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Long abstract

Title: Age-Specific Pregnancy and Abortion Rates in High-Income Countries, 1990-2023

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Background

The global incidence of pregnancy and abortion have both declined in recent decades. Abortion rates have not declined as sharply as pregnancy rates, and the proportion of pregnancies that end in abortion has increased (pregnancies are comprised of live births, abortions, and fetal losses); some 27% of all pregnancies end in abortion globally. But these trends are not consistent across countries, and they are likely to vary across population subgroups within countries.

Information on levels of and trends in pregnancy and abortion in population subgroups can be used to craft effective and equitable reproductive health policies and programs that meet the needs of all individuals. This information can also contribute to an informed public discourse around abortion, and help reduce stigma by providing a data-driven picture of the women who experience these events.

Of the various population subgroups, age is the one for which information on the incidence on live births is widely available, and the United Nations Population Division (UNPD) periodically estimates age-specific birth rates among women in 5-year age groups for all countries. Many high-income countries (HICs) with liberal abortion laws also provide reliable and comprehensive data on abortion incidence by the age of the person obtaining the abortion, making it a key demographic factor with both birth and abortion statistics.

The most recent assessment of age-specific abortion rates across countries was conducted more than 10 years ago, and it focused on countries with liberal abortion laws.¹ It showed that adolescent abortion rates had declined in most countries from the mid-1990s to 2010, adolescents accounted for a smaller share of abortions than their population size would predict in the majority of countries with data, and adolescents accounted for a larger proportion of all abortions in North America and Northern Europe than in other parts of Europe. The abortion data for low- and middle-income countries in that review were deemed to be missing a large share of all abortions. The prior analysis did not include age-specific pregnancy rates. To our knowledge, these have not yet been computed for the countries in our study.

A key purpose of research on abortion incidence is to understand the extent to which people are able to achieve their fertility desires. While information on age-specific abortion rates per 1,000 women and proportions of pregnancies ending in abortion are useful for this purpose, neither measure accounts for likely age-related differences in the proportion of women who want to avoid pregnancy and childbearing. The conditional abortion rate is a measure of the incidence of abortion among women who want to avoid pregnancy and childbearing (also defined as the proportion at risk of an unwanted pregnancy), and it can offer a window into the extent to which women in each age group are able to realize their fertility preferences.

The Institute for Health Metrics and Evaluation (IHME) has recently begun to publish model-based estimates of the age-specific numbers of females who wish to avoid pregnancy by country.² These

estimates, together with data on age-specific numbers of women who have abortions, can be used to estimate age-specific conditional abortion rates.

Objectives

We will estimate levels and trends in the incidence of abortion and, for the first time, pregnancy, by 5-year age group for women 15-49 years old in high-income countries for which abortion estimates are available. We will use these estimates to compute the age-specific proportions of pregnancies ending in abortion. We will also estimate the first-ever age-specific conditional abortion rates, that is, abortion rates among women who wish to avoid pregnancy, in these countries.

We will use the age-specific abortion and pregnancy rates to compute trends in the total abortion rate (TAR) and total pregnancy rate (TPR) which represent the number of these events a woman would have during her reproductive life if she experienced the age-specific rates observed in a given period.

Data sources

Birth data: We will use birth estimates from the United Nations Population Division (UNPD), which offers consistent and comparable estimates across countries.

Abortion data: We compiled abortion data from all high-income countries where reliable estimates are available. Currently, we have gathered data from 24 countries.

Estimates of fetal loss (miscarriages and stillbirths): As has been done previously,³ we will estimate the incidence of fetal loss using an approach derived from life tables of pregnancy loss by gestational age. According to these estimates, there are, on average, one fetal loss for every ten abortions and one fetal loss for every five livebirths.

Population data: We will use UNPD's country-specific estimates of the number of women in the population by 5-year age group from 15-49 years old, together with IHME's estimates of the proportion of women in each age group who wish to avoid pregnancy by country.

The UNPD has made model-based estimates of the numbers of females 15-19 years old who wish to avoid pregnancy;⁴ as a sensitivity analysis, we will compare the conditional abortion rates for 15-19 years olds using both UNPD and IHME estimates of the size of this group.

Measures of interest

We will compute the following:

- age-specific pregnancy and abortion rates
- age-specific proportions of all pregnancies that end in abortion
- the distribution of pregnancies and abortions across age groups
- age-specific conditional abortion rates
- total abortion rates and total pregnancy rates

We will estimate trends for 1990 to 2023, covering as much of this time span as possible for each country, with the constraining factor being availability of abortion statistics.

Expected findings

We will identify common patterns in age-specific rates of pregnancy and pregnancy outcomes, and countries that veer most sharply from these patterns. We will also identify countries that have seen the steepest changes in age-specific pregnancy and abortion rates, with particular attention to rates among adolescents. We will explore whether the previously observed decline⁵ in adolescent abortion rates has continued or whether adolescent rates have plateaued or risen in these countries.

We will highlight the contrast between standard age-specific abortion rates and conditional rates. We anticipate that we will find that standard abortion rates are lower among adolescents than among women in other age groups, whereas conditional abortion rates (rates among women wishing to avoid pregnancy) are particularly high among adolescents.

Discussion

We will discuss potential explanations for observed differences across countries and trends over time in the incidence of pregnancy and its outcomes, in the context of the existing literature on their determinants, such as educational attainment, contraceptive use and social norms. We will discuss the policy and program implications of these findings.

We will also consider the limitations of our study. For example, we will by necessity assume that the proportion of pregnancies that end in fetal loss is constant across age groups, and we will explore the literature on the extent to which rates of fetal loss are likely to vary by age group. Fetal losses account for a small share of all pregnancies.

Finally, we will identify areas for future research. These will include a call for analysis of how the cross-sectional differences and trends over time in these reproductive events are correlated with social and policy factors, with contraceptive use, and possibly with contraceptive method mix.

This analysis will contribute to a more nuanced understanding of the incidence of reproductive events in high-income countries, which could inform public health strategies and the public understanding of reproductive needs of their populations.

¹ Sedgh G, et al. Legal abortion levels and trends by woman's age at termination. *Perspectives on Sexual and Reproductive Health* 45(1):13-22, 2013.
https://www.guttmacher.org/sites/default/files/article_files/3814312.pdf

² Haakenstad, A et al. Measuring contraceptive method mix, prevalence, and demand satisfied by age and marital status in 204 countries and territories, 1970–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 400(10348), 295-327, 2022.
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(22\)00936-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)00936-9/fulltext)

³ Bearak J et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. *The Lancet Global Health*, 8(9), e1152 - e1161, 2020. [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(20\)30315-6/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30315-6/fulltext)

⁴ Kantorová V, Wheldon MC, Dasgupta ANZ, Ueffing P, Castanheira HC. Contraceptive use and needs among adolescent women aged 15-19: Regional and global estimates and projections from 1990 to 2030 from a Bayesian hierarchical modelling study. PLoS One. 2021 Mar 4;16(3):e0247479.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7932081/pdf/pone.0247479.pdf>

⁵ Sedgh G, et al. Legal abortion levels and trends by woman's age at termination. *Perspectives on Sexual and Reproductive Health* 45(1):13-22, 2013.
https://www.guttmacher.org/sites/default/files/article_files/3814312.pdf