Patterns and Trends in Adolescent Fertility Across Municipalities in Nepal Between 2011 and 2016

Charlotte Greenbaum, Samir K.C., Hari Dhonju, Toshiko Kaneda

Description

National averages and standard measures mask the complexity of family planning and fertility dynamics in Nepal. With a national total fertility rate (TFR) approaching replacement level, one could conclude that the family planning needs of Nepali men and women are close to being met. Yet, this masks any subnational variation that may tell a different story. Data from the 2011 and 2016 Demographic Health Survey (DHS) show notable variation in adolescent fertility rates (AFR) for women across provinces.[1] There are, however, no estimates of adolescent fertility available at the local level to examine the factors underlying this paradox. The objectives of this study are three-fold: first, we are estimating AFR for the 753 municipalities in Nepal in 2011 and 2016, based on adolescent girls' educational attainment, marital status, and community-level characteristics. Second, we examine the changes in adolescent fertility rates at municipality-level across Nepal between 2011 and 2016 to identify any areas experiencing little change between 2011 and 2016 and high adolescent fertility in 2016. Third, to facilitate interpretation and increase the accessibility of the results, we chart our municipality-level AFR results on easily understandable maps. The analysis of adolescent fertility rates at municipality-level over time is essential for determining where efforts are needed to improve access to family planning, reduce adolescent fertility, and ultimately contribute to improved well-being of adolescent girls as well as a potential demographic dividend for Nepal.

Data

Data for our analysis come from the 2011 and 2016 waves of the Nepal Demographic and Health Survey (DHS) and the 2011 Nepal Population and Housing Census. We use data from the DHS on the birth history, age, educational attainment, marital status, time of marriage, and geographic location of women ages 15-24. Since we are looking at women who may have had any births at ages 15-19 within the five years preceding the DHS surveys, our sample includes women 15-24 at the time of the survey. Our study sample consists of 5,071 in 2011 and 4,928 and 2016. We use data on age, educational attainment, marital status, and place of residence for women ages 15-19 and 20-24 from the census.

Methodology

Education and marital status are key determinants of adolescent fertility. Given the lack of data that allow us to produce direct estimates of AFR at municipality level in Nepal, we estimate AFR using data on education, marital status, and additional factors that are available for adolescent girls at municipality-level in Nepal.

We first examine the education-specific AFR in 2011 and 2016 using DHS fertility and education data for five different ecological/development regions in 2011 and 2016. Estimating education-specific AFR at the municipality level using the DHS was not possible due to the limited sample size. Our approach is to estimate education-specific AFR at a higher level of aggregation and apply it to all municipalities within the region. As a preliminary beta-analysis, we started with Province Six (Karnali) following the new restructuring that started after the last DHS survey was conducted (2016). However, the DHS sampling frame in 2011 was based on the three ecological zones (mountain, hill, and terai) and development regions (Eastern, Central, Western, Mid-Western, and

[1] Ministry of Health and Population (MOHP) [Nepal], New ERA, and ICF Inc, Nepal Demographic and Health Survey (DHS) 2011 (Kathmandu, Nepal: Ministry of Health and Population, New ERA, and ICF International, Calverton, Maryland, 2012); Ministry of Health, Nepal; New ERA; and ICF, Nepal Demographic and Health Survey (DHS) 2016. (Kathmandu, Nepal: Ministry of Health, Nepal, 2017).

Far-Western). Hence, we aggregated data by “eco-development” regions. Based on the sample size and characteristics of the eco-development regions, we identified five regions to use for our regional education-specific adolescent fertility rates: three development regions (Eastern, Central, and Western) and two based on ecological regions (Mid-Western/Far-Western Terai and Mid-Western/Far-Western Hills and Mountains). The choice of eco-development regions aligns with the earlier government administrative structures with five regional directorates. However, in the Mid-Western/Far-Western regions, we decided to split them by ecological regions due to 1) the DHS sampling frame putting Mid-Western/Far-Western Mountains together; 2) the sample size being too small to have Mid-Western/Far-Western mountains as one region and therefore needing to be grouped with the hills region; and 3) the terai area being distinct from Hills/Mountains in terms of accessibility and development. Importantly, we chose to use these eco-development regions instead of the seven provinces because the education-specific AFR patterns show a more consistent pattern by education in the current regional grouping than by province.

We define education attainment using five categories: no education, incomplete primary education, complete primary education, complete lower-secondary education, and school-leaving certificate or higher. We then estimate the distribution of educational attainment and time spent in marriage among adolescent girls by municipality region in 2011 and 2016 using the DHS and census data. We projected the size and education distribution of women and time spent in marriage in this age group from 2011 to 2016 for each municipality, using educational attainment progression ratios.[2] Finally, we apply the education-specific AFR to the education-marriage-specific distribution of adolescent girls in each municipality to produce the municipality-level AFR for all municipalities across Nepal in 2011 and 2016. Education is a key factor affecting adolescent fertility, as it significantly delays age at marriage; in Nepal, there are virtually no births outside of marriage among youth.

We set up calculation and estimations of the DHS data in R.[3] We used package ‘rdhs’ to read the files online in the R environment. We used r function ‘fert’ in package ‘DHS.rates’ to estimate AFRs among adolescent girls for each level of education at the province level in the 2011 and 2016 surveys.[4] Function ‘fert’ could not estimate the marital fertility rate where the exposure in the denominator needs to be corrected for time spent in a “single” state. We used a separate function (earlier prepared in R by KC by recoding DHS SPSS codes) to calculate AFRs and modified it to calculate marital AFRs. Fertility rates are calculated as an event-exposure ratio of births (event) and the number of years spent at risk of giving birth (exposure). DHS estimates fertility during a period (for example, three or five years before the survey) by counting births by mother’s age (in months) at birth, such that the mothers who gave birth when they were 15 to 19 years old could be in the age range of 15 to 24 at the time of survey.[5] The denominator, exposure, is calculated as the time spent by each woman at different ages during the period.

Results

When conducting our analysis for all of Nepal’s seven Provinces, we found that while adolescent fertility overall has decreased in some localities, in most municipalities throughout the country, adolescent fertility remains high and either stagnant or increasing.

---

[2] KC S, Speringer M, & Wurzer M (2017). Population projection by age, sex, and educational attainment in rural and urban regions of 35 provinces of India, 2011-2101: Technical report on projecting the regionally explicit socioeconomic heterogeneity in India. IIASA Working Paper. IIASA, Laxenburg, Austria: WP-17-004 Copyright © 2017 by the author(s). http://pure.iiasa.ac.at/14516/

[3] Mahmoud Elkasabi, "DHS.rates," the Comprehensive R Archive Network (2019), accessed at https://cran.r-project.org/package=DHS.rates on July 19, 2019.

[4] OJ Watson, “Rdhs,” the Comprehensive R Archive Network (2019), accessed at https://cran.r-project.org/package=rdhs on July 19, 2019.

[5] Demographic and Health Survey, “Calculating ASFR,” accessed at https://dhsprogram.com/Data/Guide-to-DHS-Statistics/Current_Fertility.htm on July 19, 2019.

For Nepal, the overall AFR was 87 in the 2006-2011 period and 89 in the 2011-2016 period, representing little change. While there have been declines in adolescent fertility in some locations, there remain areas where adolescent fertility is high and stagnant or increasing. **564 out of 753 municipalities (75%)** are estimated to have seen stagnant or increasing adolescent fertility from 2011 to 2016. **375 out of 753 municipalities (50%)** are estimated to have a high adolescent fertility rate of 100 births or more per 1,000 girls 15-19, up from 366 municipalities in 2011. **312 out of 753 municipalities (41%)** are estimated to have high and either stagnant or increasing adolescent fertility (see Figures 5 and 6).

We identified 106 priority municipalities where adolescent fertility is 1) high and stagnant or increasing, and 2) where there were an estimated 1,000 births or more to adolescent mothers from 2011 to 2016. These 106 municipalities account for over 20% of all births to girls ages 15-19 in Nepal.

Figure 1: Map of 2016 Overall Adolescent Fertility Rates by Municipality, Nepal

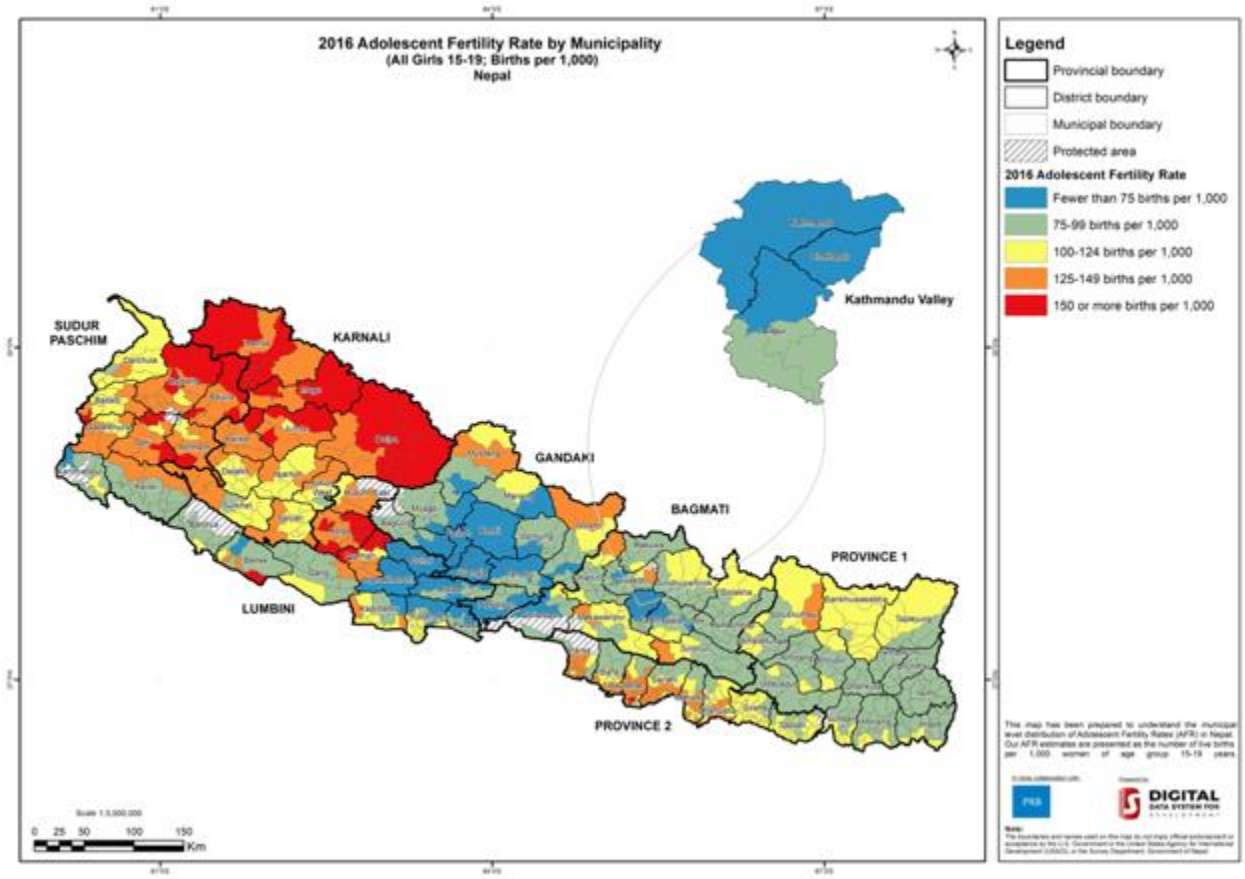
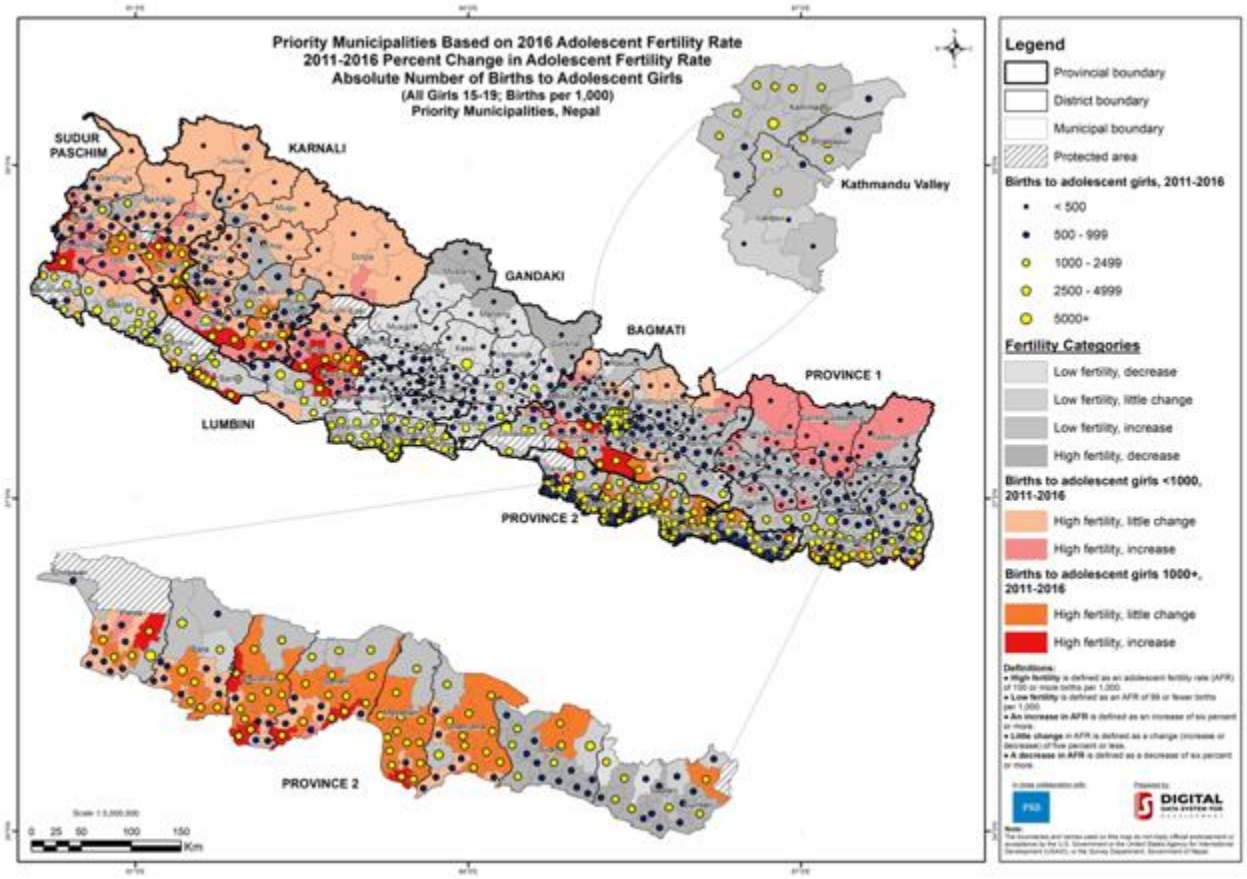


Figure 2: Map of Priority Municipalities Based on 2016 Overall Adolescent Fertility Rate, 2011-2016 Percent Change by Municipality, and Absolute Number of Births to Adolescent Girls, Nepal



Implications

Our modeled estimates of AFR will allow us to identify municipalities with persistently high rates of adolescent fertility to help guide policies and programs to reduce early marriage and childbearing so Nepal can realize the maximum benefits of a potential demographic dividend. In additional to the overall benefits that this growth in human capital could have for Nepal, it can also be a way for Nepal to improve equity in adolescent sexual and reproductive health and other outcomes.