Short Communication

Path Analysis of Factors Determinants of Health

Pedrero-Pérez EJ*, Rosana Rodríguez-Gómez, Teresa Benítez-Robredo and José Manuel Díaz-Olalla
Department of Evaluation and Quality, University of Madrid Health, Spain

Abstract

Health surveys have important advantages to researchers, but they also have important limitations. Mainly, they are not a method for causal research. Path Analysis is a method that allows application of theoretical models to select or infer causal hypotheses. The aim of this study is to find a model of directional relationships between the variables in the Health Survey which is a component of the Study of Health of the City of Madrid. Results show a consistent relationship between active leisure and indicators of mental health, as well as the perception of health related quality of life. Symptoms of poor mental health, specifically health habits and health-related quality of life, correlate with morbidity and mortality. The health of urban populations could be improved through the development of programs which include simple habits that do not require heavy investments (eg, walking 30 minutes daily).

INTRODUCTION

The objective of Health surveys is to explore health-related variables that cannot be obtained by other means (records, health databases, etc.) aside from directly asking individuals. Health surveys important advantages: they are easy to perform, are relatively inexpensive, and allow varied and different exploration of health conditions. Additionally, surveys characterize the distribution of health problems with respect to different variables, require little time for execution, and are useful in planning and health administration [1]. However, surveys also have important limitations: they are subject to potential selection bias and survey content bias. The results of survey research are limited to co variation and cannot assume causal relationships.

Various tools exist that allow researchers to infer directionality between variables [2], Path Analysis is a method that allows application of theoretical models to examine dependency relationships between variables [3]. A key feature of this method is its ability to examine direct and indirect effects between variables [4]. The results allow researchers to identify or hypothesize causal relationships between variables obtained in cross-sectional studies [5,6].

The aim of this study is to find a model of directional relationships between variables in the Health Survey which is a component of the Study of Health of the City of Madrid [7].

MATERIALS AND METHODS

Sampling method

A total of 802 interviews were conducted, using stratified random sampling. Stratification was obtained by grouping the city districts into four strata using cluster analysis by district: index of gross disposable income, a percentage of population with a level of higher education to secondary and life expectancy. The allocation per stratum sampling was performed proportionally to the population aged 16 years and over in each. The selection of persons to be interviewed in each stratum was done by simple random sampling of households. Once a home was chosen, the person in the household was selected based on probability sampling with post-stratification by sex and age group, with a single interview per household. The confidence interval 95% to estimate percentages was ± 3.5% (p=q=50%). The final sample consisted of 372 men and 430 women (for complete information on the sampling procedure and the final composition of the sample, see: Diaz-Olalla and Benítez-Robredo [7]).

Instrument

Questionnaire of Survey of Health of the City of Madrid 2014, which can be viewed in full- text in the study on the health of the City of Madrid [7].

Procedure

The variables extracted from the survey include: (1) behaviors and health related habits: regular physical activity in free time, eating fruits and/or vegetables daily, smoking daily or hours of sleep per day; (2) results of questionnaires on quality of life related to health (COOP-WONCA) and mental health (GHQ-12), as well as the question “In general, how would you rate your state of health in the last 12 months”; (3) health indicators: arterial hypertension, hypercholesterolemia, diabetes, anxiety.
and depression, as well as body mass index. Various structural models were used to analyze the data. Indicators of adjustment provided by the AMOS 18.0 were used: discrepancy indices sensitive ($\chi^2$, CMIN / DF) and not sensitive to sample size (RMSEA), comparative (CFI, NFI, TFI and IFI) and theoretical indexes (AIC and ECVI), following the rules specified in the most recent literature [8].

**RESULTS**

In Figure 1 the goodness of fit model is shown. The scores of the questionnaires COOP/WONCA and GHQ-12 questionnaires examined to determine relationship with variables of Health Related Quality of Life and Mental Health. Only variables with significant regression weights ($p<.05$) were included in the model. Goodness of fit indicators proved suitable in all cases: for a $\chi^2=31.5$ (p <0.05), relative $\chi^2$ was lower than 2, as required by the most stringent criteria (CMIN/DF= 1.86). Baseline comparisons with null models were placed in all cases above 0.95 (CFI =.98, NFI =.97, TLI =.97, IFI =.99). The study of residuals, insensitive to sample size, also fell below 0.05, according to the most stringent criteria (RMSEA = 0.033). The information criterion was the lowest of all the alternative models (AIC = 85.5), as well as the expected cross-validation index (ECVI = 0.11).

**DISCUSSION**

The emerging model demonstrates some issues of interest. First, there is a consistent relationship between habits: good nutrition predicts physical activity in leisure time, and both are related negatively with the likelihood of daily smoking. The predictive capacity of individual variables is very low, although significant, which may suggest the existence of other mediating variables not considered in this study. The hours of sleep do not have demonstrate a predictive capacity on any other estimable variables. However, the predictive capacity of active leisure on indicators of mental health is very significant, as well as the perception of mental health quality of life. These results indicate the importance of reducing sedentary habits to improve mental health and quality of life.

Secondly, poor mental health did not have a relationship with quality of life and poor mental health. The model did not include diagnosis with anxiety or depression. Third, the health related quality of life is at the junction of many roads, which seems to represent a valid indicator of overall health. This is consistent with all previous research, which found that self-perceived health is a powerful predictor of morbidity and mortality. There is a threefold increase of the probability of death in people with current poor self-rated health [9,10].

**CONCLUSION**

It is possible to formulate hypotheses about the influence of practicing healthy habits on objective indicators of health, and the interrelatedness of all these elements to interpret, in causal terms, the mutual influence of many health-related variables. The self-perception of health is central to the intersection of these variables, which is related, according to previous research, with critical morbidity and mortality variables. The health of urban populations could be improved through the development of programs which include simple habits that do not require heavy investments (eg, walking 30 minutes daily).

**REFERENCES**

8. Hipp JR, Bollen KA. Model fit in structural equation models with
