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Assessing the Reliability of Household Expenditure Data: Results of the World Health Survey

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Assessing the Reliability

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Household Expenditure Data:

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by

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Abstract

The World Health Survey (WHS) which has been implemented in more than 70 countries with standardized questionnaires opens a great opportunity for research on health care financing issues. This study examines the household expenditures and health expenditure collected in the WHS in terms of reliability, consistency between different ways of data collection within the survey and with other types of household surveys.

Data used in this study include 50 WHS and 37 other type of surveys, namely the Living Standard Measurement Survey, Household budget Survey and Income and Expenditure Survey. The analysis consists of comparison of test-retest results; the aggregated and reported total household expenditure and health expenditure; the expenditures from the WHS and other type of surveys.

The results from test-retest are fairly similar in the WHS. For health expenditure the average of reported total is lower than the aggregated total while for household total expenditure the estimate is fairly similar from the two measures. Finally the WHS was found to report lower total household expenditure but higher out-of-pocket expenditure comparing with other types of surveys. The study suggests further efforts to standardize the questions in collecting expenditure data in household surveys for the purpose of cross country and over time comparison.

Introduction

Household expenditure data has been used extensively for monitoring general household living standards, wellbeing and consumption patterns.(1) More recently, considerable attention has been paid to monitoring household expenditures on health with a view to determining if the need to pay for services prevents some people from seeking or continuing care, and results in severe financial hardship or impoverishment for others (2-4). This literature has grown considerably over the last five years, with analysts using expenditure data from whatever source they can find, including the Living Standard Measurement Survey (LSMS) supported by the World Bank, Household Budget Surveys (HBS), Income and Expenditure Surveys (IES) and Socio-economic Surveys (SES)(5-8).

There has long been concern with the accuracy of expenditure data reported in household surveys, often linked to concerns about the abilities of households to remember a multitude of different types of expenditures accurately(9-11). Measurement error can be introduced at any stage of a survey: design of the survey instrument, data collection, or data entry(12). This is partly because household expenditure surveys are among the most difficult and expensive surveys to field and are sometimes undertaken with less than sufficient funding (13).

While these concerns are well established, there has been little attempt to understand the extent to which phrasing questions in different ways can influence the response to health expenditure questions, and whether different types of surveys produce consistent results. We contribute to this literature by comparing two ways of seeking information on health expenditure developed in the World Health Survey (WHS), and then also consider the extent to which the estimated expenditures are consistent with expenditure derived from other surveys undertaken in the same countries at approximately the same time.

The WHS were launched by the World Health Organization to strengthen national capacity to monitor critical health inputs, outputs and outcomes (14). They collected information on total household expenditure with a breakdown that included health expenditures, together with a wide range of indicators on health status, health service utilization, risk factors, and the perceived responsiveness of the health system. This makes the WHS appealing to policy makers and researchers seeking information on diverse topics including the assessment of inequality of health and in intervention coverage across different socio-economic groups. World Health Surveys have been implemented in 72 countries using standard questionnaires and many of the country data sets have recently been put into the public domain (http://www.who.int/healthinfo/survey/en/index.html).

Methodology

Instrument used in the WHS

The World Health Surveys currently available for analysis were conducted in 72 countries during 2002 and 2003. All are nationally representative using a multistage stratified random cluster sampling strategy. Data were collected at both the household and individual level. Among the 72 countries, 50 used the so-called long version household questionnaire (applied only in low and middle income countries) which gives details of the breakdown of total household expenditure and out-of-pocket health expenditure into their different categories.

The expenditure data were collected at the household level from the selected household informant. The questionnaire first seeks information on total household expenditure over the last month, and then asks details of item-by-item expenditure over the same period. The specified items are food, housing, education, health care, voluntary health insurance premiums, and all other goods and services. Respondents are asked to report on both cash and in kind payments. Health expenditure excludes transportation cost to obtain care and is net of insurance reimbursement. At another point in the survey, to check consistency, respondents are asked to provide item-by-item details of their health expenditures. In this case, the listed items are inpatient care, outpatient care, traditional medicine, dentists, medication or drugs, health care products, laboratory tests, and all other health care products or services.

The initial plan was that test-retests would be undertaken for a minimum of 10% of the sample in all countries conducting the World Health Survey. However, not may countries met the request. We therefore examine test-retest reliability for all surveys that reached the 10% sample target, and who retested more than 100 households. Twenty-four out of the fifty countries met these criteria. Retests were conducted within a week of the initial interview.

Other data sources used in the analysis

Thirty seven of the countries that have implemented the WHS had also conducted other types of household surveys with questions on total and health expenditure sometime during the period after 1990. The survey instruments differed and details are found in appendix 1, but they included Living Standards Measurement Surveys (LSMS), Household Income and Expenditure Surveys (IES), Household Budget Surveys (HBS) and Socio-economic Surveys (SES).

The LSMS and the SES are multi-purpose surveys where the expenditure module is an important component. The detail sought in the expenditure breakdowns and the recall periods varied by country, but in most cases, more breakdown items on household general expenditure were employed than in the WHS. For health expenditure, the number of questions in the comparator surveys ranged from one to as many as those in the WHS. Recall period also varied in these surveys. Typically a one-month recall period was used for frequent spending and a one-year recall period for durables, sometimes including hospitalization. The IES and HBS asked for a more detailed breakdown of health expenditures than the LSMS and SES.

Analysis framework

Reliability refers to the repeatability or consistency of a set of measurements or measuring instrument (15). A measure is considered reliable if it would give us the same result over and over assuming that what we are measuring isn't changing. Reliability could be characterized as either internal or external. Internal reliability is a measure of internal consistency. It compares two sets of data on the same subject using differnt meansures. External reliability means the extent to which data measured at one time is consistent with data from the same variable measured at another time. The test-retest technique is commonly used to examine external reliability(16;17).

For internal reliability we compared the difference between the total reported in response to the single question and the total derived by aggregating responses to the questions asking for components of expenditure - called the "reported" and "aggregated" totals respectively. The test-retest information is used to examine external reliability The intra-class coefficient index

(ICC) was used to explore both types of reliability and it was applied to the responses to total household expenditure and household health expenditures (18).

The ICC is calculated as

$$ICC = \frac{\sigma^2(b)}{\sigma^2(b) + \sigma^2(w)}$$

where $\sigma^2(w)$ is the pooled variance of a variable between survey administrations, and $\sigma^2(b)$ is the variance of the same variable between subjects (respondents). The ICC is interpreted as the proportion of total variance accounted for by between-subject or between-question variation. When there is no variance between the two administrations the value is 1.

Furthermore, the study compared the expenditure estimates produced by the WHS and the other types of household surveys undertaken in the same countries. The comparisons include food expenditure, total household expenditure and health expenditure, as well as the shares of food and health expenditure in total household expenditure. GDP deflators are used to convert the value from the survey years to the year 2000. Household sampling weights, where available, are used to account for differential probabilities of selection, and to ensure comparability across surveys.

Results

Results from test-retest in the WHS

Figure 1 reports the ICCs for the test-retest responses for total household expenditure and expenditures on education, food and health. Each vertical bar depicts a country, and the range shows the 95% confidence intervals around the mean estimate of the ICC. For most countries, the average value of the ICC is above 0.6 for all items, which is generally considered to imply good external reliability (19;20). The lowest for household expenditure is 0.28, for food 0.19, for education 0.39 and for total out-of-pocket health expenditure 0.22. Some countries have very high test-retest ICCs for all items, suggesting high consistency, examples are Sri Lanka, Myanmar, China, Uruguay, Malaysia and Pakistan. On the other hand, the average ICCs were consistently lower than 0.5 in Nepal and the Dominican Republic.

Insert figure 1

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