Female height, social status and reproductive success in 40 developing countries

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Abstract

Effects of female height, socio-economic status, and context factors on reproductive success are studied using data on over 500,000 women aged 16-49 living in 360 districts within 40 developing countries. The data are derived from the Demographic and Health Surveys. Reproductive success is measured by child mortality, birth weight and height of children (stunting). Because height is besides a heritable trait also an indicator of health we expect taller women to experience less child mortality and to have children with higher birth weight and taller children than could be expected on the basis of her socio-economic status. Explanatory variables at the district level are modernization, women's status, and the availability of sanitary and public health facilities. At the national level we control for level of development. District and national characteristics are obtained by aggregating from the household surveys. The data are analyzed using three-level multilevel analysis, including cross-level interactions.

Introduction

There is broad evidence for both developed and developing countries that socio-economic status of the mother and especially her educational level has a positive effect on her reproductive success in terms of infant and child mortality, birth weight and stunting. With regard to height, as an indicator of general health and status, the evidence regarding reproductive success is mixed. Nettle (2002) showed that smaller than average women in the UK have more reproductive success. However, Sears found that, contrary to the UK, taller women in Gambia have higher reproductive success than shorter women. Of course, both extremes, very long or very short, are least successful.

There are a number of reasons why height in developing countries might be associated with successful reproduction. First of all, reproductive success has a different meaning because of the low fertility and mortality in the West. Tall women have wider pelves than shorter women, which allows them to have easier births and higher birth-weight babies, and hence less maternal and infant mortality. In Western countries, with extremely low infant and maternal mortality, this hardly affects the association between reproductive success and height. In countries with high mortality, on the other hand, is it very likely that reproductive success and height are positively related. Secondly, in developing countries height is a sign of strength, health potential, and of having experienced a more prosperous childhood, indicating more family resources. These are important features that may increase reproductive success. Thirdly, because of these positive characteristics associated with (female) height in developing countries, taller women may attract more resourceful partners. This might even be the case for shorter partners. Sear et al (2004) did not find evidence for the male-taller norm, which prevails in the West, in Gambian couples.

In this paper, we study the effect of female height, socio-economic status, and context factors on reproductive success using data on over 500,000 women aged 16-49 living in 40 developing countries. Reproductive success is measured by child mortality, birth weight and height of children (stunting). Besides explanatory variables at the household level we also include characteristics of the context in which the women are living, like the degree of modernization, the social status of women, and the availability of sanitary and public health facilities at the district level and economic development at the national level. To find out to what extent the effects of the women's resources on reproductive success depend on the context, we include cross-level interactions between district factors and household factors in the analysis. The hypotheses we test in this way is that the effects of the women's resources on reproductive success are stronger if the circumstances in the district are less favorable.

Data & method

The data are derived from the Demographic and Health Surveys (DHS), which are large representative household surveys in which, besides general household information,

detailed information on all women aged 16-49 in the households is collected. The most recent (1997+) surveys are used for 40 developing countries (5 in Latin America, 26 in Sub-Saharan Africa, 5 in the MENA region, and 4 in South and South-East Asia). We use the geographical information available in the data sets to distinguish sub-national regions within the countries (called districts here). Level of development of the districts is measured by an index constructed on the basis of six variables aggregated from our household data sets: the percentages of households in the district owning a fridge, a car, a telephone, or a television, and the percentages of households with electricity or running water. Information on health and sanitary facilities is aggregated from the household surveys to the district level. For women's status the percentage of women in the population aged 40-70 is used. At the national level, GDP per capita is used. The major analytic technique is three-level multilevel analysis with explanatory variables at the household, district and national level.