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# Understanding Self-Perceived Health in the Elderly*

## *An Analysis of 1986 Italian Data*

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**Abstract.** Measurement is one of the main problems to be dealt with when analysing health conditions. Diseases, disabilities, handicaps and other impairments, constantly affect the individual's state of physical, psychological and social well-being and interact to create the concept of illness. The numerous indicators in the current literature can therefore highlight totally different aspects of a given state of poor health. In this paper we analyze, using Italian data, the variables that influence the self-perceived health status with the aim of understanding the meaning of the indicator among people older than 65 years.

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**Résumé.** Lorsque l'on analyse les conditions de santé le principal problème à aborder est celui de leur mesure. Des affections, des infirmités, des handicaps et d'autres altérations de santé affectent en permanence le bien-être physique, psychologique et social des individus et interréagissent pour créer le concept de maladie. Les nombreux indicateurs que l'on trouve dans la littérature peuvent dès lors éclairer des aspects très différents d'un état de mauvaise santé donné. Dans cet article nous analysons, à l'aide de données italiennes, les variables qui influencent l'état de santé tel qu'il est perçu avec le but de comprendre la signification de cette mesure, parmi les individus âgés de plus de 65 ans.

## 1. Measuring health conditions

Descriptions of health conditions can vary for they depend to a large extent on conceptual methodological principles and on the nature of the data available. The differences and disparities which are thus likely to emerge will depend on the main

* The authors are both responsible for the whole paper, but, in particular, paragraphs 1 and 3 are due to S. Salvini and paragraphs 4 and 5 to F. Ongaro.

indicator (or the set of basic indicators) of the analysis (Riley, 1990; Murray and Chen, 1992).

Studies of differences in mortality rates based upon death and population statistics, have played a very important role in western countries for years. Life expectancy and mortality rates specific to age and causes of death are clear indices of the high standards achieved in general health conditions. Measures of mortality, on the other hand, tend to level out variability in the older age groups.

The morbidity area offers a more varied picture which can be described in different ways. One methodological approach distinguishes between observed morbidity and declared morbidity. Morbidity can be observed according to more or less rigorous protocols that can produce more or less objective informations (clinical screening). As it is difficult to observe morbidity, it is necessary to adopt tests, obtaining results that may be arbitrary. This approach is usually classified as objective (Blaxter, 1989). The declared morbidity is obtained by survey. Respondents (that may be the individual himself, a member of the household, the physician etc.) are asked to provide a report in response to inquiries regarding illness. This approach collects subjective data. The specific results obtained in this way are then grouped into different categories such as: symptoms and impairments, functional disability, handicap and so on. The results obtained from these surveys are sensitive to individual perception of illness and health conditions in a specific period of time. Therefore, the indicators obtained through this approach are conceptually complex and very difficult to apply with high validity and reliability (Murray and Chen, 1992).

Functional disability assessments, rather than identifying ailments, tend to highlight their pathological consequences (OMS, 1989).[1] This approach examines a series of tasks which is normally performed by the individual in the course of his daily routine. This method has, in the past ten to fifteen years, been thoroughly studied in the attempt to attribute self-sufficiency standards and in particular to obtain useful indices for grading serious individual cases and to map out policies of assistance in specific areas (Antonini et al., 1988).

Individual morbidity assessments are based upon answers given by respondents with regards to actual illness and to self-perceived states of health. The indicators derived from such a survey – the presence of acute or chronic illness; ailment symptoms; disability or impairment; and of conditions of health in more general terms – are, in reality, very different in nature. The index referring to self-perceived conditions of health, for example, is particularly difficult to interpret and assess. "Self-perceived morbidity may be due to the burden of pathology or to the illness perception and patterns of self-perceived morbidity are virtually impossible to attribute to either one interpretation or to the other" (Murray and Chen, 1992, p. 492). Nonetheless, recourse to this index fulfills more than one purpose: "first, perceived illness is by itself a major social phenomenon; secondly, self-perceived morbidity can provide critical information on the relevance of illness to the individual; and finally, changing of self-perceived morbidity may probably reflect the

variation of social "norms" in the burden of disease. Sudden changes in self-perceived morbidity may be due to changes of the burden of pathology" (Murray and Chen, 1992, p. 493). Essentially, therefore, this index can be seen as encapsulating general situations of physical and psychological malaise which cannot always be singled out in particular pathologies. To our mind, this is particularly true when analysing the health and social status of the elderly.

The aim of the present study is to understand the meaning of the index measuring the self-perceived health status in people of 65 years of age or more, assuming that this index may be the outcome both of the health condition (as measured by the reported symptoms or illnesses) and the psycho-social characteristics of the individual background (i.e. sex, age and level of education).

## 2. Data set and variables

In this paper we will make use of the data derived from the health survey carried out by ISTAT in 1986–87 (ISTAT, 1991), the third of its kind carried out in Italy.[2] The survey covers 77151 individuals, in 25427 households and representative of the Italian population, interviewed in 993 municipalities (Comuni) during the period November 1986–April 1987. The information has been supplied by a member of the family and in 47.7% of the cases it is the individual itself that answered the questions. The variables refer to the structural characteristics of population (such as age, sex, marital status, level of education, professional status, residence and so on) and to various aspects concerning state of health. The basic dimensions of health examined in the survey were self-perceived health, symptoms, acute and chronic illness, lack of self-sufficiency, the number of bed-days, the number of restricted activity days, medical care and the use of health services. We have examined only the first five dimensions. The data concerning health status refer to the last 4 weeks before the survey as regards the self-perception of the status of health, the presence of acute illness and symptoms. As regards the self-perception of health status, it was captured in the question: " *In the last four weeks, did you feel yourself to be healthy?*". According to this question, the percentage of males claiming to be healthy is 69.7 and the percentage of females is 63.3. Acute illness and symptoms following accidents are captured in the following question: " *In the last 4 weeks have you suffered from one or more diseases or consequences of accidents?*" and *"Apart from the answer you gave to the previous question, in the last 4 weeks have you suffered from one or more symptoms?"*. As concerns chronic illness, this is asked even if they have not suffered from any symptoms in the last 4 weeks before the survey. The information is captured in the question *"Apart from the answers you gave to the previous questions, do you suffer from one or more illnesses included in the following list?"*

Some descriptive results concerning male and female population according to various health indicators are included in Table 1. The acute diseases that persons to have suffered the most, concern the respiratory system, then the osteo-muscular

TABLE 1. Prevalence (percentage on population) of declared illness or symptoms according to sex, Italy, 1986–1987 – Rates higher than 3%

| Acute Illness | Males | Females |
|---|---|---|
| Respiratory system | 27,56 | 28,47 |
| Circulatory systems | 3,00 | 4,45 |
| Digestive system | 5,37 | 5,90 |
| Osteo-muscular, connective tissue | 8,45 | 13,65 |
| **Chronic Illness** | **Males** | **Females** |
| Hypertension | 4,83 | 7,66 |
| Other heart diseases | 2,68 | 3,85 |
| Respiratory insufficiency | 5,63 | 3,54 |
| Ulcer | 3,65 | 1,80 |
| Arthrosis, arthritis | 11,63 | 17,98 |
| Psychological ailments | 2,74 | 4,78 |
| **Symptoms** | **Males** | **Females** |
| Fever | 10,95 | 12,65 |
| Headache | 14,32 | 20,85 |
| Toothache | 5,66 | 6,18 |
| Articular pain | 12,62 | 16,41 |
| Dizziness | 1,61 | 3,43 |
| Tachycardia | 1,68 | 3,89 |
| Breathlessness | 2,61 | 3,65 |
| Cough | 11,85 | 10,81 |
| Insomnia | 2,79 | 4,90 |
| Depression, anxiety | 2,67 | 5,82 |
| Other symptoms | 3,04 | 4,11 |

and connective tissues and the digestive system. Generally the health status of population seems to be negatively influenced by a series of symptoms, of which the most common is headache. Chronic diseases affect all people whatever their age, both as concerns arthritis and arthrosis (in particular female population) and heart diseases. Also the percentages of persons who suffer from hypertension and respiratory insufficiency are high.

## 3. Health status of elderly by various indicators

The 1986–87 survey has made it possible to set up a number of indices which belong to the subjective-approach type and which can only partially be related to the functional approach. These indices, in particular, refer to subjective perceptions of health, reported presence of acute and chronic illnesses, symptoms of malaise,

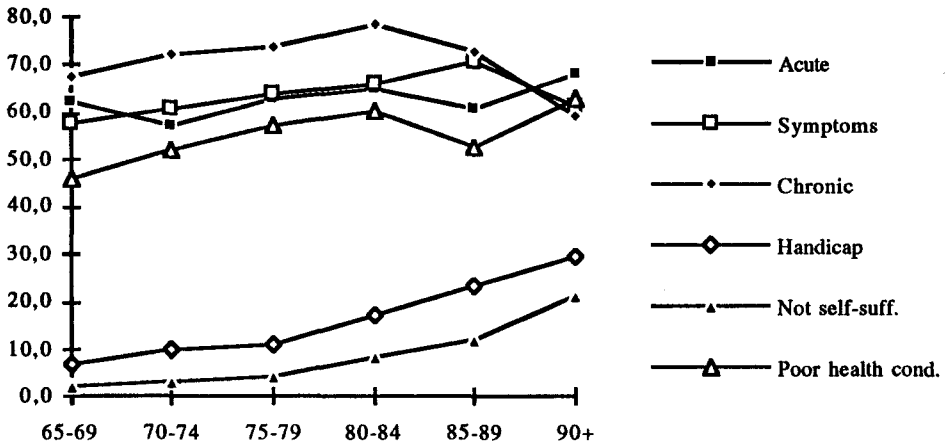


Fig. 1. Percentage of male population who reported poor health, according to various indicators, by age.

aspects of physical handicap and the consequent loss of self-sufficiency.[3] As we have already stated (Ongaro and Salvini, 1994), both the level and the age trends of the indices are different and consequently lead to varied health assessments (Figs. 1 and 2). Indices measuring ailments as reported by the respondents have been placed next to the index illustrating self perceptions of health. As concerns chronic illnesses we note that this index shows the highest rate of prevalence irrespective of age and sex-groups examined. This points to a situation of protracted illness. The graphs, showing symptoms and acute ailments, keep to slightly lower levels than those showing chronic illness. The lack of self-sufficiency which highlights the differences between those who are self-sufficient and those in need of assistance, has a much lower prevalence (which is however higher for women than for men). The index measuring the lack of functional self-sufficiency is, during the course of the analysis, privileged over that measuring the presence of handicap. This is done because this index is more homogeneous and therefore its effect on self-perceived conditions of health is easier to interpret. As far as the female population is concerned, the age trend of subjective perception is similar to that of acute illnesses and symptoms, though always on a slightly lower level.

In this paper we will verify if this index is particularly influenced by current factors and current health conditions. Even when chronic illnesses are declared, they influence the self-perceived health status only indirectly, when these combine with a particular malaise.[4]

If we compare self-perceived conditions of health to the presence of acute or chronic illnesses, we will see that amongst the men and women who suffer from chronic ailments (and not acute illness) only 17% of the men and 21% of the women claim that they are not in good health. On the other hand, psychological

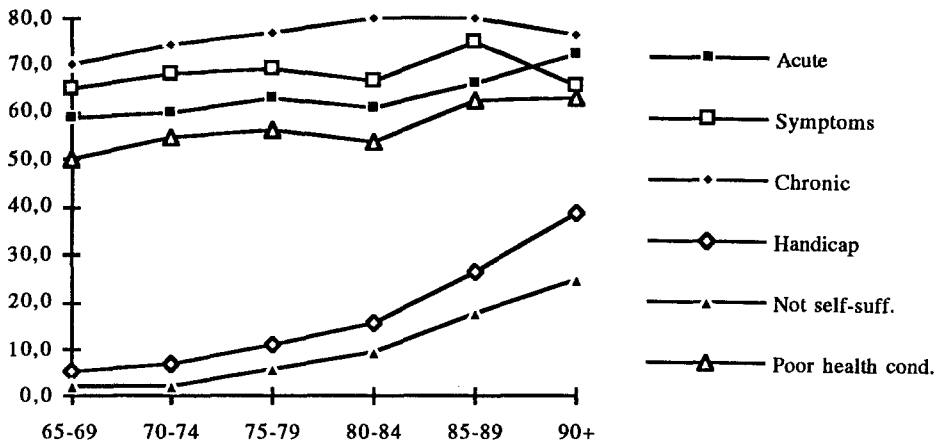


Fig. 2. Percentage of female population who reported poor health, according to various indicators, by age.

and physical malaise is reported by 70% and 75% (men and women) of those who, in spite of the fact that they do not suffer from any form of chronic disease, still claim that they suffer from acute ailments. This phenomenon can be explained in terms of the interactions between the symptoms (immediately perceived ailments) accompanying recently acquired ailments and self-perceived conditions of general health. More than 70% of those who claim that they suffer from acute but not chronic illness report pain but only less than half of those who suffer from chronic but not acute illness claim that they are in pain (Table 2). We may thus assume that contrary to reports of chronic illness where the individual has, so to say, got accustomed to pain, reports of acute illness show the individual in the process of a phase of pain which is relatively new to him and with which he has not, as yet, learned to cope. In short, the bond linking acute illnesses and symptoms to self-perceived conditions of poor health is much stronger than that linking the latter to chronic diseases.[5]

It is clear that subjective perceptions of health conditions are sensitive to a number of factors which affect the individual's response in terms of the varying quantity and the quality of the ailments in question. This means that the index could sum up – even if in relation to current conditions of health – the quality (in terms of their gravity) and the quantity of the ailments as perceived and filtered through the individual's subjective consciousness. If we examine the pattern of sickness episodes (symptoms and acute and chronic illnesses) separately in the male and female population we will see that, apart from those who have reported 1, 2, and 3+ cases of illness, on the whole many people (men and women in higher proportions) claim that they have suffered from a large number of illnesses. One can see that the less serious ailments (such as acute illness affecting both sexes

TABLE 2. Self-perceived health conditions and symptoms according to the presence of acute and chronic illnesses (per cent distribution, males and females 65 and over, Italy, 1986–1987).

| Illnesses | | Self-perceived health conditions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Males | | | Females | | |
| Chronic | Acute | Good | No good | N | Good | No good | N |
| No | No | 94.6 | 5.4 | 744 | 93.1 | 6.9 | 856 |
| | Yes | 24.5 | 75.5 | 371 | 29.6 | 70.4 | 432 |
| Yes | No | 82.8 | 17.2 | 936 | 79.1 | 20.9 | 1142 |
| | Yes | 16.6 | 83.4 | 1978 | 17.8 | 82.2 | 2785 |
| Illnesses | | Symptoms | | | | | |
| | | Males | | | Females | | |
| Chronic | Acute | No | Yes | N | No | Yes | N |
| No | No | 80.9 | 19.1 | 758 | 78.1 | 21.9 | 872 |
| | Yes | 26.3 | 73.7 | 381 | 25.3 | 74.7 | 442 |
| Yes | No | 58.3 | 41.7 | 944 | 50.5 | 49.5 | 1172 |
| | Yes | 13.1 | 86.9 | 2002 | 10.4 | 89.6 | 2836 |

in the form of arthrosis and arthritis; influenza and common cold; and chronic illnesses in the form of arthrosis and arthritis; respiratory insufficiency, in men, in particular; and hypertension in women, in particular), are more common and widespread, and the classification is unaffected by the actual number of ailments declared. Nevertheless, as the number increases, the more serious illnesses manifest themselves with more insistence amongst those who claim to suffer from at least two illnesses. For example if we consider, both in the chronic and acute area, the overall occurrence of the more serious illnesses, such as heart attack, we will see that 13.1 % of the women and 15.2% of the men examined have been affected by this disease. The higher the number of reported illnesses the more likely it is to find subjects who have had a heart attack. If the percentage of men who reported only one acute illness (heart attack) is equivalent to 12.3%, then this percentage doubles when the number of reported illnesses rises to 2 and reaches 39.5% when the number of reported ailments rises to 3 or more. This means that even the number of reported cases of illness can, to some extent, index the seriousness, both in qualitative and quantitative terms, of the clinical record.

There might obviously exist real inter-related, though perhaps not very evident, effects between pathological cases. A thorough analysis of the correlation coefficients as they occur in each group of illnesses might throw some light on this problem. In acute illness, as it affects the male population, the correlation between diabetes and heart attack is very high. As for the female population, the same proportional inter-relationship occurs, in chronic disease, between asthma and respiratory insufficiency the chronic disease area. The correlation thus highlighted can be seen as resulting not only from medical factors, but also from occurrence itself,

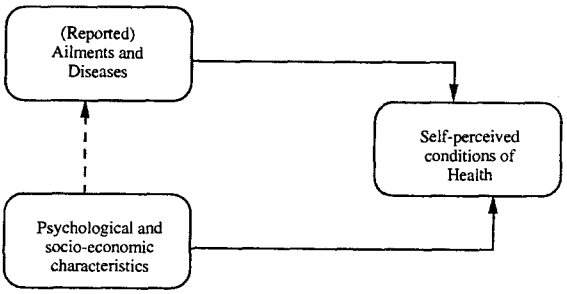


Fig. 3. Relationships among the variables used in the logistic regression model.

such as the case of hypertension and diabetes. In other words the more widespread the disease (or symptoms of illness), the more it is likely to be combined with another illness.

## 4. Determinants of self-perceived conditions of health

As already pointed out, self-perceived health reflects the subjective feeling of the person interviewed about health. The pathologies known and the ailments suffered by the individual are filtered in the light of his/her cultural and psycological characteristics. The result is a synthetical indicator, which predicts future health and mortality (Weinberger et al., 1986; Mossey and Shapiro, 1982). In order to distinguish which is the weight of each component in influencing the response given by the elderly to a questionnaire about their health conditions, a logistic regression model has been outlined. According to this model, self-perception (dependent variable) is related to two sets of variables. The first group (which represents the more "objective" and analytic dimension of the health status, as it is known by the aged person) is formed by: the number of symptoms; the number of acute illnesses; the number of chronic diseases; and the state of functional self-sufficiency reported by the individual. The second group consists of variables regarded as proxies of the psychological and socio-economic characteristics of the elderly (sex, age, living arrangement, education and geographic area of residence). Fig. 3 shows the relationships which are hypothesized among the variables.

The model hinges on three basic hypotheses. The first one is that the list of acute and chronic diseases reported by the elderly is a reliable indicator of what they know about their illnesses. This means that, out of embarrassment or discretion, the number of cases reluctant to report certain particular troubles is considered negligible. Moreover, assuming that the conditions observed in the course of clinical surveys are accurately described by the reports,[6] the first group of variables may be seen as a more "objective" way to represent health status.

The second hypothesis states that the number of ailments and the number of symptoms which affect the individual are relevant indicators even in terms of the

TABLE 3. Percentage of persons 65 and over that claimed symptoms in the last four weeks, according to the number of symptoms and sex, Italy, 1986–87

| | MALES | | | | FEMALES | | | |
|---|---|---|---|---|---|---|---|---|
| | Prevalence(*) | N. of symptoms | | | Prevalence(*) | N. of symptoms | | |
| *Type of symptoms* | | 1 | 2 | 3+ | | 1 | 2 | 3+ |
| Fever | 12.1 | 8.6 | 18.5 | 33.3 | 13.0 | 6.4 | 16.4 | 33.8 |
| Fainting | 1.6 | 1.0 | 1.3 | 5.2 | 2.3 | 1.2 | 2.0 | 6.4 |
| Headache | 17.1 | 9.8 | 24.7 | 51.6 | 23.4 | 13.9 | 32.2 | 57.2 |
| Toothache | 5.6 | 4.2 | 23.7 | 17.1 | 5.8 | 3.6 | 7.6 | 14.0 |
| Joint pain | 30.1 | 32.2 | 47.1 | 68.9 | 38.4 | 42.1 | 53.3 | 72.5 |
| Dizziness | 4.9 | 2.1 | 5.8 | 16.8 | 7.5 | 2.0 | 6.1 | 23.4 |
| Nausea | 1.9 | 0.5 | 2.2 | 6.7 | 2.9 | 0.3 | 1.4 | 10.0 |
| Vomiting | 1.8 | 0.4 | 2.5 | 6.1 | 2.4 | 0.5 | 1.1 | 8.2 |
| Hiccups | 1.1 | 0.3 | 0.4 | 4.5 | 0.6 | 0.0 | 1.1 | 2.3 |
| Diarrhoea | 2.4 | 1.1 | 1.6 | 8.8 | 2.4 | 0.5 | 2.0 | 7.5 |
| Icterus | 0.2 | 0.0 | 0.4 | 0.7 | 0.1 | 0.0 | 0.0 | 0.4 |
| Tachycardia | 7.0 | 3.2 | 7.3 | 24.1 | 10.7 | 4.4 | 9.7 | 31.1 |
| Breathlessness | 11.7 | 3.7 | 13.2 | 41.9 | 11.3 | 2.5 | 9.5 | 35.7 |
| Cough | 22.2 | 16.9 | 35.0 | 59.3 | 15.4 | 7.3 | 19.8 | 39.9 |
| Nose bleeding | 1.0 | 0.5 | 1.3 | 3.2 | 0.5 | 0.2 | 0.3 | 1.6 |
| Itching, skin problems | 2.8 | 1.0 | 3.7 | 9.2 | 2.5 | 0.8 | 2.2 | 7.5 |
| Insomnia | 8.6 | 2.6 | 10.9 | 30.0 | 13.3 | 3.8 | 13.1 | 39.6 |
| Depression, anxiety | 6.2 | 2.8 | 6.7 | 21.3 | 10.9 | 4.1 | 10.5 | 31.5 |
| Other symptoms | 7.3 | 9.1 | 11.1 | 15.3 | 7.9 | 6.4 | 12.6 | 16.0 |
| Number of individuals | 4085 | 1053 | 669 | 837 | 5322 | 1384 | 905 | 1353 |

(*) calculated on the total sample

seriousness of illness. Qualitative considerations can be overlooked when dealing with the elderly, who are normally affected by a great number of ailments. Moreover it has been noted that the higher the number of ailments, the more an individual is likely to succumb to one of the more serious diseases (Tables 3–5). Nevertheless, one must not forget that when ailments are considered only in terms of their quantity, residual qualitative aspects can be overlooked and be captured by social and demographic variables associated with them.

The third hypothesis concerns the relationships among the variables. Health conditions (both reported and perceived) are assumed to be dependent on social and demographic factors. This is generally true for age and geographic area of residence but not for education and living arrangement whose levels can be the result of the individual health status. Household structure, in particular, may be influenced by the conditions of health. In other words, people living alone may be a selected group because, even controlling the number of ailments, they suffer

TABLE 4. Percentage of persons 65 and over that declared to suffer acute illnesses in the last four weeks, according to the number of illnesses and sex, Italy, 1986–87

| | MALES | | | | FEMALES | | | |
|---|---|---|---|---|---|---|---|---|
| | | N. of acute illnesses | | | | N. of acute illnesses | | |
| *Type of acute illnesses* | Prevalence(*) | 1 | 2 | 3+ | Prevalence(*) | 1 | 2 | 3+ |
| Measles | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Hepatitis | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.2 |
| Typhoid | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Other contagious diseases | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 |
| Common cold | 16.1 | 14.8 | 27.4 | 52.1 | 14.4 | 9.8 | 26.8 | 46.2 |
| Pneumonia, pleurisy | 11.0 | 8.1 | 17.9 | 40.4 | 5.9 | 4.1 | 7.7 | 23.2 |
| Influenza | 12.2 | 10.4 | 21.3 | 40.4 | 12.0 | 9.9 | 19.5 | 40.0 |
| Other resp. infections | 5.5 | 2.6 | 9.0 | 22.5 | 2.9 | 1.7 | 2.9 | 13.2 |
| Cancer | 0.9 | 1.4 | 1.3 | 2.2 | 0.6 | 1.0 | 0.7 | 1.6 |
| Anaemia | 0.8 | 0.7 | 1.3 | 2.9 | 1.2 | 0.8 | 1.7 | 4.4 |
| Psychosis | 2.2 | 1.7 | 2.7 | 9.0 | 3.4 | 2.5 | 5.2 | 12.1 |
| Paresis and other diseases related to the nervous system | 4.3 | 3.7 | 5.5 | 16.4 | 4.4 | 3.1 | 6.7 | 15.6 |
| Heart attack | 13.1 | 12.3 | 24.0 | 39.5 | 15.2 | 11.4 | 26.8 | 48.6 |
| Caries | 8.1 | 8.0 | 12.0 | 27.3 | 8.1 | 4.9 | 13.3 | 29.7 |
| Nephritis | 5.7 | 4.7 | 7.8 | 21.8 | 3.2 | 1.9 | 4.7 | 12.8 |
| Diabetes | 4.2 | 2.7 | 7.7 | 15.3 | 6.3 | 3.9 | 10.6 | 22.8 |
| Skin disease | 1.7 | 0.9 | 2.3 | 7.5 | 1.8 | 0.6 | 2.8 | 7.8 |
| Arthrosis, arthritis | 26.7 | 24.4 | 54.4 | 75.5 | 35.5 | 39.2 | 66.1 | 83.8 |
| Other diseases | 1.5 | 1.4 | 2.3 | 5.3 | 1.9 | 1.7 | 2.4 | 6.8 |
| Bruises, fractures | 1.9 | 2.1 | 2.9 | 5.9 | 2.0 | 3.5 | 2.0 | 4.3 |
| Number of individuals | 4085 | 1105 | 691 | 587 | 5322 | 1546 | 965 | 767 |

(*) calculated on the total sample

less serious diseases, or have a more optimistic perception of personal health condition.[7]

Table 6 illustrates the results of a first logistic regression analysis[8] applied to both men and women. The two models were obtained by starting with the same group of explanatory variables and eliminating variables and interactions with statistically non significant effects, which were common to both sexes.[9] The analysis shows that self-perceived health status is sensitive to many factors.

Tables 7–8 illustrate the results of the two reduced models derived separately for males and females from those extended and not significantly different from them

TABLE 5. Percentage of persons 65 and over who claimed to suffer chronic illnesses, according to the number of illnesses and sex, Italy, 1986–87

| | MALES | | | | FEMALES | | | |
|---|---|---|---|---|---|---|---|---|
| | | N. of chronic illnesses | | | | N. of chronic illnesses | | |
| *Type of chronic illnesses* | Prevalence(*) | 1 | 2 | 3+ | Prevalence(*) | 1 | 2 | 3+ |
| Diabetes | 9.9 | 7.7 | 16.7 | 22.0 | 12.8 | 8.2 | 17.1 | 34.0 |
| Hypertension | 18.8 | 13.8 | 29.4 | 45.7 | 25.6 | 16.8 | 38.3 | 62.3 |
| Myocardial Infarct | 5.2 | 4.9 | 6.3 | 12.8 | 2.4 | 1.2 | 2.4 | 8.0 |
| Other heart diseases | 12.2 | 7.7 | 16.7 | 34.7 | 14.5 | 7.0 | 18.7 | 43.9 |
| Respiratory insufficiency | 23.4 | 16.0 | 32.7 | 63.6 | 11.5 | 4.8 | 14.1 | 36.8 |
| Asthma | 11.1 | 3.7 | 13.6 | 40.2 | 5.7 | 2.2 | 6.6 | 19.1 |
| Allergy | 2.3 | 1.2 | 2.3 | 7.9 | 2.1 | 0.8 | 1.9 | 7.6 |
| Anaemia | 0.6 | 0.2 | 0.8 | 2.2 | 1.4 | 0.5 | 0.8 | 6.0 |
| Cancer | 1.0 | 1.1 | 1.3 | 2.1 | 1.3 | 1.1 | 1.6 | 3.1 |
| Ulcer | 8.0 | 6.0 | 9.0 | 23.2 | 3.8 | 1.5 | 5.1 | 12.0 |
| Liver calculosis | 3.1 | 1.9 | 3.0 | 10.2 | 5.7 | 1.8 | 7.4 | 19.1 |
| Cirrhosis of the liver | 0.7 | 0.4 | 1.1 | 1.9 | 0.4 | 0.2 | 0.4 | 1.5 |
| Renal calculosis | 2.5 | 0.9 | 3.0 | 9.1 | 1.9 | 0.7 | 1.5 | 7.1 |
| Arthrosis, arthritis | 35.5 | 31.3 | 56.6 | 75.0 | 48.3 | 49.1 | 70.4 | 86.2 |
| Psychological ailments | 6.3 | 3.1 | 7.3 | 21.0 | 9.4 | 4.2 | 13.8 | 27.3 |
| Number of individuals | 4085 | 1390 | 832 | 724 | 5322 | 1902 | 1124 | 982 |

(*) calculated on the total sample

in a statistical sense.[10] The regression coefficients indicate that self-perceived health assessments are closely related to more "objective" and analytic measures of health.

The percentage of elderly people who claim to suffer from poor health rises in proportion with the increasing number of both acute and chronic illnesses, the increasing number of symptoms, and the lack of functional sufficiency. It is the presence of acute pathology and symptoms affecting the respondent in the month preceding the interview which most influences the elderly's self-perceived condition of health. The risk of reporting poor health by those reporting acute illnesses is up to 70 times as high for men (with three or more acute illnesses) and up to 40 times as high for women (with at least one acute illness) as that of those not affected by acute pathology. The presence of symptoms, too, negatively affects the conditions of health as perceived by the individual. In this case the probability of reporting poor health increases up to 14 times for males (with two or more symptoms) and up to 19 times for females (with three or more symptoms) with

TABLE 6. Regression coefficients in logistic regression models, dependent variable self-perceived health conditions: extended models for males and females

| | | MALES* | | | FEMALES** | | |
|---|---|---|---|---|---|---|---|
| Code | Variable | Coefficient | Standard Error | P | Coefficient | Standard Error | P |
| | Constant | −3.9284 | 0.2579 | 0.0001 | −3.8278 | 0.1907 | 0.0001 |
| | *Number of Symptoms* | | | | | | |
| SIN1 | 0 | 0.0000 | – | – | 0.0000 | – | – |
| SIN2 | 1 | 1.9627 | 0.2060 | 0.0001 | 1.5254 | 0.1821 | 0.0001 |
| SIN3 | 2 | 2.6059 | 0.2501 | 0.0001 | 2.4353 | 0.2030 | 0.0001 |
| SIN4 | 3+ | 2.7033 | 0.2828 | 0.0001 | 2.9560 | 0.2154 | 0.0001 |
| | *Number of Acute Illnesses* | | | | | | |
| ACU1 | 0 | 0.0000 | – | – | 0.0000 | – | – |
| ACU2 | 1 | 3.9144 | 0.2028 | 0.0001 | 3.5723 | 0.1835 | 0.0001 |
| ACU3 | 2 | 3.7591 | 0.3213 | 0.0001 | 4.0477 | 0.2810 | 0.0001 |
| ACU4 | 3+ | 4.3024 | 0.5873 | 0.0001 | 4.0053 | 0.5492 | 0.0001 |
| | *Number of Chronic Illnesses* | | | | | | |
| CRO1 | 0 | 0.0000 | – | – | 0.0000 | – | – |
| CRO2 | '1–3' | 0.3064 | 0.1129 | 0.0066 | 0.4825 | 0.0980 | 0.0001 |
| CRO3 | >3 | 0.8989 | 0.2437 | 0.0002 | 0.4054 | 0.1840 | 0.0276 |
| | *Functional Ability* | | | | | | |
| AUT1 | Total or partial | 0.0000 | – | – | 0.0000 | – | – |
| AUT2 | No funct. ability | 0.9235 | 0.2841 | 0.0012 | 0.6323 | 0.1975 | 0.0014 |
| | *Age Group* | | | | | | |
| AGE1 | 65–69 | 0.0000 | – | – | 0.0000 | – | – |
| AGE2 | 70–74 | 0.2181 | 0.1167 | 0.0615 | 0.1585 | 0.1032 | 0.1244 |
| AGE3 | 75–79 | 0.2632 | 0.1311 | 0.0447 | 0.1116 | 0.1097 | 0.3093 |
| AEG4 | 80+ | 0.2420 | 0.1498 | 0.1064 | 0.1708 | 0.1150 | 0.1375 |
| | *Schooling* | | | | | | |
| EDU1 | < Primary | 0.0000 | – | – | 0.0000 | – | – |
| EDU2 | Primary | −0.1132 | 0.0023 | −0.1276 | 0.0864 | 0.1396 | |
| EDU3 | > Primary | −0.4426 | 0.1403 | 0.0016 | −0.3431 | 0.1279 | 0.0073 |
| | *Living Arrangement* | | | | | | |
| FAM1 | Living alone | 0.0000 | – | – | 0.0000 | – | – |
| FAM2 | Not Living alone | 0.5783 | 0.1561 | 0.0002 | 0.6416 | 0.0841 | 0.0001 |
| | *Place of Residence* | | | | | | |
| RES1 | North | 0.0000 | – | – | 0.0000 | – | – |
| RES2 | Centre | 0.0811 | 0.1217 | 0.5055 | 0.2724 | 0.1039 | 0.0088 |
| RES3 | South | 0.2360 | 0.1089 | 0.0303 | 0.1202 | 0.0926 | 0.1945 |

TABLE 6. (continued)

| | | MALES* | | | FEMALES** | | |
|---|---|---|---|---|---|---|---|
| Code | Variable | Coefficient | Standard Error | P | Coefficient | Standard Error | P |
| | *Interactions* | | | | | | |
| INT1 | SIN1*ACU1 | −1.5073 | 0.2676 | 0.0001 | −1.1422 | 0.2393 | 0.0001 |
| INT2 | SIN1*ACU2 | −1.1550 | 0.3928 | 0.0033 | −1.3716 | 0.3491 | 0.0001 |
| INT3 | SIN1*ACU3 | −1.9641 | 0.6868 | 0.0042 | −1.3878 | 0.6465 | 0.0318 |
| INT4 | SIN2*ACU1 | −1.9514 | 0.3326 | 0.0001 | −1.7570 | 0.2798 | 0.0001 |
| INT5 | SIN2*ACU2 | −1.2111 | 0.4338 | 0.0052 | −2.0264 | 0.3562 | 0.0001 |
| INT6 | SIN2*ACU3 | −1.6094 | 0.6954 | 0.0206 | −2.0160 | 0.6267 | 0.0013 |
| INT7 | SIN3*ACU1 | −1.6849 | 0.3925 | 0.0001 | −1.8768 | 0.3031 | 0.0001 |
| INT8 | SIN3*ACU2 | −1.6040 | 0.4442 | 0.0003 | −2.1460 | 0.3676 | 0.0001 |
| INT9 | SIN3*ACU3 | −1.5216 | 0.6638 | 0.0219 | −1.9339 | 0.5900 | 0.0010 |

* −2 LOG L = 3009.431; Concordant 90.2%; Discordant 9.6%; Tied 0.2% on 4044870 pairs
* −2 LOG L = 4295.024; Concordant 88.1%; Discordant 11.7%; Tied 0.2% on 6718684 pairs

respect to those without symptoms. This holds true even though the interaction between symptoms and acute illness are negative.[11]

Other forms of more persistent diseases are important even if not equally relevant in the responses about self-perceived conditions of health given by the elderly. Both morbid chronic conditions as well as lack of functional self-sufficiency play a significant role in self-perceived conditions of health even if they are not as relevant as acute disease. In particular, a lack of functional self-sufficiency is relevant only when it is very serious.

The reported ailments and pain do not absorb all the variability expressed by the self-perceived health conditions. In both reduced models only age is irrelevant when explaining self-perceived health conditions. This fact, which is not normally recognised by other authors (Waters et al., 1989), is of great importance for it indicates that, given the same number of illnesses, as one grows older one does not change his/her sense of well-being. But what is also interesting is the fact that the four reported morbidity indicators adopted in this study well capture the physical decline associated to the senescence.

Conditionally on the same number of symptoms and illnesses, education, region of residence, and living arrangement exercise some degree of influence on the health conditions reported by the elderly. This result has to be interpreted with caution. On the one hand, the significant effects of these variables might express a residual heterogeneity in terms of seriousness of the disease which the morbidity quantitative indicators do not absorb. It is reasonable to think that, given the same number of pathologies, the elderly who live on their own, who are characterized by a higher level of education (and probably a higher income), and reside in economically more developed regions (with better social and health services) are

TABLE 7. Regression coefficients in final logistic regression model, dependent variable self-perceived health conditions: Males

| Code | | Coefficient | Standard error | Odds-ratio | P |
|---|---|---|---|---|---|
| | Constant | −3.6952 | 0.2340 | – | 0.0001 |
| | *Number of Symptoms* | | | | |
| SIN1 | 0 | 0.0000 | – | 1.00 | – |
| SIN2 | 1 | 1.9693 | 0.2052 | 7.17 | 0.0001 |
| SIN3 | 2+ | 2.6503 | 0.2170 | 14.15 | 0.0001 |
| | *Number of Acute Illnesses* | | | | |
| ACU1 | 0 | 0.0000 | – | 1.00 | – |
| ACU2 | 1–2 | 3.9028 | 0.1949 | 49.40 | 0.0001 |
| ACU3 | 3+ | 4.3074 | 0.5867 | 74.44 | 0.0001 |
| | *Number of Chronic Illnesses* | | | | |
| CRO1 | 0 | 0.0000 | – | 1.00 | – |
| CRO2 | 1–3 | 0.3330 | 0.1120 | 1.39 | 0.0030 |
| CRO3 | 4+ | 0.9530 | 0.2378 | 2.56 | 0.0001 |
| | *Functional Ability* | | | | |
| AUT1 | Total or Partial | 0.0000 | – | 1.00 | – |
| AUT2 | No funct. ability | 0.9698 | 0.2818 | 2.64 | 0.0006 |
| | *Schooling* | | | | |
| EDU1 | < Primary | 0.0000 | – | 1.00 | – |
| EDU2 | ≥ Primary | −0.4194 | 0.1050 | 0.66 | 0.0001 |
| | *Living arrangement* | | | | |
| FAM1 | Living alone | 0.0000 | – | 1.00 | – |
| FAM2 | Not living alone | 0.5347 | 0.1525 | 1.70 | 0.0005 |
| | *Place of residence* | | | | |
| RES1 | Centre–North | 0.0000 | – | 1.00 | – |
| RES2 | South | 0.2038 | 0.1000 | 1.22 | 0.0415 |
| | *Interactions* | | | | |
| INT1 | SIN2*ACU2 | −1.4465 | 0.2545 | 0.23 | 0.0001 |
| INT2 | SIN2*ACU3 | −1.9540 | 0.6858 | 0.14 | 0.0044 |
| INT3 | SIN3*ACU2 | −1.6962 | 0.2656 | 0.18 | 0.0001 |
| INT4 | SIN3*ACU3 | −1.5290 | 0.6294 | 0.22 | 0.0151 |

– 2 log L = 3022.822; Concordant 89.7%; Discordant 9.3%; Tied 1.0% on 4044870 pairs.

TABLE 8. Regression coefficients in final logistic regression model, dependent variable self-perceived health conditions: Females.

| Code | | Coefficient | Standard error | Odds-ratio | P |
|---|---|---|---|---|---|
| | Constant | −3.7014 | 0.1749 | | 0.0001 |
| | *Number of Symptoms* | | | | |
| SIN1 | 0 | 0.0000 | – | 1.00 | – |
| SIN2 | 1 | 1.5195 | 0.1820 | 4.57 | 0.0001 |
| SIN3 | 2 | 2.4283 | 0.2028 | 11.36 | 0.0001 |
| SIN4 | 3+ | 2.9401 | 0.2135 | 18.92 | 0.0001 |
| | *Number of Acute Illnesses* | | | | |
| ACU1 | 0 | 0.0000 | – | 1.00 | – |
| ACU2 | 1+ | 3.6891 | 0.1721 | 40.45 | 0.0001 |
| | *Number of Chronic Illnesses* | | | | |
| CRO1 | 0 | 0.0000 | – | 1.00 | – |
| CRO2 | 1+ | 0.5034 | 0.0973 | 1.65 | 0.0001 |
| | *Functional Ability* | | | | |
| AUT1 | Total or Partial | 0.0000 | – | 1.00 | – |
| AUT2 | No funct. ability | 0.6609 | 0.1935 | 1.93 | 0.0006 |
| | *Schooling* | | | | |
| EDU1 | < Primary | 0.0000 | – | 1.00 | – |
| EDU2 | Primary | −0.1531 | 0.0852 | 0.32 | 0.0722 |
| EDU3 | > Primary | −0.3775 | 0.1267 | 0.68 | 0.0029 |
| | *Living Arrangement* | | | | |
| FAM1 | Living alone | 0.0000 | – | 1.00 | – |
| FAM2 | Not living alone | 0.6177 | 0.0829 | 1.86 | 0.0001 |
| | *Place of Residence* | | | | |
| RES1 | North | 0.0000 | – | 1.00 | – |
| RES2 | Centre | 0.2688 | 0.1036 | 1.31 | 0.0095 |
| RES3 | South | 0.1207 | 0.0918 | 1.13 | 0.1886 |
| | *Interactions* | | | | |
| INT1 | SIN2*ACU2 | −1.1981 | 0.2256 | 0.30 | 0.0001 |
| INT2 | SIN3*ACU2 | −1.7699 | 0.2502 | 1.17 | 0.0001 |
| INT3 | SIN4*ACU2 | −1.7772 | 0.2551 | 0.17 | 0.0001 |

– 2 log L = 4306.922; Concordant 87.9%; Discordant 11.5%; Tied 0.6% on 6718684 pairs.

likely to be affected by less serious illnesses. Moreover, it is possible that those living alone manage to do so precisely because they are not prone to the more serious diseases. On the other hand one cannot exclude "a priori" the capacity of some socio-demographic variables to determine the value of the subjective indicator of morbidity. In this case both cultural and educational backgrounds seem to play an important part in influencing the perception of the same pathological condition. In particular, contrary to common belief, the elderly living alone are psychologically better equipped than others when it comes to reacting to poor health.

The comparison between the two reduced models highlights the different effects of illnesses on male and female self-perceived conditions of health. While women show greater variability (and sensitivity) as far as symptoms are concerned, men are subject to higher variability (and sensitivity) in the acute and chronic pathology area. Obviously, this may depend on aspects of a qualitative nature which can be overlooked by considerations of a quantitative nature (see Tables 3–5). Nevertheless, this result suggests that for women a state of well-being is related not so much to the number of illnesses, as to the presence or absence of pathology.

## 5. Concluding remarks

Measuring conditions of health (or illness) is one of the main problems to be dealt with when analysing the health conditions of a given population. Acute and chronic diseases, disabilities, handicaps and other impairments, constantly affect the individual's state of physical, psychological and social well-being and interact to create the concept of illness. The numerous indicators present in the current literature can therefore highlight totally different aspects of a given state of poor health. The problem is then further complicated when one considers that the same indicators can be obtained from clinical screening (observed and more objective morbidity) or from answers given by the individuals during a survey (reported and more subjective morbidity).

Self-assessed or, rather, self-perceived conditions of health constitute one of the most widely used indicators. It is preferred mainly because of its uncomplicated way of revealing information and because it sums up the numerous features which normally characterise illness. Moreover, precisely because of its subjective nature, this indicator contains a record of individual suffering which is usually overlooked but which is of great relevance from a personal point of view.

The meaning of the indicator was examined with respect to a sample of elderly people living in households in the second half of the 1980s in Italy.

Little more than half of persons aged 65 and over judged their health to be poor. There were some variations in responses among age groups and between sexes. Women had worse self-perception (54%) than men (52%) and the older respondents were more pessimistic about their health than the younger. Consistently with findings in other health surveys (Schroll et al., 1991), the proportion of elderly who perceived their health to be poor was in contrast to the high percentage of people

reporting chronic diseases (over 70%) and symptoms (over 65%). Apparently the many diagnoses were handled in such a way that they were not perceived as a handicap.

According to the results of a deeper analysis, reported ailments are the factors that mainly determine the value of the self-perceived conditions of health. However, not all cases of illness seem to affect the elderly response in the same way. Perception is seen to rely, above all, upon pathological cases related to more recently-experienced pathology as acute ailments (one or more) and symptoms (two or more). Longer illnesses (such as chronic disease and lack of self-sufficiency), to which the elderly have become accustomed, seem to play a minor role in determining the self-perceived health conditions of the elderly.

As expected, self-perception of health is also connected with the individual's psychological and cultural characteristics. After controlling for the number of different ailments, self-perception of health is influenced by the gender, the living arrangement and, to some extent, the education and the region of residence of the elderly. Women's perception is more sensitive to a presence of symptoms; men's perception, instead, is more influenced by variation in the number of (chronic and acute) diseases. Moreover, living alone and better educated people are (probably for different reasons) psychologically more equipped than others to react to poor health.

Age differences are not observed. This result is not surprising. Several simple descriptive analyses explain it in terms of selection effect due to increasing institutionalization of less healthy members of the population at older ages. In this case, therefore, the explanation is insufficient. The persistence of the result controlling for the number of different diseases, indicates that chronological age has actually no influence on an individual having a more pessimistic or optimistic perception of the health condition.

## Notes

[1] Another category of indicators is made up of figures which are also related to consequences of illness such as: consumption of medicines; recourse to medical check-ups and health assistance institutions; number of days spent in bed and in hospital; etc.

[2] The other two surveys were carried out in 1980 and in 1983 (ISTAT, *Indagine statistica sulle condizioni di salute della popolazione e sul ricorso ai servizi sanitari*, Novembre 1980, Supplemento al Bollettino mensile di statistica, 1982, n.12, and ISTAT, *Indagine statistica sulle condizioni di salute della popolazione e sul ricorso ai servizi sanitari*, novembre 1983, Note e Relazioni, 1986, n.1).

The 1986–87 Survey refers to the population living in the household. Persons currently living in hospitals or institutions are consequently not interviewed. According to the 1981 Census these persons amount to 1.3% and 2.3% of the whole male and female population aged 65 and over. If these persons' characteristics (such as the socio-economic status, the type of family and so on) and health status, differ from those living in households, our analysis may bring results that do not represent the whole of the old population.

[3] As for the index representing self-perceived conditions of health, this is calculated as the proportion of those who answered negatively, when asked if they were in good health in the four weeks before the interview. The indices related to the presence of acute illness and symptoms are expressed as the proportion of those people who stated that they were suffering in the last four weeks from at least one

of the type of illnesses listed in the questionnaire. The chronic illness reported by the respondents instead refers to any which has arisen during the whole life span. The variables representing handicap and functional self-sufficiency depend, so to say, on one another. In fact the possible loss of self-sufficiency is only asked of those who report some kind of physical handicap (blindness, deafness and dumbness, invalidity), and the answers are classified according to whether the individual claims partial or total loss of self-sufficiency. No distinction whatsoever is made between the daily tasks that the respondant is able or unable to perform. The filter question about handicap, which precedes the question on the level of self-sufficiency, probably excludes a group of people who are affected by real handicap but who are actually able to perform their daily tasks.

[4] The drop of the percentage of the persons declaring chronic illnesses at age 90 and over, may depend both on poor data quality and the under-reporting of chronic pathologies to which the 'oldest old' are accustomed.

[5] Cramer's index (for both males and females) is higher than 0.5 when illustrating the relationship between acute illnesses and symptoms and is equivalent only to 0.3 when indexing the relationship between chronic disease and symptoms. The same index is higher than 0.6–0.7 (males and females respectively) when indexing the bond between acute illness and poor health and is equivalent only to 0.3 when indicating the relationship between chronic illness and poor health.

[6] Generally, self-report seems to be a valuable proxy of the information obtained by clinical screening only for conditions (fractures, breast cancer ...) that have clear diagnostic criteria and are easily communicated to the patient (Coldiz et al., 1986). In the case of aged people this result may be extended to a larger proportion of population considering that: a) the surveillance for the desease outcome is increasing with age, b) the main ailments suffered by the elderly are visible and well known.

[7] The same consideration may be made for elderly living in institutions with respect to those living in households. One explanation might be that, after controlling for the number of ailments, institutionalized people are a group selected for a more pessimistic perception of own health condition. This means that the results of this work are limited to people living home.

[8] The model, of the type:

$$logit(p) = ln\left(\frac{p}{1-p}\right) = a + \mathbf{bX}$$

assumes that the logit transformation of the p proportion of people who report poor health (the logarithmic ratio of the probability of being in poor health to the probability of being in good health) is a linear function of the **X** vector of explanatory variables. The a parameter represents the intercept and the **b** vector of the coefficients the effects of each explanatory variable on the logit transformation. In our case, since the independent variables are all polytomous, **b** expresses the relative effect of each category (exposed) in relation to that assumed as a basic category (reference group) for each variable. The exponential transformation of **b** (Odds ratio) estimates then the (relative) risk of an exposed group of elderly reporting poor health compared to that of the reference group.

[9] Among these, interactions between chronic illness and symptoms are to be mentioned.

[10] The reduction was carried out after having verified the statistical significance of the data through the test

$$G = -2ln(L_R/L_M)$$

where $L_M$ is the likelihood of a model with "k" degrees of freedom; $L_R$ is the likelihood of a reduced model with respect to the previous one with "h" degrees of freedom; the statistic G, assuming the two models are equal, follows a chi-square distribution with "k−h" degrees of freedom.

[11] The presence of negative interaction coefficients between symptoms and acute disease is an interesting result. It means that the acute illness and the symptoms, acting together, have an effect on the self-perceived health which is lower than the sum of the effects of each factor.

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