

## Utilization of Maternal Care Services in Rural Philippines

### Introduction

According to the National Demographic Health Survey (NDHS) in The Philippines, conducted during 2003, only 20 percent of mothers received all the recommended types of antenatal care, 34 percent of births were delivered in a medical institution, 38 percent of deliveries were assisted by a medical doctor and 61 percent of the births were taken place at homes (NSO, DOH, and Macro International, 2003). Wide differentials are also observed between rural and urban areas. The recommended minimum of four antenatal care follow-up visits were received by 78 percent of births to mothers living in urban areas, but for only 62 percent of births to mothers living in rural areas. Similarly, 55 percent of deliveries in urban areas, only 23 percent of deliveries in rural areas, took place in health care facilities. These measures indicate that the utilization of various maternal care services are not encouraging, particularly in the rural areas.

Although several studies have addressed the importance and determinants of the use of maternal care in The Philippines, many limitations are noted in these studies. First, while prior studies on utilization of maternal care have focused on individual characteristics (Rogan and Olvena, 2004), the effects of program components seldom received any attention. Many studies have approached the use of health care services as a behavioral phenomenon (Becker et al., 1993; Chakraborty et al., 2003), while the quality and cost of and access to services are not included.

Studies from western societies, however, have often argued that the use of health care services is not determined merely by design and delivery strategies but also by the characteristics of potential users (Andersen and Newmen, 1973; Phillips et al., 1998). In other words, the mere existence of health care facilities may not ensure utilization. While these studies argue the importance of both individual and program factors they are often considered independently. This indicates a lack of conceptualization and use of theoretical approaches in studying maternal care utilization, particularly studies from The Philippines. Thus, studies on maternal care utilization combining individual and program factors will fill this gap in the literature and thus further strengthen our understanding the varying differentials in maternal care utilization.

While previous studies from the Philippines focused either at regional or provincial levels, sub-national variations in the use of maternal care are few and far between. For example, sub-national variations in the use of maternal care are found between rural and urban areas. The large differences noted earlier between urban and rural areas indicate a need to understand the factors influencing this disparity in the use of maternal care.

Another limitation found in the literature is the lack of separation between public and private health care facilities in the analysis. Although a thriving private medical sector exists in the Philippines, studies have not considered a potential distinction between the medical care provided in private and public sector settings. Public health care in rural areas is concentrated on prevention and promotion of services to the disadvantage of curative services. The rural primary health centers are woefully underutilized because they fail to provide their clients with the desired amount of attention and medication and because they have inconvenient locations and long waiting times. Furthermore, the differences of roles for public and private health care facilities can be illustrated in their provision of services. Since there exists significant differences in individual characteristics of people who access these facilities in terms of availability and quality of services, it is recommended to consider access to government and private health facilities separately. This is because affordability and quality play a critical role in the decision to use health care services in situations where services are available and accessible.

In the present analysis we address the above-mentioned limitations using a theoretical framework developed by Andersen and Newman (1973). This approach incorporates both individual and program characteristics in addressing the utilization of maternal care services in rural areas of The Philippines. To capture the complexity of the various aspects of maternal care utilization we construct a composite index based on the various components of the maternal care services. The analysis based on such an index may provide a better picture of the utilization of maternal care services.

## Data and Methods

The 2008 National Demographic and Health Survey (2008 NDHS) is a nationally representative survey of 13,594 women age 15-49 from 12,469 households successfully interviewed, covering 794 enumeration areas (clusters) throughout the Philippines. This survey is the ninth in a series of demographic and health surveys conducted to assess the demographic and health situation in the country.

The survey obtained detailed information on fertility levels, marriage, fertility preferences, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and young children, childhood mortality, maternal and child health, and knowledge and attitudes regarding HIV/AIDS and tuberculosis. Also, for the first time, the Philippines NDHS gathered information on violence against women. The NDHS dataset is similar to that of the Demographic and Health Surveys conducted in many other countries. Relevant questions on safe motherhood were included in the Women's Questionnaire. The topics covered include pregnancy complications, antenatal and postnatal care, place of and assistance during delivery,

delivery characteristics, and postpartum complications. For the present analysis, the maternal care services of antenatal visits, tetanus toxoid injections, iron and folic acid tablets or syrup, delivery place and assistance during delivery are considered. Results presented in this paper pertain only to last births, which took place within three years preceding the date of interview. In total in the rural areas, there were 6,832 women with last births during the three years preceding the survey. Due to missing observations for some of the factors considered, the number of women included in the final analysis is reduced to 6,516. Information on relevant program and community level variables are extracted from the village data file.

## Methodology

Instead of considering various maternal care services separately, a composite index based on the utilization of various maternal care services is constructed to explain their utilization in rural Philippines. The different types of maternal care services considered for the construction of this composite index include: number of antenatal visits, whether the mother received enough iron and folic acid tablets/syrup for more than three months, whether the mother received two tetanus toxoid injection, whether the birth was delivered in a medical institution and whether the delivery was assisted by a trained health personnel. Responses to these questions are used to develop a composite index on the status of utilization of maternal care services. The utilization index is created using Principal Component Analysis (PCA). In general, principal component analysis helps to reduce the number of variables in an analysis by describing linear combination of the variables that contain most of the information. Given an array of correlation coefficients for a set of variables, principal component techniques enable one to see whether some underlying pattern of relationships exists such that the data may be “rearranged” or “reduced” to a smaller set of components that may be taken as source variables accounting for the observed interrelation in the data (Dunteman, 1989). The results of principal component analysis applied on the utilization of five different maternal care services confirm that the five measures are related to each other and could be reduced to construct a composite index to be used as a new variable in the later analysis. The results provided five principal components for these five variables included in the analysis. The first component captured about 54 percent of the variation in the data and based on the results of the first principal component each maternal services were assigned different weights. The principal component scores for the five maternal care services were generated based on the weights of individual variables obtained from the first component. Further these scores were used to create a composite index that contains categories corresponding to five quantiles. We named these five categories as, “Poor”, “Fair”, “Average”, “Good” and “Excellent” utilization of maternal care services and this composite index was used as the final dependent variable in the analysis.

First, bivariate relationship between the utilization index and individual and program characteristics is examined. Multilevel ordered logit regression is used to explain the important individual and community level determinants of utilization of maternal care services. A brief description of the ordered logit model is presented below.

Ordered logit models are used to estimate relationship between an ordinal dependent variable and a set of independent variables. In ordered logit, an underlying score is estimated as a linear function of the independent variables and a set of cut-points. The probability of observing outcome 'i' corresponds to the probability that the estimated linear function, plus random error, is within the range of the cut-points estimated for the outcome:

$$\Pr(\text{outcome}_{jk} = i) = \Pr (K_{i-1} < bX_{jk} + dZ_k + m_k + e_{jk} \leq K_i )$$

$X_{jk}$ : individual control variables,  $Z_k$ : observed community variables,  $m_k$ : error of unobserved community variables,  $e_{jk}$ : error of unobserved individual variables,  $b$  and  $d$  are the coefficients for individual and community level variables.  $m_k + e_{jk}$  is assumed to be logistically distributed in ordered logit. In either case, one estimates the coefficients  $b$  and  $d$  together with the cut-points  $K_1, K_2, \dots, K_{i-1}$ , where "i" is the number of possible outcomes.

#### Expected Results

Among the various socioeconomic and demographic variables considered, we expect that variables such as birth order, education of woman, household standard of living index and women's exposure to mass media would have larger variations in the utilization of maternal care services, even after controlling for other predictor variables. Similarly, among various community level and program variables considered, a health worker visit during pregnancy and the distance to a government health facility would also have strong and statistically significant influence on the utilization of maternal care services.