

A quantitative approach to perceived health status: a validation study

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SUMMARY The current recognition of the importance of perceived health status as a predictor of need for, and utilisation of, health services has led to attempts to produce indicators which assess subjective rather than objective health problems. The development of the Nottingham Health Profile is described, together with a study which tested the validity of the instrument on four groups of elderly people differing in health status. The results showed that the profile was capable of discriminating between groups differing in terms of diagnosed chronic illness, number of consultations at primary care level, and physiological fitness. Age, sex, and marital status were not significant overall in affecting scores. In these elderly subjects, perceived health status accorded well with objective health status. Further tests of the profile are now taking place on younger groups of subjects.

Traditionally the health of populations has been measured in mortality, morbidity, consultation rates, use of services and so on. These measures, however, are acknowledged to have many limitations¹ and in recent years there has been a growing interest in sociomedical indicators, which try to assess health in terms of 'quality of life'.²⁻⁶

An individual's perception of his or her health status is coming to be seen as an essential adjunct to the traditional indicators in the assessment of health needs. Complex interactions of physical, emotional, and social conditions are known to be important in the aetiology of disease and indicators which ignore these are likely to be misleading.⁷⁻¹⁰

Current trends in medical care emphasise the role of the individual in prevention and self-care and also the sharing of health decisions between providers and consumers, or their representatives.¹¹ For such an approach to be successful, it is necessary for providers to be aware of health status from the consumer's point of view. The need to take account of functioning beyond the purely physical has been underlined by the work of Rosser and Watts,¹² who showed that great distress may be accompanied by minimal restriction of the activities of daily living. Conversely, the activities of everyday life may be severely attenuated while a person remains well in other respects.

One of the aims of a measure of health status is the supplementation of routinely collected statistics in order to provide a basis from which judgments can be made by political, professional, and administrative workers about 'need', 'disability', and 'distress'. Culyer¹³ has pointed out that such health status measures should avoid too high a degree of sophistication, which would make them difficult to obtain and hard to interpret. Outcome measures based upon 'ontological' health must be both sensitive enough for the assessment of the health needs of selected populations and also specific enough for the evaluation of health care provision for special groups.¹⁴

THE NOTTINGHAM HEALTH PROFILE

The Department of Community Health at Nottingham University has been developing an instrument designed to measure subjective health status. This instrument is short and simple enough to be included in a comprehensive health survey, and it is also sensitive to both short-term and long-term changes in subjective health status.¹⁵⁻¹⁸

The health profile consists of six packages, each referring to a separate area of functioning. An example from each package follows:

I have trouble getting up and down stairs or steps. (Physical mobility).

I'm tired all the time. (Energy).

I lie awake for most of the night. (Sleep).

I'm in constant pain. (Pain).

I feel there is nobody I am close to. (Social isolation).

I'm feeling on edge. (Emotional reactions).

The statements refer to departures from 'normal' functioning because, in the field of health especially, it is easier to obtain, record, and provide some measure of departures from the norm than it is to specify the norm itself. Respondents are asked to answer 'Yes' or 'No' according to whether or not they feel the item applies to them 'in general'. Within each package, statements have been weighted for perceived severity using a modified version of the Thurstone method of paired comparisons.¹⁹ There are nine statements referring to emotional reactions, eight to pain, eight to physical mobility, five to social isolation, five to sleep and three to energy level. (For a detailed description of the development of the Nottingham Health Profile see Hunt and McEwen.²⁰)

A highly problematic area in the development of subjective health indicators is that of the validation of the scores against other criteria. Some relationship between subjective and objective factors might be expected, but this relationship seems to vary between minimal and absolute and is, of course, highly dependent upon the topic under consideration. Some writers have found very little positive association between self-assessment of health and physician ratings^{21, 22} while others have found a large amount of agreement.^{23, 24} The greatest discrepancies between self- and physician ratings seem to occur in overall assessment of health; there is greater agreement on specific functions such as physical mobility. However, the issue of what constitutes 'objectivity' is itself a thorny one, especially in view of those studies which cast doubt on the accuracy and criterion validity of some 'hard' data.²⁵⁻³⁰

Thus, it may be more efficient to adopt the pragmatic approach of choosing not that which is 'true' in some absolute sense, but rather that which is most useful in providing comparative criteria.

THE NATURE OF THE VALIDATION STUDY

At a minimal level a health status measure should be able to distinguish between different degrees of health, so the aim in the present study was to test the construct validity of the six packages of the profile by observing the power of the scores to discriminate between four groups of elderly people, each with a different health status. The study was also designed to look at the contribution to the scores on the packages of age, sex, marital status, and whether or not the respondent lived alone.

The elderly were chosen for a number of reasons. Previous studies have found them to have unmet physical, social, and emotional needs,³¹ and to have a tendency to under-report problems to professional agencies, seeing their discomforts as the natural concomitants of ageing.³²⁻³⁴ They are therefore a particularly interesting group from the point of view of perceived health status. Indeed, Linn³⁵ has called for the development of an instrument which would allow us to identify those elderly people who may need medical or social help or both and those whose decrements are due to normal 'healthy' ageing. A second reason is that the over-60s would be the age group most likely to have difficulty in understanding and responding to the statements. They therefore provide a more severe initial test of the profile than would groups of younger people.

Method

Two groups of elderly people were selected who were thought to differ in objective health status. Two groups who were available for study were added, making four in all.

Group A consisted of 50 men who were participating in a physical exercise programme. Physiologists had judged these men to be 'fit' and 'active' based on their exercise heart rates while undertaking bicycling and walking tests.

Group B included 28 people selected from a one-in-four sample of the patients of one general practice. They met the following criteria: (i) they had no diagnosed illness, and (ii) they had not visited their GP for at least two months before their selection. They were assumed to be well.

Group C consisted of 49 people who attended a luncheon club run by the social services. The physical health of these subjects varied considerably, but most had some degree of physical, social, or emotional disability.

Group D were selected in the same way as Group B, but using the following criteria: (i) they had at least one diagnosed chronic disease (for example, rheumatoid arthritis, chronic bronchitis, heart or circulatory disorders), (ii) their condition had lasted or would last for at least 12 months, and (iii) their condition would be likely to produce symptoms and impair well-being. Eighty-six people who satisfied these criteria were approached.

With the exception of Group C, who were met at the luncheon club, the initial contact with subjects was by a letter, accompanied by a stamped addressed return envelope. Of the 213 people approached, five had died or left the district and 167 agreed to be interviewed, giving an acceptance rate of 80%.

All subjects who agreed to take part were interviewed using the profile. In addition, they were given a short mental status test. Five people scored less than six points out of a possible eight and were dropped from the analysis. Table 1 shows the age and sex distribution of subjects in the four groups who were included in the analysis.

Table 1 Age and sex distribution of subjects interviewed

Group	No. in group	No. of males	No. of females	Age range (years)	Mean age (years)
A	40	40	0	63-72	68.9
B	19	6	13	60-78	68.5
C	49	5	44	63-93	74.4
D	54	19	35	60-83	73.0

ADMINISTRATION OF THE HEALTH PROFILE

All respondents were visited at home by trained interviewers and, after the initial introduction, were asked to look at the items one by one while the interviewer read them aloud. The respondent would then answer 'Yes' or 'No'. If there was some doubt or hesitation, the interviewer would say 'Remember, is this true of you in general?'

Results

Fig. 1 illustrates the mean scores of each group on the six packages. The higher the scores the greater the number and severity of perceived problems. The histograms show that the mean scores of Groups A and B were lower than those of Groups C and D.

Kruskal Wallis tests were carried out on the ranked scores of the four groups on each of the packages. Table 2 shows that there were statistically significant differences between the groups on all six packages. Mann Whitney 'U' tests were performed to see whether there were significant differences between Groups A and B, and also whether there were differences between Groups C and D. Only one difference reached statistical significance, on the sleep package, where there was a difference between Groups A and B in their ranked scores. For the purposes of further analysis Groups A and B were combined and called 'low scorers' and Groups C and D were combined and called 'high scorers'. These names were given for convenience only because, although the average scores for the groups were very different, there was considerable variability within groups. There were few differences in scores resulting from the demographic variables. Social class, age (under or over 70), and whether or not the respondent lived alone were not associated with scores on the packages. Three differences associated with marital status and sex were found. Within the

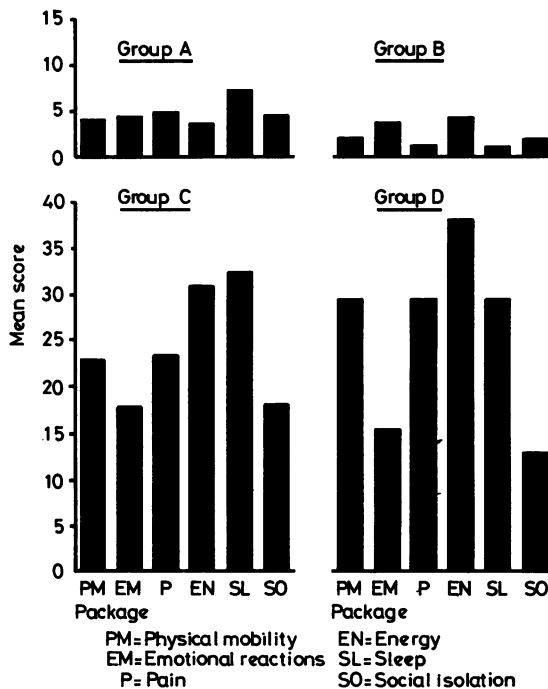


Fig. 1 Mean scores of each of the groups on the six packages.

Table 2 Differences between the ranked scores of the groups on the six packages

Package	All groups*	Groups	
		A and B†	C and D†
Physical mobility	H _c = 49.94 df = 3 P < 0.001	Z = 0.84 P = 0.20	Z = 0.88 P = 0.19
Energy	H _c = 32.32 df = 3 P < 0.001	Z = 0.04 P = 0.48	Z = 0.85 P = 0.20
Pain	H _c = 27.81 df = 3 P < 0.001	Z = 0.98 P = 0.16	Z = 0.85 P = 0.20
Emotional reactions	H _c = 13.64 df = 3 P < 0.005	Z = 0.51 P = 0.31	Z = 0.13 P = 0.45
Sleep	H _c = 37.27 df = 3 P < 0.001	Z = 2.27 P = 0.01	Z = 0.37 P = 0.36
Social isolation	H _c = 20.79 df = 3 P < 0.001	Z = 0.44 P = 0.33	Z = 1.35 P = 0.09

* Kruskal Wallis test † Mann Whitney 'U' test

'high scorers', married respondents were less likely than divorced or widowed respondents to score on the social package ($\chi^2=4.01$ df=1 $P < 0.05$). Again within the 'high scorers', women were more likely than men to score on the social scale ($\chi^2=4.13$ df=1 $P < 0.05$). Finally, in the 'low scorers' men were more likely than women to score on the sleep package (Fisher's exact probability test $P < 0.05$).

Analysis was also carried out of responses to individual items within packages. In general there was little association between the severity of the problem, as judged by its weight, and the number of respondents who answered it affirmatively. Correlation coefficients varied from $r=1$ for energy level (where there are only three statements) to $r=-0.5$ for social isolation. In this package the statement with the lowest weight was affirmed by only 3% of respondents.

The total number of statements on the profile which were affirmed by individuals is shown in Table 3. The maximum number of statements affirmed by an individual was 32, out of a possible 38. The median number of statements affirmed was four.

There was a clear bias towards affirming few statements. Of the 162 subjects, 31 (19%) affirmed no statements and a further 34 (21%) affirmed only one or two statements. There was a marked contrast in the number of statements affirmed by individuals in the 'low' and in the 'high' scoring groups. This difference is illustrated by the histograms in Fig. 2. A χ^2 test on the data in Table 3 provided a value of 47.26 with four degrees of freedom. The probability of a result as extreme as this occurring by chance is less than 0.001.

Discussion

In this paper we report on the first of a series of validation studies of the Nottingham Health Profile. This study has gone some way towards establishing convergent construct validity for the profile in so far as scores on the profile are able to discriminate between groups with different health statuses, that is, those with varying degrees of diagnosed chronic illness and of physical, social, and emotional

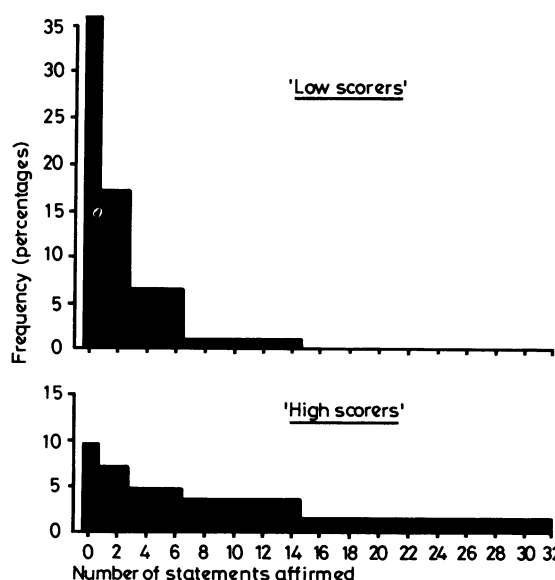


Fig. 2 Number of statements affirmed by the 'low' and 'high' scoring groups.

disability, and those who are physiologically fit or who have not recently sought medical intervention.

Age, sex, marital status, and whether or not the respondent lived alone did not appear to affect scores significantly. However, within the 'high scorers' married people were less likely to have social problems than the divorced and widowed—a possible reflection of greater social support in the presence of a spouse. Within this group, too, women were more likely than men to have social problems, which may be a consequence of role expectations, where men perceive themselves as needing to be more independent of others. There is also an interaction with marital status since a larger number of men had a living spouse. These differences were not evident in the 'low scorers', but in the latter, significantly more men than women reported sleep problems, a result contrary to most findings in sleep research.^{36 37} This apparent contradiction may be due to the fact that within this group the majority of men were drawn

Table 3 Number of statements affirmed

No. of statements	Frequency 'low scorers'	Frequency 'high scorers'	Total frequency	Total percentile
0	21 (35.6%)	10 (9.7%)	31	1-19
1-2	20 (33.9%)	14 (13.6%)	34	20-40
3-6	14 (23.7%)	19 (18.4%)	33	41-60
7-14	4 (6.8%)	28 (27.2%)	32	61-80
15-32	0 (0.0%)	32 (31.1%)	32	81-100
Total	59 (100%)	103 (100%)	162	

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from a population different from that for the women. There could be several explanations for finding that, contrary to logical expectation, there was no association between the number of respondents answering 'Yes' to an item and the perceived severity of that item. In the elderly, less severe problems may be seen as a part of normal ageing and not defined as problems at all. It may be that the less severe items are less common in the population, or it may be that the elderly do not suffer from certain kinds of problems represented by the less severe items. Finally, it is possible that the items within packages represent facets of a problem rather than a continuum from minor to severe. This is an area for future investigation.

At this stage of development it is not possible to say whether it is the presence of symptoms or the possession of a diagnosis which is responsible for producing a worse perceived health status. As Twaddle³⁸ has pointed out, the relationship between changes in health status and physiological changes is not a direct one since the latter first require interpretation. It is hoped to clarify this issue in future studies.

Although age does not seem to be a contributory factor to scores in this study, it seems likely that it would be an important sociomedical variable in a population with a greater age range. One of our aims for the future is to set up age and sex 'norms' for each section of the profile which would be necessary for comparative purposes, especially since health and illness are normatively defined.

Sociomedical indicators have been shown to be better explanatory variables of self-assessed health than socioeconomic or psychological indicators of well-being,³⁹ and our findings support the view that a person's perceived health status is realistic.⁴⁰ The instrument has shown itself to be simple and short enough to be acceptable to elderly persons. A study of consultants and non-consultants of GPs, embracing a larger population and a wider age range, is now being undertaken.

It would appear from our findings that the congruence between consumer and provider perspectives may be closer than imagined, but the development of measures which incorporate a consumer perspective will allow us to examine any discrepancies between the two and to illuminate analyses based upon traditional indicators. Patient report is a vital part of individual diagnosis and is likely to play an increasingly important role in the assessment of community needs.

Projected validation studies of the Nottingham Health Profile include comparisons of consultants and non-consultants of GPs and studies of patients before

and after medical intervention. The intervention studies are designed to test criterion validity. A study attempting to determine the reliability of scores on the profile is in progress. In this study the profile scores at different points in time of patients with relatively stable chronic conditions are being examined.

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