

Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: estimates from a Bayesian hierarchical model

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Summary

Background Estimates of pregnancy incidence by intention status and outcome indicate how effectively women and couples are able to fulfil their childbearing aspirations, and can be used to monitor the impact of family-planning programmes. We estimate global, regional, and subregional pregnancy rates by intention status and outcome for 1990–2014.

Methods We developed a Bayesian hierarchical time series model whereby the unintended pregnancy rate is a function of the distribution of women across subgroups defined by marital status and contraceptive need and use, and of the risk of unintended pregnancy in each subgroup. Data included numbers of births and of women estimated by the UN Population Division, recently published abortion incidence estimates, and findings from surveys of women on the percentage of births or pregnancies that were unintended. Some 298 datapoints on the intention status of births or pregnancies were obtained for 105 countries.

Findings Worldwide, an estimated 44% (90% uncertainty interval [UI] 42–48) of pregnancies were unintended in 2010–14. The unintended pregnancy rate declined by 30% (90% UI 21–39) in developed regions, from 64 (59–81) per 1000 women aged 15–44 years in 1990–94 to 45 (42–56) in 2010–14. In developing regions, the unintended pregnancy rate fell 16% (90% UI 5–24), from 77 (74–88) per 1000 women aged 15–44 years to 65 (62–76). Whereas the decline in the unintended pregnancy rate in developed regions coincided with a declining abortion rate, the decline in developing regions coincided with a declining unintended birth rate. In 2010–14, 59% (90% UI 54–65) of unintended pregnancies ended in abortion in developed regions, as did 55% (52–60) of unintended pregnancies in developing regions.

Interpretation The unintended pregnancy rate remains substantially higher in developing regions than in developed regions. Sexual and reproductive health services are needed to help women avoid unintended pregnancies, and to ensure healthy outcomes for those who do experience such pregnancies.

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Introduction

Periodic estimation of the incidence of unintended pregnancy is needed so that policy makers, researchers, and other stakeholders can track progress towards helping women and couples achieve their reproductive goals. It also helps demonstrate the need for contraceptive services and the impact of programmes and policies on unintended pregnancies and their outcomes. These estimates can additionally be used to examine variations in how women resolve unintended pregnancies across settings and over time. Most unintended pregnancies occur in developing regions where, combined with limited access to safe abortion care, they are an important contributor to unsafe abortions worldwide.^{1–3} Moreover, unintended pregnancies are widely acknowledged as both a cause and a consequence of socioeconomic inequality.^{4,5}

Estimating the incidence of unintended pregnancy at the national or regional level is challenging. Data

requirements include information on the proportion of births that arise from unintended pregnancies (hereafter referred to as unintended births), and data on the incidence of abortion. Estimates of the incidence of abortion worldwide for all regions and subregions have recently been published by a group that includes the coauthors of this study for the period 1990–2014.⁶ Additionally, a substantial body of nationally representative surveys that measure the proportion of births that are unintended are available for this same time period.

Past estimates of global unintended pregnancy incidence relied primarily on computation of subregional averages using available country data and the assumption that these averages apply to countries without data. Statistical uncertainty in differences across regions or over time could not be computed.¹ Building on a method recently developed to estimate

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Research in context

Evidence before this study

Previous estimates of global trends in unintended pregnancy were made for 1995, 2008, and 2012. These point estimates relied on country-level data on the incidence of unintended births and estimates or projections of abortion rates, and qualitative assessments of exchangeability to make inference from existing data to countries and territories lacking data. Separate databases were used to make estimates for each of the 3 years.

Added value of this study

We use birth rates estimated by the UN for 1990–2014, all available data on the proportion of births unintended, and recently published estimates of abortion incidence and factors associated with unintended pregnancy, including family-planning indicators for married women, to develop model-based estimates of pregnancy rates by intention status and outcome in all major regions and subregions of the world for 1990–2014. This is the first time that unintended pregnancy has been estimated using a statistical model, that differences in data quality have been accounted for, and that uncertainty intervals have been estimated. Data on unintended births and unintended pregnancies were compiled from nationally representative surveys done periodically in

developing and developed countries, and from one-time studies that were found through a PubMed literature search using multiple combinations of keywords. This data collection effort yielded 298 datapoints for 105 countries. We estimate that the global unintended pregnancy rate fell from 74 (90% UI 72–84) per 1000 women aged 15–44 years in 1990–94 to 62 (59–72) in 2010–14. The proportion of pregnancies that were unintended has not changed appreciably, and was 44% (90% UI 42–48) in 2010–14. Some 56% (90% UI 53–60) of all unintended pregnancies ended in abortion in this period.

Implications of all the available evidence

The findings underscore that women and couples are having smaller families and fewer unintended pregnancies in many parts of the world. The findings also emphasise the continuing need for investments to meet women's and couples' contraceptive needs. Unintended pregnancy rates remain much higher in developing regions compared with developed regions, and many of the resulting abortions are unsafe. Additional research on the causes and consequences of unintended pregnancy are needed to compel appropriate investments in programmes and design policies that meet the needs of women and couples everywhere.

global levels and trends in induced abortion for 1990–2014, and using estimates of abortion incidence for that period,⁶ as well as the body of available data on the proportion of births that are unintended, we developed a Bayesian hierarchical time series model⁷ to estimate subregional, regional, and global levels and trends in the incidence of unintended pregnancy over the period 1990–2014. With the recently estimated abortion rates and new estimates of the percentage of births that are unintended, applied to general fertility rates from the UN Population Division (UNPD), we produced estimates of the proportion of all pregnancies that are unintended and the proportion of unintended pregnancies that end in abortion.

Methods

Background

The statistical model is grounded in a theoretical framework in which the incidence of unintended pregnancy is a function of the numbers of women with an unmet need for contraception (ie, women who want to stop or delay childbearing but are not using any method of contraception) and women using a contraceptive method who experience a method or user failure, and the risk of unintended pregnancy in each of these subgroups. The risk of unintended pregnancy in these subgroups is in turn influenced by women's fecundity and the timing and frequency of their sexual activity.⁸ Along with abortion, which affects the percentage of unintended pregnancies that end in a birth, these are key proximate determinants of fertility.⁹

We adapt the theoretical framework to take account of the available evidence, and estimate the incidence of unintended pregnancy as the sum of events among married women with an unmet need, married women experiencing failure with a contraceptive method, and all unmarried women. Following the standard Demographic and Health Survey (DHS) definition, married women included those living in a cohabiting union.¹⁰

Data

Pregnancies are comprised of births, abortions, and miscarriages. Livebirth estimates for each country and year were taken from the UNPD.¹¹ Numbers of abortions were taken from special tabulations of recently published estimates.⁶

We searched for data on the percentage of births that were unintended for every country and major territory in the world for 1990–2014. Data were obtained from nationally representative surveys and from published studies identified through literature searches. We systematically searched PubMed, JSTOR, and Google Scholar for a combination of the following terms: “incidence”, “unplanned birth”, “unintended pregnancy”, “unwanted pregnancy”, “unplanned pregnancy”, “pregnancy intention”, “unintended births”, “unwanted births”, and “pregnancy intention”. We limited the search to papers studying the incidence of unintended pregnancy between Jan 1, 1990, and Dec 31, 2014.

In DHS surveys conducted periodically in developing countries, a birth is considered unintended if it occurred sooner than desired or if it was not wanted at all. Women

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