1)	521 (55.3)	228 (24.2)	42 (4.5)
80+ (n = 344)	64 (18.6)	172 (50.0)	85 (24.7)	23 (6.7)
P value for χ^2 with 9 degrees of freedom		0.001		
Female, n = 2033				
<60 (n = 569)	136 (23.9)	307 (54.0)	108 (19.0)	18 (3.2)
60-69 (n = 712)	147 (20.7)	399 (56.0)	140 (19.7)	26 (3.7)
70-79 (n = 546)	87 (15.9)	304 (55.7)	134 (24.5)	21 (3.9)
80+ (n = 206)	38 (18.5)	104 (50.5)	51 (24.8)	13 (6.3)
P value for χ^2 with 9 degrees of freedom		0.001		
Male, n = 1556				
<60 (n = 442)	99 (22.4)	248 (56.1)	87 (19.7)	8 (1.8)
60-69 (n = 579)	116 (20.0)	322 (55.6)	118 (20.4)	23 (4.0)
70-79 (n = 397)	65 (16.4)	217 (54.7)	94 (23.7)	21 (5.3)
80+ (n = 138)	26 (18.8)	68 (49.3)	34 (24.6)	10 (7.3)
P value for χ^2 with 9 degrees of freedom		0.001		

* 65 persons with missing data excluded

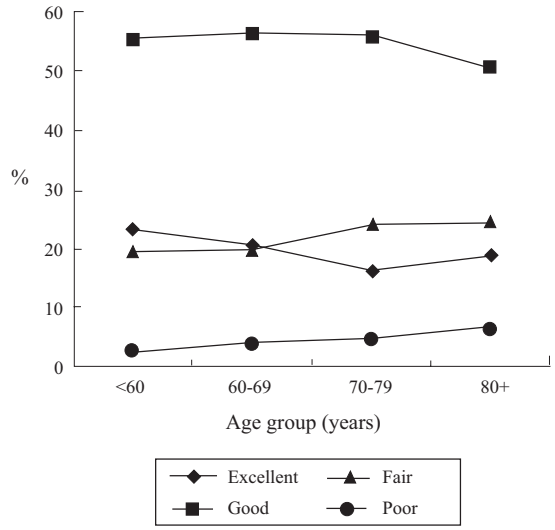

Fig. 1. Self-rated health by age group in the Blue Mountains Eye Study Population.

(Table 2). Variables statistically significantly associated with self-ranking of health included demographic, socioeconomic and daily activity limitation variables, sensory impairment, chronic diseases and health risk behaviours.

All study variables were then assessed in multivariate-adjusted logistic regression models. Variables significantly associated with *poor* compared to *good* or *excellent* self-rated health were: >1 hospital admission in the last 12 months, regular use of any community support service, perceived inability to go out alone, difficulty with walking, a history of angina, asthma, or cancer and failure to do any walking exercise in the past 2 weeks (Table 3). A broader range of factors were significantly associated with *fair* compared to *good or excellent* self-rated health. These included socioeconomic variables, sensory impairment, many chronic diseases, as well as health risk behaviour variables (Table 4). Only 4 variables overlapped in the 2 multivariate models: history of angina and asthma, >1 hospital admission in the past 12 months and failure to do any walking exercise in the past 2 weeks (Tables 3 and 4).

After excluding people with good or excellent self-rated health, variables found significantly associated with poor compared to fair self-rated health were: regular use of any community support service, walking difficulty, a history of asthma or cancer, and more than one hospital admission in the last 12 months (Table 5). The adjusted R^2 and goodness-of-fit statistics of these 3 models are shown in Tables 3, 4 and 5 respectively.

Discussion

Responses to questions about self-rated health have typically been categorised by past studies into 4 or 5 ordered ranks, with a numerical score attached to each rank. Previously, such scores were often treated as a continuous variable[34] and multiple regression models used in analyses,[20,21,35,36] while some past studies employed factor

Table 2. Associations Between Study Variables Assessed and Self-ranking of Health (Univariate Analyses)

Variable	Self-rated Health (% with each rank among persons with/without the variable)				*P* value
	Poor	Fair	Good	Excellent	χ^2 for trend
Demographic variables					
Age (per year)					0.001
Gender					0.709
Female	3.8	21.2	54.9	20.1	
Male	4.0	21.4	54.9	19.7	
Living status					0.017
Alone	5.0	22.4	54.3	18.4	
With other person(s)	3.5	20.9	55.1	20.5	
Marital status					0.001
Not currently married	5.2	23.3	53.4	18.1	
Currently married	3.1	20.2	55.8	20.9	
Socioeconomic variables					
Home ownership					0.001
Not owning home	6.0	29.3	52.1	12.5	
Home owner	3.5	20.2	55.5	20.7	
Qualifications obtained					0.001
Lower than trade certificate	4.9	24.9	52.6	17.6	
Trade certificate or higher	2.8	17.2	57.5	22.5	
Main job prestige					0.001
Low	4.9	25.8	52.4	16.9	
Average or high	3.0	18.6	56.6	21.8	
Daily activity limitation variables					
Meals-on-Wheels					0.001
Regular use	25.5	35.3	35.3	3.9	
Not using	3.4	21.1	55.5	20.1	
Community nurse home visit					0.001
Regular visits	24.2	37.1	33.9	4.8	
Not using	3.3	20.9	55.6	20.2	
Community home help services					0.001
Regular use	22.1	29.7	39.3	9.0	
Not using	3.0	20.9	55.8	20.4	
Any community services					0.001
Regular use	19.2	30.2	42.3	8.2	
Not using	2.9	20.8	55.8	20.5	
Support from community or family					0.001
Needed regularly	15.4	31.3	42.3	11.0	
Not needed regularly	2.8	20.4	56.3	20.6	
Perceived ability to go out alone					0.001
Not able to	24.0	40.0	30.0	6.0	
Able to	4.1	22.6	53.7	19.6	

Table 2. Contd.

Variable	Self-rated Health (% with each rank among persons with/without the variable)				*P* value
	Poor	Fair	Good	Excellent	χ^2 for trend
Sensory impairment					
Visual impairment					0.001
Moderate to severe	14.0	34.9	44.2	7.0	
None or mild	3.9	21.1	55.0	20.1	
Hearing problem					0.001
Moderate to severe	6.3	29.1	48.6	16.0	
None or mild	3.4	19.9	56.0	20.7	
Visual or hearing impairment					0.001
Moderate to severe	6.7	29.0	48.7	15.6	
None or mild	3.3	19.8	56.1	20.8	
Tinnitus					0.001
Present	4.8	26.9	53.5	14.8	
Not present	3.5	19.6	55.4	21.5	
Chronic diseases					
More than one hospital admission in last 12 months					0.001
Yes	20.1	32.4	41.0	6.5	
No	3.2	20.8	55.7	20.2	
Walking difficulty					0.001
Present	16.7	30.7	40.6	12.0	
Not present	2.9	20.6	56.0	20.5	
One or more falls in last 12 months					0.001
Falls	7.1	25.3	52.2	15.3	
No falls	2.7	20.0	56.2	21.3	
History of angina					0.001
Present	10.3	37.4	44.4	7.9	
Not present	3.0	18.8	56.4	21.7	
History of stroke					0.001
Present	9.9	35.9	42.0	12.2	
Not present	3.6	20.5	55.6	20.4	
History of acute myocardial infarction					0.001
Present	9.1	33.4	48.0	9.4	
Not present	3.4	20.0	55.6	21.0	
Episode of blood loss or sharp fall in blood pressure					0.001
Present	7.0	34.9	41.5	16.5	
Not present	3.5	20.0	56.1	20.3	
History of hypertension					0.001
Present	4.4	26.7	55.4	13.4	
Not present	3.5	17.8	54.7	24.0	
History of diabetes					0.001
Present	7.6	37.3	48.1	7.1	
Not present	3.7	20.3	55.3	20.7	
History of arthritis					0.001
Present	5.4	26.9	54.1	13.6	
Not present	2.4	15.8	55.9	26.0	
History of thyroid disease					0.448
Present	3.8	20.4	59.8	16.0	
Not present	3.9	21.3	54.5	20.4	

Table 2. Contd.

Variable	Self-rated Health (% with each rank among persons with/without the variable)				*P* value
	Poor	Fair	Good	Excellent	χ^2 for trend
Chronic diseases					
History of gout					0.001
Present	5.9	32.1	47.6	14.5	
Not present	3.4	19.5	56.7	20.5	
History of asthma					0.001
Present	8.0	30.8	49.0	12.3	
Not present	3.3	19.6	57.1	20.0	
History of migraine headache					0.003
Present	5.1	23.0	54.6	17.4	
Not present	3.5	20.8	55.0	20.7	
History of cancer					0.001
Present	9.6	24.1	50.8	15.5	
Not present	3.4	21.0	55.3	20.4	
Health risk behaviour variables					
Obesity (BMI ≥30)					0.001
Present	4.5	29.1	52.6	13.8	
Not present	3.8	19.7	55.4	21.2	
Walking exercise in the past 2 weeks					0.001
No	5.8	29.3	49.8	15.1	
Yes	2.3	16.2	58.5	23.0	
Current smoking					0.001
Current smoker	6.9	26.7	52.0	14.4	
Never or past smoker	3.4	20.3	55.4	20.9	
Alcohol consumption (drinks per day)					0.012
None	5.8	23.1	51.6	19.6	
Light (<1)	3.1	20.5	55.7	20.7	
Moderate (1-3)	2.2	18.1	58.6	21.1	
Heavy (4 or more)	1.6	34.4	53.9	10.2	
Alcohol consumption (current drinkers vs others)					0.001
Current	2.6	20.2	57.0	20.2	
Never/past	5.9	23.0	51.6	19.5	
Alcohol consumption (heavy drinkers vs others)					0.003
Heavy	1.6	34.4	53.9	10.2	
None/light/moderate	3.7	20.7	55.1	20.4	

analysis.[25,37,38] However, as scores representing ranks of self-rated health are not true continuous variables, multiple regression assumptions could be violated.

In the majority of studies reported during the last 10 years, logistic regression techniques have been used after dichotomising self-rated health ranks.[24,39] This is appropriate in view of the categorical nature of self-rated health and confirmed the choice of logistic regression in our study. When an ordinal regression model was applied to fit our data, most models yielded a *P* value of less than 0.05 for the

Table 3. Variables significantly associated with poor compared to good or excellent self-rated health (multivariate logistic regression model, excluding subjects with fair self-rated health)

Variable	Multivariate adjusted odds ratios (95% confidence intervals)
Daily activity limitation variables	
Use of any community support service	4.3 (2.1-9.0)
Perceived inability to go out alone	4.2 (1.3-13.4)
Chronic diseases	
More than one hospital admission in last 12 months	7.3 (3.5-15.0)
Walking disability	3.0 (1.5-6.0)
History of angina	4.8 (2.7-8.3)
History of asthma	2.9 (1.6-5.3)
History of cancer	2.8 (1.4-5.5)
Health risk behaviour variables	
No walking exercise in past 2 weeks	1.8 (1.1-3.1)

adjusted R^2 for this model is 0.2880, goodness-of-fit statistic = 1.9496 with 3 degrees of freedom (P = 0.5829).

proportional odds assumption, confirming the inappropriateness of ordinal regression.

Past studies have consistently shown that age modifies the association found between disabilities and self-rated health.[20,21,34,37,39,40] Older respondents may give disproportionately positive subjective health assessments, or in other words, some older elderly persons may be more likely than younger elderly persons to rate their health as excellent or very good at a given level of chronic disease or functional disability.[37,40] Findings from our study population confirmed this phenomenon. After age 75, the proportion of persons rating their health as either excellent or poor increased while the proportion rating their health as good decreased (Fig. 1). In the 2 multivariate models comparing a self-rating of either poor or fair to a rating of good or excellent health, age became non-significant. Why does the perception of health apparently change for the better or at least not decline as many people grow older? Idler[40] summarised theories put forward to explain this phenomenon in terms of a reference group, birth cohort differences and survivorship. In our study, a reference group (age peer) was included in the question, "For someone of your age, how would you rate your overall health ..."[21] It seems unlikely that birth cohort differences in general perceptions about health could explain the age trends observed in a number of earlier[20,21,34,41-43] as well as in some more recent studies.[40,44] Hoeymans et al[45] used time-series analyses to examine longitudinal data from the Zutphen Elderly Study and found changes in self-rated health over time but no birth cohort effects were evident. Increased survivorship may provide a partial explanation, as suggested by Idler[40]: "Lifelong health optimists come to dominate the composition of their cohorts as they reach their eighties and beyond..."

Table 4. Variables significantly associated with fair compared to good or excellent self-rated health (multivariate logistic regression model, excluding subjects with poor self-rated health)

Variable	Multivariate adjusted odds ratios (95 % confidence intervals)
Socioeconomic variables	
Lower than trade certificate qualification	1.4 (1.1-1.7)
Sensory impairment	
Moderate to severe hearing problem or visual impairment	1.4 (1.1-1.9)
Tinnitus	1.3 (1.0-1.6)
Chronic diseases	
More than one hospital admission in last 12 months	1.7 (1.0-2.9)
History of angina	2.2 (1.7-2.9)
History of stroke	1.8 (1.2-2.7)
Episode of blood loss or sharp fall in blood pressure	1.7 (1.1-2.4)
History of hypertension	1.4 (1.2-1.8)
History of diabetes	1.8 (1.2-2.7)
History of arthritis	1.7 (1.4-2.1)
History of asthma	1.8 (1.4-2.4)
History of gout	1.4 (1.0-1.8)
Health risk behaviour variables	
Obesity (BMI ≥30)	1.5 (1.2-1.9)
No walking exercise in past 2 weeks	1.9 (1.5-2.3)
Current smoking	1.7 (1.3-2.2)
Alcohol consumption (4 or more drinks per day)	1.9 (1.2-3.0)

adjusted R^2 for this model is 0.1712, goodness-of-fit statistic = 2.2732 with 8 degrees of freedom (P = 0.9715).

Table 5. Variables significantly associated with poor compared to fair self-rated health (multivariate logistic regression model, excluding subjects with good/excellent self-rated health)

Variable	Multivariate adjusted odds ratios (95% confident intervals)
Daily activity limitation factors	
Use of any community support service	3.2 (1.7-5.7)
Physical health factors	
More than one hospital admission in last 12 months	2.8 (1.5-5.3)
Walking difficulty	2.6 (1.5-4.4)
History of asthma	1.8 (1.1-3.0)
History of cancer	2.2 (1.2-3.9)

adjusted R^2 for this model is 0.1511, goodness-of-fit statistic = 3.9187 with 3 degrees of freedom (P = 0.2704).

Krause and Jay[19] investigated what people think when approached with the self-rated health question. They reported that the conceptual domain varied with age, education and race, but not gender. Most,[18,22,27,35,44] but not all,[38,43] previous studies found no or only a minor gender difference in self-rated health. Our finding of no statistically significant gender difference is in keeping with the majority of studies.

Past studies have shown that self-rated health is highly correlated with objective health status,[34] disability and functional limitation[22,46] or current illness.[47] It has also been found to be correlated with sensory function, nutritional risk and mental health.[26] Mental health was not included in our dataset and we have not investigated nutritional risk or physical health status in this report. However, we have assessed an extensive array of factors from many different domains and confirmed that components involved in the measure of self-rated health are multi-dimensional and complicated.

A novel aspect of our study is the attempt to partition poor and fair self-rated health rankings to determine whether a different set of variables influences each of these 2 ranks. Two multivariate models were constructed to separately assess variables associated with a ranking of either poor or fair, using subjects rating their health as good or excellent as the reference group. Interestingly, there was minimal overlap of variables in the 2 models. We also directly compared subjects with poor to those with fair self-rated health, while excluding other subjects. Regular use of community support services, >1 hospital admission in the last 12 months, having difficulty in walking or a history of asthma and cancer were found to significantly contribute to a ranking of poor compared to fair health. Thus, variables limiting physical functioning or daily living activities as well as the presence of severe disease may be the main factors leading a person to rank his or her health as poor. On the other hand, a wider range of variables may lead people to rank their health as fair, including lower socioeconomic status, moderate to severe sensory impairment, many chronic diseases and behaviours known to increase health risk.

In a Swedish study, Lindgren et al[27] assessed factors related to perceived health and contentment in people aged 75 years or older. They reported that vision and hearing problems did not affect perceived health to any large extent, whereas mobility and sleeping problems had a greater impact. They found that contentment and perceived health were highly intercorrelated. The authors suggest that the most important factors related to perceived health were activity score, contentment and mobility problems. In our study, vision or hearing impairment did not appear to influence a person to rank their health as poor, but was associated with a ranking of fair health. Variables contained in our model for poor self-rated health could possibly cause considerable discontentment with life, while those in the model for fair self-rated health could reflect a milder level of discontentment.

What about the role of psychosocial factors, including life stress, in determining a person's perception of their health? Perhaps due to difficulty in measuring these factors, particularly in cross-sectional studies which can assess mental health status during a brief period only, there have been few studies of the relationship between self-rated health and psychosocial factors.[38,46] Evidence suggests a direct relationship between declining physical status and mental-health scores. Psychological adaptation among patients with chronic illness is remarkably effective and is fundamentally independent of specific diagnosis.[48] Functional deterioration may correlate with psychosocial decline, such as feelings of uselessness and an inability to plan for the future.[46] Late-life depression may also predict an increased 4-year mortality.[49] Given that self-rated health is a predictor of survival, independent of physical health or functioning,[2] components involved in self-perception of health are likely to include psychosocial and mental health variables. Indeed, the report by Stoller[38] suggests a stronger negative impact on health ranking from a person's psychological state than from his or her physical or functional status. Our study did not collect psychosocial data or information about mental health or cognitive status. In future studies, the inclusion of psychosocial, mental health and cognitive variables is likely to provide useful information about its interaction with physical health and functioning in determining how people rank their health.

In conclusion, our study of a large, fairly representative older Australian population has assessed a wide array of variables (apart from psychosocial factors and mental health status) that are likely to influence people to rank their health as poor or fair, rather than excellent or good. Our findings suggest that different sets of variables may influence people to rank their global health at different perceived levels.

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