Explaining Areal Variations in Modern Contraceptive Use in East Africa

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Introduction

Many developing countries contain substantial geographic variations in modern contraceptive use (Amin, Basu and Stephenson 2002: National Research Council, 1993). The application of multi-level modelling techniques has often found that areal (sub-national geographic) variations in contraceptive use remain after controlling for individual and household factors (Amin, Basu and Stephenson 2002). These variations could be attributed to a number of unobserved contextual factors, such as cultural beliefs, reproductive health service provision, the physical characteristics of the area, macro-economic factors, or the presence of transport routes. However, there is a lack of detailed research examining the possible impact of such factors. Furthermore, in sub-Saharan Africa, research has typically concentrated on the use of any contraceptive method rather than the use of modern methods or any examination of areal (sub-national) variations in contraceptive use. This is probably because modern contraceptive use has typically been very low and increasing uptake has only occurred recently.

Recently Demographic and Health Surveys (DHS), especially in sub-Saharan Africa, have collected Geographic Information Systems (GIS) data that now allows for the linking of other contextual data sources to the DHS data. Furthermore, detailed maps can be plotted in order to better inform researchers and local policymakers, by highlighting the characteristics of those areas with unusually high or low levels of contraceptive use.

The overall aim of this project is to explain areal variations in modern contraceptive use in three East African countries using a combination of DHS data and contextual data sources, and through combining multilevel modelling and GIS techniques. The objectives of this paper are as follows:

1) To quantify, using individual, household and community contextual data from the DHS and other sources, the determinants of modern contraceptive use in three East African countries.
2) To identify the importance of these determinants in accounting for areal variation in contraceptive use
3) To identify communities of unusually high or low contraceptive use within each of these countries after controlling for such factors.
4) To inform policy on the uptake of modern contraceptive methods in each country.

Three East African countries were selected for this study, Kenya, Tanzania and Malawi. The selection of these countries was restricted to countries with DHS data that contain GIS information. The selection of neighbouring countries also allows the identification patterns of areal variations that may transcend political boundaries. Contraceptive use varies from 23.6% in Kenya to 15.6% in Tanzania, with injectibles and the pill being the main methods used.

Data and Methodology
The paper analyses data on modern contraceptive use obtained from the latest available Demographic and Health Surveys (DHS) conducted in each of the study countries. Only those women considered 'at risk' of conception and therefore potential contraceptive users were included. A conservative measurement of the number of women 'at risk' of conceiving in each survey was calculated by excluding, from all women interviewed, those women who were currently pregnant or who had not had previous sexual intercourse.

Individual and household potential explanatory factors were selected from the relevant DHS from those highlighted by past research. This included a range of demographic, biological, socio-economic, knowledge, attitude and partner / household factors. Contextual data was either derived from the DHS at the Primary Sampling Unit (PSU) level, whilst other indicators were collected from sources within the country at the district level (e.g. National Statistics Offices). A range of both health contextual factors, such as the provision of family planning, and non-health contextual factors, such as community socio-economic, infrastructure and cultural related factors, were collated.

There are three levels of hierarchy in each dataset: individual / household, PSU and administrative area or 'district'. This was determined by the survey design and contextual data collected. However, it also reflects levels of potential contextual influence upon women, either at the smaller community level or a wider administrative level. The data are analysed using multilevel logistic models, because of the hierarchical nature of the data set and in order to analyse the factors accounting for the areal variation in the reproductive health outcomes. Initially individual / household factors were tested in the model, then contextual factors were entered into the models.

Findings
All three countries show substantial variation. For example, for 'at risk' women in Tanzania, modern contraceptive use varies from 6% in Mara region to 39% in Kilimanjaro region. The initial modelling of individual / household factors has showed similar factors predict modern contraceptive use in each country. All the demographic and biological factors are significant predictors of modern contraceptive use in all three countries. In general, women aged under 40, higher parity women, those formerly or never married and fecund women are more likely to be using modern methods.

There was evidence of an association between women's educational attainment and modern contraception use in Malawi and Tanzania, where the more educated were more likely to use modern methods. Similarly, there was also an association with occupation, but only in Kenya and Malawi. Turning to factors shaping knowledge and attitudes towards fertility and contraception, those who had heard of family planning through media messages were more likely to use modern methods, except in Tanzania. However, the association between modern contraceptive use and religion is weak. It is only significant in Malawi.

The results also show the importance of the women's partner and household in determining modern contraceptive use. If her partner currently lives with her, is educated to secondary level or the household has more basic amenities (except in Tanzania), then she is more likely to use a modern contraceptive method. However, partner's occupation and the respondent's autonomy in financial decision making are not significant predictors of use. Otherwise, the partner's approval of family planning plus discussion of family planning with her partner are strongly associated with modern contraceptive use.

The individual / household factors also accounted for some of the unexplained PSU and district variation in each country. However, significant unexplained variation remained between PSUs and districts in all three countries, except between PSUs in Kenya. Maps of the district residual variation in modern contraceptive use were plotted. They show a cluster of high and low residual areas. Parts of southern Malawi, coastal Tanzania and central Kenya typically have higher use than predicted by the model. Conversely, parts of western Kenya and northern Tanzania have lower use. This indicates that contextual factors may account for the remaining district variation.

The paper will present findings from adding the potential contextual explanatory factors to each model. It is anticipated that some of these will have an impact on both the determinants of use and its variation. The individual / household factors noted as important are likely themselves to vary across each country. For example, household amenities are likely to vary because of sub-national variation in water and sanitation provision. Consequently, such individual / household factors could also represent contextual effects. It will be examined whether their significance is mitigated by the introduction of the contextual measures.

The paper will demonstrate whether, as anticipated, the contextual factors account for the remaining unexplained variation in modern contraceptive use. It will also consider the relative importance of the individual / household factors and contextual factors in accounting for the areal variation in use. The findings will be discussed in terms of the differences between the study countries in the factors associated with use and variation, and also their relevance to policy. It will be highlighted that key factors associated with use are not necessarily important factors explaining areal variation.

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