Predictors of differences in health services utilization for children in Nigerian communities

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ABSTRACT

Health service utilization is an important component of child health promotion. Evidence shows that two-thirds of child deaths in low and middle income countries could be prevented if current interventions were adequately utilized. Aim of this study was to identify determinants of variation in health services utilization for children in communities in Nigeria. Multivariable negative binomial regression model attempting to explain observed variability in health services usage in Nigerian communities was applied to the 2013 Nigeria Demographic and Health Survey data. We included the index of maternal deprivation, gender of child, community environmental factor index, and maternal health seeking behaviour, multiple childhood deprivation index and ethnicity diversity index as the independent variables. The outcome variable was under-fives' hospital attendance rates for acute illness. Of the 7577 children from 896 communities in Nigeria that were sick 1936 (25.6%) were taken to the health care facilities for treatment. The final model revealed that both multiple childhood deprivation (incidence rate ratio [IRR] = 1.23, 95% confidence interval [CI] 1.12 to 1.35) and children living in communities with a high ethnic diversity were associated with higher rate of health service use. Maternal health seeking behaviour was associated with a significantly lower rate of health care service use. There are significant variations in health services utilization for sick children across Nigeria communities which appear to be more strongly determined by childhood deprivation factors and maternal health seeking behaviour than by health system functions.

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1. Background

Health service utilization is an important component of child health promotion. Evidence shows that two-thirds of child deaths in low and middle income countries (LMICs) could be prevented if current interventions were adequately utilized (Jones et al., 2003). Utilization of such interventions in high childhood mortality regions remains low (Winter et al., 2015). Nigeria has high childhood mortality, in 2015, under-five mortality rate (UFMR) was 109 per 1000 live births with only a 2.7% annual rate of reduction (ARR) expected over the period of 25 years from the year 1990 (UNICEF, 2015). In an attempt to address this problem, the Federal Ministry of Health (FMOH) in Nigeria developed a child health policy which introduced interventions covering areas such as perinatal and neonatal health, young child feeding, major childhood illness, HIV/AIDS, school health and injury protection (Federal Ministry of Health, 2006). One of the objectives of these interventions was to increase health service utilization through the removal

of obstacles to the uptake of health services for children (Federal Ministry of Health, 2006). Reports, however, indicate that public health service facilities have witnessed decreased utilization from mid-1980s to year 2010 (Federal Ministry of Health, 2010).

Currently, there is increasing interest in the levels of performance of the interventions adopted in the Nigeria National Strategic Health Development Plan (NSHDP) especially in the area of childhood health outcomes and health services utilization (Federal Ministry of Health, 2010). Although most communities in Nigeria have low health services usage, it is unclear whether lower service utilization arises from low maternal health seeking behaviour, low parental levels of education, weak regional health system or from other demographics such as ethnicity, sex or deprivation.

Recent efforts at improving health services utilization are shifting to the community. The role of the community in promoting child health has been recognized by the international community and led to the establishment of the Integrated Management of Childhood Illness (IMCI) initiative which has three key components. One of these is improvement in family and community care practices (Hill et al., 2004). In line with this, the FMOH of Nigeria highlighted the involvement of family and community as part of its strategic plan for health service improvement (Federal Ministry of Health, 2010). However, the successful

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engagement of the community hinges on a better understanding of the differing factors which operate in various communities. Such factors may contribute to the differentials in health service utilization but there have been relatively few studies to date which have examined these factors (Sule et al., 2013; Nzioki et al., 2015; Emmanuel et al., 2013; Wolff, 1993; Kenny et al., 2015; Benova et al., 2015; Geldsetzer et al., 2014; Uzochukwu et al., 2008; Merrin et al., 2010). The aim of this study was to examine factors which predict differentials in health service utilization for children in Nigerian communities.

2. Methods

2.1. Study design

This study was based on secondary analyses of cross-sectional population-based data from the 2013 Nigeria Demographic and Health Survey (DHS).

2.2. Setting

Nigeria covers a total area of about 923,768 km^2. It is the thirty-second largest country in terms of land mass and the most populous country in Africa with a recent estimate of its population as 140,431,790 (NPC, ICF International, 2013). About 67.8% of the population live in rural areas and 32% in urban areas. There are 374 identifiable ethnic groups in Nigeria with varying languages, customs and cultures (NPC, ICF International, 2013). The largest ethnic groups are the Yoruba, Hausa/Fulani and Igbo which account for about 68% of the population (NPC, ICF International, 2013). Available statistics indicate that about 8% of the population are categorised as poor, 34% as lower class, 25% as lower middle class, 18% as upper middle class, 8% as lower upper class and 3% as upper class (Nigeria Population Distribution by Socioeconomic Class, 2015).

2.3. Sampling technique

The 2013 DHS (NPC, ICF International, 2013) was conducted in Nigeria to collect data on demographic, environmental, socioeconomic, and health issues (family planning, infertility, nutritional and health status of children, their mothers and the fathers) from a nationally representative sample of 39,902 women aged 15–49 years and 18,229 men aged 15–59 years in 38,904 households (NPC, ICF International, 2013). The survey used a three-stage cluster sampling technique. The country was stratified into 36 States and the Federal Capital Territory (FCT), Abuja making 37 districts in total. The primary sample unit (PSU) was based on 2006 General Population and Housing Census enumeration areas (EAs). The first stage involved selecting 896 localities (clusters). In the second stage, one EA was randomly selected from most localities. A total of 904 EAs were selected, with 372 in urban areas and 532 in rural areas (NPC, ICF International, 2013). The third stage involved random selection of a fixed number of 45 households in every urban and rural geographical area.

2.4. Data collection

Data collection procedures have been published elsewhere (NPC, ICF International, 2013). Data (on demographic characteristics, wealth, anthropometry, female genital cutting and awareness of HIV/AIDS, knowledge of HIV prevention, sexual behaviour, and domestic violence) were collected by conducting face-to-face interviews with women and men who met the eligibility criteria. Among all eligible individuals and households, participation rates were 98% for household, 98% for women and 95% for men (NPC, ICF International, 2013). Each woman was asked to provide a detailed history of all her live births in chronological order, including whether a birth was single or multiple, assigned sex of the child, date of birth, survival status, age of the child on the date of interview if alive and age at death of each live birth, if the child was not still alive.

2.5. Outcome variable

Hospital attendance rates for acute illness at a community level was the response variable. We focused on data for children under-five who had had an episode of diarrhea and/or fever/cough in the preceding 2 weeks before the survey and whose parents/carers sought consultation from a health care provider (either public or private).

2.6. Independent variables

We included the following independent variables; gender of child, community environmental factor index, maternal health seeking behaviour, multiple childhood deprivation index and ethnicity diversity index. We used composite indices because they are easier to interpret than a battery of separate indicators and because they help to construct narratives for lay and literate audiences. In addition, they reduce the visible size of a set of indicators without dropping underlying information. Furthermore, multidimensional concepts like welfare, well-being, human development, environmental sustainability, industrial competitiveness and so on cannot be adequately represented by individual indicators (OECD, 2008).

2.6.1. Childhood deprivation index

We used a childhood deprivation index previously described in a study by Uthman (2009). The childhood deprivation index in this study was operationalized with a principal component comprised of the proportion of children with low birth weight, not breast fed, with short birth interval (<24 months), high number of under-fives in the household and children with high birth order. A standardized score with mean 0 and standard deviation of 1 was generated from this index; with higher scores indicative of higher childhood deprivation (Uthman, 2009).

2.6.2. Maternal deprivation index

Maternal deprivation comprised of the proportion of mothers who are non-literate, unemployed, residing in rural areas and living below the poverty level (asset index < 20% poorest quintile).

2.6.3. Community environmental factor index

This was derived using principal component analysis on 3 variables that included proportion of children in households with access to safe water, proper sanitation, and low pollution cooking fuel. A standardized score with mean 0 and standard deviation of 1 was generated with higher scores indicative of better and cleaner environmental status.

2.6.4. Maternal health seeking behaviour index (MHSBI)

This was operationalized with a principal component analysis comprised of the proportion of respondents: with a health card, who attended ante natal care clinic and received tetanus vaccine during pregnancy, with the child's delivery in the hospital and with child received at least one dose of vaccination. A standardized score with mean 0 and standard deviation of 1 was generated from this index; with higher scores indicative of better MHSBI.

2.6.5. Ethnicity diversity index

The ethnicity of the children was computed by using an ethnicity diversity index. This index was created using a formula (Eq. (1) below) which captures both the number of different ethnic groups in an area and the relative representation of each group (Vyas and Kumaranayake, 2006).

$$Ethnic\ diversity\ index = 1 - \Sigma_{i=1}^{n}\left[\frac{xi}{y}\right]^{2} \tag{1}$$