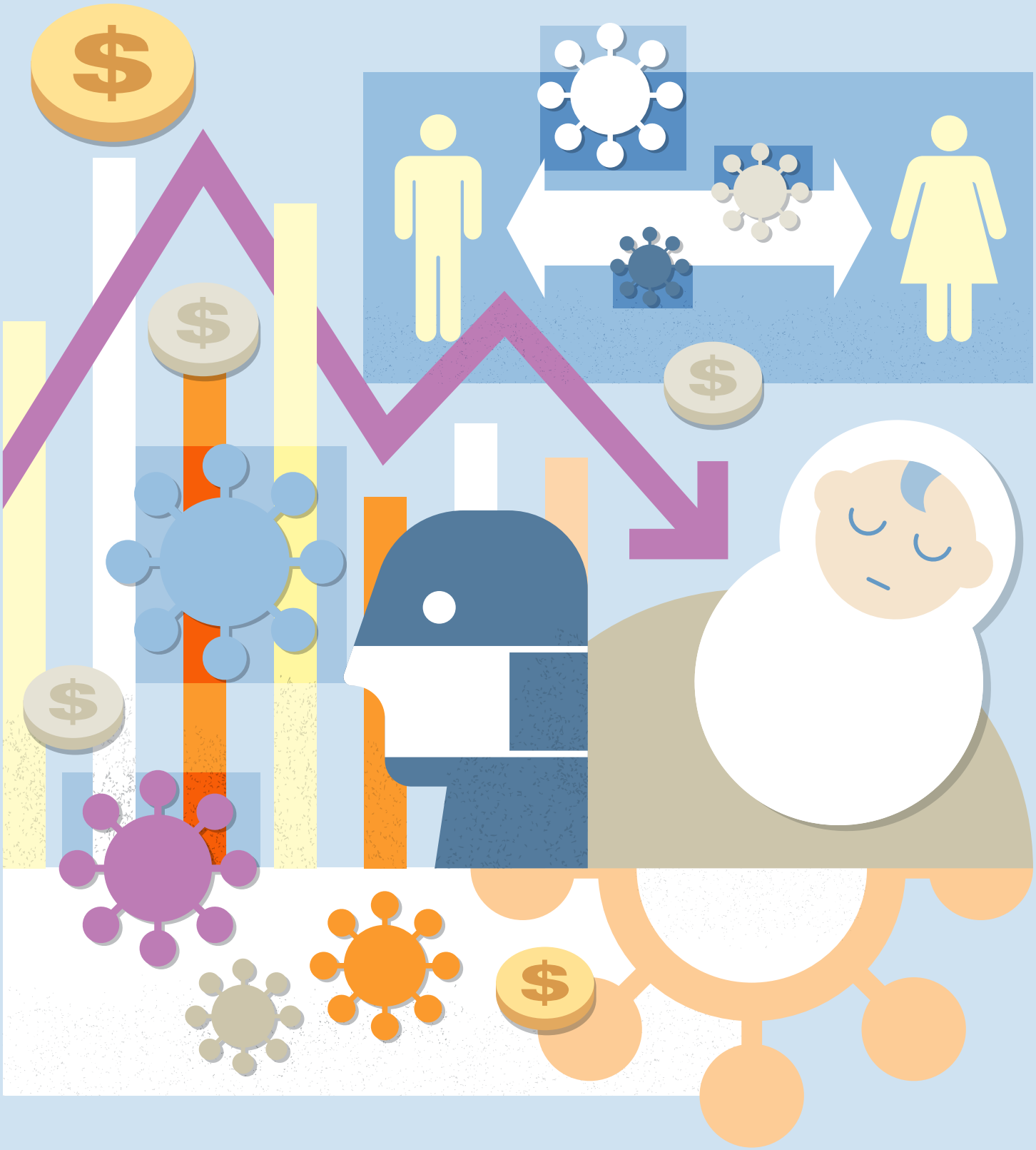
The Impact of COVID-19 on Human Fertility in the Asia-Pacific Region



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EXECUTIVE SUMMARY

The COVID-19 pandemic is the greatest global public health crisis in a century. As of 5 October 2020, there were 35,111,544 cumulative cases and 1,035,355 cumulative deaths worldwide, with 8,672,655 cumulative cases (24.7%) and 165,876 cumulative deaths (16.0%) in UNFPA Asia-Pacific programme countries[1] (WHO, 2020a). Governments across the Asia-Pacific region and beyond have taken unprecedented steps to curb the spread of the virus, and provide care for the many infected individuals. Yet, while the mortality and morbidity consequences of COVID-19 have been well documented, the impact of the pandemic on human fertility trends, patterns and choices remains comparatively less explored.

With a focus on Asia and the Pacific, this report aims to explore the potential impact of the COVID-19 pandemic on human fertility trends, patterns and choices. While it is too early to assess the full impact of COVID-19 on fertility with any certainty, this report identifies five key dimensions of the pandemic that may impact fertility:

1. High mortality,

2. Restricted access to family planning services,

3. Reduced work-life balance,

4. Economic recession and uncertainty, and

5. Disruptions to assisted reproduction services.

For each dimension, the report reviews the global literature on the effect on fertility of past 'proxy' events, such previous epidemics, natural disasters, societal upheavals and economic recessions, as well as early evidence from COVID-19 itself where available. This review is supplemented with case studies from four countries (the Philippines, Viet Nam, the Islamic Republic of Iran and Japan) in the Asia-Pacific region.

This report shows that previous epidemics and other high mortality events have been characterized by a predictable pattern of a fertility depression approximately nine months after the mortality peak, followed by a fertility rebound in the following years. However, it seems unlikely that this typical pattern will be replicated for the current pandemic, owing to the different age profile of COVID-19 compared to past high mortality events, and the fact that other dimensions of COVID-19 that were not relevant for past high-mortality events are likely to interact to affect fertility in the current pandemic.

[1] Afghanistan, Bangladesh, Bhutan, Cambodia, China, Democratic People's Republic of Korea, India, Indonesia, Iran (Islamic Republic of), Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pacific Island Countries*Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Timor-Leste and Viet Nam,
*Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu

Importantly, the report shows that the impacts of the pandemic on fertility trends, patterns and choices are unlikely to be uniform, both between and within countries. In settings, largely in low- and middle-income countries (LMIC), where supply- and demand-side restrictions impede access to family planning services, an increase in unintended pregnancies in 2020 and 2021 may be expected. However, in settings where women have greater control over their fertility, COVID-19 could have a downward impact on period total fertility rates (TFR), at least in the short term, driven by fertility postponement in response to economic uncertainty and recession, as well as reduced work-life balance, particularly for women. At the country level, the impact of COVID-19 on fertility will depend critically on the prevailing institutional, cultural and policy environment.

Restricted access to family planning services, economic uncertainty and recession, and reduced work-life balance – as well as restricted access to assisted reproduction services – also restrict fertility choices at the individual level. Within countries, it will likely be those already vulnerable groups, such as the poor, marginalized communities, and informal and migrant workers who face the greatest barriers to achieving their desired family size, and the greatest constraints on their reproductive rights. In many cases, these barriers to reproductive choices identified during COVID-19 are not new; the pandemic has merely illuminated them. This report concludes with policy implications to tackle these barriers, while addressing inequalities to enable fertility choices for all in the context of COVID-19 and beyond.

1 INTRODUCTION

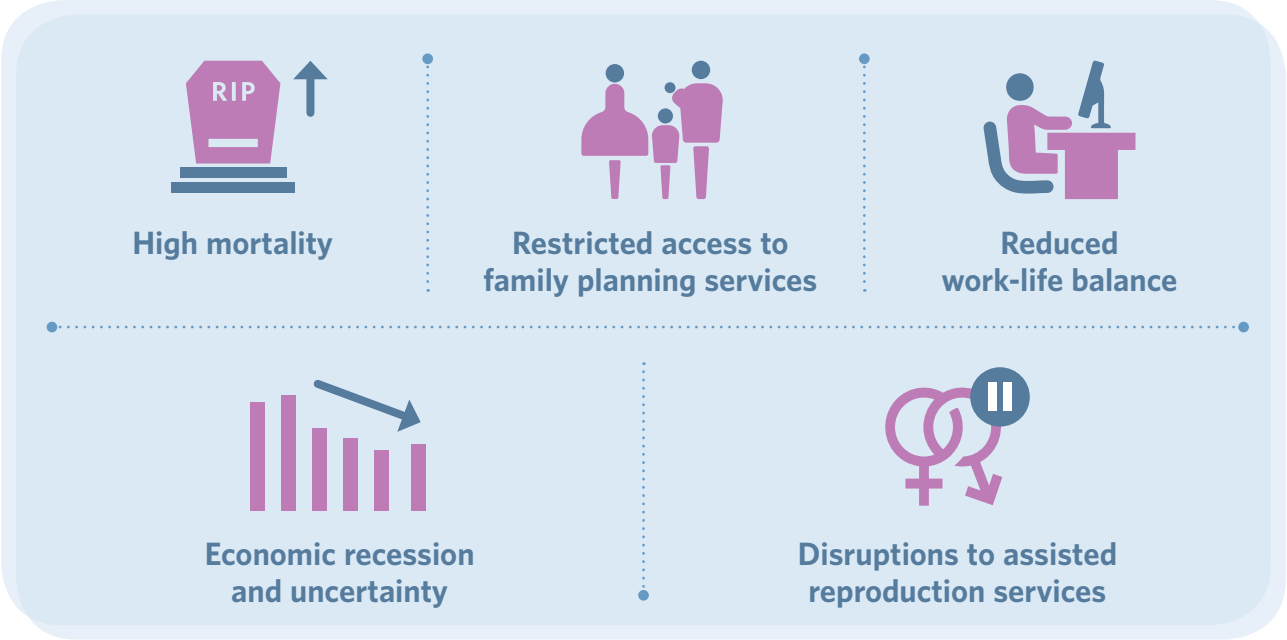
The COVID-19 pandemic is the greatest global public health crisis in a century. Since its emergence in late 2019, the coronavirus (SARS-CoV-2) that causes COVID-19 has spread to every continent. As of 5 October 2020, there were 35,111,544 cumulative cases and 1,035,355 cumulative deaths worldwide, with 8,672,655 cumulative cases (24.7%) and 165,876 cumulative deaths (16.0%) in UNFPA Asia-Pacific programme countries[2] (WHO, 2020a). Governments across the Asia-Pacific region and beyond have taken unprecedented steps to curb the spread of the virus, and provide care for the many infected individuals. Yet, while the mortality and morbidity consequences of COVID-19 have been well documented, the impact of the pandemic on human fertility trends, patterns and choices remains comparatively less explored.

Understanding the likely impact of the virus on fertility is important, however. In the short term, an appreciation of future fertility trends is key for the planning of education, and infant and child health care services, while in the longer term, an understanding of fertility dynamics can support societal planning for future population ageing. Aside from population numbers, there is potential for various emerging facets of the pandemic to impede fertility choices. The International Conference on Population and Development Programme of Action, endorsed by 179 countries in 1994, stated that *'all couples and individuals have the basic right to decide freely and responsibly the number and spacing of their children and to have the information, education and means to do so'*. Yet, restrictions on access to sexual and reproductive health (SRH) services, reduced work-life balance, increased economic insecurity, and disruptions to assisted reproductive technologies associated with COVID-19, for example, can act as barriers to individuals and couples realising their family size aspirations, and by extension, their reproductive rights.

Crucially, the impact of the pandemic on fertility is associated with huge uncertainty. First, COVID-19 comprises a unique, hitherto unexplored constellation of factors that have not been seen for previous public health crises. Moreover, we are still in the midst of the pandemic, and it is difficult to say with real certainty what trajectory it will ultimately take. Furthermore, unlike for morbidity and mortality, there is a nine-month time lag between conceptions and outcomes in terms of births. Consequently, the aim of this report is not to make firm predictions about the impact of COVID-19 on fertility, but rather to identify key dimensions of the pandemic that may also impact on fertility trends, patterns and choices, and explore these potential impacts, with a focus on Asia and the Pacific.

[2] Afghanistan, Bangladesh, Bhutan, Cambodia, China, Democratic People's Republic of Korea, India, Indonesia, Iran (Islamic Republic of), Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Timor-Leste, Viet Nam, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu.

The report identifies five key dimensions of the pandemic that may impact fertility, namely:



For each dimension, this report reviews the global literature on the effect on fertility of past 'proxy' events, such previous epidemics, natural disasters, societal upheavals and economic recessions, as well as early evidence from COVID-19 itself where available. This literature review is supplemented with case studies from countries in Asia and the Pacific to highlight specific on-the-ground experiences of the ways in which COVID-19 is affecting fertility in the region.

Ultimately, the report finds that the impacts of the pandemic on fertility are unlikely to be uniform, both between and within countries. In settings, largely in low- and middle-income countries (LMIC), where supply- and demand-side restrictions impede access to family planning services, an increase in unintended pregnancies in 2020 and 2021 may be expected. However, in settings where women have greater control over their fertility, COVID-19 could have a downward impact on period total fertility rates (TFR), at least in the short term, driven by fertility postponement in response to economic uncertainty and recession, as well as reduced work-life balance, particularly for women. At the country level, the impact will depend critically on the prevailing institutional, cultural and policy environment, while within countries, it will likely be those already vulnerable groups, such as the poor, marginalized communities, and informal and migrant workers who face the greatest barriers to achieving their desired family size, and the greatest constraints on their reproductive rights. The report concludes with practical policy recommendations to enable fertility choices for all in the context of COVID-19 and beyond.

FIVE KEY DIMENSIONS OF THE PANDEMIC THAT MAY IMPACT FERTILITY

2

2.1. High mortality

The first dimension of the COVID-19 pandemic that may have an impact on fertility trends, patterns and choices is the high mortality rate of the disease itself. Historically, high mortality events such as famines, wars and epidemics have had predictable effects on human fertility, reducing fertility in the short term, typically around nine months after the mortality peak, followed by a fertility rebound in the following years (Palloni, 1988). This relationship was first identified by Jacques Bertillon for the 1989-1990 influenza outbreak in France and other European countries. Since then, numerous studies covering diverse geographies, time periods and types of event have revealed a similar pattern.

For example, for the 1918-1919 influenza pandemic, the largest pandemic of the 20th century, Chandra and Yu (2015a) found a birth deficit nine months after the mortality peak in Japan, paralleling findings of a short-term fertility decline for Taiwan Province of China (Chandra & Yu, 2015b); Norway (Mamelund, 2004), Sweden (Boberg-Fazlic *et al.,* 2017), and the United States where the pandemic resulted in a 13% decrease in the birth rate between 1918 and 1919 (Chandra *et al.,* 2018). Similar short-term depressions in births were revealed by Herteliu et al (2018) for French flu seasons and heat waves since 1945, and by Richmond & Roehner (2018) for the aforementioned 1889 and 1918 influenza outbreaks; the 1868 famine in Finland; and the 1923 Kanto earthquake in Japan. More recently, Stone (2020) has collated data revealing a dip in births nine months after the mortality peak for recent major hurricanes in the United States such as Hurricane Maria and Hurricane Katrina; as well as for 2011 West Africa Ebola virus outbreaks.

Studies with a timeframe of one to five years after high-mortality crises have typically revealed a fertility rebound. Indeed, for the 1918-1919 influenza pandemic in Norway, Mamelund (2004) found an increase in conceptions in 1919, and subsequent births in 1920, with the size of the rebound exceeding by 50% that which would be expected if births had simply been postponed from 1918. Boberg-Fazlic *et al* (2017) also found, for the same pandemic, a fertility rebound in rural districts of Sweden, although interestingly not in urban districts (possibly due to different childbearing incentives in rural and urban areas, or a stronger community rebuilding effect in more closely knit rural areas)[3]. Similar medium-term rebounds have been seen for natural disasters. Nobles *et al* (2014) found fertility increases from 2006 to 2009 in Indonesian communities in response to the 2004 Indian Ocean Tsunami, while Nandi *et al* (2017) found that the 2001 Gujarat earthquake was associated with significant increases in childbirth rates.

[3] In the longer-term (over a 10-year period), Boburg-Fazlic found that districts more strongly affected by the influenza outbreak in fact exhibited lower fertility rates compared to less affected districts, which they attributed to other additional factors including changes in the marriage market and labour market, as well as negative income effect.

Various mechanisms have been proposed to explain these fertility changes in response to high-mortality events. Potential drivers of the short-term fertility depression after the 1918-1919 influenza pandemic include the increased likelihood of the death of one's spouse[4] (Mamelund, 2004); temporary reductions in male (but not female) fecundity (Biraben, 1973, cited in Mamelund, 2004); increases in miscarriage and stillbirth rates (Bloom-Fechbach *et al.,* 2011; Mamelund, 2004; Chandra *et al.,* 2018); as well as a decline in the frequency of sexual intercourse, and hence conceptions, owing to morbidity of infected individuals, fear of transmitting the virus, and negative perceptions about the future (Mamelund, 2004; Chandra *et al.,* 2018). Reduced conceptions linked to fear about the impact of infection on the developing foetus may also have played a role for the 2015-2016 Zika virus outbreak in Brazil. For example, Marteleto found a decline in live births, stratified across education and geographic lines, which started approximately nine months after the connection between the virus and foetal microcephaly was made public.

To some extent, similar factors could drive a short-term decline in fertility during the COVID-19 pandemic. While current evidence does not show major risks of complications in babies born to mothers infected with the virus (WHO, 2020b), it is still plausible that individuals and couples may voluntarily postpone births as a result of their own fears about the risk of infection on birth outcomes. In addition, people may avoid intercourse to reduce the risk of viral transmission, or because of social distancing regulations. On the other hand, COVID-19 affects older age groups more severely than younger age groups (WHO, 2020c). This lies in contrast to the 1918-1919 influenza epidemic, for which most deaths were in the 20-40 years age range (Mamelund, 2004). For COVID-19, therefore, reduced sexual intercourse due to morbidity, plus mortality effects linked to the death of a spouse, are unlikely to play a significant role in driving down fertility in the short term.[5] Furthermore, while there are several plausible mechanisms by which COVID-19 might increase the risk of male infertility, concrete evidence for such an impact is currently lacking, and longer-term monitoring studies are required to confirm any link (Dutta & Sengupta, 2020).

Proposed mechanisms for the medium-term fertility rebound typical of high-mortality events include the recuperation of delayed births as the crisis subsides; replacement fertility to compensate for lost offspring within the family (Preston, 1978; Nobles *et al.,* 2015), or as insurance in the expectation that some offspring will not survive (Pörtner, 2001; Frankenberg *et al.,* 2014); as well as symbolic population rebuilding at the wider community level (Nobles *et al.,* 2015). However, unlike these past events, child mortality for COVID-19 has been minimal, thereby removing one of the key mechanisms for a fertility rebound (Aassve *et al.,* 2020a). Overall, it seems unlikely that the typical pattern for high-mortality events of a short-term fertility dip followed by a fertility rebound should be replicated for COVID-19. This is all the more so because other dimensions of the COVID-19 pandemic discussed below also have significant potential to interact to affect fertility.

[4] In settings where births are largely confined to marriage, the death of one's spouse could cause a temporary decline in fertility, especially if legal and moral customs encouraged widows to abstain from remarriage for 6 months to one year after a spouse's death as was the case in Norway and Sweden in 1918 (Mamelund, 2014; Boberg-Fazlic, 2017).

[5] One might speculate that the postponement of weddings as a consequence of movement restrictions may contribute to a short-term postponement of fertility in settings where births and marriage are tightly linked, although there has been limited investigation of such an effect so far.

2.2 Restricted access to family planning services

Restricted access to family planning services is one important dimension of the COVID-19 pandemic that could impact fertility trends, patterns and choices, particularly in LMIC settings. Previous public health emergencies have demonstrated the potential for crises to disrupt access to family planning and other SRH services, with such impacts often underappreciated as generally the effects are not the direct consequence of infection (WHO, 2020c, cited in Riley *et al.,* 2020). For example, examining government service statistics and Demographic and Health Survey (DHS) data before, during and after the 2013-2016 Ebola epidemic, Bietsch *et al* (2020) found that family planning distribution fell by 65% in Liberia, and 23% in Sierra Leone at the peak of the outbreak compared to the six-month average prior to the first Ebola case, although possible decreases in reporting of service provision by clinics during the outbreak could have caused slight downward biases in these estimates. Similarly, for the Macenta district of Guinea, Camara *et al* (2017) found a 51% decrease in family planning visits during the peak of the Ebola outbreak compared to the pre-Ebola level.

Consistent with findings from past epidemics and disasters, there is evidence during COVID-19 of emergent disruptions in access to family planning services, on both the supply and demand sides in some countries. On the supply side, the closure of production facilities in Asia to prevent transmission of the virus has added delays to the manufacture of active pharmaceutical ingredients and contraceptive products (Purdy, 2020). These strains on production and supply chains have been exacerbated by delays in shipping, regulatory approval and clearance of contraceptive imports. For example, in the Islamic Republic of Iran, restrictions on international transportation resulted in suspension of imports of intrauterine devices (IUDs) (Purdy, 2020).

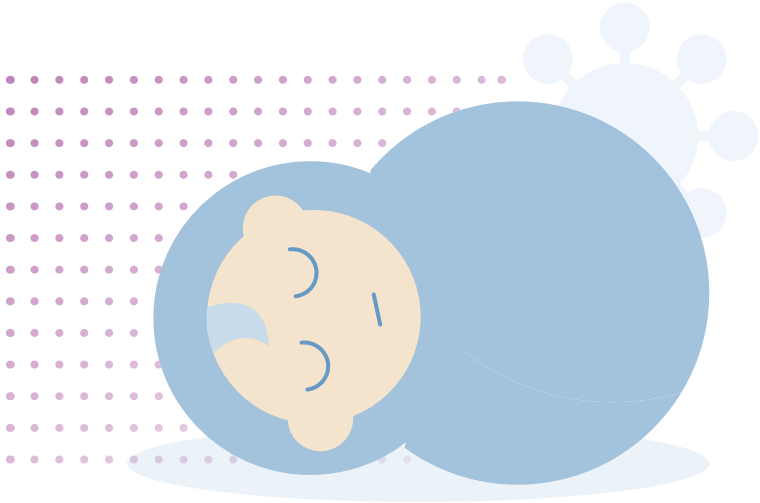
In addition, many private family planning clinics have been forced to suspend or limit services because of restrictions on movement and disruptions to transportation services, which has been compounded by a lack of adequate personal protective equipment (PPE). In a survey of its national members, the International Planned Parenthood Federation (IPPF) reported in April 2020 that 5,633 static and mobile clinics and community-based care outlets across 64 countries had closed as a consequence of the pandemic, equivalent to 14% of total IPPF service delivery points in 2018 (IPPF, 2020). The highest number of closures was seen in IPPF's South Asia region.

Even where hospitals and clinics have remained open, the diversion of human and public health resources away from routine services to the pandemic response has the potential to reduce supply of family planning services further. In India, for example, it has been reported that nearly 900,000 accredited community health workers, who used to work on reproductive health and distribution of family planning, were diverted to the country's COVID-19 response (Bagri, 2020). Users of longer-lasting methods such as injectables, IUDs and implants, which require interaction with a healthcare provider, might be expected to experience particular disruptions. In addition, the lack of information in several settings about where and how to access family planning and other SRH services during the pandemic has exacerbated barriers to access.

Barriers to service utilisation also exist on the demand side, with some individuals avoiding family planning clinics due to restrictions on movement and/or a (legitimate) fear of contracting the virus during visits to healthcare providers or pharmacies (UN Women, 2020). This is compounded by the reduced affordability of services at a time when many have lost their livelihoods (UN Women, 2020a). Furthermore, during lockdowns, there appears to have been a rise in the rate of intimate-partner violence, which may include sexual coercion and sexual assault, potentially increasing the need for emergency contraception (Sharma *et al.,* 2020).

Aside from family planning, national lockdowns and social distancing measures during COVID-19 have led to disruptions to abortion services and post-abortion care (Riley *et al.,* 2020), particularly in jurisdictions where women require approval for an abortion from multiple physicians (UN Women, 2020). In many countries, abortion has not been designated as an essential service, but even where it has, people may not be aware of the regulations if they are not well publicized. This parallels findings from the Zika virus outbreak in 2015-2016, where women faced significant obstacles in accessing abortion care, including poor knowledge of regulations, low affordability and availability of services, and objection by healthcare providers, even in jurisdictions where abortion is legal (Wenham *et al.,* 2019). In settings where abortions are unsafe or not legal, the likelihood of life-threatening complications is significantly increased (Sharma, 2020).

In settings where supply- and demand-side restrictions impede access to family planning services, there is real potential for a rise in unintended pregnancies in 2020 and 2021. In April 2020, UNFPA projected that 47 million women in 114 LMICs Globaly may be unable to use modern contraceptives if the average lockdown persists for 6 months with high levels of COVID-19 related disruptions to health services, and that an additional 2 million women would be unable to use modern contraceptives for every 3 months the lockdown continues. This translates into an estimated 7 million unintended pregnancies if the lockdown lasts for 6 months with major health service disruptions due to COVID-19 (UNFPA, 2020a).[6] National studies for individual Asia-Pacific countries, for example the Philippines **(Case Study 1),** also project reduced access to family planning, and an increase in unintended pregnancies and adverse health impacts for mothers and children.



[6] In addition to unintended pregnancies, restricted access to SRH services could lead to increases in the incidence of unsafe abortion (Riley *et al.,* 2020), plus significant indirect negative health implications for mothers and infants. Such effects were demonstrated for the 2013-2016 Ebola outbreak, where an analysis of Sierra Leone's Health Management Information System found that reduced utilization of essential reproductive, maternal and neonatal health services could have led to an additional 3,600 maternal, neonatal and stillbirth deaths in 2014-2015 under the most conservative scenario. This figure is close to the total number of deaths in the country due to Ebola itself (Sochas et al., 2017).

CASE STUDY 1

Disrupted access to sexual and reproductive health in the Philippines

The first case of COVID-19 was detected in the Philippines in January 2020, and as of 5 October 2020, there were 322,497 cumulative confirmed cases and 5,776 deaths (WHO, 2020a). President Duterte declared a State of Public Health Emergency on 8 March 2020, and on 16 March 2020, the government implemented an Enhanced Community Quarantine across the Luzon island group, home to around half of the country's population of 107 million, and the capital, Manila (The Economist, 2020). In an effort to contain the spread of the virus, this lockdown has been one of the most extreme and protracted in the world, with the closure of schools and offices, limitations on all forms of transportation, and in several areas, severe restrictions on movement, including requirements to secure quarantine passes from local officials to move around (The Economist, 2020). Restrictions have subsequently been relaxed, although in September 2020, a number of regions remain in General Community Quarantine (GCQ) status.

Coupled with disruptions to international shipping and flights and the associated negative impacts on contraceptive supply chains, the restrictions on movement have resulted in severe disruptions in access to SRH services. For months, patients and medical staff faced difficulties accessing clinics, and while public clinics stayed open officially, in many cases they remained inaccessible in reality (Ratcliffe & Fonbuena, 2020). In May 2020, the Department of Health carried out a 'Rapid Assessment of the Provision of FP Services During Community Quarantine'. Most of the facilities reported stock-outs of the pill, implants, and male condoms, and while more women have expressed a wish to shift to longer-acting methods of contraception, such as IUDs, implants, and injectables, such methods require physical interaction with a healthcare professional, which makes access more difficult (UNFPA, 2020b)

An analysis conducted by the University of the Philippines Population Institute (UPPI) and UNFPA to model the impact of COVID-19 on several key sexual and reproductive health (SRH) indicators has estimated that between mid-March and the end of December 2020, there could be an additional 2.07 million women aged 15 to 49 years with unmet need for family planning due to community-quarantine induced service reduction. This represents a 67% increase, compared to the 2019 level. As a result, there could be 2.56 million unintended pregnancies by the end of 2020, an increase of 751,000 (42%) compared to 2019. The projections also indicate an additional 570 maternal deaths, a 26% increase compared to 2019 (UNFPA Philippines, 2020).

COVID-19 related disruptions to SRH services are of particular concern in the Philippines because of the country's SRH challenges prior to the pandemic. According to the 2017 Philippines National Demographic and Health Survey, two thirds of women are not using any method of contraception, and 16.7% of women currently married or in union had an unmet need for family planning (PSA & ICF, 2018). COVID-19 has exacerbated these existing challenges. Importantly, however, the impact of SRH service disruption will not be felt uniformly across the country. Indeed, several communities are coping with recovery from natural disasters and conflicts alongside the COVID-19 pandemic. For example, internally displaced persons from the Marawi siege, the North Cotabao earthquakes, and the Taal volcano eruption, alongside homeless people, migrants, female sex workers and adolescent mothers, face existing challenges which have been exacerbated by the COVID-19 related disruptions to SRH services (UNFPA, 2020b).

CASE STUDY 1 (continued)

Disrupted access to sexual and reproductive health in the Philippines

However, despite these challenges, a number of innovative measures have been implemented to enhance access to SRH in the context of COVID-19. For example, UNFPA has launched an integrated SRH online platform to provide information, counselling and referral services to Filipino women of reproductive age, and developed a COVID-19 SRH Dashboard displaying real-time data on the impact of COVID-19 on reproductive-age Filipino women especially. UNFPA has also developed a 24/7 information and advice hotline for pregnant women who face difficulties accessing birth facilities during the quarantine; donated PPE to front-line health workers, including those who attend to pregnant women; and supported the 'Condom Hero Programme', a community initiative that delivers free condoms by bicycle to people affected by quarantine measures. As the Philippines continues to respond to this unprecedented crisis, efforts to ensure continued access to SRH services, especially for marginalized communities, are imperative.

Aside from the effect on fertility trends, such restrictions on access to planning represent impediments to fundamental individual reproductive rights and choices, threatening women's abilities to take care of their health and bodies, and limiting progress towards Sustainable Development Goal (SDG) Target 3.7[7] and Target 5.6[8].

Importantly, however, these impacts on fertility trends and choices will not be felt evenly between or within countries. Between countries, political will and institutional context are important. Where healthcare systems are strong; supply chains are resilient; and governments classify sexual and reproductive health services as essential, provide information about how and where to access services, and ensure affordable service provision, barriers to access of family planning, and the likelihood of unintended pregnancies during the pandemic will be reduced. The Ebola epidemic in West Africa exemplifies such between-country inequalities, with Liberia experiencing a greater impact on its family planning provisions than Sierra Leone, despite having fewer Ebola cases (Bietch *et al.,* 2020).

Within countries, it is likely to be poorer, harder-to-reach communities, such as those in humanitarian settings and rural areas, as well as marginalized groups, including ethnic minorities, sex workers, and refugee and displaced populations, who suffer a disproportionate impact of restricted access to family planning and unintended pregnancies (Riley *et al.,* 2020; Stidham Hall *et al.,* 2020). In a number of countries, large-scale movements of migrant workers from their places of work to their home towns (both within countries and across borders), prompted by prolonged lockdowns or unemployment, may lead to unplanned sexual

[7] SDG Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes (https://unstats.un.org/sdgs/metadata).

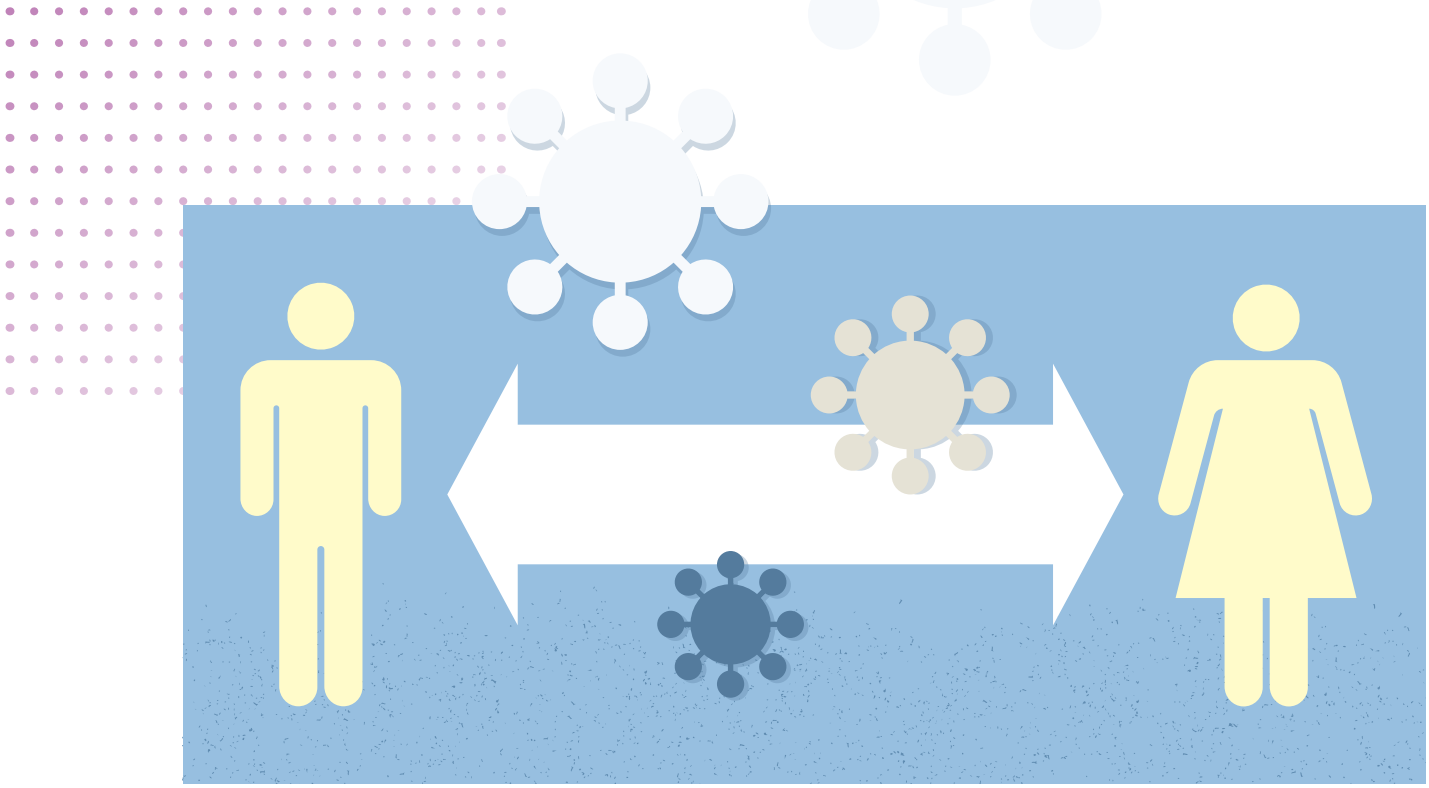
[8] SDG Target 5.6: Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences (https://unstats.un.org/sdgs/metadata).

activity as couples are reunited after extended periods of time. In a context where access to contraception is restricted, this may increase the likelihood of unintended pregnancies for this group (Sharma *et al.*, 2020).

Adolescents may also suffer disproportionately if school closures prevent access to an important source of contraception. According to a recent online survey conducted among young people in Thailand, 36% of all heterosexual young people aged 18-30 years stated that accessing SRH information and services was more difficult during the time of the COVID-19 pandemic than before. Among LGBT youth, the proportion was even higher, with 47% of all respondents aged 18-30 years reporting increased difficulties accessing SRH information and services (and 52% of those LGBT who had sex during the pandemic reporting increased difficulties with such access) (IPSR, 2020).

Such within-country inequalities are explicitly reflected in the projections of the impact of COVID-19 for different social groups in Viet Nam, with those who have very good socio-economic conditions and very good health care capacities expected to see no change in their ability to access contraceptives, and consequently no change in unmet need for family planning, compared to those with weak socio-economic conditions and health capacities, for whom 7.4-8.2% of married women of reproductive age are projected to have an unmet need for family planning in 2020, compared to a baseline of 6.6% unmet need (UNFPA Viet Nam, 2020). Overall, however, owing to the relatively high prevalence of contraceptives in Viet Nam, and the low existing unmet need, the impact of COVID-19 on family planning in the country is expected to be limited (UNFPA Viet Nam, 2020).

In settings where access to family planning has not been significantly disrupted, and where women consequently have greater control over their fertility, other dimensions of the COVID-19 pandemic have the potential to have contrasting impacts on fertility.



2.3. Reduced work-life balance

One such other dimension is reduced work-life balance. With lockdowns and school closures, UNESCO estimates that 1.52 billion students (87%) are now at home (UNESCO, 2020; United Nations, 2020a), and parents are facing increasing workloads in terms of housework and childcare (United Nations, 2020a). This domestic burden is exacerbated by the decline in the availability of formal childcare services, as well as informal childcare support, a substantial part of which is provided by older relatives in many countries. To the extent that the increased domestic workload places a burden on parents' time, in settings where contraception is accessible, it could lead to the postponement of childbearing, particularly of second births, driving declines in period TFR, at least in the short term.

Related to this is the degree to which the burden of domestic work is shared between men and women. By way of background, over the last few decades, a number of Asia-Pacific countries have seen an expansion of opportunities for women in education and employment; however, in the home, gender equity typically remains low, with women continuing to assume the bulk of the responsibility for household chores, childrearing, and care for older relatives. This 'incomplete gender revolution' (Esping-Andersen, 2009) has resulted in a double-burden for women and an increased opportunity cost of having children, and is considered to be a major explanation for low fertility rates seen in several countries in the region (Gietel-Basten, 2019).

Consistent with this theory, longitudinal household studies across diverse settings indicate that greater equality in the sharing of domestic tasks increases the likelihood of couples having a second birth (Oláh, 2003; Duvander & Anderssen, 2006; Duvander *et al.,* 2008; Lappegard, 2009; Torr & Short, 2004). In East Asia specifically, Nagase & Brinton (2017) found that for dual-earner couples (though not male-breadwinner couples) in Japan, an increased contribution by husbands to domestic work increased the likelihood of a second birth. For the Republic of Korea, Kim (2017) and Yoon (2017) found that the greater the time spent by husbands on domestic work (above a threshold of three hours a day for Yoon, 2017), the greater the likelihood of a second birth.

Prior to the pandemic, the International Labour Organization (ILO) estimated that women in Asia and the Pacific spent 4.1 times more time on unpaid care work than men (reported in Mercado *et al*., 2020), and in some countries up to 11 times more time (ADB/UN Women, 2020). However, there is strong potential for this gender gap to be exacerbated during the pandemic as social norms and the existing workforce structure make it more likely that additional housework and childcare will fall on women (United Nations, 2020a; Mercado *et al*., 2020). Preliminary research from Europe is already revealing evidence of this effect. Studying the impacts of working from home combined with school closures for Italian women in dual-earner households, Del Boca et al (2020) found that most of the additional domestic responsibilities have been taken up by women, although childcare activities have been shared more evenly than housework. Meanwhile, studies from Spain (Farré & González, 2020) and the United Kingdom (Sevilla & Smith, 2020) have found a more equal distribution of childcare and housework between men and women during the pandemic, although again most of the *additional* household work has fallen to women.

A recent web-based survey in the Tokyo and Osaka areas of Japan of 340 people who were working from home revealed mixed evidence of the impact on families. While some positive impacts of working from home were reported, with several (mainly male) respondents reporting improvements in family relations as a consequence of having more time available for communication with their families, the survey also revealed gender inequalities in the effect of working from home on unpaid housework. One in three women reported that their housework had increased as a result of working from home, compared to one in five men, and just over 20% of female respondents reported that housework and childrearing was a problem caused by working from home, compared to just under 10% of men (Ochiai, 2020). Recent findings from Viet Nam also reveal that women are still performing the majority of the household work in the context of COVID-19, and increases in men's contribution have been minimal **(Case Study 2)**.

If COVID-19 further increases the domestic burden on women, in contexts where access to family planning has not been disrupted, it could lead to the postponement of childbearing, particularly of second births, and a decrease in period TFR, at least in the short term. Such a double burden of paid and unpaid work also represents a constraint on fertility choices.

Ultimately, the effect of this dimension of the COVID-19 pandemic on fertility is unlikely to be uniform between and within countries. In countries and households with prolonged school closures, and a high level of female labour force participation alongside the persistence of traditional gender norms in the home, fertility choices for women especially are more likely to be constrained, and a greater tendency for fertility postponement may be anticipated. By contrast, and less apparent based on current evidence, where women work but the gender division of domestic labour is more equal, or where the pandemic has prompted an increase in the domestic contribution of men, individual fertility choices are likely to be less constrained, and the tendency for fertility postponement reduced.

CASE STUDY 2

Gender division of domestic labour in Viet Nam

The first COVID-19 case in Viet Nam was reported on 23 January 2020, and as of 5 October 2020, there have been 1,096 cumulative confirmed cases and 35 deaths (WHO, 2020a). Yet despite the country's success in managing the spread of the virus, evidence suggests that COVID-19 has disproportionately impacted women in Viet Nam, as in many other countries (CARE, 2020). In addition to increasing the risks of gender-based violence, limiting access to resources, and jeopardizing the livelihoods and incomes of the most vulnerable women, one important area where women have been disproportionately affected is in the division of household work.

The results of a Rapid Gender Analysis (RGA) carried out by CARE Viet Nam, based on a secondary data review plus 42 in-depth interviews conducted remotely from 15-30 April 2020, are particularly insightful here (CARE, 2020). Prior to the pandemic, women were typically the primary care givers in Viet Nam, spending on average 5 hours (314 minutes) per day on unpaid care work, compared to 2 hours (125 minutes) per day spent by men, while in areas with poor public services, particularly for women and including child care, and low economic development, women and girls could spend up to almost 9 hours (533 minutes) per day on unpaid care work (ActionAid, 2016, World Bank, 2018).

CASE STUDY 2 (continued)

Gender division of domestic labour in Viet Nam

The results of CARE's RGA have revealed that during the pandemic, in both rural and urban areas, women still perform the majority of household work. The closure of schools by the Ministry of Education and Training in February 2020 in an effort to prevent viral transmission, seems to have compounded the unequal gender division of labour in the home, with women largely the ones responsible for the extra work of looking after children and supervising their (online) learning during the day (CARE, 2020). A gender-sensitive assessment of the impact of COVID-19 on vulnerable households and enterprises in Viet Nam, commissioned by UNDP-UN Women, as well as the United Nations Analysis on the Social Impacts of COVID-19 for Viet Nam has reiterated these results, finding that an emphasis on traditional gender roles and gender stereotypes manifested itself as an increased burden for women in terms of care for children (especially during the school closures), older relatives, and persons with disabilities, as well as increased domestic work, alongside a heightened risk of infection from purchasing daily necessities (United Nations Viet Nam, 2020; UNDP & UN Women Viet Nam, 2020). Focusing specifically on the division of labour in agricultural settings, it is generally women who take the primary role in activities relating to agricultural product output, including processing (ISDS, 2015), and as reported by CARE (2020), increased non-consumption (linked to movement restrictions) during the COVID-19 pandemic is likely to have created an additional workload for women in processing, storing, or discarding foodstuffs.

While there have been some indications that restrictions on movement and increased unemployment have given men more time to contribute to domestic work, and indeed some male respondents in Bac Kan and Dien Bien reported an increased contribution to housework as well as valuing spending more time with children, greater male participation was rarely reflected in the responses from female respondents in the CARE's RGA; overall, it seems that increases in men's domestic contribution have been minimal (CARE, 2020). Currently, the impact on fertility intentions and behaviour of this unequal gender division of labour, which has likely been exacerbated during the pandemic, has not been investigated for Viet Nam, but will be an important area for future study.

2.4. Economic recession and uncertainty

A fourth important dimension of the COVID-19 pandemic that has significant potential to impact fertility trends, patterns and choices is economic recession and uncertainty. In contrast to many previous public health crises, COVID-19 has had major economic ramifications, disrupting supply chains, reducing confidence in financial markets, forcing the scale-back or closure of businesses, and increasing job losses (United Nations, 2020b). The International Monetary Fund (IMF) projects significant contractions in GDP in 2020. In China, GDP is expected to decline from 6.1% in 2019 to 1.2% in 2020; in the Republic of Korea from 2% in 2019 to -2.1% in 2020; and in Thailand, which has been particularly severely hit by the global slowdown in tourism, GDP is expected to decline from 2.4% in 2019 to -7.7% in 2020 (IMF, 2020).

In general, the literature reveals a pro-cyclical association between fertility and economic fluctuations in post-transitional countries over the past 100 years, with fertility largely tracking the peaks and troughs of the business cycle (Sobotka *et al.,* 2011). However, this effect has often been small, and can be difficult to discern as most recessions have been of short duration and dominated by longer-term trends driven by factors other than economic decline (Basten *et al.,* 2014).

Various interrelated mechanisms, the effect of which can be difficult to separate, underpin the link. Rising unemployment and job insecurity, which may encourage individuals to defer long-term binding commitments such as having a child, is often identified as the most important driver (Sobotka *et al.,* 2011). The downward effect of unemployment on fertility has repeatedly been identified for the Great Recession in Europe, which took place around 2008-13. Analysing European Social Survey data from 2004 to 2011, Fahlén & Olah (2018) found a reduction in the short-term intention to have a first child in countries where unemployment rates increased, particularly for men. This is consistent with studies analysing actual fertility: Comolli (2017) showed that the increase in unemployment rates during the Great Recession led total fertility rates (TFR) in Western economies to decline by an average of 0.05 births (3% decrease) from the start of the recession. Analysing 251 European regions in 28 European Union Member States, Matysiak et al (2020) found a negative association between economic downturns and fertility, with a dominant role of unemployment and long-term unemployment compared to other economic indicators.

Studies also reveal a negative effect of unemployment on fertility in East Asia. For example, analysing municipal data for Japan, Ogura and Kadoda (2008, cited in Sobotka *et al.,* 2011) found that increasing unemployment among young men made was a key contributor to the fall in the TFR between 2000 and 2004, while Huang (2003) showed that rising unemployment between 1978 and 2000 negatively impacted monthly time series of birth rates in Taiwan Province of China.

High levels of uncertainty characteristic of economic recessions can increase risk-averse behaviours, including the avoidance of making major decisions such as having a child. Uncertainty combined with high levels of unemployment may encourage young people to spend more time in education, and in turn delay childbearing (Kohler *et al.,* 2002; Sobotka *et al.,* 2011). Interestingly, it also seems that the perception of uncertainty, fuelled by negative media coverage of the economy, can increase uncertainty and have a downward effect on fertility irrespective of the actual personal conditions of individuals and their families (Matysiak *et al.,* 2018; Sobotka *et al.,* 2011).

Other mechanisms by which recessions might have a negative impact on fertility include declines in real wages, which reduces the affordability of children, as well as increased difficulty acquiring adequate housing (Sobotka *et al.,* 2011), which is generally seen as a precondition for starting a family. More broadly, societal upheaval, in addition to economic and institutional changes, during the collapse of the Former Soviet Union has been linked with widespread feelings of distress and an increase in 'normlessness' among some people (Philipov, 2003); Perelli-Harris (2006) has posited for Ukraine that such anomie and uncertainty may have reduced people's desire to have another child, not because of financial constraints, but because they '[felt] that they [had] lost control over their environment' (p. 1163).

Furthermore, recession may trigger long-term changes in the economic structure of a country, with consequences for fertility. As noted by Yoo & Sobotka (2018), the 1997 Asian economic crisis represented a major societal 'turning point' in the Republic of Korea: large-scale deregulation of the labour market led to lay-offs, and an increase in the proportion of irregular jobs without employment protection, parental leave, or other benefits (Ma, 2014). It became more difficult for young people, especially women, to get a job. This occurred at the same time as an increase in women's attachment to the labour market (Yoo & Sobotka, 2018), downward labour market mobility for mothers returning to the workforce after childbirth (Ma, 2014), and a shift in women's attitudes about the value of children (Kim & Yoo, 2016). Together, these factors led many young people in the country to delay or avoid marriage and childbearing (Kim, 2009).

Finally, recession may trigger delays and declines in partnership formation and marriage. Where childbearing is largely confined to marriage, as is the case in most Asia-Pacific countries, this trend may contribute indirectly to a fall in first-birth rates (Sobotka *et al.,* 2011; Basten *et al.,* 2014). The postponement of marriage was a key proximate determinant of the fertility decline during the 1997-98 economic crisis in the Republic of Korea (Eun, 2003). Indeed, Kim & Yoo (2016) estimate that 52% of the fertility decline in this country between the 1958-1960 birth cohort and the 1973-75 birth cohort is attributable to an increase in the proportion of never-married women. Retherford *et al* (2001) also suggest that economic recession is linked to marital postponement in Japan, with lower income growth during recession making marriage unaffordable for many young people. However, it is important also to consider the potential for reverse causality: reduced marriage rates during economic recessions may in part be a consequence of couples not wishing to have a child, and therefore not seeing a need to marry. Moreover, as noted by Sobotka *et al* (2011), in at least two Asian countries, economic downturns appear to be associated with higher marriage rates: Nobles & Buttenheim (2006) found that the economic crisis of 1997-98 increased the likelihood of younger men and women marrying in 1998-99, disrupting a long-lasting shift toward later marriage; while for Taiwan Province of China, modelled monthly data also indicate that unemployment has a positive effect on marriage rates (Huang, 2003).

Many of these mechanisms from past economic recessions are also applicable in the context of COVID-19. Unemployment and job instability have increased dramatically during the present crisis; real incomes have declined, and there is huge prevailing uncertainty fuelled by global media coverage of the pandemic. On this basis, at the aggregate level, in settings where women have control over their fertility, economic downturns associated with COVID-19 may encourage the postponement of childbearing, reducing period TFR, at least in the short term. At the individual level, economic insecurity and uncertainty are also likely to act as obstacles to fertility choices, making it more difficult for couples to realize their family size ideals.

It is also worth noting the potential for financial crises to affect other aspects of fertility, specifically the sex ratio at birth. Lee & Orsini (2018) found that the 1997-1998 economic crisis in the Republic of Korea led to a 2% reduction in the number of female babies expected between January and August 1998, driven by a fall in the number of girls among newborns with two or more older siblings. The authors attributed this effect to gender-biased sex selection, during a period of economic hardship, in a context of son preference. Such an effect might seem less plausible in the present pandemic, however, owing to limited access to sex-selection technology and services during national lockdowns.

CASE STUDY 3

Economic uncertainty and fertility in the Islamic Republic of Iran

The COVID-19 pandemic reached Iran on 19 February 2020, and since then has spread rapidly around the country. As of 5 October 2020, the total number of confirmed cases in Iran was 471,772, and the total number of deaths was 26,957 (WHO, 2020a).

Iran is a country where the socio-economic impact of the pandemic has been particularly large. Estimates suggest that the impact in 2020 will be substantial with large-scale job losses and decreases in income anticipated. Overall, it is expected that the near to 11.5 million households close to the multidimensional poverty line will be significantly impacted by the crisis (United Nations Islamic Republic of Iran, 2020). These economic impacts of COVID-19 in Iran are likely to be compounded by the high pre-pandemic unemployment rates, particularly among women, as well as the existing economic sanctions, which have caused further challenges.

Such economic challenges are likely to impact fertility in Iran. High unemployment among youth, job insecurity and declines in real income are likely to lead to a decline in fertility, at least in the short term as births are postponed. In addition, preliminary data for the two months from March to April 2020 reveal a decline in the number of registered marriages: compared to the same period in 2019, the number of marriages in the country has fallen by 44%, linked to restrictions on movement and quarantine measures (Iran NOCR, 2020). Given that childbearing in Iran largely occurs within marriage, this decline in marriages is also likely to have an indirect downward effect on fertility in the short term. Nevertheless, a significant number of young people – as a consequence of the baby boom in the 1980s – is entering into their reproductive ages, and the country might face a rise in the number of births if the economic situation stabilizes. It is currently too early to observe the full impact of COVID-19 on fertility in Iran, and further monitoring of fertility trends in the coming months will be imperative.

A key question is whether the a downward impact on fertility trends will be temporary or more long lasting. Generally, past economic recessions in post-transitional countries have prompted the postponement of childbearing, particularly of first births (Sobotka *et al.,* 2011), which have subsequently been recuperated at later ages as the economy improves (Neels *et al.,* 2013). As a result, there has often been a temporary downward shift in the period TFR (tempo effect), but *cohort* fertility rates, which reflect the underlying level of fertility (quantum), have typically not been affected.

For the Great Recession in Europe, fertility decline was particularly steep for young women under 25 years (Lanzieri, 2013), which implied that the recession led to fertility postponement rather than a reduction in the underlying level of fertility (quantum) (Sobotka, 2017). However, recent evidence for the Great Recession in Europe indicates a negative relationship between fertility rates and deteriorating economic conditions across the whole childbearing age range, including later reproductive ages (Matysiak *et al.,* 2020). This indicates that the Great Recession may have affected fertility quantum, and not just caused a temporary deferment of childbearing. Kim & Yoo (2016) also show that the delay in marriage and childbearing as a result of the 1997-1998 Asian economic crisis was linked to a decline in cohort fertility in the Republic of Korea. Whether COVID-19 causes a temporary depression in period TFR, or a longer-term downward impact on cohort fertility is likely to depend on the severity and duration of the crisis, as well as the management of the economic and social fallout.

The effect of the COVID-19-related recession on fertility will not be uniform across countries. Those countries that experience a more severe, long-lasting recession will be more likely to witness a greater downward pressure on fertility. At the same time, national institutional and policy environments have the potential to offset or exacerbate the negative effects of economic recession on fertility (Sobotka *et al.,* 2011). For example, in countries with a well-functioning labour market, strong social welfare protection, and specific policies to retain jobs and reduce economic insecurity, economic recession is likely to have a weaker impact on fertility than in those with a rigid labour market, and weak social safety net. Furthermore, the sociocultural context has potential to affect the fertility response, with evidence that social trust can act as a buffer against fertility decline during periods of increased economic uncertainty (Aassve *et al.,* 2020b).

Within countries, the effects of the recession are also likely to vary across social groups. Informal workers – who account for close to 60% of non-farm workers in the Asia-Pacific region (WEF, 2020) – are particularly vulnerable to the effects of recession. To earn a living, such workers, including street vendors and domestic workers, often depend on social interactions, which have been restricted in many countries to reduce the spread of the virus. Many informal workers live close to the poverty line, and have limited protections against dismissal, lack access to unemployment and health benefits, and have limited savings (WEF, 2020).

Women are also likely to be disproportionately affected by the recession compared to men. Job losses have been pronounced in the service sector, especially in retail, hospitality and tourism, where women are overrepresented; women also tend to hold less secure jobs and earn less than men (United Nations, 2020a). Such effects risk reversing the important progress made in female labour force participation.

In addition, migrant workers may be particularly hard-hit. For example, in India each year approximately 9 million workers migrate from rural to urban areas in search of work in factories and construction sites (Jan Sahas, 2020). The country's national lockdown has forced many of these migrants to return home, often without access to basic necessities. In a study based on data collected from telephone interviews with 3,196 migrant construction workers from North and Central India, 42% reported that they had no ration left for the day, let alone for the lockdown period, and 33% were still stranded in lockdown in the destination cities, lacking access to food, water and money. Crucially, 94% of the workers lacked the Building and Construction Workers identity card, which is essential to access emergency benefits from the government (Jan Sahas, 2020). For these groups, economic uncertainty is likely to place greatest constraints on fertility choices.

Furthermore, reactions to economic uncertainty may be differentiated by socioeconomic characteristics, related to different opportunity costs of childbearing. For example, among women in Germany, Kreyenfeld (2010) identified diverse responses to economic uncertainty depending on education level: highly educated women responded by delaying childbearing, perhaps because they faced a higher opportunity cost of childbearing, while lower educated women tended to respond to economic uncertainty by having children, possibly as a strategy to reduce personal uncertainty (Friedman *et al.,* 1994). However, for the Republic of Korea, Kim (2013) found that during the 1997 economic crisis, there was a greater decline in marital fertility among women with lower educational attainment and employment position. Finally, there is evidence that the availability of support from individuals' social networks can reduce the effect of uncertainty on fertility (Philipov, 2003), such that those with greater social support may have a buffer against constraints on fertility choices.

2.5. Disruptions to assisted reproduction services

A final dimension of the COVID-19 pandemic that may impact fertility choices mainly in high-income countries affects individuals and couples who wish to have a child, but are unable to do so owing to fertility problems, often linked to high maternal age. In these cases, people may rely on assisted reproductive technologies (ART) to increase their chances of having a child. During COVID-19-related lockdowns, however, many ART cycles have been suspended or terminated altogether (Aassve *et al.,* 2020a). In the early stages of the pandemic, the International Federation of Gynecology and Obstetrics (FIGO) recommended the discontinuation of fertility treatments where possible; the suspension of all new treatments; the postponement of non-urgent fertility interventions; the cryopreservation of oocytes and/or embryos to postpone pregnancy; and the postponement of elective surgery (FIGO, 2020). The American Society for Reproductive Medicine (ASRM) and the European Society of Human Reproduction and Embryology (ESHRE) independently recommended the discontinuation of fertility treatments except in the most urgent circumstances (Monteleone et al., 2020), and the Asia-Pacific Initiative on Reproduction (ASPIRE) recommended that members consider deferring treatment where possible (ASPIRE, 2020). More recently, there has been a gradual resumption of service provision, but many cycles have already been lost.

This dimension of the pandemic is unlikely to have a significant effect on fertility trends as the proportion of total births born as a result of ART treatments is small – approximately 0.3% of the total live birth rate globally each year (Alviggi et al., 2020). However, for many individuals and couples, missed treatment cycles will not be regained, and this represents an obstacle to reproductive choice. Again, the impact of this dimension of the pandemic will not be felt uniformly. At the national level, disruption to ART services will be most relevant in high-income countries, and particularly those countries such as Japan, where a relatively high proportion of babies is conceived by in-vitro fertilisation (IVF) **(Case Study 4).** Within countries, it will be individuals facing fertility problems, many of which are at the higher end of the reproductive age range, who are disproportionately affected.

CASE STUDY 4

Disrupted access to assisted reproductive technologies in Japan

Japan has one of the highest proportions of babies conceived by assisted reproductive technologies (ARTs) in the world, at 1 in 15 (about 7%) in 2018 (Japanese Society of Obstetrics & Gynaecology, 2020), compared to roughly 2% of babies in the UK and USA (Inagaki, 2020). This is facilitated in part by generous government subsidies, including, since 2007, the national 'Specific Treatment Support' policy, in addition to financial support provided by local governments. In response to the COVID-19 pandemic, there were no legal restrictions imposed on the availability of ART in Japan, although the Japanese Society for Reproductive Medicine issued a statement, similar to those statements issued by European and American societies of reproductive medicine, to encourage the postponement or suspension of services.

The result was the postponement and cancelling of cycles for couples. This was likely compounded by the reduced affordability of ART services for some couples as a result of pandemic-related job losses and corresponding falls in income (the government subsidies, which are means tested, are based on last year's income and therefore may not be available for some people this year) (Inagaki, 2020). With such delays and cancellations of treatments there is a chance that some individuals may permanently lose the opportunity to have a child, particularly those patients at high maternal ages. This represents a restriction on fertility choices, and also presents broader risks in terms of adverse mental health consequences. It may be months or even years before these effects can be fully assessed.

This case study was prepared following an interview with the Japan Society of Reproductive Medicine in October 2020.

3 DISCUSSION

Table 1 summarizes the potential effect of each individual dimension on fertility.

Previous epidemics and other high mortality events have been characterized by a pattern of a short-term fertility depression approximately nine months after the mortality peak, followed by a fertility rebound in subsequent years. However, it seems unlikely that this typical pattern will be replicated for the current pandemic. First, the age profile of COVID-19, which affects older persons most severely, is distinct from most previous high-mortality events. As a result, two of the key drivers of the typical short-term fertility depression – mortality and morbidity of persons in reproductive ages – are less significant for COVID-19 compared to previous epidemics. Moreover, child mortality rates for COVID-19 are low, removing one of the key factors behind the fertility rebounds seen for past crisis events. Furthermore, many of the other dimensions of the COVID-19 pandemic were not relevant for past high-mortality events, but are likely to interact to affect fertility trends, patterns and choices for the current pandemic.

In settings, particularly in LMIC, where supply and demand-side restrictions impede access to family planning, an increase in unintended pregnancies in 2020 and 2021 may be expected. However, in settings where women have greater control over their fertility, COVID-19 could have a downward impact on period total fertility rates (TFR), at least in the short-term. In these settings, reduced work-life balance, particularly for women, as a result of lockdowns, increased working-from-home, and school closures, may prompt fertility postponement, particularly of second births, while economic recession and associated unemployment and uncertainty may encourage the postponement of childbearing, particularly of first births. If these births are merely postponed, and recuperated in subsequent years, one might expect a short-term, temporary reduction in period TFR, as a result of the tempo effect, but a limited impact in the longer-term. However, a protracted crisis may result in a longer-term downward effect on cohort fertility. The effects of disruptions to ART services were also discussed; owing to the small proportion of births from ART, this dimension is unlikely to affect fertility trends, although, at the individual level, it does represent a significant impediment to fertility choices for those whose cycles have been lost.

At the national level, the institutional, cultural and policy environment will be key in determining the impacts. In those countries with well-functioning labour markets, and robust social safety nets, as well as immediate policies to retain jobs, the downward impact of the recession on fertility will likely be shorter and less severe, and fertility choices less constrained, compared to countries with high existing unemployment, and weaker social welfare systems. Furthermore, in countries with extended lockdowns and school closures, as well as a 'double burden' of paid and unpaid work for women, linked with traditional gender norms in the home, fertility choices are also likely to be more constrained, and the downward impact on fertility greater and longer lasting.

Preliminary evidence from five European countries – France, Germany, Italy, Spain, and the United Kingdom - supports the idea of cross-country differences in the effects of the pandemic on fertility intentions (Luppi *et al.,* 2020). In a survey of young people (aged 18-34 years), Luppi *et al* (2020) found that fertility intentions had been negatively revised during the COVID-19 crisis in all five countries, although in different ways. Fertility intentions in Germany and France had changed only modestly, with many young people still planning or postponing their decision to have a baby in 2020. In Spain, a greater proportion of young people were postponing or abandoning of their decision to have a child compared to those who were still planning. In the UK, a higher proportion of young people were postponing their decision, and a smaller proportion abandoning their decision, compared to Spain. In Italy, meanwhile, the proportion of abandoners was considerably higher than in the other countries. The authors attributed the country differences to country-specific factors such as a high pre-crisis level of youth employment and difficulty of women combining paid work and childbearing due to traditional gender roles and availability of public childcare services.

Contextual factors are also significant in determining access to family planning services, and the related impacts on unintended pregnancies. Where governments classify family planning (and other SRH services) as essential, raise awareness of sexual and reproductive rights among the population, and ensure affordable service provision, barriers to the access of family planning, and the likelihood of unintended pregnancies during the pandemic, will be reduced.

Furthermore, within countries, COVID-19 will likely have differential effects for different social groups. Informal workers, migrant workers, women, as well as younger people, are likely to be especially vulnerable to the effects of economic recession, and face more pronounced constraints on their fertility choices. Similarly, women for whom the pandemic has further increased the burden of domestic work are projected to face increased constraints on fertility choices. As for access to family planning and other SRH services, it is likely to be poorer, harder-to-reach communities, such as those in humanitarian settings and remote rural areas, as well as marginalized groups, including ethnic minorities and migrant workers, and disadvantaged adolescents, who suffer a disproportionate impact on access to family planning, and associated unintended pregnancies.

Table 1: Summary of potential impacts of individual dimensions of COVID-19 on fertility in the Asia-Pacific region and policy implications

Dimensions of COVID-19	Potential impact on fertility trends	Potential impact on fertility choices	*Between countries:* Contextual conditioning factors	*Within countries:* Vulnerable groups	Key policy implications
1. High mortality	Typical pattern of short-term fertility depression 9-months after mortality peak followed by fertility rebound unlikely for COVID-19				
2. Restricted access to family planning services	Increase in unintended pregnancies	Constrained fertility choices (increase in unintended pregnancies)	• Strength of healthcare system • Resilience of family planning supply chains • Family planning and other SRH services labelled as essential • Extent to which family planning services are affordable • Extent to which information about where and how to access family planning services is provided	• Rural communities in LMIC • Humanitarian settings • Marginalized groups (including ethnic minorities, sex workers, refugees, displaced persons) • Migrant workers • Adolescents	• Designate family planning and other SRH services as essential services • Strengthen supply chains by seeking out partnerships with manufacturers and raw materials providers, and reducing heightened border scrutiny on contraceptive imports • Collect and maintain data on family planning inventory to avoid stock-outs and enable inter-state transfers • Invest in health system strengthening, including a strong SRH workforce with access to PPE, as well as affordable access to SRH • Consider relaxation of family planning dispensing rules e.g. enabling multi-month prescriptions to avoid repeat visits • Make provisions for extra supplies of emergency contraception • Explore use of innovative delivery methods such as telemedicine • Disseminate information through multiple channels on where to access family planning and other SRH services

Dimensions of COVID-19	Potential impact on fertility trends	Potential impact on fertility choices	*Between countries:* Contextual conditioning factors	*Within countries:* Vulnerable groups	Key policy implications
3. Reduced work-life balance (particularly for women)	In settings where women have control over their fertility, reduced work-life balance might lead to fertility postponement and a decrease in period TFR; possible longer-term downward impact on fertility quantum if protracted crisis	Constrained fertility choices (double burden of work and family)	• Extent to which prolonged school closures increase childcare burden in the home • Strength of traditional gender norms in domestic division of labour	• Households where women work but traditional gender norms mean women perform the bulk of domestic work	• Employers to provide flexible working arrangements, including flexible hours, paid reductions in working time or work-sharing opportunities for workers with care responsibilities, as well as paid family leave • Provide of childcare for key workers • Public initiatives to tackle engrained social norms, including gender awareness and behaviour change workshops, plus public campaigns
4. Economic recession and uncertainty	In settings where women have control over their fertility, economic recession and uncertainty might lead to fertility postponement and a decrease in period TFR; possible longer-term downward impact on fertility quantum if protracted crisis	Constrained fertility choices (financial constraints)	• Severity and duration of recession • Strength of social welfare system • Extent to which labour market is well-functioning • Extent of job retention programmes • Level of social trust	• Informal workers • Migrant workers • Women	• Provide of paid sick leave to protect health, income and jobs • Adapt existing social protection systems to extend reach, including for informal and migrant workers • Consider introducing new temporary job retention and income-replacement measures, to provide emergency support during the crisis, and extend reach to informal and migrant workers
5. Disruptions to ART services	Minimal impact on fertility trends (proportion of births conceived by ART is small)	Constrained fertility choices (lost ART cycles, that may not be regained)	• Mainly applicable in high-income countries, where the proportion of births conceived by ART is greater	• Individuals with fertility problems, including those conceiving at high maternal age	

POLICY IMPLICATIONS

4

It is possible that, in response to projections of fertility decline in some settings, even in the short term, some governments may be inclined to implement pronatalist policies in an effort to boost fertility rates. Indeed, in recent years several governments have adopted explicitly pronatalist family policy interventions and political rhetoric, against a backdrop of 'fear' about low fertility. It is important to anticipate such a response in the context of COVID-19, and to guard against it, not only because such concerns are largely exaggerated, but also because pronatalist policies and rhetoric risk undermining reproductive rights, especially for women.

Instead, it is vital that policymakers focus efforts on addressing the constraints on reproductive choices identified during the current pandemic to enable women, men and couples to have the number of children they wish to have. This includes, in particular, addressing constraints around access to family planning, reduced work-life balance, and economic recession and uncertainty. In many cases, the barriers to reproductive choices identified during COVID-19 are not new; the pandemic has merely illuminated them. In this way, the recovery phase presents an opportunity for countries to re-set, to dismantle existing obstacles to fertility choices while addressing inequalities, and to build a more inclusive, sustainable society beyond the present crisis. Here we outline a number of broad policy ideas, but note that specific interventions should be tailored to individual country contexts.

Tackle restrictions on access to family planning

First, it is vital to ensure that access to family planning and other sexual and reproductive health services is prioritized in governments' responses to COVID-19. Ensuring attention and resources remain focused on SRH will be important to prevent increases in unintended pregnancies as well as adverse health consequences for mothers and infants, and more broadly, to protect the precious gains in access to services made over the past few decades.

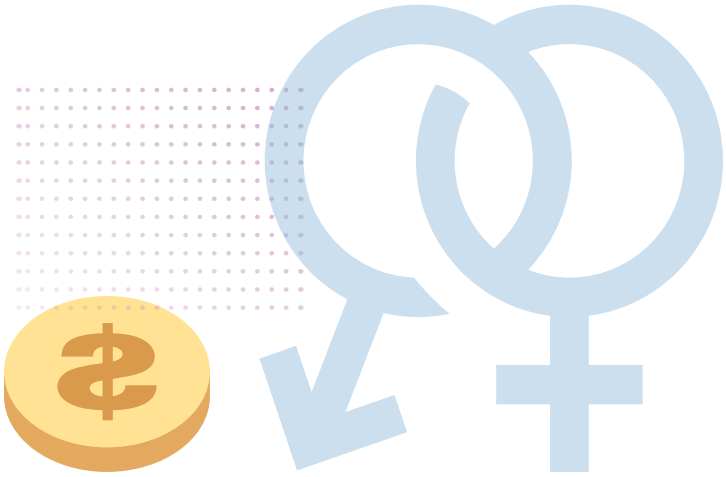
It is recommended that governments designate sexual and reproductive health care as essential (Riley *et al.,* 2020). This is important to enable people to travel to access family planning and other SRH services in lockdown settings, where it otherwise might not be permitted. At the same time, governments, in collaboration with partner organisations, should focus on strengthening family planning supply chains that have been disrupted during the pandemic, seeking out partnerships with manufacturers and providers of raw materials for improved contraceptive supplies, sourcing alternative suppliers where possible, and reducing the heightened scrutiny on contraceptive imports that has slowed clearance approvals at national borders. This will require coordination among multiple government agencies and departments (Sharma *et al.,* 2020). Within countries, it will also be important to collect and maintain data on family planning inventory and procurement to avoid possible stockouts, and enable inter-state transfers of commodities to areas where they are most needed (WHO, 2020d). Domestic investment in strengthening health systems, including maintaining a strong SRH workforce to deliver services is vital (Stidham Hall, 2020), as is providing the SRH health workforce with adequate PPE (Sharma *et al.,* 2020).

Relaxing some requirements in the delivery of family planning could also improve access during crisis events. For example, making it possible for pharmacies to increase the range of contraceptive options provided, and enabling the provision of multi-month prescriptions, with clear accompanying information, to avoid the need for frequent visits (WHO, 2020d). Assuring the availability of emergency contraception will also be important, as during lockdown rates of intimate-partner violence, which sometimes includes sexual coercion and sexual assault, appear to have increased (Sharma *et al*, 2020).

Use of innovative delivery methods such as telemedicine also has the potential to ensure provision of care while minimizing physical contact, and partnerships with IT and communications agencies may aid promotion of such delivery methods. However, it is important to recognize that lack of Internet access or devices may impede the use of telemedicine for some people. To ensure equitable access, alternative means of delivery will also be required. This might include innovative use of transport – for example, after most taxi services were suspended in line with social distancing guidelines, Marie Stopes Viet Nam offered private transport for clients in Hanoi to enable them to reach clinics (Marie Stopes International, 2020), while in parts of Nepal midwives and nurses travel on foot to support women in hard-to-reach rural communities (Marie Stopes International, 2020). Community-based distribution of short-acting contr aceptives, such as the oral contraceptive pill and condoms, through community volunteers and depot holders could also be investigated (Sharma *et al.,* 2020).

Alongside the provision of services, it will be important to disseminate, through multiple channels, comprehensive information about contraception and other SRH service availability to promote awareness among the population of when and where to access such services, while emphasizing the importance of seeking care from a skilled provider (UNFPA Viet Nam, 2020). Helplines and counselling services to provide information on where users can access contraception, including emergency contraception, can play a key role here (Sharma et al., 2020). More broadly, ensuring the affordability of services is vital to facilitate equitable access. Universal health care programmes should incorporate SRH services, and ensure that they cover pregnant women, adolescents, and other marginalized communities such as ethnic minorities and migrant workers to prevent extreme out-of-pocket health expenditures (Sharma *et al.,* 2020; UNFPA Viet Nam, 2020).

Evidence from the Ebola outbreak in Liberia and Sierra Leone shows that the family planning sector can recover from a public health crisis (Bietsch *et al.,* 2020). The challenge will be to ensure that the learnings during COVID-19 are sustained. In this way, we can enhance preparedness to provide equitable access to family planning and other SRH services in future crisis events and beyond.



Improve work-family balance

Second, policies to improve work-life balance, particularly for women, will be important to reduce constraints on fertility choices in the context of COVID-19. These may include paid reductions in working time or work-sharing opportunities for workers with care responsibilities, as well as provision of child care vouchers, especially for key workers (United Nations, 2020a).

However, the difficulty of combining paid work and childbearing for women, and its effect on constraining fertility choices, is not new. The recovery phase offers an opportunity to address this existing barrier to fertility choices in the longer term. Providing affordable and accessible public childcare services will be important, and is possible, as demonstrated by Sri Lanka and Nepal, which both have high participation rates (>80%) (OECD, 2014, cited in ADB/UN Women, 2018). At the same time, it is vital that access is equitable, and made available for the most marginalized groups, including informal workers, as well as formal employees (ADB/UN Women, 2018).

Increased flexibility in work, including flexible working hours and work-from-home facilities where possible, will also play a part in a comprehensive policy response to facilitate work-family balance. So too will paid family leave to allow workers to take time off without compromising employment opportunities. Less than 15% of female workers in the Asia-Pacific region had effective protection of maternity leave cash benefits (UN Women, 2015b), while most countries in the region offer only a few days of paternity leave, often unpaid (ADB/UN Women, 2018). Again, extending coverage to informal workers should be a priority.

In addition, addressing the inequality in unpaid work within the home will be key. Potential initiatives to tackle ingrained social norms include the provision of gender awareness and behaviour-change workshops in schools, specifically addressing the redistribution of domestic work, as well as public campaigns on 'de-gendered' labour in paid work and in the home, supported by civil society organisations (Nandy & Dutta, 2020). A practical example in the context of COVID-19 comes from Sri Lanka, where UNFPA has initiated a social media campaign outlining 10 ways that men can step up and increase their contribution in the domestic sphere.

Mitigate effects of economic recession and uncertainty

Finally, mitigating the effects of economic recession and uncertainty during COVID-19 is important. A discussion of policies that aim to change the course of the recession itself is beyond the scope of this report. However, a number of policy suggestions to address the symptoms of the economic recession and associated unemployment and uncertainty as a constraint on fertility choices may be identified.

In the short term, paid sick leave to protect health, income and jobs, including access for self-employed workers, will be important, as will employment retention schemes to protect livelihoods. For example, Malaysia has introduced grants for microbusinesses hiring less than five workers (WEF, 2020). In addition, adapting existing social assistance systems to ensure protection during the crisis will play a role. This may include extensions of existing systems to reach more people, increases in benefit levels, expansion of cash and in-kind transfers for poor households and informal workers, as well as increasing utility subsidies for poor households (WEF, 2020). This could occur at the same time as introducing new temporary income replacement measures, including for informal workers. For instance, Thailand recently implemented a new cash transfer of 153 USD for three months for up to 10 million farmers not covered by the national social security programme, while in Viet Nam, a new social

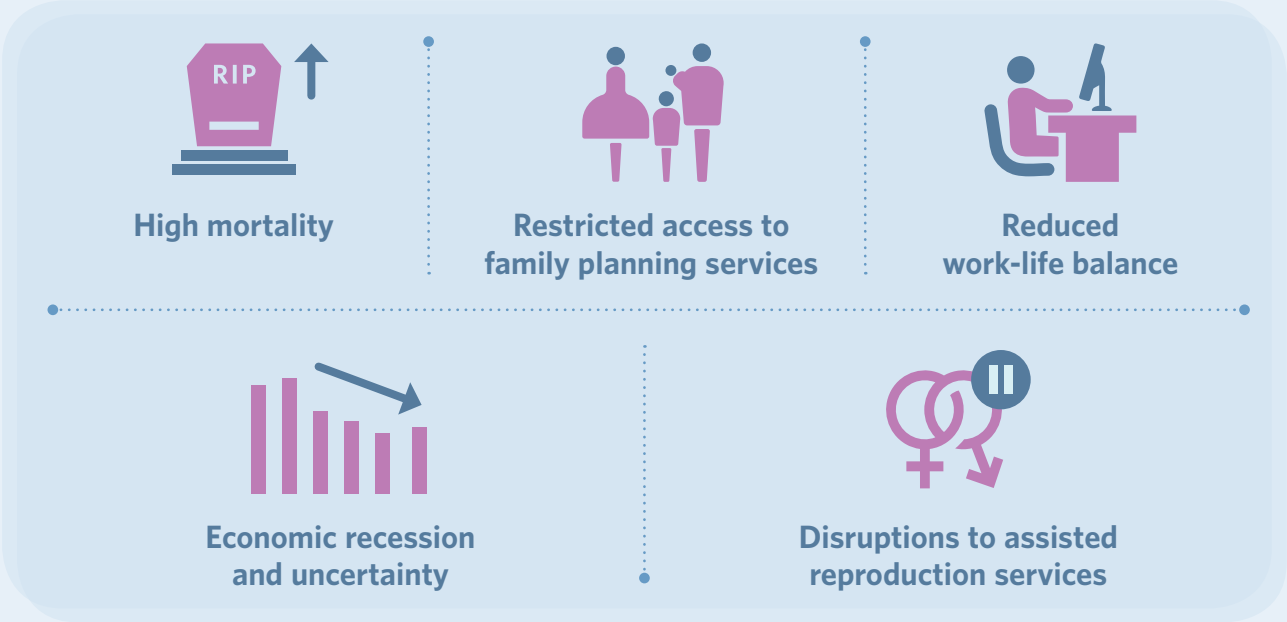
assistance cash transfer has been introduced for informal households and self-employed persons who have been forced to close their businesses temporarily as a result of the pandemic (WEF, 2020). Extending the reach and benefit levels of social assistance schemes that specifically target women, including supporting women-led businesses, will also be key (United Nations, 2020a).

COVID-19 has exposed economic insecurity as an existing constraint on fertility choices. In the longer term, the recovery from the pandemic offers the opportunity to address this obstacle. For example, implementing more expansive and inclusive social welfare systems, encompassing sick pay, pensions, maternity leave, and unemployment benefits could help to offset the negative effects of economic uncertainty. Importantly, these benefits need to reach beyond the formal workforce and be accessible to people in all spheres of work (United Nations, 2020), including informal workers as well as migrant workers. Many migrant workers in India, for example, remain unregistered, and as a result are ineligible for state benefits. Action to ensure such unregistered workers receive emergency welfare benefits will be important to ensure no one is left behind (Jan Sahas, 2020).

CONCLUSION

5

This report has examined five key dimensions of the COVID-19 pandemic that have the potential to impact fertility trends, patterns and choices:



It has shown 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.

Importantly, the impacts of the pandemic on fertility are unlikely to be uniform, both between and within countries. In settings, mainly in LMICs, where supply- and demand-side restrictions impede access to family planning, an increase in unintended pregnancies in 2020 and 2021 may be expected. However, in settings where women have greater control over their fertility, COVID-19 could have a downward impact on period TFR, at least in the short term, driven by fertility postponement in response to economic uncertainty and recession, as well as reduced work-life balance, particularly for women. At the country level, the impact will depend critically on the prevailing institutional, cultural and policy environments.

Restricted access to family planning services, economic uncertainty and recession, and reduced work-life balance – as well as restricted access to assisted reproduction services – also restrict fertility choices at the individual level. Within countries, it will likely be those already vulnerable groups, such as the poor, marginalized communities, and informal and migrant workers who face the greatest barriers to achieving their desired family size, and the greatest constraints on their reproductive rights.

The response to the COVID-19 crisis offers an unprecedented opportunity to recognize and address key, often longstanding, barriers to fertility choices in the Asia-Pacific region, so we can strive towards a situation where *all couples and individuals have the basic right to decide freely and responsibly the number and spacing of their children and to have the information, education and means to do so* beyond the pandemic.

BIBLIOGRAPHY

Aassve, A., Cavalli, N., Mencarini, L., Plach, S., and Livi-Bacci, M. (2020a) 'The COVID-19 pandemic and human fertility', *Science,* **369**(6502): 370-371.

Aassve, A., Le Moglie, M., and Mencarini, L. (2020b) 'Trust and fertility in uncertain times', doi: https://doi.org/10.1080/00324728.2020.1742927.

ActionAid Viet Nam (2016) *Making a house become a home: Policy Brief,* ActionAid Viet Nam. Accessed on 23.09.20 from: www.actionaid. org/sites/files/actionaid/ucw_policy_brief_-_en.pdf.

Alviggi, C., Esteves, S., Orvieto, R. et al. (2020) 'COVID-19 and assisted reproductive technology services: repercussions for patients and proposal for individualized clinical management', *Reproductive Biology and Endocrinology,* **18**(45): 1-7.

Asian Development Bank/UN Women (2018) *Gender Equality and the Sustainable Development Goals in Asia and the Pacific: Baseline and pathways for transformative change by 2030*, Bangkok, ADB and UN Women.

ASPIRE (2020) Message from ASPIRE President – In times of COVID-19. Accessed on 20.08.20 from: https://www.aspire-reproduction.org/#:~:text=ASPIRE%2C%20the%20Asia%20Pacific%20Initiative,in%20the%20Asia%2DPacific%20region.

Bagri, N.T. (2020) 'Women always take the brunt': India sees surge in unsafe abortion. (*The Guardian*, 13.07.20). Accessed on 30.08.20 from: https://www.theguardian.com/global-development/2020/jul/13/women-always-take-the-brunt-india-sees-surge-in-unsafe-abortion

Basten, S., Sobotka, T., and Zeman, K. (2014) "Future fertility in low-fertility countries", In: W. Lutz, W. Butz., and K. Samir (eds.), *World Population and Human Capital in the Twenty-First Century*, Oxford University Press: 39-146.

Bietsch, K., Williamson, J., & Reeves, M. (2020) 'Family Planning During and After the West African Ebola Crisis', *Studies in Family Planning*, **51**(1): 71-86.

Biraben, J-N. (1973) 'Aspects médicaux et biologiques de la démographie historique', *International Population Conference*, Liège, IUSSP, **3**:9–22.

Bloom-Feshbach, K., Simonsen, L., Viboud, C., Mølbak, K., Miller, M., Gottfredsson, M., and Andreasen, V. (2011) 'Natality Decline and Miscarriages Associated With the 1918 Influenza Pandemic: The Scandinavian and United States Experiences', *Journal of Infectious Diseases,* **204**: 1157-1164.

Boberg-Fazlic, N., Ivets, M., Karlsson, M., and Nilsson, T. (2017) 'Disease and Fertility: Evidence from the 1918 Influenza Pandemic in Sweden', *IZA Institute for Labour Economics, Discussion* Paper No. 10834.

Camara, B., Delamou, A., Diro, E. *et al.,* (2017) 'Effect of the 2014/15 Ebola outbreak on reproductive health services in a rural district of Guinea: an ecological study', *Transactions of the Royal Society of Tropical Medicine and Hygeine*, **111**: 22-29.

CARE (2020) *CARE Rapid Gender Analysis for COVID-19, Viet Nam May 2020*. Accessed on 23.09.20 from: https://philarchive.org/archive/GIACRG.

Chandra, S. & Yu, Y. (2015a) 'The 1918 Influenza Pandemic and the Subsequent Birth Deficit in Japan', *Demographic Research*, **33**(11): 313-327.

Chandra, S. & Yu, Y. (2015b) 'Fertility Decline and the 1918 Influenza Pandemic in Taiwan', *Biodemography and Social Biology,* **61**(3): 266-272.

Chandra, S., Christensen, J., Mamelund, S-E., and Paneth, N. (2018) 'Short-Term Birth Sequelae of the 1918-1920 Influenza Pandemic in the United States: State-Level Analysis', *American Journal of Epidemiology,* **187**(12): 2585-2595.

Comolli, C. (2017) 'The fertility response to the Great Recession in Europe and the United States: structural economic conditions and perceived economic uncertainty', *Demographic Research*, **36**(51): 1549–600

Cooke, L. (2004) "The gendered division of labor and family outcomes in Germany", *Journal of Marriage and Family*, **66**(5): 1243-1256.

Del Boca, D., Oggero, N., Profeta, P., and Rossi, M. (2020) 'Women's work, housework, and childcare before and during COVID-19', *VOX EU CEPR*. Accessed on 24.08.20 from: https://voxeu.org/article/women-s-work-housework-and-childcare-and-during-covid-19

Dutta, S. & Sengupta, P. (2020) 'SARS-CoV-2 and Male Infertility: Possible Multifaceted Pathology', *Reproductive Sciences,* doi: 10.1007/s43032-020-00261-z.

Duvander, A. and Andersson, G. (2006) "Gender Equality and Fertility in Sweden: A Study of the Impact of the Father's Uptake of Parental Leave on Continued Childbearing", *Marriage and Family Review,* **39**(1-2): 121-142.

Duvander, A., and Jans, A. (2008) *Consequences of Fathers' Parental Leave Use: Evidence from Sweden,* Stockholm Research Report in Demography (Vol. 2008: 6): Stockholm University, Dept of Sociology, Demography Unit (SUDA).

The Economist (2020) 'The Philippines' fierce lockdown drags on, despite uncertain benefits' (11.07.20). Accessed on 24.09.20 from: https://www.economist.com/asia/2020/07/11/the-philippines-fierce-lockdown-drags-on-despite-uncertain-benefits.

Elston, J., Cartwright, C., Ndumbi, P., and Wright, J. (2017) 'The health impact of the 2014–15 Ebola outbreak', *Public Health,* **143**: 60–70.

Esping-Andersen, G. (2009) *The Incomplete gender revolution: Adapting welfare states to women's new roles,* Cambridge: Polity Press.

Eun, K. (2003) 'Understanding recent fertility decline in Korea', *Journal of Population and Social Security (Population)* 1 (Supp.): 573-594.

Fahlén, S. and Oláh, L. (2018) 'Economic uncertainty and first-birth intentions in Europe', *Demographic Research,* **39**(28), 795-834.

Farré, L. & González, L. (2020) '¿Quién Se Encarga de Las Tareas Domésticas Durante El Confinamiento ? COVID-19, Mercado de Trabajo Y Uso Del Tiempo En El Hogar', *Nada Es Gratis*. Accessed on 24.08.20 from : https://nadaesgratis.es/admin/quien-se-encarga-de-las-tareas-domesticas.

Frankenberg, E., Laurito, M., and Thomas, D. (2014) 'The demography of disasters'. In: International encyclopedia of the social and behavioral sciences (area 3), 2nd edition. North Holland, Amsterdam, pp 1–22.

Friedman, D., Hechter, M., and Kanazawa, S. 1994. "A theory of the children," *Demography* **31**(3): 375-401.

Gietel-Basten, S. (2019) The *"Population Problem" in Pacific Asia,* Oxford University Press: Oxford.

Hertelieu, C., Richmond, P., and Roehner, B. (2018) 'Deciphering the Fluctuations of High Frequency Birth Rates', *Physica A: Statistical Mechanics and its Applications,* **509**: 1046-1061.

Huang, J. (2003) 'Unemployment and Family Behavior in Taiwan', *Journal of Family and Economic Issues,* **24**(1): 27-48.

Inagaki, K. (2020) 'Japanese couples put off parenthood as coronavirus fears mount', (The Financial Times, 19.05.20), Accessed on 07.10.20 from: https://www.ft.com/content/d7eb28a5-a033-4eb5-8458-0d97ded9e738.

Institute for Population and Social Research (IPSR), Mahidol University (2020) *Draft Youth and Covid-19 in Thailand: Socioeconomic impact of the crisis: Synthesis report,* Bangkok: IPSR.

Institute for Social Development Studies (ISDS) (2015) *Social determinants of Gender equality in Viet Nam.* Accessed on 23.09.20 from: https://vietnam.embassy.gov.au/files/hnoi/ISDS_Report_Binh%20dang%20gioi_EN_PDF-2.pdf.

International Federation of Gynecology and Obstetrics (FIGO) (2020) *Fertility Treatment and COVID-19.* Accessed on 20.08.20 from: https://www.figo.org/sites/default/files/2020-04/30.03.20%20-%20FIGO%20Statement%20on%20Fertility%20Treatment%20and%20COVID-19%20EN.pdf.

International Monetary Fund (IMF) *World Economic Outlook Update, June 2020*. Accessed on 26.08.20 from: https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020.

International Planned Parenthood Federation (IPPF) (2020). Accessed on 19.08.20 from: https://www.ippf.org/news/covid-19-pandemic-cuts-access-sexual-and-reproductive-healthcare-women-around-world.

Iran (Islamic Republic of) National Organization for Civil Registration (NOCR). Accessed on 01.11.20 from:

https://www.sabteahval.ir/avej/Upload/Modules/Contents/asset99/12MRates.rar.

Jan Sahas (2020) *Voices of the Invisible Citizen:s A Rapid Assessment on the Impact of COVID-19 Lockdown on Internal Migrant Workers Recommendations for the State, Industry & Philanthropies,* Jan Sahas: New Delhi.

Japanese Society of Obstetrics & Gynaecology (2020) *Registry of ART.* Accessed on 07.10.20 from: http://plaza.umin.ac.jp/~jsog-art/).

Kim, D. (2009) 'The 1997 Asian economic crisis and changes in patterns of socioeconomic differentials in Korean fertility', In: G. Jones, P. Straughn, and A. Chan (eds.) *Ultra-low Fertility in Pacific Asia: Trends, Causes and Policy Issues,* Routledge: New York.

Kim, D., and Yoo, S. (2016). "Long-term effects of economic recession on fertility: the case of South Korea", *Paper presented at the European Population Conference 2016,* Mainz, Germany.

Kim, E. (2017) "Division of domestic labour and lowest-low fertility in South Korea", *Demographic Research,* **37**(24): 743-768.

Kohler, H-P., Billari, F, and Ortega, J. (2002) 'The emergence of lowest-low fertility in Europe during the 1990s', *Population and Development Review,* **28**(4), 641-680.

Kreyenfeld, M. (2010) "Uncertainties in female employment careers and the postponement of parenthood in Germany", *European Sociological Review,* **73**: 854-873.

Lanzieri, G. (2013) "Towards a 'Baby Recession' in Europe? Differential Fertility Trends During the Economic Crisis". *Statistics in Focus 13.* Statistics in Focus. Luxembourg: Eurostat. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF13-013/EN/KS-SF-13-013-EN.PDF.

Lappegard, T. (2009) "Family Policies and Fertility in Norway", *European Journal of Population,* **26**(1): 99-116.

Lee, R. (1981). 'Short-term variation: vital rates, prices and weather'. In: *The population history of England, 1541-1871.* E.A. Wrigley and R.S. Schofield, eds.

Lee, S. & Orsini, C. (2018) 'Girls and Boys: Economic Crisis, Fertility, and Birth Outcomes', *IZA Insitute of Labor Economics Discussion Paper Series.* Bonn: IZA.

Luppi, F., Arpino, B., and Rosina, A. (2020) 'The impact of COVID-19 on fertility plans in Italy, Germany, France, Spain and UK'. Doi: https://doi.org/10.31235/osf.io/wr9jb.

Ma, L. (2014) 'Economic crisis and women's labor force return after childbirth: Evidence from South Korea', *Demographic Research,* 31(18), 511-552.

Mamelund, SE. (2004) 'Can the Spanish Influenza Pandemic of 1918 Explain the Baby Boom of 1920 in Neutral Norway?', *Population,* 59(2): 229-260.

Marie Stopes International (2020) *Stories from the frontline: In the shadow of the COVID-19 pandemic.* Accessed on 17.07.20 from: https://www.mariestopes.org/covid-19/stories-from-the-frontline/.

Marteleto, L., Guedes, G., Coutinho, R. and Weitzan, A. (2020) 'Live Births and Fertility Amid the Zika Epidemic in Brazil', *Demography,* **57**: 843-872.

Matysiak, A., Sobotka, T., and Vignoli, D. (2020) 'The *Great Recession* and Fertility in Europe: A Sub-national Analysis', *European Journal of Population,* doi: https://doi.org/10.1007/s10680-020-09556-y

McDonald, P. (2000a) "Gender equity in theories of fertility transition", *Population and Development Review,* **26**(3): 427-429.

McDonald, P. (2000b) "Gender equity, social institutions and the future of fertility", *Journal of Population Research,* **17**(1): 1-15.

McDonald, P. (2006). "Low fertility and the state: the efficacy of policy", *Population and Development Review,* **32**(3): 485–510.

Menken, J., Trussell, J. and Watkins, S. (1981). 'The nutrition fertility link: An evaluation of the evidence', *The Journal of Interdisciplinary History,* **11**(3), 425–441.

Mercado, L., Naciri, M., and Mishra, Y. (2020) *Women's Unpaid and Underpaid Work in the Times of COVID-19.* Accessed on 24.08.20 from: https://asiapacific.unwomen.org/en/news-and-events/stories/2020/06/womens-unpaid-and-underpaid-work-in-the-times-of-covid-19

Monteleone, P., Nakano, M., Lazar et al., (2020) 'A review of initial data on pregnancy during the COVID-19 out-break: implications for assisted reproductive treatments', *JBRA Assisted Reproduction,* 24(2): 219-225.

Myrskylä, M., Goldstein, J.R. and Cheng, Y.A. (2013) 'New Cohort Fertility Forecasts for the Developed World: Rises, Falls, and Reversals'. *Population and Development Review,* **39**: 31–56.

Nagase, N. and Brinton, M. (2017) "The gender division of labor and second births: Labor market institutions and fertility in Japan", *Demographic Research,* **36**(11): 339-370.

Nandi, A., Mazumdar, S., and Behrman, J. (2017) 'The effect of natural disaster on fertility, birth spacing, and child sex ratio: evidence from a major earthquake in India', *Journal of Population Economics,* **31**: 267-293.

Nandy, A. & Dutta, D. (2020) *Unpaid Care Work and Violence Against Women and Girls at a Crossroads: A Case for Behaviour Change of Dominant Social Norms,* New Delhi: Oxfam India.

Neels, K., Theunynck, Z. and Wood, J. (2013) 'Economic Recession and First Births in Europe: Recession-induced Postponement and Recuperation of Fertility in 14 European Countries Between 1970 and 2005', *International Journal of Public Health,* **58**: 43–55.

Nobles, J. & Buttenheim, A. (2006) 'Marriage in periods of crisis', *California Center for Population Research Online Working Papers CCPR-017-06.*

Nobles, J., Frankenberg, E., Thomas, D. (2014) 'The Effects of Mortality on Fertility: Population Dynamics after a Natural Disaster', *NBER Working Paper No. 20448.*

Ochiai, E. (2020) 'Shadow Work of Staying at Home: Positive and Negative Effects on Gender Relations in Japan', *Study presented at the Asian Families Amid The Covid-19 Pandemic webinar co-sponsored by the Asian Population Association and NUS Centre for Family and Population Research,* 6 August 2020.

Ogura, S. & Kadoda, T. (2008) 'Labor Market Policies and Fertility of Japanese Women: Analysis of Municipal Data', *Paper presented at the workshop at Economic Research Institute of Hitotsubashi University,* 4 June 2008.

Oláh, L. (2003) "Gendering fertility: Second births in Sweden and Hungary", *Population Research and Policy Review,* **22**(2): 171-200.

Oxfam (2020) 'The SHE Network Advocates for the Continuous Delivery of RH Services During the COVID-19 ECQ'. Accessed on 23.09.20 from: https://philippines.oxfam.org/latest/stories/she-network-advocates-continuous-and-unhampered-delivery-reproductive-health-services.

Palloni, A. (1988), 'On the role of crisis in historical perspective: An exchange', *Population and Development Review,* **14**(1): 145-164.

Perelli-Harris, B. (2008) 'On the border between old and new in uncertain times', *Demographic Research,* **19**: 1145-1178.

Philipov, D. (2003) 'Fertility in times of discontinuous societal change'. In: Irena Kotowska and Janina Jozwiak (eds.), *Population of Central and Eastern Europe: Challenges and Opportunities. Warsaw: Statistical Publishing Establishment,* pp. 665-689.

Philippine Statistics Authority (PSA) and ICF. (2018) *Philippines National Demographic and Health Survey 2017,* Quezon City, Philippines, and Rockville, Maryland, USA: PSA and ICF.

Pörtner CC (2001) 'Children as insurance', *Journal of Population Economics,* **14**:119–136.

Preston, S. H. (1978). *The effects of infant and child mortality on fertility.* New York: Academic Press.

Purdy, C. (2020) 'Opinion: How Will COVID-19 Affect Global Access to Contraceptives – And What Can We Do About It?', *Devex.* Accessed on 19.08.20 from: https://www.devex.com/news/sponsored/opinion-how-will-covid-19-affect-global-access-to-contraceptives-and-what-can-we-do-about-it-96745.

Ratcliffe, R. & Fonbuena, C. (2020) 'Coronavirus lockdown could lead to 214,000 extra babies in the Philippines', (*The Guardian, 29.06.20*). Accessed on 23.09.20 from: https://www.theguardian.com/world/2020/jun/29/coronavirus-lockdown-could-lead-to-214000-extra-babies-in-the-philippines?CMP=fb_gu&utm_medium=Social&utm_source=Facebook&fbclid=IwAR2p8iZIsL2IF1ENODq0-Jydz02QbjsrPQ88g5WUtwuc8VckvIWyIL18nbU#Echobox=1593425910.

Retherford, R. Ogawa, N., and Matsukura, R. (2001) 'Late marriage and less marriage in Japan', *Population and Development Review,* **27**(1): 65-102.

Richmond, P. & Roehner, B. (2018) 'Coupling Between Death Spikes and Birth Troughs: Part 1: Evidence', *Physica A,* **506**: 97-111.

Riley, T., Sully, E., Ahmed, Z., and Biddlecom, A. (2020) 'Estimates of the Potential Impact of the COVID-19 Pandemic on Sexual and Reproductive Health in Low- and Middle-Income Countries', *International Perspectives on Sexual and Reproductive Health,* **46**:73-76.

Sevilla, A., & Smith, S. (2020) 'Baby Steps: The Gender Division of Childcare After COVID-10', *London CEPR Press, COVID Economics: Vetted and Real-Time Papers 23.*

Sharma, V., De Benil, D., Sachs Robertson, A. and Federica Maurizio (2020) 'Why the Promotion of Family Planning Makes More Sense Now Than Ever Before?', *Journal of Health Management,* **22**(2) 206–214.

Sobotka, T., Skirbekk, V. and Philipov, D. (2011) 'Economic recession and fertility in the developed world', *Population and Development Review* **37**(2): 267-306.

Stidham Hall, K., Samari, G., Garbers, S., *et al.,* (2020) 'Centring sexual and reproductive health and justice in the global COVID-19 response', *Lancet,* **395**(10231): 1175-1177.

Stone, L. (2020) 'Short-Run Fertility Responses to Mortality Events: A Look to the Past', *Applied Demography,* **32**(1): 18-20.

Torr, B. & Short, S. (2004) "Second births and the second shift: A research note on gender equity and fertility", *Population and Development Review,* **30**(1): 109-130.

UNDP & UN Women Viet Nam (2020) *Full report: COVID-19 Socio-economic Impact on Vulnerable Households and Enterprises in Viet Nam: A Gender-sensitive Assessment,* UNDP & UN Women Viet Nam.

UNESCO (2020) *Take a Survey: COVID-19 and Early Childhood Education Workforce.* Accessed on 31.08.20 from: https://en.unesco.org/news/take-survey-covid-19-and-early-childhood-education-workforce.

UNFPA (2020a) 'Impact of the COVID-19 Pandemic on Family Planning and Ending Gender-based Violence, Female Genital Mutilation and Child Marriage', Interim Technical Note: 27 April 2020, UNFPA.

UNFPA (2020b) *Policy Brief: Bayanihan To Heal As One Act,* UNFPA, Accessed on 23.09.20 from: https://philippines.unfpa.org/sites/default/files/pub-pdf/Policy%20Brief_%20UNFPA_Bayanihan%20Heal%20As%20One%20Act%20%282%29_0.pdf.

UNFPA Philippines (2020) *Significant rise in maternal deaths and unintended pregnancies feared because of COVID-19, UNFPA and UPPI study shows.* Accessed on 30.09.20 from: https://philippines.unfpa.org/en/news/significant-rise-maternal-deaths-and-unintended-pregnancies-feared-because-covid-19-unfpa-and

UNFPA Viet Nam (2020) *The Impact of COVID-19 on Maternal Health and Family Planning in Viet Nam:* Technical Brief. Accessed on 29.08.20 from: https://vietnam.unfpa.org/en/publications/impact-covid19-maternal-health-and-family-planning-viet-nam.

UN Women (2020a) *Spotlight on Gender, COVID-19 and the SDGs,* UN Women.

UN Women (2015b) *Progress of the World's Women. Transforming Economies, Realizing Rights.* New York: UN Women.

United Nations (2020a) *Policy Brief: The Impact of COVID-19 on Women.* Accessed on 30.08.20 from: https://asiapacific.unwomen.org/en/digital-library/publications/2020/04/policy-brief-the-impact-of-covid-19-on-women.

United Nations (2020b) *Shared Responsibility, Global Solidarity: Responding to the Socio-Economic Impacts of COVID-19.* Accessed on 26.08.20 from: https://unsdg.un.org/sites/default/files/2020-03/SG-Report-Socio-Economic-Impact-of-Covid19.pdf

United Nations Islamic Republic of Iran (2020) *Building Back Better UN Iran Socio-Economic Recovery Programme Against the Impact of COVID-19.* Accessed on 01.11.20 from: https://reliefweb.int/sites/reliefweb.int/files/resources/IRN_Socioeconomic-Response-Plan_2020.pdf.

United Nations Viet Nam (2020) *UN Analysis on Social Impacts of COVID-19 and Strategic Policy Recommendations for Viet Nam.* United Nations Viet Nam.

Wenham, C., Arevalo, A., Coast, E. et al., (2019) 'Zika, abortion and health emergencies: a review of contemporary debates', *Globalization and Health*, **15**(1): 49.

World Bank (2018) *Viet Nam Future Job: The gender dimension.* Accessed on 23.09.20 from: http://documents.worldbank.org/curated/en/398191532522140333/pdf/128839-WP-PUBLIC-P163147- WBFutureJobsGenderDimensionTA.pdf.

World Economic Forum (WEF) (2020) *COVID-19 could bring about a 'new deal' for millions of Asia's informal workers.* Accessed on 27.08.20 from: https://www.weforum.org/agenda/2020/05/informal-workers-asia-coronavirus-covid19-employment-deal.

World Health Organization (WHO) (2020a) *WHO Coronavirus Disease (COVID-19) Dashboard.* Accessed on 31.08.20 from: https://covid19.who.int/.

World Health Organization (WHO) (2020b) *Clinical Management of COVID-19 Interim Guidance.* Accessed on 23.08.20 from: https://www.who.int/publications/i/item/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected.

World Health Organization (WHO) (2020c) COVID-19: *vulnerable and high-risk groups.* Accessed on 31.08.20 from: https://www.who.int/westernpacific/emergencies/covid-19/information/high-risk-groups.

World Health Organization (WHO) (2020d) *Maintaining essential health services: operational guidance for the COVID-19 context.* Accessed on 24.08.20 from: https://www.who.int/publications/i/item/10665-332240.

Yoon. S. "The influence of a supportive environment for families on women's fertility intentions and behavior in South Korea", *Demographic Research,* **36**(7): 227-254.

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