

Sex and Gender Differences for Severity and Mortality from COVID-19: Rapid Evidence Synthesis for the Implication of Health Equity in Access Policies

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Abstract

To really answer questions that who will get worse from COVID-19 and the reasons why, researchers need robust data disaggregated by age, sex, race and socio-economic background. But, how the government of different countries in the world responded for COVID-19 so far was with paramount limitations. Supporting gender analysis and sex-disaggregated data are an integral part of a strong COVID-19 response. Gender blinded decisions and policies are not only worse, they are ineffective and usually fail. Severity and mortality of individuals from COVID-19 are attributable to sex and gender differences. However, many countries in the world still lack storing their sex-disaggregated data on their respective data sources. Therefore, all countries need to start storing their data independently by sex, age and even race. National policies and intervention guidelines for COVID-19 pandemic are better if prepared based on sex-centered approach. International researchers from different disciplines like, immunology are requested to intensively investigate for sex and gender specific factors.

Key words: COVID-19, Sex, Gender, severity, mortality

Introduction

To really answer questions that who will get worse from COVID-19 and the reasons why, researchers need robust data disaggregated by age, sex, race and socio-economic background. Despite this, early numbers are not encouraging for males [1].

An international organization promoting gender equality in healthcare, a Global health 50/50 search initiatives found that sex and gender based risks of COVID-19 has an inconsistent pattern throughout the country. The report suggested that there are globally an equal number of infected men and women [2-4]. In contrast, there are also clear indications in which sex and gender

have a great role in determining the severity of COVID-19 among men and women. For example, as of April 20, 2020, India, USA and the world at large have a record of more cases of women than men but, higher rate of mortality among men was recorded [5, 6].

Similarly, different descriptive and observational studies in Wuhan, China, stated that the majority of deaths from the disease recorded among men and sex was found an independent risk factor for refractory diseases [7].

Moreover, Italy, New York (which has one of the highest outbreaks of the world) and some other countries show men are more likely to be hospitalized than women [8-11]. Randomized trials also indicated male mice is found more susceptible for SARS-CoV-2 than female mice [12].

But, there are still scholars describing that delivering a personalized care is a paramount problem due to lack of knowledge how the corona virus affected women and men differently [13].

In fact, how the government of different countries in the world responded for COVID-19 so far was with paramount limitations. Supporting gender analysis and sex-disaggregated data are an integral part of a strong COVID-19 response. Gender blinded decisions and policies are not only worse, they are ineffective and usually fail. Though many countries are lacking of their gender specific data, evidences from countries reporting their sex-disaggregated data showed that men are more likely to die of COVID-19 than women [14-17]. Despite corona virus cases and deaths from many countries in the globe including Ethiopia is continuing to soar, sex and gender specific, comprehensive data with regard to the patients is not yet available.

Therefore, there should be consistent evidences that sex and gender differences greatly matters on the severity and mortality status of individuals by COVID-19. On top of this, comprehensive sex-disaggregated data is required to ensure and improve health equity. Accordingly, policies should be prioritized and drafted based on the need of individualized care.

Review objectives

To synthesis evidences on sex and gender differences for COVID-19 in terms of mortality and severity. To review the presences of global and national Sex disaggregated data.

To inform the national policy makers in developing intervention strategies based on the different needs of men and women. What evidences are there?

The process to answer who will be more risky for COVID-19 is highly challenging. Because of few countries only have sex disaggregated data. The studies conducted in different countries worldwide took their sample from the hospital, not from the sources of data surveillance team in the country as per June 11, 2020. Global health 50/50 found only 47 countries having sex disaggregated data from a total of 115 entries. Among these countries, 44 (94%) have higher male to female mortality ratio Costa Rica is the country recording the highest "male to female mortality ratio" which is nearly 8 fold of women. For most of the countries, the proportion of cases among men and women was nearly equal. For example, Costa Rica has 53% male cases which are close to females But, the death rate of males is nearly 8 fold of females.

Additionally, we tried to review few available papers to have an overview understanding of sex and gender differences as a response of COVID-19. We searched the papers mainly from goggle and PubMed databases. All the reviewed papers have a conclusion that males are more at risk of getting severe illness and death than females with the presences of equal proportion of corona virus cases.

Why males are more risky than females for COVID-19?

Sex hormones and sex chromosomes (Biological differences)

One of the sex enzymes, which bring a biological difference between male and female is an Angiotensin converting enzyme 2 (ACE 2) [18, 19]. This enzyme is found in the lung, kidney and intestine. The infections first attack the receptors of this enzyme. ACE 2 gene is mainly found in X chromosomes and suggests that females have a better protection against infections [24]. Females have two X chromosomes and this is a natural opportunity. Immune cells are more likely to be found on the X chromosomes. Hence, women have a double copy of key immune genes in their XX, compared to a single copy of XY in men [25]. Estrogen receptors in many immune cells are potentially likely to boost the immune of the women if estrogen is supplied [20].

Males also have ineffective cytokines responses which are responsible for tissue damage in the lung [21]. The natural reduction of testosterone level and older ages is associated with increased levels of cytokines This may worsen COVID-19 in older men [19].

Social and behavioural factors

Sex by itself is a contributing factor for gender roles. Studies show that men are less likely to seek care immediately after the

sign and symptoms are shown [26]. Males are typical in ignoring the issue of physical distancing. They are also less likely to wash their hands with soap than women But they are more likely to engage in a risky lifestyle behaviours. This risky behaviours like smoking, alcohol drinking are more likely to worsen the cases of COVID-19 among men [22, 26]. Underlying disease are other contributing factors for males to be at a higher risk for COVID-19 than females [23].

Ideas still controversial

These preliminary explanations in collaboration with other different sources of evidences may give potential information for the wider responsible bodies. This could influence policy makers in designing future preventive strategies against COVID-19. But, further full length studies are required to complement doubts in this arena Furthermore, there are controversies which are not explained so far. Example, the single most important factor which may leave women at risk of getting COVID-19 is their involvement at workplaces and other home based activities [21] Women make up 70% of all health and social services staff globally, but less paid Domestic and gender based violence increases during crisis [27] But, still men are more likely to die Why?

Even, to explain the case disparity based on estrogen and progesterone levels, extra information is needed. Because, menopausal women having a declined level of estrogen has still a better surviving ability from COVID-19 than men with same age.

Conclusion and recommendation

Severity and mortality of individuals from COVID-19 are attributable to sex and gender differences. Therefore, all countries need to start storing their data independently of sex, age and data specified by race and socioeconomic status if possible National policies and intervention guidelines for COID-19 are better if prepared based on sex-centred approach. International researchers from different disciplines like, immunology are requested to intensively investigate for sex and gender specific factors.

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