8 Statistical analysis

Introduction

Two sets of analyses have been undertaken to illustrate the extent of association between areas with low socioeconomic status and poor health. Correlation coefficients have been produced to indicate interdependence between the measures of socioeconomic status, health status and use of health services. Cluster analysis has been undertaken to indicate the extent to which areas display significantly similar characteristics from among the chosen measures of socioeconomic status, health status and use of health services.

Inequalities in health have traditionally been indicated by an approximation to social class, frequently based on a categorisation of occupations. The other major indicators traditionally used have included income, education, ethnicity and employment status (which allows for the inclusion of unemployed people and those not in the labour force). The measures of socioeconomic status included in this analysis include income, education, occupation, labour force status and Aboriginality.

Correlation analysis

Description

Correlation is the degree to which one variable is statistically associated with another. The correlation coefficient is a measure of the strength of this association. When high values for one variable are matched by high values for the other (or when low values are matched by low values), then they are positively correlated. Where the interdependence is inverse (ie. high values for one are matched by low values for the other), the two variables are negatively correlated.

Methods

The Pearson product-moment correlation (r) has been used in this analysis to indicate the degree of correlation between pairs of variables. Pearson correlation coefficients range from +1 (complete positive correlation) through 0 (complete lack of correlation) to –1 (complete negative correlation). As a general rule, correlations of plus or minus 0.5 or above are considered to be of meaningful statistical significance. Correlations of plus or minus 0.71 or above are of substantial statistical significance, because this higher value represents at least 50 per cent shared variation (r^2 greater than or equal to 0.5).

Correlation coefficients were calculated by comparing the value (expressed as a percentage, or as a standardised ratio) for each variable in each SLA with the value of each of the other variables. Correlation coefficients are generally referred to as being, for example, 'a correlation of low income families with the *paired* variable of hospital admissions of females'. However, to promote ease of reading where many correlation coefficients are quoted in the text, the word 'paired' has been omitted. For similar reasons the symbol used to indicate a correlation coefficient (r) has been omitted.

Two measures of socioeconomic status included in the analysis in this section have not been mapped. They are families receiving an income of $52,000 or more per annum and people in occupations classified as 'managers and administrators' and 'professionals'. These two measures were included as they indicate high socioeconomic status, in contrast to most other measures, which were chosen because they indicate low socioeconomic status.

The results of the correlation analysis, which was undertaken separately for the capital cities and other major urban centres and the rest of the State/Territory, are shown in the following tables: coefficients of from 0.5 to 0.7 and from 0.71 to 1 (both positive and negative) are highlighted in the tables.

The correlation analysis presented here is based on the SLA data mapped in the State and Territory atlases (for all capital cities and separately for all non-metropolitan areas), rather than on the data mapped in this atlas for the larger SSDs. To have produced the analysis at the SSD level would have reduced its value.

When discussing the results of the correlation analysis in the text, mention is often made of 'the indicators of socioeconomic disadvantage'. This reference is to variables such as those for single parent families, the unemployed, the Indigenous population and housing authority rented dwellings. References to 'high socioeconomic status' reflect the variables for high income families, female labour force participation and managers and administrators, and professionals.

The associations discussed in the text are, in general, limited to associations between the variable under discussion and the indicators of socioeconomic status from Chapter 3. This approach is largely a response to the limited space available for comment. The extent of any association with the other variables analysed can be ascertained from an examination of the correlation matrices (**Tables 8.1 and 8.2**).

Results

Capital cities

There is a strong relationship evident in the correlation analysis between the distribution of people receiving income support payments from the Commonwealth Government and socioeconomic disadvantage, other than with the Age Pension.

The correlation analysis also showed a strong relationship between the overall health of the community, when measured by people reporting their health as fair or poor health (as distinct from people reporting their health as excellent, very good or good) and the Physical Components Score (PCS), and measures of socioeconomic status with clear income implications (eg. those for single parent families, low income families, unemployment levels and female labour force participation). There were also associations between the indicators of socioeconomic disadvantage mapped in Chapter 3 and the variables for premature death: the strongest correlations were with the variables for deaths from lung cancer, circulatory system diseases and respiratory system diseases.

Correlations of meaningful significance at the SLA level in the capital cities were also recorded between high Total Fertility Rates and several of the other variables – children aged from 0 to 4 years (0.69), early school leavers (0.62) and females receiving a

Sole Parent Pension (0.58); and inversely with managers and administrators, and professionals (-0.57).

Admissions to public acute hospitals were highly correlated with the measures of socioeconomic disadvantage, dependence on income support and a high incidence of fair/poor health. High rates of admission to private hospitals were associated with indicators of high socioeconomic status.

The use of GP services by both males and females is correlated (at meaningful levels of significance) with the same variables – for example, with unskilled and semi-skilled workers, people aged 65 years and over, female sole parent pensioners and dependent children of people receiving income support payments. Inverse correlations were recorded with the variables for managers and administrators, and professionals and the Index of Relative Socio-Economic Disadvantage.

Non-metropolitan areas

It is clear from the matrix of correlation coefficients (**Table 8.2**) that there are fewer correlations of significance in non-metropolitan areas than in the capital cities.

As was the case with the capital cities, there are strong relationships between people receiving various types of income support and the variables for socioeconomic disadvantage.

The correlation analysis also revealed a reasonably strong relationship between the general health of the community, as measured by people reporting fair/poor health and the PCS, and the indicators of socioeconomic disadvantage. This was particularly the case for variables with income implications, such as those for single parent families, low income families, unemployment levels and female labour force participation. There were also correlations of significance between the distribution of people with a handicap and the indicators of socioeconomic disadvantage, the highest being with the variables for low income families (0.73) and dwellings without a motor vehicle (0.51).

In the non-metropolitan areas, the correlation analysis was not undertaken for specific causes of premature death, except cancer deaths, due to low numbers of deaths. There were, however, correlations of significance between the variable for years of potential life lost (the summary measure of premature death) and the variables for single parent families, the Indigenous population, dwellings without a motor vehicle, people receiving unemployment benefits and people reporting fair/poor health.

In contrast to the situation in the capital cities, there were only weak associations evident between the indicators of socioeconomic status and the variables for admissions to public acute and private hospitals, the use of GP services and immunisation levels.

Table 8.1: Correlation matrix for SLAs in the capital cities and other major urban centres

Refer to file: ch8 correlation matrices

Table 8.1: Correlation matrix for SLAs in the capital cities and other major urban centres ...*cont*

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Table 8.2: Correlation matrix for SLAs in the non-metropolitan areas of Australia

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Table 8.2: Correlation matrix for SLAs in the non-metropolitan areas of Australia ...*cont*

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Cluster analysis

Description

Each of the State and Territory atlases includes a cluster analysis. The intention of the cluster analysis is to produce summary measures of socioeconomic status, health status and health service use at the small area level.

A cluster analysis has also been undertaken for all of the areas (SLAs or groups of SLAs) mapped in the State and Territory atlases. One set of analyses covers all of the capital cities and other major urban centres, and the other covers all of the non-metropolitan areas.

The results of these analyses may assist in the allocation of resources to areas with similar levels of socioeconomic disadvantage or health status, or in addressing issues of high levels of use of health services in areas with highly disadvantages communities.

The results of these analyses have not been included here as the list of areas is particularly long (including all areas mapped in the State and Territory atlases). Maps and lists of the areas in each cluster, as well as descriptions of the analyses and of the cluster analysis technique can be down loaded from the atlas World Wide Web site (www.publichealth.gov.au). They are also available directly from the Public Health Information Development Unit; write to PHIDU, The University of Adelaide, South Australia, 5005.

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