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THE IMPACT OF THE COVID-19 PANDEMIC ON FERTILITY
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BACKGROUND NOTE

A review of research related to the impact of the COVID-19 pandemic on fertility¹

Population Division

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¹ The views expressed in the paper do not imply the expression of any opinion on the part of the United Nations Secretariat



DESA

Population Division

Introduction

Since the first case of COVID-19 was reported in China in December 2019, the disease has quickly spread across the world. This pandemic has infected and killed millions of people, and it has severely impacted economic activity as countries imposed tight restrictions on social contacts and movements in an effort to halt the spread of the virus. Globally, as of 1 May 2021, there were more than 150 million confirmed cases of COVID-19 infections globally, including over 3 million deaths, as reported by the WHO. Governments across the world have taken unprecedented measures to contain the spread of the virus, including lockdowns, quarantines, social distancing measures and prolonged closures of school and non-essential services. The social as well as economic costs of the pandemic and the related containment measures have been considerable. According to an estimate by the United Nations Department of Economic and Social Affairs, the global GDP fell by an estimated 4.3 per cent in 2020, compared to a reduction of 1.7 per cent during the Great Recession in 2009. The present recession has brought about the sharpest contraction of global output since the Great Depression in 1929 (United Nations, 2021). Developed countries as a whole have so far been hit harder, with a contraction of GDP of 5.6 per cent, compared to a 2.5 per cent downturn in developing countries in 2020.

There is little doubt that this once-in-a-century public health crisis, compounded by an economic crisis and social disruptions, has and will have considerable and possibly lasting impacts on the three demographic variables, namely fertility, mortality and migration, that determine the present and future size and structure of the population. While the impact of the pandemic on mortality has been immediate and severe, very limited evidence is available so far about the pandemic's influence on present and future fertility trends. The full impact on births trends will only become evident with a time lag, of at least nine months between conception and birth. Given the prominent role of changes in fertility for population growth and its age composition, it is important to understand how the pandemic has affected and will continue to affect fertility in different parts of the world. While the decision to have a child is an individual one taken by parents, socio-economic circumstances are known to play a critical role in this regard. These circumstances are even more important in a global pandemic like the present one, where access to healthcare and family planning services are affected simultaneously. The government's capacity to contain the spread of the virus, to adopt mitigation measures and soften the effects of the pandemic are all likely to shape reproductive behavior.

Given the scarcity of data and the need to determine fertility levels for present and future years to inform population estimates and projections, researchers have begun to try to draw comparisons with the impact on fertility from comparable past global or regional health and economic shocks. Such examples are the Influenza pandemic during 1918-1919, the Zika epidemic in Brazil during 2015-2016 and the Ebola outbreak in West Africa during 2014-2016. In the case of economic shocks, the impacts of the Great Depression of the 1930s as well as the Great Recession during 2008-2009 have been studied. This research helps to develop a preliminary understanding of the possible implications of the current pandemic on fertility and to develop assumptions and explore possible scenarios for present levels and future fertility trajectories in different parts of the world.

To facilitate the discussions of this Expert Group Meeting on the impact of the COVID-19 pandemic on fertility levels and trends, this paper provides a summary of selected research and analysis of evidence on the following topics that will be discussed in the Expert Group Meeting: (a) theoretical considerations of fertility responses to public health and economic crises; (b) lessons from previous pandemic(s)/epidemics,

e.g., the 1918 Influenza pandemic; (c) lessons on the impact on fertility from the 2008 Great Recession in the United States and other affected countries; and (d) recent data/evidence on fertility levels and changes.

Theories of fertility response to crisis

Historically, human fertility responded to external shocks such as famine, epidemics and economic crisis following a fairly common pattern: fertility declined in response to rising mortality, normally with a nine-month lag, and rebounded one or two years after the crisis (Livi Bacci, 2000; Stone, 2020).

According to Palloni (1985), a crisis by and large starts with a gradual and then a sudden increase in mortality, followed by a drop in fertility. Normally after such a crisis, mortality would return to pre-crisis levels and fertility would rebound temporarily to higher than the pre-crisis levels.

In a paper entitled “The demographic response to economic crisis in historical and contemporary populations”, Lee (1990) reported that the effects of an economic fluctuation, such as food price fluctuations or famine, are often spread out over time and fertility, mortality, nuptiality and migration all respond to economic fluctuations. He clarified that short-run fertility fluctuations are mainly due to marital fertility rather than marriage. In reviewing experiences from Europe and many developing countries during the latter half of the 20th century, he identified a predictable pattern of fertility change: a decrease in fertility that normally occurred in the year after the crisis, which was then followed by an increase of fertility one or two years later.

Drawing on historical experiences in Europe (Livi Bacci, 2000) described in detail a “textbook model” on how births and fertility change in response to an epidemic related mortality crisis: births decline with a nine-month lag, following reductions in conception along with rising mortality. Conceptions reach a minimum level at the mortality peak, and generally rebound one or two years after the crisis. Many reasons are proposed which could contribute to the decline in conceptions, including declines in new unions and marriages, a reduction of the frequency of sexual intercourse, deliberate birth control and decline of fecundity.

Research on the impacts of past pandemics/epidemics on fertility

The 1918 Influenza (“Spanish flu”) outbreak has been labelled the “most severe pandemic in recent history”, estimated to have infected more than one-third of the world population and resulted in at least 50 million deaths globally (CDC, 2018). In the past two decades, there has been a growing body of evidence documenting similar experiences of fertility falling roughly 6-9 months after the 1918 Influenza Pandemic's peak that was followed by a rebound in births in a number of countries across Asia, Europe, Oceania, and the United States (for example, Mamelund, 2004; Chandra and Yu, 2015a, 2015b; Boberg-Fazlić and others, 2017; Wilson and others, 2019).

As highlighted by (Mamelund, 2001, 2004), there was no baby boom in 1919 in either belligerent or neutral nations in Europe and the United States following the end of World War I. Instead, all these countries first experienced a dip in births and fertility in 1919 that was followed by a modest baby boom in 1920. Based on a series of multivariate analyses of high-quality data for Norway (Mamelund, 2004)

estimated that a decline of one conception in a given region in 1918 resulted in 1.5 conceptions made up in that region in 1919, causing a baby boom in Norway in 1920. He argued that both, biological factors and behavioral factors, as well as deaths of pregnant women and husbands, fetal losses, reduction of sexual activity and postponement in conceptions, contributed to these changes. Like Norway, Sweden was also neutral in World War I, and its fertility decline was also only disrupted during 1919-1921 and continued its downward trajectory after that, reaching below replacement levels in 1928. An analysis of historical births and deaths data from Sweden (Boberg-Fazlić and others, 2017) shows that a large morbidity and mortality shock from the Influenza pandemic impacted negatively on fertility rates not only in the short term but even a decade later.

More recently, the fertility effect of the 2014-2016 Ebola outbreak in West Africa and the 2015-2016 Zika epidemic have also been studied. Rangel, Nobles and Hamoudi (2020) reported that in Brazil, the Zika epidemic changed the reproductive behavior of women, causing reductions of about one-fourth in births 18 months after the Zika infections peaked and 10 months after public health messages advocating to delay childbearing, which were released eight months into the epidemic. However, the fertility decline in Brazil continued after the epidemic and was compounded by worsening economic conditions.

Reportedly, the 2014-2016 Ebola outbreak in Guinea, Sierra Leone and Liberia led to disruptions in access to family planning services (Sochas, Channon and Nam, 2017). An early sign of a “post-Ebola baby boom” attributed to increased unintended pregnancies was observed in Liberia in January 2016 (McBain and others, 2016). In addition, more recent research (Bietsch, Williamson and Reeves, 2020) reported that the distribution of contraceptives declined by 65 per cent in Liberia and 23 percent in Sierra Leone at the peak of the epidemic. However, two years after the Ebola epidemic, Liberia's average monthly distribution of contraceptives had risen to 39 per cent above pre-crisis levels, while the distribution in Sierra Leone increased by 27 per cent. The authors argue that the family planning services, and particularly the supply of modern contraceptives can recover, and even improve after significant service delivery disruptions.

Research on fertility decline in low fertility countries since the Great Recession

Before the COVID-19 pandemic, the Great Recession that started in the United States and Europe² but also affected many other countries was, at the time, the most severe economic and financial downturn since the 1929 Great Depression. This economic shock produced declines in fertility in many countries as reported the Human Fertility Database³. Given the economic downturns due to business interruptions and shutdowns from social distancing measures adopted to curb the spread of the present coronavirus, it can be expected that the current economic crises will have an impact on fertility levels, at least in the short but possibly also in the medium-term, particularly in the United States as well as in Europe. A wide range of research has been undertaken to shed light on the interrelationships between fertility and economic development and in particular on the impact of economic crises on reproductive behavior. A selection of available papers that are relevant to the present discussion, has been reviewed and summarized in the following paragraphs.

² The recession started at the end of 2007 and lasted through mid-2009 (<https://www.britannica.com/topic/great-recession>).

³ Available from the Human Fertility Database: www.humanfertility.org/cgi-bin/main.php

Sobotka, Skirbekk and Philipov (2011) undertook a broad review of research on the effects of economic recessions, typically measured by declining GDP, rising unemployment and uncertainty, on fertility as well as on family formation and dissolution. Most studies supported a procyclical relationship between fertility and the ups and downs of the business cycle, but with generally small effects and short durations. In addition, economic downturns normally influence the timing of childbearing rather than cohort fertility levels, consequently not interrupting major long-term fertility trends. The Great Recession brought a decline in the number of births and fertility rates, reversing the recovery from very low fertility in many European countries.

Economic uncertainty has been proposed as a factor of couples' fertility decisions. Kreyenfeld, Andersson and Pailhé (2012) undertook a number of country-specific analyses that found that the relationship between economic uncertainty and fertility varied according to the different combinations of country, gender, birth order, and degree of employment uncertainty.

Goldstein and others (2013) analyzed data from the Human Fertility Database, Eurostat, and the OECD for the period 2001-2010 and found that fertility declined, especially at younger ages, in countries hit hard by the recession when compared with a hypothetical continuation of recent trends (without recession). They also noticed variations in the relationship between changes in aggregate unemployment rates and age-specific fertility rates by region, age, and parity. Comolli (2017) extended this study including more recent data for the period 2000-2013 and more indicators of economic uncertainty. He confirmed that increased unemployment during the Great Recession, in particular an increase of female unemployment, was largely responsible for the negative consequences for fertility. He also reported that the effects of female unemployment were more significant among younger females and also found that falling consumer confidence was strongly related to fertility declines.

Matysiak, Sobotka and Vignoli (2021) used data for 251 regions in 28 European Union (EU) member states (including the United Kingdom) from 2002 to 2014 to examine the association of changes in labor market conditions and economic growth with fertility before and during the Great Recession in Europe. They showed that fertility decline was significantly related to a rise in unemployment at different reproductive ages during the economic recession and that the strongest fertility declines were observed in Southern Europe, Ireland and parts of Central and Eastern Europe. These countries and regions were affected much more severely by the recession than countries in Western Europe, especially the Nordic countries.

Before the Great Recession, the United States had higher fertility levels compared to other developed countries but saw its total fertility decline after that, reaching a historic low of 1.73 births per woman in 2019. This decline was mostly driven by fertility declines among Hispanic women and women in young age groups. In addition, this post-recession fertility decline was largely driven by declines in unintended pregnancies, as more women started to use long-acting reversible contraceptives (LARCs) (Gemmill, 2020).

Schneider (2015) estimated the effect of area-level economic conditions on state fertility in the years leading up to and including the years of the Great Recession and confirmed the relationship between worsened economic conditions and fertility decline. Seltzer (2019) explored why the fertility decline after the Great Recession continued in the United States, regardless of improvements in conventional economic indicators. He found that the economic downturns had differential effects on people in different racial/ethnic groups due to changes in industry composition, specifically the loss of manufacturing jobs, which had a larger effect on TFRs than changes in the overall unemployment rate. He argued that structural changes in the labor markets have prolonged the financial uncertainty that leads women and couples to delay or forgo childbearing. These findings have important implications for post-pandemic



fertility trends in developed countries, as the COVID-19 pandemic overlaps with ongoing structural changes in the labor market.

Early research on the impacts of the COVID-19 on sexual and reproductive health services, fertility preferences and fertility changes

Theoretical considerations

In July 2020 (Aassve and others, 2020), drawing on historical lessons, proposed a theoretical framework on the potential impact of the COVID-19 pandemic on fertility that argues that in response to the pandemic, birth trajectories would vary according to socio-economic conditions. In high-income countries with already very low fertility levels, economic downturns and associated uncertainty together with the prolonged closure of schools and non-essential services would contribute to continued fertility decline. On the other hand, pandemic-related economic slowdown and disruptions of access to family planning services could impact fertility levels and trends in middle-income countries and urban areas in low-income countries and could contribute to a slowdown of the fertility decline in rural areas in low-income countries.

In January 2021, the UNFPA Asia-Pacific Regional Office (APRO) released a report on the potential impact of COVID-19 on human fertility in the Asia-Pacific Region. That report argued, following (Aassve and others 2020), that the impact of the pandemic on fertility trends, patterns and choices was unlikely to be uniform, either between or within countries. They identified five key dimensions of the pandemic that may have an impact on fertility levels: (a) high mortality; (b) restricted access to family planning services; (c) reduced work-life balance; (d) economic recession and uncertainty, and (e) disruptions to assisted reproduction services. The report highlighted that the scope of the impact would depend critically on the prevailing institutional, cultural and policy environment at the country level.

Disruptions in family planning services

At the early stage of the COVID-19 pandemic, there was concern that the crisis could leave significant numbers of women and couples without access to essential sexual and reproductive health care and family planning services. In April 2020, the UNFPA produced an estimate on the potential impact on ending unmet need for family planning, with contributions from Avenir Health, Johns Hopkins University and Victoria University in Australia. It was projected that with “medium” health services disruptions for 6 months, some 26 million women in 114 low- and middle-income countries would be unable to use modern contraceptives, resulting in 7 million additional unintended pregnancies.

Riley and others (2020) at the Guttmacher Institute reported on a scenario of a 10 per cent decline in the use of short- and long-acting reversible contraception in low- and middle-income countries due to COVID-19, which would result in an additional 49 million women with unmet need for modern contraception and an additional 15 million unintended pregnancies over the course of the year in low and middle-income countries.

Dasgupta, Kantorová and Ueffing (2020) estimated a possible 6 percentage points decline in the proportion of women of reproductive age (15-49 years) having their need for family planning satisfied with modern contraceptive methods in 2020. This could result in around 60 million fewer users of modern contraception worldwide in 2020.

Subsequently, UNFPA and Avenir Health released an updated, and much lower estimate of 12 million women having experienced contraceptive interruptions, leading to 1.4 million unintended pregnancies during 2020 across 115 low- and middle-income countries (UNFPA, 2021). The study found that the average lockdown period had been 3.6 months, and that disruptions in family planning services were largely concentrated in April and May 2020.

For sub-Saharan Africa, a panel study on contraceptive dynamics during COVID-19 in Burkina Faso and Kenya (Karp and others, 2021) reported that a majority of most women at risk of unintended pregnancy did not change their use of contraception during COVID-19, and that more women adopted than discontinued methods, while a minority of women reported COVID-19-related reasons for non-use.

Changing fertility preferences and behaviors

In April 2020, the Guttmacher Institute (Lindberg and others, 2020) launched a survey in the United States on the emerging impact of the pandemic on women's sexual and reproductive health, with questions about the childbearing preferences and contraceptive use. 2,009 women aged 18-49 years responded to this survey that went into the field between April 30-May 6, 2020. The survey found that 34 percent of the women interviewed wanted to become pregnant later or wanted fewer children because of the pandemic. Black women (44 per cent) and Hispanic women (48 per cent) were more likely than White women (28 per cent) to state that they wanted to have children later or wanted fewer children because of the pandemic.

Luppi, Arpino and Rosina (2020) reported results from an online survey on the impact of COVID-19 on fertility plans, administered in March and April 2020 to 6,000 young adults aged 18-34 years in Germany, France, Spain, and the United Kingdom. Overall, they found that about 73 per cent of respondents with a plan to have a child in 2020 either decided to delay or abandoned their plans entirely. Similar to other studies presented earlier, they also found considerable differences in the four countries studied. In Germany and France, fertility plans changed moderately, whereas Italy the proportion of abandoners was reported to be much higher and the proportion of those deciding to postpone becoming pregnant was lower compared to other countries. The study concluded that the country-specific economic, demographic, and policy pre-crisis conditions and post-crisis prospects could explain these differences.

Emery and Koops (2021) assessed the impact of the COVID-19 pandemic on fertility intentions and behavior in the Republic of Moldova, using data from the Generations and Gender Survey. This survey was conducted from late January 2020 to late November 2020, partially before and partially after the pandemic peak. The survey results suggest that couples were less likely (by 41 per cent) to be trying to conceive after the onset of the pandemic, but that medium-term fertility intentions were unchanged. The authors also reported that couples' access to family planning services were affected and that this might affect fertility in the short term.

Available evidence from panel surveys in Nigeria (Kano and Lagos) and Burkina Faso, suggested that for a large proportion of women, the desire to have more children changed between the baseline survey undertaken before the pandemic and a phone survey administered after the onset of the COVID-19 epidemic. Overall, the proportion of women who wanted a child within 2 years did not decline substantially and, in some settings, slightly increased for women who wanted a child after 2 years (PMA 2020a; 2020b; 2020c).

Early predictions of fertility and number of births

So far, projections of fertility levels and number of births that have taken into account the impact of COVID-19 on all demographic variables, are available for Australia and the United States. Projecting fertility levels and trends in Australia for the next decade, McDonald (2020) explicitly took into account the impact of COVID-19, which was assumed to be fully felt in 2021. He proposed two scenarios: (a) the “likely COVID-19” scenario, where the total fertility rate is assumed to be 0.15 births per woman lower than in 2021, and around 80 per cent of the deferred births are assumed to be recuperated within ten years; and (b) the “severe COVID-19” scenario, where the total fertility rate is assumed to be 0.25 birth per woman lower than in 2021, and around 70 per cent of the births that are deferred are assumed to be recuperated within ten years. Both scenarios would converge to 1.62 births per woman just after 2030, the same outcome with the no-COVID-19 scenario for projections made before the pandemic.

Drawing on lessons from both the 2008 Great Recession and the 1918 influenza pandemic (Kearney and Levine, 2020a; 2020b) predicted in June 2020 that the United States may encounter a baby bust of up to half a million in 2021, and in December 2020 they downwardly adjusted their projections to a reduction of about 300,000 births. An analysis of population and economic data at the state-level in the United States found that a one percentage point increase in the state unemployment rate led to a 0.9 percent reduction in the birth rate during the period from 2007 to 2010. In addition, they assumed that a further decline in births would occur due to the continued uncertainty and anxiety created by this public health crisis.

Wilde, Chen and Lohmann (2020) tried an innovative method using data on Google searches during the COVID-19 pandemic to predict changes in aggregate fertility rates in the United States in following three steps: (a) establish associations between search volumes and timing of births; (b) cross-validate through out of sample tests and keep predictive words; and (c) use associations between selected words and births to forecast future births. They selected seven pregnancy and unemployment keywords hypothesized that between November 2020 and February 2021, monthly births in the United States may drop by approximately 15 per cent.

On the other hand, the UNFPA Asia-Pacific Regional Office (2021: 27) in a report prepared in late 2020 but released in January 2021 predicted that “the pattern of a short-term fertility dip approximately nine months after the mortality peak followed by a medium-term rebound that has been typical past ‘high mortality’ events is unlikely to be replicated for the current pandemic”. This is because of the different age profile of COVID-19 compared to past high mortality events that killed proportionately more adults of reproductive age, and the fact that other dimensions of COVID-19 are likely to interact to affect fertility.

Early births statistics

Using monthly births statistics from 11 high-income countries in Europe and the United States (Aassve and others, 2021) found, in comparison to the first 10 months in 2020, a drop of the crude birth rate of 2.6 per cent from November 2020 to February 2021, with large declines experienced in Spain (-11.5 per cent), France (-6.3 per cent) and in the United States (-4.6 per cent).

In March 2021 (Sobotka and others, 2021) showed the initial signs of the expected “birth recession” using the new Short-Term Fertility Fluctuations (STFF) data series, embedded in the Human Fertility Database (HFD). Monthly number of births in many countries fell sharply between October 2020 and the most recent month observed, compared with the same month of the previous year. For example, in 15 analyzed

countries of the European Union, the year-on-year number of births plunged by 5.0 per cent in November 2020 and 8.0 per cent in December 2020, while in the United States it declined by 7.7 per cent. In January 2021, the number of births declined by 20 per cent in Spain, 10.3 per cent in Russia, and 13.5 in France, respectively. The authors suggested that the decline in the number of births would be likely to accelerate in the first months of 2021, with a record low number of births and a record low total fertility rate expected in many countries in 2021. However, the authors also reported that the number of monthly births so far reported since the start of the COVID-19 pandemic, was not affected by the pandemic in several countries including Denmark, Finland, the Netherlands and Norway.



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