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Estimates of Adolescent Fertility in Developing Countries: An Innovative Use of DHS Birth Histories

Abstract

Early childbearing, particularly before age 15, is risky for the health and survival of the mother and the child; it also negatively affects future well-being. There is great interest in levels and trends of early fertility. The Demographic and Health Surveys Program is a major source of fertility estimates after age 15, but because the minimum age of eligibility is 15, it may appear that DHS surveys cannot estimate fertility before age 15. This paper uses the birth histories for women age 15-19 to estimate the rate for age 10-14 during the three years and five years before the survey. Simulations show that the gain in precision from hypothetically lowering the minimum age of eligibility would usually be very small. Estimates of levels and trends in approximately 70 countries are included. Under-15 fertility is generally rare or occurs primarily at age 14. Potentially relevant biases in age reporting are discussed.

Extended Abstract

The proposed paper will be an extension of a DHS report published in September 2018 (i.e. earlier this month), referred to as MR23:

Pullum, Thomas W., Trevor Croft, and Kerry L. D. MacQuarrie. 2018. Methods to Estimate Under-15 Fertility Using Demographic and Health Surveys Data. DHS Methodological Reports No. 23. Rockville, Maryland, USA: ICF. <https://www.dhsprogram.com/pubs/pdf/MR23/MR23.pdf>

Here is the abstract for MR23:

Early childbearing carries serious risks to the health of both the child and the mother. International guidelines classify births before age 18 as high-risk births, and births before age 15 are of even greater concern. Early marriage and pregnancy are also interpreted as negative indicators of child protection, and may severely limit an adolescent girl's educational opportunities.

DHS surveys are a major source of fertility estimates for age 15-49, the age range of eligibility for the women's interview and the collection of birth histories. Until recently, DHS surveys were not used for the calculation of fertility rates below age 15. This methodological report provides technical details for calculating fertility rates for age 12-14 and age 10-14 during the 3 years before the survey, and age 10-14 during the 5 years before the survey, the standard time intervals for DHS age-specific fertility rates. The under-15 births, which go into the numerator of the fertility rates, are obtained from the birth histories of women age 15-19 at the time of the survey.

The central question is how to deal with the left censoring of under-15 exposure, which goes into the denominator of fertility rates, but is truncated because girls under age 15 are not included in the surveys. To deal with censoring, rates for single years of age 10, 11, 12, 13, and 14 are constructed. DHS does not normally construct single-year rates, but they are of special interest below age 15 and convenient for calculating 3-year and 5-year rates. Single-year rates are only slightly affected by censoring. For example, the mean age observed for age 14 in the past 3 years is only about 12 days higher than 14.5. Pooled rates for age 12-14 or 10-14 are constructed as weighted averages of the single-year rates. Three alternative weighting methods are considered. The first uses information about girls age 10-14, who are included in

the household survey but not in the women's survey. The second uses weights derived from the geometry of a Lexis diagram. These estimates are easier to calculate and are the ones currently available on STATcompiler. The third method is simply the arithmetic average of the single-year rates. These estimates are the easiest to calculate but lack a demographic rationale. The second and third methods, when relevant, also assume that 60% of the total exposure to age 10-14 is to age 12-14.

This report applies the alternative approaches to 67 DHS surveys conducted between 2001 and 2016. The three estimates are virtually indistinguishable in almost all surveys. When they differ, the main reasons appear to be that the assumption of 60% is not valid and/or there are irregularities in the reported age distribution that are probably traceable to digit preference or age displacement across the age 15 boundary or potential age displacement related to having an early birth. The first method, which makes the most use of the available data, is most sensitive to data quality. The third method, which makes the least use of available data, is least sensitive to data quality.

The report describes simulations of the effect of reducing the minimum age for eligibility from 15 to 14, or to 13, in terms of the expected additional number of under-15 births and the expected improvement in the precision of the estimated rate. The gain from lowering the age range of eligibility below age 15 would be surprisingly small. Most under-15 fertility occurs at age 14, and the birth histories of women 15-19 provide nearly complete information on births at age 14.

A 2017 DHS Comparative Report is also very relevant:

MacQuarrie, Kerry L.D., Lindsay Mallick, and Courtney Allen. 2017. Sexual and Reproductive Health in Early and Later Adolescence: DHS Data on Youth Age 10-19. DHS Comparative Reports No. 45. Rockville, Maryland, USA: ICF. <https://www.dhsprogram.com/pubs/pdf/CR45/CR45.pdf>

The PAA submission is intended to communicate the strategy DHS has developed to estimate under-15 fertility, and to give an empirical overview of the patterns of under-15 fertility found in DHS surveys since 2000. Beyond the content of MR23, it will include a completely new analysis of the effect of age misreporting in the vicinity of age 15, due to potential displacement caused by the eligibility criterion or due to a potential tendency for girls with early fertility to be reported as older than they actually are. If the paper is accepted for session 123, the emphasis will be primarily methodological. If it accepted for session 103, the emphasis will be on empirical results. In either case, the abstract would be revised somewhat.