**Gendered vulnerabilities of women during Covid-19: Limitations of the current data capture systems and response**

Amita Pitre, Oxfam India and

Sunita Sheel Bandewar, Health, Ethics and Law Institute of

Forum for Medical Ethics Society, Mumbai; and Vidhayak Trust, Pune

Email ids: [amita@oxfamindia.org](mailto:amita@oxfamindia.org); [sunita.bandewar@gmail.com](mailto:sunita.bandewar@gmail.com)

**Word Count: 6994 including references of 1758 words| Word count = 5236 sans references**

**Introduction**

Appropriate, well-informed, timely, and sustained response to public health emergencies in general, and to those of global concerns such as Covid-19, in particular is key to contain the pandemic. One of the critical pieces in achieving this goal is a well-established system for epidemiologic and other relevant data capture, data repositories, data retrieval and data sharing; and governance structures for the same. This enables evidence-based public health intelligence for informed interventions to respond to pandemics. (Hedberg and Maher, 2018). Such an intelligence is also essential to inform policies to help rebuild communities, constituencies and nations post pandemic. “Ongoing, comprehensive and verified global surveillance data about COVID‑19 is crucial for response at the global, national, and local levels.”. (WHO, 2020; pp:11). While there are a number of efforts underway, the World Health Organization (WHO) (WHO, 2020) notes that the lack of a global data architecture acts as “… a barrier for access to disaggregated data, ….. needed to understand age and sex-specific epidemiologic features, risk characteristics of certain sub-groups, and distributions of cases over time and geographic areas.”. (pp: 11). In the past, WHO’s interim review of response to the Ebola Virus Disease (EVD) pandemic identified absence of integrated standards for data collection and that “… data were not aggregated, analyzed, or shared in a timely manner and in some cases not at all. …”. (WHO, 2015; pp: 11).

The Covid-19 pandemic stands to be vastly different from the earlier recent public health emergencies such as EVD, H1N1, and Zika Virus Disease (ZVD). The reasons being: extensive global spread, little knowledge about the novel Corona virus, no availability of treatment and very limited prevention measures.. Additional differences include the strategy of a sustained lockdown around the world including closure of international borders, and adverse impact of these on the global and local economies. This makes the pandemic unprecedented and warrants an evidence-based and yet dynamic response to the changing trends of the pandemic. We note three broad domains of impact to understand which, it is important that data capture systems are comprehensive enough.

First, the scale of infections, mortality and morbidity patterns for different sub-groups of a population and across populations, and how they play out to shape the overall outcome for those affected. Over time, differential impact of pandemics on different populations and sub-populations in different contexts is far better acknowledged. We recognize the intersectionality of wide-ranging factors/variables, such as, demographic characteristics of age, sex, race, class, caste, ethnicity, sexual orientation; pre-existing health conditions, co-morbidities, and other socio-behavioral factors or life-style related factors. For example, Joe and colleagues argue (2020), “…a full comprehension of the risk profile is very critical to decide upon lockdown relaxation approach and flexibilities in resumption of economic activities for different population age-sex groups.”(pp: 12). A number of published works also provide insights into the interplay between structural factors such as sex, lifestyle, class and access to health care, existence of co-morbidities and COVID related mortality (Bello-Chavolla et al., 2020; Goutte et al., 2020). Data from government sources have enabled these researches.

Second, extensive scholarship from the past public health emergencies such as EVD pandemic of 2014-15 in West Africa (Decroo et al., 2017; Brolin et al., 2016; Delamou et al., 2016) demonstrate that public health emergencies adversely impact health care access for needs other than the pandemic disease. Similar trends are projected using modeling studies (Clark et al., 2020; Hogan et al., 2020; Roberton et al., 2020; Sands, 2020) in case of the ongoing pandemic of COVID-19.

Finally, it is more than established since the recent past that public health emergencies impact people’s health – directly by the pandemic, and indirectly affecting access to health care - and much beyond. For example, the UN (2015) reported the socioeconomic effects of Ebola in Africa to include the increased risks of pregnancy in adolescent girls, school dropouts, and child abuse. In case of COVID-19, too, emerging research from around the world shows its adverse impact on livelihoods and food security, leading to extensive hardships, deepening poverty, destitution and an existential crisis for the most marginalized. (Kalhan et al., 2020; Jan Sahas, 2020).

It is against this backdrop that we focus on the health risks women have been facing during the COVID-19 pandemic, salience of a gendered response to public health emergencies, and explore if the data sources are robust enough to understand the problem and respond appropriately. We locate the Indian scenario in the global context. The focus on higher number of deaths among men may tend to underemphasize the impact on women and the underlying structural determinants to appreciate ‘why’ of these patterns. We discuss four key thematic areas. They are: heightened risks for women health care workers, neglected area of unique risks to pregnant women, compromised sexual and reproductive health of women, and increased adversities women confront on the domestic fronts in the form of domestic violence as a result of an extended lockdown. We show that the heightened risks to women in these four domains are gendered and concerning. It is also clear that data sources are not sufficiently robust, well-structured and integrated, hampering a nuanced understanding of intersectionality for a better-informed and timely response.

**Salience of a gendered response to public health emergencies**

A gender specific response to any public health emergency includes the assessment of how the infection affects both sexes and all genders. Such an approach enables responders to identify any biological and social relationship that might exists between various risk factors, exposure or vulnerability to the infection including an interplay of biological and social factors. It also helps appreciate if sex and gender might affect diagnosis, access to care, compliance to treatment and treatment outcomes. Here we attempt to draw attention to how public health crises such as this one affect women and men differently. A gender analysis of the pandemic is essential for a more comprehensive, holistic and equity-oriented response.

Various public health crises in the recent past have shown that sex and gender differences are seldom factored in the response to the crises. For example, the Ebola Virus Disease (EVD) which primarily affected West Africa in 2014-15, infected nearly 28,646 people in various countries and killed nearly 11,323 people. The virus infected more women than men (approximately 51%). The difference in proportion appears small, but conceals the additional risks that women faced. Women’s vulnerability to the disease increased as they are closely involved in nursing the sick as well as in preparing bodies for burial. However, sex disaggregated data were available quite late and opportunity to reduce the risks women faced was lost (Davies and Benette, 2016). In case of Zika Virus Disease (ZVD) pandemic, there was no reliable count of Zika virus infections by sex and ethnicity (Editorial, The Lancet Global Health, 2016). Lack of data led to a neglect of impact of Zika infection on the pregnancy and foetus (Davies and Benette, 2016).

**Relative risks faced by men and women: Brief insights into the gaps in available data**

Global, National and time related variance in the distribution of the Covid-19 infections suggests that there is much to be studied and documented regarding sex, gender+[[1]](#footnote-1) and age distribution and this can provide important pointers to prevention, protection from infection and early detection (Danielsen, Rushovitch and Tarrant, 2020). For example, globally, many countries show more infections among women, some examples being The Netherlands, Belgium, Scotland and Wales (62% among women), while others such as Luxemborg, Australia, China, Mexico, Philippines, Indonesia show less than 50% infections among women as of 24th July (Global Health 5050, 2020). The cases reported by different states in the United States, show a similar picture, ranging from 44 to 58% among women as of June 22. Even after adjusting for population proportion of the sexes, 33 states showed a higher rate of infection per 100,000 population, among women than men (Danielsen, Rushovitch and Tarrant, 2020).

Though the burden of infection is not necessarily higher among men, a clear picture of men’s higher risk of mortality has been emerging from the evidence. The range of proportion of deaths among men varies from 52-53% in Northern Ireland, Moldova, South Africa and South Korea to 70% or more in Thailand, Guatemala and Peru. Bangladesh and Afghanistan have reported 77% and 78% deaths among men respectively (Global Health 5050, 2020).

However, recent analysis by Harvard Public Health Researchers, of excess deaths on account of the COVID-19 pandemic in both men and women by comparing age standardized mortality rates for Massachusetts for 2015-19 and 2020, showed identical relative increases in the rise of deaths in both sexes though the absolute numbers were higher for men (Krieger, Chen and Waterman, 2020). Other data is also beginning to caste a doubt on a clear theory that men necessarily have a higher relative risk of excess deaths due to the pandemic. For example, the state specific data coming in from the USA shows a range of 40 to 56% of deaths among women. After adjusting for the population proportion of men and women, 10 states in the US still showed a higher rate of mortality among women. Indirect age-adjusted mortality rates showed a higher rate of deaths among men in all states, however the variation in size of difference was substantial across states. Some states showed the rate of deaths among men to be double that for women while in others the difference in mortality rates was not statistically significant (Danielsen, Rushovitch and Tarrant, 2020).

The total number of COVID -19 infected active cases in India is 4,56,071, and the number of deaths is 31,358 as of July 26, 2020. However, there is no easily accessible disaggregated data on important variables including age and sex/gender+. In the absence of official, disaggregated data in India, Joe and colleagues relied on crowd sourced data, to study sex disaggregated morbidity and mortality due to COVID-19 (<https://www.covid19india.org>). The data is curated by volunteers drawing upon data maintained by the Union Ministry of Health and Family Welfare in India, and modelling of trends to fill in the gaps. As per the study, as of 20th May, 66% of the total burden of infections were among men with 2.9% of Case Fatality Rate (CFR). Though burden of the disease was lower, the CFR among women was 3.3% and the difference is statistically significant.

These varying trends suggest the need to look into both social and biological determinants and pathways. For example, men’s vulnerability probably is not merely biological but also extends to the socio-economic, lifestyle and cultural spheres which encompass gendered differences. Currently experts point out that increased male vulnerability to COVID-19 may be linked to their immunological response, increased propensity of underlying chronic diseases such as cardiovascular diseases and Chronic Obstructive Pulmonary Diseases (COPD), behavioral concerns such as tobacco and alcohol consumption and poor practice of disease prevention behavior, all of which are impacted by sex and gender (Wenham, Smith and Morgan, 2020; BMJ Global Health, 2020). Similarly, in the case of women it needs to be explored if the lesser number of infections and increased mortality rate in India was on account of reduced access to testing, lower index of suspicion for COVID-19 or delayed care seeking for women thus delaying the diagnosis, and worsening the outcome among women. The difference in the disease burden can also be on account of varying manifestation of the disease in men and women. Such differences leading to missed and delayed diagnosis for women have been noted in the case of tuberculosis, in India (Pitre, 2018, MOHFW, 2019). Higher levels of undernutrition among women or specific risk factors may also explain poorer outcomes.

These insights reinforce the need for systematic data to map specific vulnerabilities of men and women and other genders to better inform the response to the COVID-19 pandemic.

**Heightened risks to women health care workers**

Globally, women form more than 70% of the total health workforce (including doctors and nurses). In most regions of the world an overwhelming majority of the nursing staff are women (Boniol, McIsaac et al, 2019). The International Council of Nurses (ICN) has stated in its analysis that as of June 3, 2020, about 600 nurses died on account of COVID-19. This was due to exposure at work which is typically longer for nurses than doctors and the number is unacceptably high. As per their information about 7% of all novel Corona Virus infections are among healthcare workers. Extrapolating the number globally would mean that more than 4,50,000/- healthcare workers are infected (ICN, 2020). Similarly, there are reports of nurses and frontline workers having died of COVID-19, especially in low and middle income countries (LMICs), and most of these are women. For example, Brazil had recorded nearly 18,000 infections among nurses and death of nearly 181 nurses in the line of duty, according to Brazil’s Federal Nursing Council by early June. This was the highest number recorded in any country by then, and formed a third of the total deaths among nurses. In Mexico, government data points to nearly one in five corona virus infections among healthcare workers (CGTN, 2020). The International Council of Nurses has also pointed to wide variation in risk of dying for health workers across countries, disproportionate deaths being reported among black, Asian and minority ethnic healthcare workers. They critique that number of deaths among nurses is under-estimated worldwide due to a lack of segregated and systematic data collection (ICN, 2020). Such data is urgently required to take necessary action.

In India, women comprise more than 85% of the nursing and frontline worker staff (PLFS 2017-18). Media reports show that about 540 doctors, nurses and paramedics have COVID -19 and the number continues to rise (Times of India, May 2020). However, there are no official data available. A high number of nurses appear to be getting infected at work. A representation sent by the Mumbai chapter of the Jan Swasthya Abhiyan (People’s Health Movement) in India, to the Municipal Corporation of Greater Mumbai (MCGM) in June 2020 notes that, in Mumbai alone, there were nearly 1500 infections among MCGM frontline workers, majority of them nurses, of which 25 died as per media reports. (JSA, 2020). These numbers have not been reported officially.

Entrenched hierarchy within the health care system partly explains the vulnerability of nursing staff and grassroots health care workers. The workplace safety and rights of nurses come only after the doctors. Media have reported lack of access to face-shields, goggles, protective gowns and gloves, increased number of work hours and reduced access to tests on request. In addition, many nurses do not have satisfactory and safe residential arrangements, a minimum requirement, given that they are forced to live away from home due to the risk of passing on the infection to their families.

In India, yet another cadre, that of Auxillary Nurse Midwives (ANMS) and Accredited Social and Health Activists (ASHAs) is the backbone of the grassroots health care system. ASHAs have been entrusted with additional tasks of providing essential services during the COVID-19 pandemic (MoH&FW, April 20, 2020) in addition to their 66 existing tasks. Longstanding issues of their long working hours, poor honorarium, and need to include them in the formal health care system instead of their given status of a ‘volunteer’ are worsened during this pandemic. Safety measure – PPE kits, access to sanitisers, and testing facilities for themselves – are either absent or too inadequate (Rao and Tewari, June 12, 2020; Behanbox; Mishra et al., 2020) despite the notification from the Union Ministry of Health and Family Welfare (NHM, MoH&FW, 2020).

Nurses, ANMS and ASHAs also suffer from harassment, bullying and physical attacks from public and local communities as a result of stigma attached to the COVID-19 infection. (Scroll, April 6, 2020; Yohannan, 2020).

Within the system too, ANMs and ASHAs experience discriminatory and un-dignified treatment, often a result of their being less educated, belonging to poorer families, of marginalised caste identities, and therefore assumed to be incompetent. The cadre of ANMs and ASHAs perceive that they have been excluded from the appreciation received by the entire health care force, police force, and other essential service providers working on the frontlines. (Rao and Tewari, 2020). Lack of recognition of their significant contribution amounts to their invisibilization. Besides, the lack of data on burden of infections or mortality due to COVID-19 among them makes it difficult to assess the risks they face, though these are bound to be high.

**Epidemiology of infections in pregnant women:** Limited case studies and evidence documentation have shown concerns of severe morbidity and mortality in pregnant women with COVID-19 (Farell, Michie and Pope, 2020). However, very little is known about COVID -19 infection in pregnancy, its impact on the mother and child as well as disease presentation and progression in pregnant and post-partum women. Learnings from other viral infections and pandemics show that this is an important gap to be bridged. For example, viral infections such as HIV, Cytomegalovirus and Rubella are known to cross the placental barrier and affect the foetus. Women in the third trimester were particularly at risk in the 2009 pandemic of H1N1 infection (WHO, 2009b). The impact of the Zika infection on pregnant women was neglected for long in Latin America. It was not noticed until the later phase of the epidemic that pregnant women with Zika infection faced the risk of giving birth to babies with microcephaly- an under-developed brain which could potentially be fatal (Davies and Benette, 2016). Early integration of this information in the pandemic response would have averted many unwanted births, hardships and emotional trauma. Data on pregnancy outcomes in the EVD outbreak of 2015 in the West Africa are relatively scarce. (Kitching et al., 2015). However, there is evidence that pregnant women with EVD were also at risk of serious complications, such as spontaneous abortions, pregnancy related excessive bleeding, stillbirth and death. Overall, there was high maternal and neo-natal mortality among EVD affected pregnant women (Kitching et al., 2015). This was neither adequately studied, not publicized adequately. Especially worrying is the lack of public education to women and families about this, and almost no attempts at early diagnosis of complications (Davies and Benette, 2016).

Neglect of epidemiology of diseases in pregnant women is primarily because of the continuing trend of exclusion of pregnant and post-partum women from research studies and clinical trials despite guidance developed for specific health conditions such as tuberculosis (Gupta, Mathad et al, 2015), EVD (Gomes et al, 2017) and ZVD (Schwartz, 2018) as well as a general recommendation by National Institute of Health guidelines (2001) to move towards presumption of inclusion of pregnant women rather than exclusion (Farell, Michie and Pope, 2020). Exclusion leads to pregnant women either losing out on any potential benefits of the tested drugs or exposing themselves to unnecessary risks if newer untested drugs are used in pregnant women. (Gomes et al., 2017). The EVD vaccine trials largely excluded pregnant women leading to availability of only limited data on how they responded to EVD vaccines. (Haddad et al., 2018). Gilboa and colleagues (2017) have argued that that can be addressed by improved and integrated ongoing systems for surveillance of infectious diseases, tracking of pregnancies and infections during pregnancies, birth outcomes and birth anomalies.

In the current context of COVID-19, pregnant women have been excluded from clinical trials for vaccines as well as of drugs such as Hydroxychloroquin and Remdesivir, for example, though both have been tested earlier in pregnant women; (Farell, Michie and Pope, 2020). Recommendation of presumed inclusion of pregnant women in clinical trials with reasoned documentation of exclusions needs to be enforced unless specific reasons exist for exclusion.

**Adverse impact of COVID-19 on women’s access to Sexual and Reproductive Health Care services**

We noted earlier that there is emerging evidence of the adverse impact of the current COVID-19 crisis on people’s non-COVID-19 related health care needs. This includes women’s access to sexual and reproductive healthcare. This is reminiscent of the EVD pandemic trends in West Africa during 2014-15. During 18 months of the pandemic, maternal mortality in three African countries - Guinea, Liberia and Sierra Leone increased by 75% primarily due to disruption in the health system and disproportionate deaths in health personnel (Lancet, 2015; IASC, 2015). Many women could not access contraception, safe abortion, ante-natal care and safe deliveries due to the health system being occupied with the EVD pandemic. The countries worst affected by the pandemic were also countries with weak health systems and recent history of conflicts and civil wars (Davies and Benette, 2016).

The United Nations Population Fund (UNFPA) has estimated that during the current COVID-19 pandemic, disruption in health services and poor access will deprive nearly 47 million women of contraception and 7 million women will suffer unwanted pregnancies in LMICs, if the lockdown continues for six months. It is estimated that though fewer women may have died due to COVID-19 disease as compared to men, there may have been more deaths during child birth or for other reasons directly linked to the crisis (UNFPA, April 28, 2020). Closer to home, there is evidence of interrupted access to contraception and safe abortion services which resulted in unwanted pregnancies, risks of unsafe abortions as well as increased maternal mortality. Modelling studies indicate that nearly 1.85 million women had compromised access to safe abortions in the first three months of the lockdown (Ipas, 2020). After this was highlighted in the media, the Indian government has included safe abortion services and contraception among the list of ‘essential services’ which are to be available without interruption during the lockdown. However, media reports cast a doubt over whether services on the ground have indeed improved (The Quint, July 10, 2020). There is also no data provided of how many safe abortions have been conducted, how the number compares to pre-crisis times and which facilities provide the services. To overcome the challenge of service provision in India, the non-profit campaign, Pratigya, is crowd sourcing and publicizing a database of facilities providing safe abortion services (Pratigya, June, 2020). Both the need for data based on modelling studies and crowd sourcing of facilities demonstrates the inadequate data available on both health events and facilities for the same.

Disruptions in health services also affected safe deliveries. Several media reports have documented home deliveries, deliveries on the road and in transport vehicles and severe maternal and infant morbidity and mortality, during the lock-down (Hindustan Times, May 2020). There are reports of upto 40% decrease in institutional deliveries during the lockdown period from multiple states which is very worrying given that institutional deliveries were the main vehicle used for reduction in maternal mortality in India (Hindustan Times, May 30, 2020). It is more than established that essential sexual and reproductive health services must be a right of every person, especially women when it threatens their life and health seriously. (WHO, 2014). Response to COVID-19 public health emergency ought not to compromise non-Covid-19 health care services.

**The crisis of Domestic Violence: A ‘shadow pandemic’**

Another important impact of the COVID-19 crisis globally has been the increased reported cases of domestic violence faced by women stuck at home due to the lockdown, unable to escape and unable to find help. The UN Women (2020) termed the heightened reporting as a ‘shadow pandemic’, that is, a pandemic of domestic violence shadowing the pandemic of COVID-19. The press release by UN Women (May 2020) reports, “Emergency calls for domestic violence cases in Argentina have increased by 25 per cent since the lockdown began. Helplines in Singapore and Cyprus have registered an increase in calls of more than 30 per cent. In the USA, the National Domestic Violence Hotline reported a rising number of victims who reached out via text or phone.”. The United Nations Secretary General was forced to acknowledge the phenomenon and call upon nation states to take care of women’s safety as part of the pandemic planning.

In India, the National Commission for Women released data of women who approached them for help in the 25 days before the lockdown (27 February to 22 March) and 25 days after the lockdown (March 23 to April 17, 2020) (Economic Times, April 17, 2020). During this period reporting of offences against women increased from 396 cases to 587 and within these the cases of domestic violence increased from 123 cases to 239 cases. Another analysis compared reporting of cases to the NCW in the same time-period in 2019 as the lockdown in 2020 and found an increase in cases of domestic violence in 2020 (Deshpande, 2020). It is obvious that women bore the impact of frustrations built within the home on account of various insecurities including loss or fear of loss of jobs, helplessness on account of the lock-down, increase in domestic chores and decrease in mobility, along with the specific risk of being a power-less person within the home. While women too experienced the same insecurities and shouldered the majority responsibilities of the domestic chores, they had to also experience the added trauma of domestic violence at the hands of men. Added to this, most women had no access to transportation facilities, free movement, privacy or even use of the phone in some cases, being locked in with the perpetrators. Field experiences showed that women were also turned away from shelter homes, could not meet counselors, and NGOs could not run crisis support centres due to the lockdown.

As feminists point out, the COVID-19 lockdown merely brought out publicly what is a perpetual but silent ongoing pandemic with one in three women globally facing gender-based violence at any given time. Precipitation of Violence Against Women and Girls during or after disasters and emergencies is well documented (Davies and Benette, 2016). Then why was it not anticipated and steps taken to mitigate the concerns? This points to a general lack of a gender analysis of the situation and consequent lack of a gendered public health emergency response. For example, Civil Society Organisations are asking for violence services to be deemed ‘Essential Services’ just as medical stores, hospitals, grocery stores and other essential services are recognized; enabling their uninterrupted functioning. (Oxfam India, April 2020). It will also provide an accountability framework to demand active facilitation of these services, even if provided by private players.

Another specific difficulty while analyzing the NCW data was that there is no uniform classification of forms of gender based violence. Different heads under which the NCW data was classified has several overlaps such as ‘Domestic Violence’, ‘Harassment of married women’, ‘Right to live with dignity’ to name a few heads (Deshpande, 2020). Therefore, though overall the number of complaints in the lockdown were higher, it would be difficult to analyse the information further. The State Governments run helplines and One Stop Centres but that data is also not published or available for analysis. It would be important to have a uniform and rational classification system for forms of gender-based violence and anonymized data to be collated at the national level and published regularly on the government website. Disaggregated analysis of such data by state, district, forms of violence as well as in times of crisis can provide important guidance to service provision and to understand the trends in gender-based violence.

**Discussion and way Forward**

The four themes we discussed are but examples of the gendered and adverse impact of the pandemic. Similar gendered impact was seen, also during the past pandemics. Despite vigorous efforts, sex and gender+ dimensions of pandemics continue to remain at margins and periphery. This discussion would be worthwhile if it gave public health planners a gender lens through which they could discover other differential impacts which are as yet unknown.

In the closing, we discuss two intertwined aspects of COVID-19 pandemic: the constrained data capture systems; and its adverse impact on ability to comprehend differential or gendered impact on women of COVID-19, preventing a more nuanced and informed response to the pandemic.

The process of tackling a disease or health issue begins by characterizing the problem, initially by the collection of epidemiology (Lang, 2011), social epidemiology; and beyond. Lack of sex, gender+ disaggregated data and data for women specific concerns has come out as a major foundational impediment in a gender responsive approach which needs to be urgently addressed.

We suggest undertaking the following broad domains of measures to respond to these constraints.

First, a multidisciplinary task force should be set up to create appropriate data capture systems, necessary infrastructures, and overall systems of data governance, prioritizing age, sex/gender and social group disaggregated data. Given the frequent emergence of public health emergencies of global concern, setting up of a task force could be done collaboratively by multi-lateral agencies, and regional and national agencies. Multidisciplinary teams would help. These efforts may take the shape of global level coalitions involving academia, funders with a commitment to evidence-based response to public health emergencies, and civil society. One such example of collaborative initiative to create robust data platform is Infectious Diseases Data Observatory (<https://www.iddo.org/>) aimed at assembling “…clinical, laboratory and epidemiological data on a collaborative platform to be shared with the research and humanitarian communities. … that enable research-driven responses to the major challenges of emerging and neglected infections.”. (IDDO website, 2020).

Second, it is important to ensure gender diversity and social inclusion in the leadership of the response. For example, in India, of the 11 Empowered Groups announced by the Government of India on 29th March 2020, less than 15% members are women (Govt of India, 2020). Two Empowered Groups have no women in them. Similarly, there is no representation from nursing professionals, and frontline health care workers in these Groups. Also important is inclusion of experts specializing in gender justice to enable a gender analysis and gendered response. Mere data technology will not resolve the issue of women’s invisibilisation which is essentially rooted in hierarchy and women’s unequal status in society. Ensuring meaningful participation and leadership, and not merely tokenism would help reduce a systematic gender bias in the overall response and governance systems set up for responding to pandemics.

McGregor (2020) and Saini (2017) reveal the failure of medicine and science to recognise entrenched sex and gender based biases in their working. This often ends up treating women primarily as men with additional female reproductive organs, thus not requiring separate enumeration or treating differences through the lens of biological essentialism. Both underscore the transformative potential of reliable sex and gender disaggregated data, embedded in other parameters, to address the longstanding and entrenched exclusion and prejudice on the basis of gender. We call upon the scientific community and governments to enable this revolution in data systems to shape an appropriate response to pandemics or indeed any human suffering.

**References (References = 1758 words**

1. Bello-Chavolla OY, González-Díaz A, Antonio-Villa NE, et al. Unequal impact of structural health determinants and comorbidity on COVID-19 severity and lethality in older Mexican adults: Considerations beyond chronological aging [published online ahead of print, 2020 Jun 29]. *J Gerontol A Biol Sci Med Sci*. 2020;glaa163. doi:10.1093/gerona/glaa163.
2. BMJ Global Health. Sex, gender and COVID-19: Disaggregated data and health disparities. March 24, 2020. Available from: <https://blogs.bmj.com/bmjgh/2020/03/24/sex-gender-and-covid-19-disaggregated-data-and-health-disparities/>
3. Boniol M, McIsaac M, Xu L, Wuliji T, Diallo K and Campbell J. Gender equity in the health workforce : Analysis of 104 countries. Health workforce working paper 1. WHO. 2019 March. (WHO/HIS/HWF/Gender/ WP1/2019.1) <https://apps.who.int/iris/bitstream/handle/10665/311314/WHO-HIS-HWF-Gender-WP1-2019.1-eng.pdf>
4. Brolin Ribacke KJ, van Duinen AJ, Nordenstedt H, Höijer J, Molnes R, Froseth TW, et al. (2016) The Impact of the West Africa Ebola Outbreak on Obstetric Health Care in Sierra Leone. PLoS ONE 11(2): e0150080. <https://doi.org/10.1371/journal.pone.0150080>.
5. CGTN News. COVID-19 global round-up: Latin America logs 70,000 deaths. 11 June 2020. Available at https://news.cgtn.com/news/2020-06-11/Latin-America-logs-70-000-coronavirus-deaths-straining-hospitals-ReQhR2MyuQ/index.html
6. Chretien J-P, Rivers CM, Johansson MA (2016) Make Data Sharing Routine to Prepare for Public Health Emergencies. PLoS Med 13(8): e1002109. <https://doi.org/10.1371/journal.pmed.1002109>
7. Clark A, Jit M, Warren-Gash C et al. with the Centre for the Mathematical Modelling of Infectious Diseases COVID-19 working group. Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. Lancet Global Health 2020. Published Online June 15, 2020. <https://doi.org/10.1016/S2214-109X(20)30264-3>.
8. Danielsen A C, Rushovitch T and Tarrant M. Highlights from the GenderSci Lab’s US Gender/ Sex Covid-19 Data Tracker. GenderSci Blog.June 24, 2020. Available from: <https://www.genderscilab.org/blog/covid-data-highlights>
9. Davies S and Bennett B. A Gendered Human Rights Analysis of Ebola and Zika. International Affairs 92: 5 (2016) 1041-1060.
10. Decroo T., Fitzpatrick G., and Amone J. What was the effect of the West African Ebola outbreak on health programme performance, and did programmes recover? Public Health Action. 2017 Jun 21; 7(Suppl 1): S1–S2. Published online 2017 Jun 21. doi: 10.5588/pha.17.0029Delamou A, Delvaux T, El Ayadi AM, et al. Public health impact of the 2014–2015 Ebola outbreak in West Africa: seizing opportunities for the future. BMJ Global Health 2017;2:e000202.
11. Deshpande Ashwini. In locked down India, women fight coronavirus and domestic violence. Quartz India. April 16, 2020. Available from: <https://qz.com/india/1838351/indias-coronavirus-lockdown-leads-to-more-violence-against-women/>
12. Economic Times. India witnesses steep rise in crime against women amid lockdown, 587 complaints received: NCW. April 17, 2020. Available from: <https://economictimes.indiatimes.com/news/politics-and-nation/india-witnesses-steep-rise-in-crime-against-women-amid-lockdown-587-complaints-received-ncw/articleshow/75201412.cms?from=mdr>
13. Farell R, Michie M and Pope R. Pregnant women in trials of COVID-19: A critical time to consider ethical frameworks of inclusion in clinical trials. Ethics Hum Res. 2020 June 20: 10.1002/eahr.500060. [Ethics Hum Res](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7323073/). 2020 Jun 20 : 10.1002/eahr.500060. doi: [10.1002/eahr.500060](https://dx.doi.org/10.1002%2Feahr.500060) [Epub ahead of print] Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7323073/#eahr500060-bib-0019
14. Gilboa SM, Mai CT, Shapiro-Mendoza CK, et al. Population based pregnancy and birth defects surveillance in the era of Zika virus. Birth Defects Res 2017; 109: 372-8. Doi: 10.1002/bdr2.1007
15. Global Health 5050. Available from: https://globalhealth5050.org/covid19/sex-disaggregated-data-tracker
16. Gomes MF, de la Fuente-Núñez V, Saxena A, Kuesel AC. Protected to death: systematic

exclusion of pregnant women from Ebola virus disease trials. Reprod Health 2017; 14:

Suppl 3: 172.

1. Gouttea S, Péranc T, Porchere T. The role of economic structural factors in determining pandemic mortality rates: Evidence from the COVID-19 outbreak in France. Research in International Business and Finance. June 23,2020. https://doi.org/10.1016/j.ribaf.2020.101281
2. Government of India. 2020. COVID-19 State-wise Status <https://www.mygov.in/corona-data/covid19-statewise-status/>
3. Government of India. Ministry of Home Affairs. Order: Constitution of the Empowered Groups under the Disaster Management Act 2005. Available at: <https://www.thehindubusinessline.com/resources/article31204033.ece/binary/MHAOrder-Empowered%20Groups.pdf>
4. Government of India. Ministry of Women and Child Development (Women Welfare Division). No. WW-22011/27/2016-WW. 25 March 2020
5. Gupta A, Mathad J, Abdel-Rahman S and others. Toward Earlier Inclusion of Pregnant and Postpartum Women in Tuberculosis Drug Trials: Consensus Statements From an International Expert Panel. Clinical Infectious Diseases. 10.1093/cid/civ991s
6. Haddad LB., Jamieson D J., Rasmussen SA. Pregnant Women and the Ebola Crisis. New England Journal of Medicine. Dec 27, 2018. 379; 2492-93
7. Hedberg K and Maher J. The CDC Field Epidemiology Manual. CDC. Last Reviewed; December 2018. Available from: <https://www.cdc.gov/eis/field-epi-manual/chapters/collecting-data.html> Cited June 29, 2020.
8. Hindustan Times. With hospitals overwhelmed, pregnant women left with no care or place to give birth. May 03, 2020. Available from: <https://m.hindustantimes.com/delhi-news/with-hospitals-overwhelmed-pregnant-women-left-with-no-care-or-place-to-give-birth/story-iqOmJLgWn4TyXwx719O8vM.html>
9. Hindustan Times. During COVID-19 lockdown, births at clinics plummet by 40%. May 30, 2020. Available from: <https://www.hindustantimes.com/india-news/during-lockdown-births-at-clinics-plummet-by-40/story-D1DzxlaZhGswBRtHbeXwjN.html>
10. Hogan AB, Jewell BL, Sherrard-Smith E, et al. Potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria in low-income and middle-income countries: a modelling study. Lancet Glob Health 2020; published online July 13. https://doi.org/10.1016/S2214-109X(20)30288-6.
11. Inter-Agency Standing Committee. 2016. Humanitarian crisis in West Africa (Ebola): Gender Alert: February 2015. <https://interagencystandingcommittee.org/system/files/iasc_gender_reference_group_-_gender_alert_west_africa_ebola_2_-_february_2015_0.pdf>
12. International Council of Nurses. More than 600 nurses die from COVID-19 world-wide. June 3, 2020. <https://www.icn.ch/news/more-600-nurses-die-covid-19-worldwide>
13. Ipas Development Foundation. Compromised Abortion Access due to COVID-19: A model to determine impact of COVID-19 on women’s access to abortion. 2020. Available at: <https://www.ipasdevelopmentfoundation.org/resourceFiles/59202006092650.pdf>
14. Jan Sahas. Voices of the Invisible Citizens A Rapid Assessment on the Impact of COVID-19 Lockdown on Internal Migrant Workers Recommendations for the State, Industry & Philanthropies. April, 2020. Available from: <https://ruralindiaonline.org/library/resource/voices-of-the-invisible-citizens/> Cited 2020 May 1.
15. Jan Swasthya Abhiyan and others. 2020. Representation to the Municipal Corporation of Greater Mumbai (MCGM) by the People’s Health Movement, Mumbai, Clinical Nursing Research Society, Trained Nurses Association of India- Maharashtra State Branch, Association of Nursing Teachers, Maharashtra, Municipal Nursing and Paramedical Staff Union-Mumbai, and United Nurses Association- Maharashtra dated June 01, 2020 (pdf available)
16. Joe W., Kumar A. Rajpal S., Mishra US., Subramanian SV. Equal risk, unequal burden? Gender differentials in COVID-19 mortality in India. J Glob Health Sci. 2020 Jun;2(1):e17. <https://doi.org/10.35500/jghs.2020.2.e17>
17. Kalhan A., Singh S., Moghe K. Locked Down, Trapped and Abandoned Migrant Workers in Pune City. Economic and Political Weekly. Vol. 55(26-27) Jun 27, 2020.
18. Kitching, A., Walsh, A. and Morgan, D. 2015. Ebola in pregnancy: risk and clinical outcomes. BJOG: An International Journal of Obstetrics & Gynaecology; 122: 287. Lang T. Advancing Global Health Research Through Digital Technology and Sharing Data. Science. Feb 11, 2011; Vol 331: 714-717.
19. Krieger N, Chen J and Waterman P. 2020. Excess mortality in men and women in Massachusetts during the COVID-19 pandemic. Lancet Correspondence Vo. 395 June 13, 2020. <https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(20)31234-4.pdf>
20. Ministry of Health and Family Welfare. Central TB Division. National framework for a gender responsive approach to TB in India. December 2019. Available at <https://tbcindia.gov.in/WriteReadData/l892s/388838054811%20NTEP%20Gender%20Responsive%20Framework_311219.pdf>
21. Ministry of Statistics and Programme Implementation (2019) Annual Report, Periodic Labour Force Survey, 2017-18 Government of India, National Statistical Office May 2019
22. Mishra A., Bandewar S., and Gautam S. Being at the frontline of COVID 19: Conversations with grassroots health care workers [Web log post]. July 15, 2020. Retrieved from https://fmesinstitute.org/blogs/
23. National Health Mission, Ministry of Health and Family Welfare. Notification for ASHAs. April 20, 2020. Available from: <https://nhm.gov.in/New_Updates_2018/In_Focus/2DO_AS_MD_ASHA_incentives.pdf> Cited 2020 Jun2 29.
24. McGregor Alyson. Sex matters: How male centric medicine endangers women’s health and what we can do about it. Hachette Go. May 2020. ISBNs: 978-0-738-24676-5 (Hardcover); 978-0-738-24675-8 (e-book)
25. Moeser A. COVID-19 affects men more than women and this could be the reason why, according to scientists. World Economic Forum in Collaboration with The Conversation. June 16, 2020. Available from: https://www.weforum.org/agenda/2020/06/covid19-mortality-rates-men-women/ Cited July 6, 2020.
26. Mullan Z. The cost of Ebola. Editorial. The Lancet. Published Online July 9, 2015 http://dx.doi.org/10.1016/ S2214-109X(15)00092-3
27. Oxfam India. COVID-19: Recommendations for a Feminist Approach. April 2020. <https://www.oxfamindia.org/knowledgehub/policybrief/covid-19-recommendations-feminist-approach>
28. Pratigya Campaign. Facebook Appeal. June 11, 2020. Available from: <https://www.facebook.com/PratigyaRights/posts/2936570726395976>
29. Rao B and Tewari S. Anger, Distress Among India’s Frontline Workers: In Fight Against Covid-19. Behanbox. June 12, 2020. Available from: https://www.behanbox.com/anger-distress-among-indias-frontline-workers-in-fight-against-covid-19/ Cited 2020 June 29.
30. Rios L. Mexican doctors attacked with bleach over coronavirus fears. *Time.* 2020 Apr 25[cited 2020 Jun 3]. Available from:https://time.com/5827496/mexico-doctors-coronavirus-attacks/
31. Roberton T, Carter ED, Chou VB, et al. Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. Lancet Global Health 2020; 8: e901–08 Published Online May 12, 2020. https://doi.org/10.1016/

S2214-109X(20)30229-1

1. Sands P. HIV, tuberculosis, and malaria: how can the impact of COVID-19 be minimised? Lancet Global Health. Published Online July 13, 2020. <https://doi.org/10.1016/S2214-109X(20)30317-X>
2. **Saini A.** Inferior: How Science Got Women Wrong-and the New Research That's rewriting the Story. Beacon Press. Mar 06, 2018; 224 Pages; ISBN 9780807010037.
3. Scroll. Coronavirus: Nurses association in Kerala moves SC seeking safety of health officials. April 6, 2020. Available from: <https://scroll.in/latest/958348/coronavirus-nurses-association-in-kerala-moves-sc-seeking-safety-of-health-officials> Cited 2020 June 29.
4. Semple K. ‘Afraid to be a nurse’: Health workers under attack during coronavirus pandemic. *New York Times.* 2020 Apr 27[cited 2020 Jun 3]. Available from: <https://www.nytimes.com/2020/04/27/world/americas/coronavirus-health-workers-attacked.html>
5. Schwartz D. Clinical trials and administration of Zika Virus Vaccine in pregnant women: Lessons (that should have been) learned from excluding immunization with the Ebola Vaccine during pregnancy and lactation. Vaccines (Basel). 2018 Dec. 6(4):81. doi: [10.3390/vaccines6040081](https://dx.doi.org/10.3390%2Fvaccines6040081)
6. The right(s) approach to Zika. *The Lancet Glob Health.* 2016 Jul;4(7):e427. doi: 10.1016/S2214-109X(16)30109-7.
7. The Quint. How ‘Essential’ Abortion Services Are Inaccessible in the Lockdown. July 10, 2020. Available from: <https://fit.thequint.com/coronavirus/access-to-abortion-and-contraceptive-services-during-coronavirus-lockdown-in-india>
8. Times of India. Coronavirus latest updates: Death toll touches 1,694, cases rise to 49,391. May 6, 2020. Available from: <https://timesofindia.indiatimes.com/india/coronavirus-latest-updates-evacuation-flight-ticket-from-us-to-cost-1l-from-uk-50000/articleshow/75567080.cms>
9. UN Economic Commission for Africa. Socio-economic Impacts of Ebola on Africa. Jan 2015. Available from: <https://www.uneca.org/sites/default/files/PublicationFiles/eca_ebola_report_final_eng_0.pdf>. Cited 2020 July 9.
10. UN Women. Press release: UN Women raises awareness of the shadow pandemic of violence against women during COVID-19. May 27, 2020. Available from: <https://www.unwomen.org/en/news/stories/2020/5/press-release-the-shadow-pandemic-of-violence-against-women-during-covid-19>. Cited 2020 July 1.
11. UNFPA. Press release: New UNFPA projections predict clalmitous impact on women’s health as COVID-19 pandemic continues. April 28, 2020. Available from: <https://www.unfpa.org/press/new-unfpa-projections-predict-calamitous-impact-womens-health-covid-19-pandemic-continues>
12. Wenham C, Smith J and Morgan R. COVID-19 the gendered impacts of the outbreak. The Lancet. March 06, 2020. DOI:<https://doi.org/10.1016/S0140-6736(20)30526-2> Available from: <https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30526-2/fulltext>
13. World Health Organisation. COVID‑19 STRATEGY UPDATE. April 14, 2020. Available from: <https://www.who.int/docs/default-source/coronaviruse/covid-strategy-update-14april2020.pdf?sfvrsn=29da3ba0_19> Cited 2020 April 2020.
14. World Health Organization. Report of the Ebola Interim Assessment Panel. May 2015. Available from: <http://www.who.int/csr/resources/publications/ebola/ebola-interim-assessment/en/>
15. World Health Organization website. 2009b. Clinical features of severe cases of pandemic influenza: Pandemic (H1N1) 2009 briefing note 13. http://www.who.int/csr/disease/ swineflu/notes/h1n1\_clinical\_features\_20091016/en/index.html. accessed Nov 24, 2009.
16. Temmermen M, Khosla R and Say L. World Health Organisation. Sexual and Reproductive Health and Rights: a global development, health, and human rights priority. The Lancet. Vol 384, Issue 9941, E30-31, August 2014. Available from: <https://www.who.int/reproductivehealth/publications/gender_rights/srh-rights-comment/en/>
17. Yohannan S. Impact of COVID 19 on nursing workforce. IAPH Blog. June 21, 2020.

Available from: <https://iaph2030.org/impact-of-covid-19-on-nursing-workforce/>

Cited 2020 July 8

Lancet Glob Health 2020. Published Online June 15, 2020. https://doi.org/10.1016/

S2214-109X(20)30264-3

1. Ideally both sex disaggregated (as in male, female) and gender disaggregated (as in transgender, gender minorities) data would be important. However, in most countries only sex disaggregated data is generally available. Hence references in the article are mostly about sex disaggregated data. Gender+ denotes other variables such as sexual orientation which are important to understand public health parameters. [↑](#footnote-ref-1)