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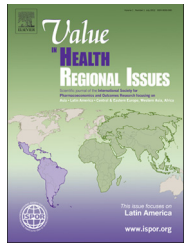

PREFERENCE-BASED OUTCOMES

Societal Preferences for EQ-5D Health States from a Brazilian Population Survey

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ABSTRACT

Objective: To elicit preference weights for a subset of EuroQol five-dimensional (EQ-5D) questionnaire health states from a representative sample for the state of Minas Gerais, Brazil, using a time trade-off (TTO) method and to analyze these data so as to estimate social preference weights for the complete set of 243 states. **Methods:** Data came from a valuation study with 3362 literate individuals aged between 18 and 64 years living in urban areas. The present study was based on quota sampling by age and sex. Face-to-face interviews were conducted in participants' own homes. A total of 99 EQ-5D questionnaire health states were selected, presorted into 26 blocks of six unique health states. Each participant valued one block together with the full health, worst health, and dead states. Each health state was evaluated by more than 100 individuals. TTO data were modeled at both individual and aggregate levels by using ordinary least squares and random effects methods. **Results:** Values estimated by different models yielded very similar results with satisfactory goodness-of-fit statistics: the mean absolute error was around 0.03 and fewer than 25% of the states had a mean absolute error greater than 0.05. Dummies coefficients for each level within the EQ-5D questionnaire dimensions of health displayed an internally consistent ordering, with the mobility dimension demonstrating the largest value decrement. The values of mean observed transformed TTO values range from 0.869 to −0.235. **Conclusions:** The study demonstrates the feasibility of conducting face-to-face interviews using TTO in a Brazilian population setting. The estimated values for EQ-5D questionnaire health states based on this Minas Gerais survey represent an important first step in establishing national Brazilian social preference weights for the EQ-5D questionnaire.

Keywords: cost-effectiveness, cost-utility, EQ-5D, health states, time trade-off.

Introduction

Health technology assessment (HTA) is important in supporting health policy decisions designed to allocate resources efficiently and in defining criteria for the introduction of new technologies. In Brazil, HTA has been a concern since the 1980s with important government initiatives being introduced since 2004 with the creation of the Department of Science and Technology (Departamento de Ciência e Tecnologia) [1]. Departamento de Ciência e Tecnologia is responsible for formulating and promoting HTA for the Unified Health System (Sistema Único de Saúde). In 2008, the Brazilian Network for HTA (Rede Brasileira de Avaliação de Tecnologias em Saúde) was created to subsidize the government in formulating HTA regulation and producing HTA research in Brazil.

Some developed countries such as the United Kingdom, Germany, and The Netherlands have a long history of using cost-effectiveness analysis to inform this type of high-level decision making. Cost-effectiveness analysis requires cost and health outcome information related to the alternatives that are being evaluated. The representation of health benefits in terms of quality-adjusted life-years (QALYs) has been adopted by many national regulatory agencies, usually with the stipulation that the quality-adjustment factor should be based on the social preferences of the relevant population [2]. The EuroQol five-dimensional (EQ-5D) questionnaire is probably the most widely used generic measure of health status used in measuring benefits for economic evaluation. The instrument defines health in terms of five dimensions (mobility, usual activities, self-care activities, pain/discomfort, and anxiety/depression), each

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divided into three levels of severity. National value sets exist for many countries, enabling health benefits to calibrate in terms of domestic social preferences [3–12]. In Latin America, only two countries (Argentina and Chile) have so far established their own national value sets for EQ-5D questionnaire health states [13,14].

This article reports an EQ-5D questionnaire valuation study conducted in Minas Gerais, a large and heterogeneous state in the southeast region of Brazil. Minas Gerais has a population of 20 million inhabitants accounting for just over 10% of the country's total population, the majority residing in urban areas [15]. Belo Horizonte, the state capital, has a population of some 4 million. The state has the second largest economy of Brazil but presents great heterogeneity in terms of both economic development and standards of living. According to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística), in 2008, Minas Gerais's gross domestic product per capita was US $7635 compared with Brazil's US $8690 while average years of schooling (around 7 years) and income inequality (Gini coefficient equal to 0.51) were very similar to those of the whole country. The analysis of the Human Development Index shows evidence of how similar are the social economic disparities in Minas Gerais compared with those observed in Brazil: in 2000, the values of the Human Development Index for Minas Gerais cities ranged from 0.57 (northeast of the state) to 0.84 (southeast of the state), while in Brazil, the range was 0.64 (northeast of Brazil, state of Maranhão) and 0.82 (South of Brazil, state of Santa Catarina) [16]. Because of its great diversity, Minas Gerais is considered to be representative of Brazilian heterogeneity.

Methods

The EQ-5D questionnaire descriptive classification defines a total of 243 distinct health states, each of which is labeled with a unique five-digit code. For example, 11111 represents the full health state defined as having no problems in any dimension while 33333 represents the worst health state with extreme problems on all five dimensions. The EQ-5D questionnaire's Brazilian language version was culturally adapted and provided by the EuroQoL Group.

The interview protocol followed a revised version [17] of the original Measurement and Value of Health (MVH) study [18]. This protocol has already been applied in deriving French population values for the EQ-5D questionnaire [5] and in a Korean valuation study [11]. The present study was designed so as to obtain values for 102 health states selected from the complete set of 243 states, covering three broad severity categories defined by their proximity to the best possible health state. Mild states contain no level 3 problem on any dimension; severe states contain no level 1 problem on any dimension; moderate states lie within these two boundaries. More information about the choice of health states is described in the revised version of the MVH protocol [17]. States were grouped into 26 blocks, with six health states in each comprising two mild, two moderate, and two severe states. A block of six was chosen to reduce interview length because of budget constraints. Because the sample size is large, more than 100 observations by health state are guaranteed. Each individual evaluated one block of health states together with the logically best and worst health states (states 11111 and 33333, respectively) and the state "dead"—a total of nine states. Health state descriptions were presented on a printed set of cards that were handed to the participant.

Individuals were first asked to describe their own health in terms of the EQ-5D questionnaire classification system and to rate it by using a visual analogue scale with end points of 0 and 100 corresponding to the worst and best imaginable health states. They were then asked to rank order the set of nine printed cards containing the health state descriptions from the best to worst. The cards were then shuffled, and individuals were asked to rate them on the same 0 to 100 visual analogue scale used to rate their own health. Respondents were instructed that each health state would last for 10 years followed by death. These exercises were performed before time trade-off (TTO) to familiarize individuals with the description of health states.

The TTO elicitation protocol has been fully described elsewhere [18]. It essentially involves presenting participants with choices between two alternatives that comprise varying levels of quantity and quality of life. Health states can be evaluated as either better or worse than death. A double-sided time board is used, with one side for health states considered better than dead and the other side for health states considered worse than dead. For states evaluated better than dead, individuals establish the number of years ($x < 10$) in full health that provides them the same expected utility level as living 10 years experiencing some specific health condition. The TTO value (V) is obtained by dividing the length of time in full health by 10: $V = x/10$. For states considered to be worse than dead, individuals compare death with a choice that gives them $10 - x$ years in some specific health state followed by x years ($x < 10$) in full health. In this case, the TTO value is given by $V = -x/(10 - x)$. Indifference points in the TTO protocol were effectively established in terms of 6-month increments, yielding a range of values from −19 to 1. To treat the asymmetric distribution of negative values, a monotonic transformation $V_t = V/(1 - V)$ was performed where V and V_t are pre- and posttransformation values so as to alter the range of values to be −1 to 1 [19].

Study Design

The target population was literate individuals aged between 18 and 64 years living in urban areas of Minas Gerais. A sample-size definition was based on the 2010 Brazilian Demographic Census with a margin of error equal to 3%. In total, 3362 individuals were recruited, of whom 1115 lived in Belo Horizonte (capital), 626 in the metropolitan area, and 1621 in the nonmetropolitan area. The sample was selected on the basis of quota sampling by age and sex. Face-to-face interviews were conducted in households in which one individual was selected. Sociodemographic information was recorded on all participants, including socioeconomic status, religious beliefs, happiness, health, and social work experience. Economic incentives were not offered to interviewees. All health states were evaluated by more than 100 individuals as recommended by Chuang and Kind [20]. Test retest evaluation was not conducted.

A total of 13 interviewers were recruited through a commercial market research agency; all interviewers received 3 days training delivered by experienced university researchers. Fieldwork was carried out between October and December 2011. Twenty percent of questionnaires were checked by phone call to detect possible fraud by interviewers. All field research was supervised by the university team to guarantee quality in data collection and minimize any systematic errors by interviewers in applying the protocol. In the presence of systematic errors, the interviewer was retrained; however, during the fieldwork, three interviewers were excluded. All respondent data were double-entered into a Microsoft Excel file.

Modeling

Regression analysis was used to estimate social preference values for all 243 possible EQ-5D questionnaire health states. Estimated values for the 99 health states plus 33333 were compared with the directly observed values obtained from the TTO procedure. It