# Country-level gender distributions among confirmed COVID-19 cases across Sub-Saharan Africa

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***Results as of May 11, 2020***

## Purpose

To investigate trends in the male to female ratio of confirmed COVID-19 cases across Sub-Saharan Africa.

## Geography

49 countries across Sub-Saharan Africa (SSA).

## Key Take-aways

We find that there are more documented cases in male than female individuals. Approximately 62.2% of cases reported with a gender classification were male; this percentage varies widely by country and over time.

This may be the result of several intersecting factors, including social-economic risks [e.g. work outside the home], chronic comorbidity rates, care-seeking behavior, or testing and reporting biases in the healthcare system. Future work is needed to investigate and disaggregate the roles of these factors, so that interventions can be effectively targeted to address both the clinical and social factors affecting health outcomes from SARS-CoV2 infection.

## Background

To understand the role of gender in the COVID-19 outbreak and to recognize the extent to which disease outbreaks affect females and males differently, collecting and reporting country-level data is essential. Incorporating gender information into pandemic response efforts is important to improve the effectiveness of policy actions and health interventions towards positive outcomes (Wenham et al, 2020; Jin et al, 2020).

## Methods

Publicly available data were derived from country-level COVID-19 case reporting for all SSA countries reporting at least one case. Sources included situation reports and updates published by national Ministries of Health, local news outlets, and official social media (Twitter, Facebook, etc) accounts. Numbers of confirmed male and female cases were tallied from individually line-listed data, if reported, or from aggregate M:F ratios, when available. We report the gender

ratio of confirmed cases as the percentage of the total number of confirmed cases (with known gender) per country which is male.

**Findings and Outcomes**

The total number of confirmed cases as of May 11, 2020 ranged by SSA country from just 6 to 10,652 cases. 61.2% of countries reported total cases of 500 or less (Figure 1). 22.4% (11/49) of countries had a complete report of female and male confirmed cases, among which the median male gender percentage was 63.6% (range 37.5%-84.1%), or majority male (Figure 2). About half (24/49) of the countries reported the gender information for 50% of confirmed cases or more; among these countries, the median gender ratio was 62.2%. Overall, among the 49 countries, regardless of the percentage of data with unknown gender, the median value of the ratio was 62.2% and more than 73.4% (36/49) of countries have more male than female cases (Figure 2).

Not all countries report the number of males and females for confirmed cases, which makes it difficult to identify a clear pattern of M:F ratio in SSA. Mapping the percentage of cases with gender information reported which are male shows no clear spatial pattern in the region (Figure 3). However, among confirmed cases, more males were infected with COVID-19 than females in about three quarters of countries. For instance, the percentage of cases with known gender for Sudan is 100% male, however less than 1% of cases have reported gender information. Further, the percentage for Mozambique is 84.1%, with 107 confirmed cases, out of which 90 are males and 17 are females. Conversely, South Africa, with 67% of cases having gender information, has more female cases than males (the percentage male is 42.1%, Figure 2).

We evaluated the time series of percentage of males among cases with gender reports for two countries, Nigeria and Burkina Faso, as an example (Figure 4). We observe an inconsistency in the percentage of reported male cases closer to date of introduction; earlier in time, where there is a spike or trough in percentage of males, over 50% of cases have no gender information (Figure 4). This inconsistency later on is stabilized around the value of 60%-70% for these two countries.

**Interpretation**

These results emphasize the importance of understanding how males and females are affected differently by the COVID-19 pandemic at national levels, and how response measures and management policies can be designed to be more effective.

We speculate that the gender imbalance in detected COVID-19 morbidity could be a result of differences in lifestyle choices, behaviors, and other predisposing factors around exposure and disease severity between males and females.

*Differential Exposure Risk.* Males may be at increased risk of exposure to infection with SARS-CoV-2. For instance, many of the initial cases in the region were due to international travel, which is likely more common for men than women. A previous study by Skrip et al, 2020 has shown that out of reported cases within the first 30 days after the first introduction of COVID-19 to the SSA region, 77.3% were considered as imported cases, and 67% of the imported cases were male (Skrip et al, 2020).

*Differential Susceptibility.* Higher transmission settings have reported a gender imbalance in severe cases, with a higher proportion male, despite more equal proportions of males and females in overall case counts (Jin et al, 2020). Males may be more likely to develop symptomatic disease due to immunological differences (Iwasaki, 2020), as has been observed across various infectious agents (Kelin and Flanagan, 2016). Males also may be more likely to have underlying conditions, such as hypertension and diabetes, that predispose them to severe disease; although evidence in the SSA region suggests that prevalence of non-communicable diseases may be relatively equal between males and females, and obesity actually tends to be higher among females than males (Addo et al, 2007; Price et al, 2018).

*Differential Access*. If males are more likely to be symptomatic due to differential susceptibility, they will also be more likely detected in settings with relatively limited testing and capacity for active community surveillance. It could suggest that women are less likely to be tested in the absence of any or severe symptoms. Additionally, the UN Foundation has highlighted that COVID-19 may be worsening gender inequalities overall and in some places, women may be less likely to be tested due to home responsibilities or needing permission before seeking healthcare as has been seen regarding other health needs (for example: Bohren et al, 2014; Finlayson and Downe 2013).

The undetected COVID-19 cases among females could have implications for maternal and neonatal health outcomes, to reduce health impacts from COVID-19 infection during pregnancy and delivery remain. An example of this impact is a recent death of a female who contracted COVID-19 after giving birth in Nepal. This impact would be in addition to the effect of strain on health systems and the potential for reduced availability or quality of pregnancy-related care services as a result of surge in COVID-19 cases.

Overall, the pandemic is highlighting existing inequities between males and females. This is not unique to the current situation. Experience from the Ebola outbreak in 2014-16 in Africa, highlights that women were less involved than men in decision making around the outbreak,

and their needs were largely unmet (Harman, 2015). It is important to keep track of trends in detection to reveal potential differences in how males and females are being affected, and to address potential non-biological causes of any imbalances. It will be critical to equally incorporate women into detection, control and prevention operations.

**Acknowledgements**

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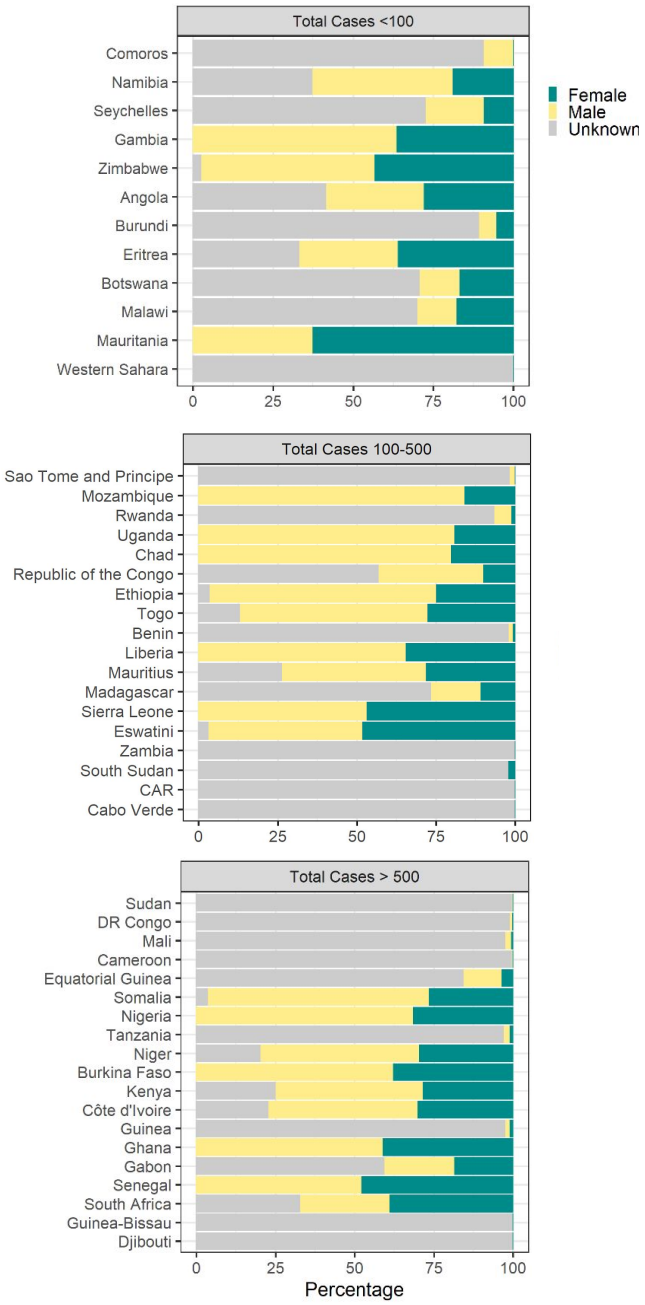

Figure 1. Percentage males and females and unknown gender cases in three groups of countries with total cases of < 100, between 100 to 500 and > 500. Within each group, countries are ranked based on the M:F ratio

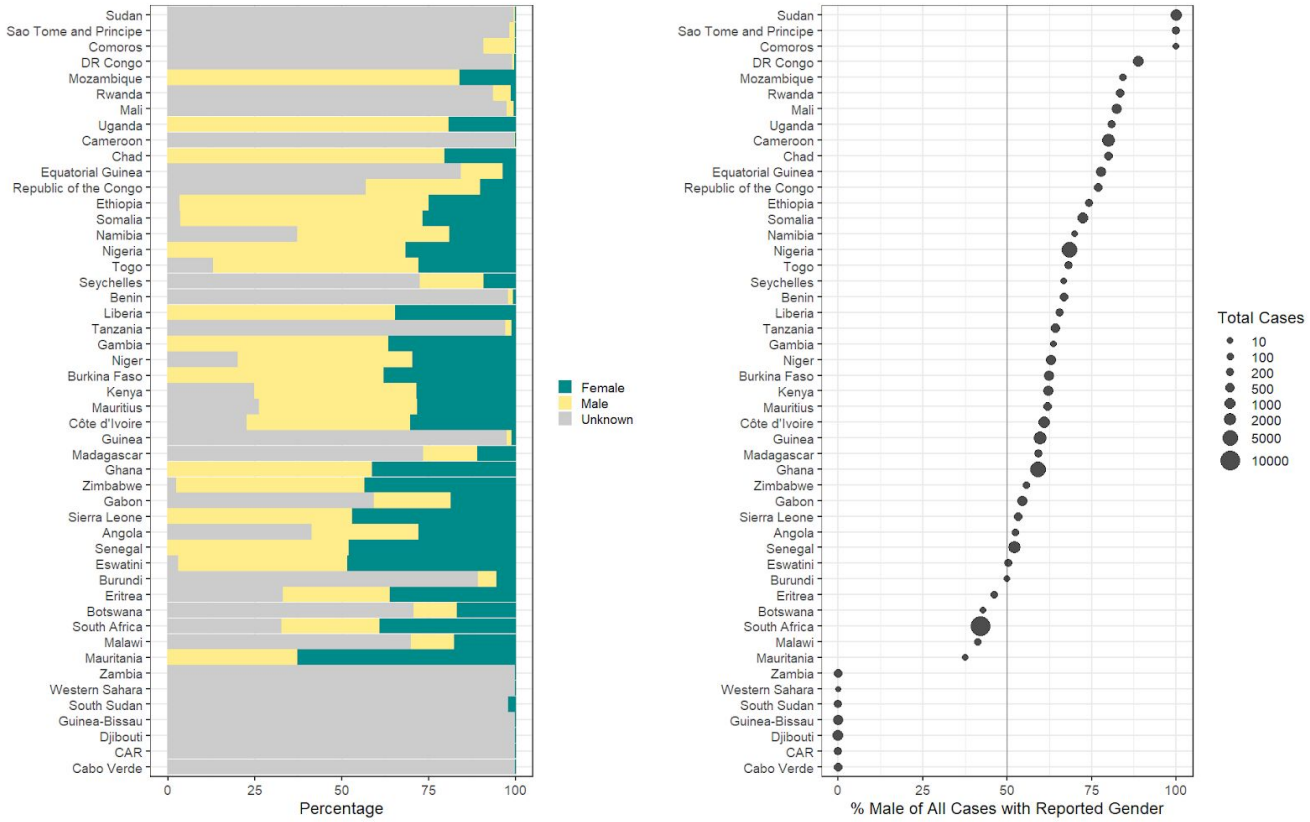


Figure 2. Left plot shows the percentage of females (green), males (yellow), and unknown gender (grey) of COVID-19 cases for all included countries. Right plot shows the percentage of cases reporting the gender field which were male, the circle size shows the total number of confirmed cases. Countries are ranked based on the percentage of cases with a reported gender that were male.

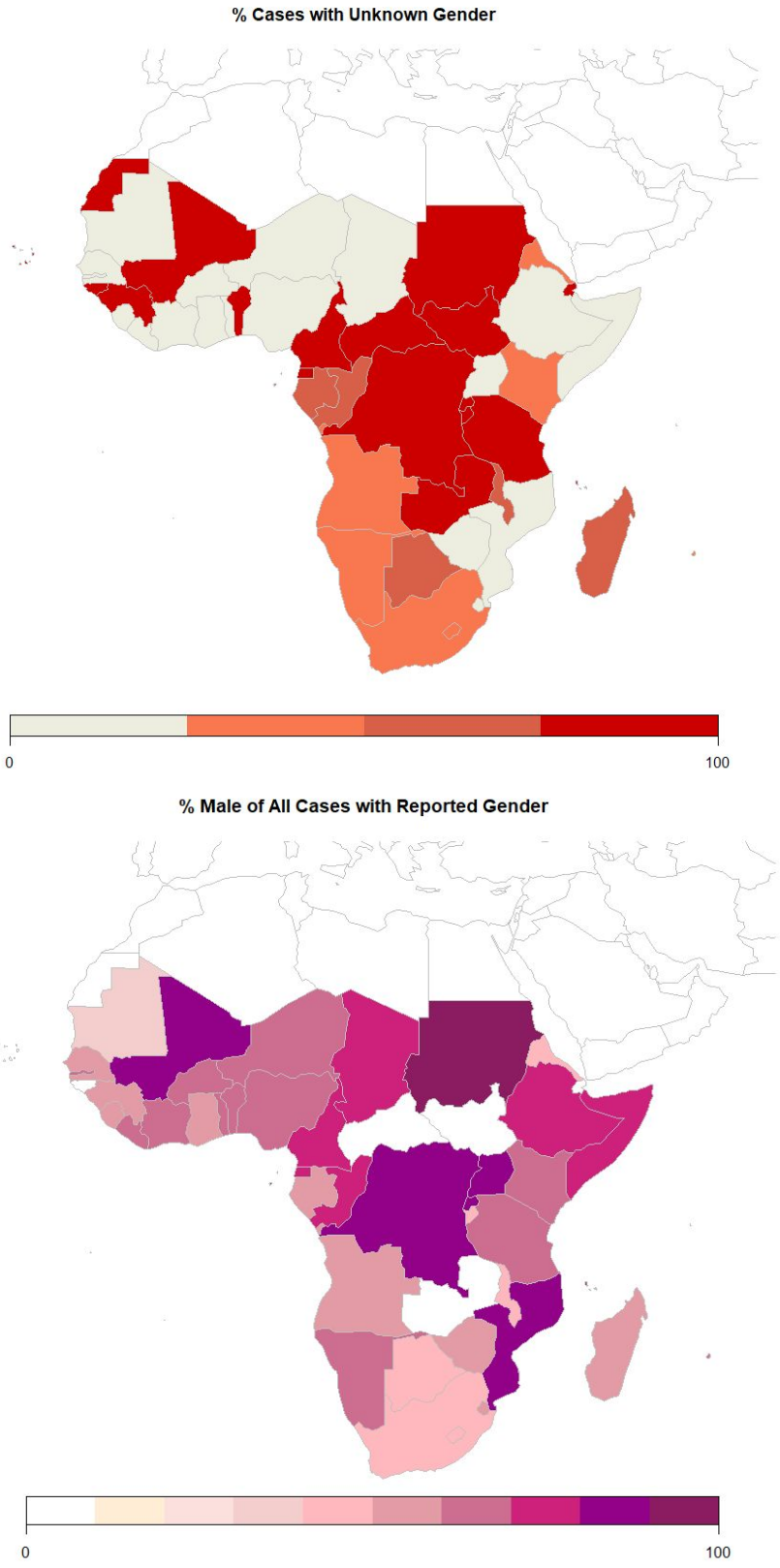


Figure 3. Upper map shows the percentage of COVID-19 confirmed cases with no gender report and the lower map shows the percentage of cases with gender reported that were male.

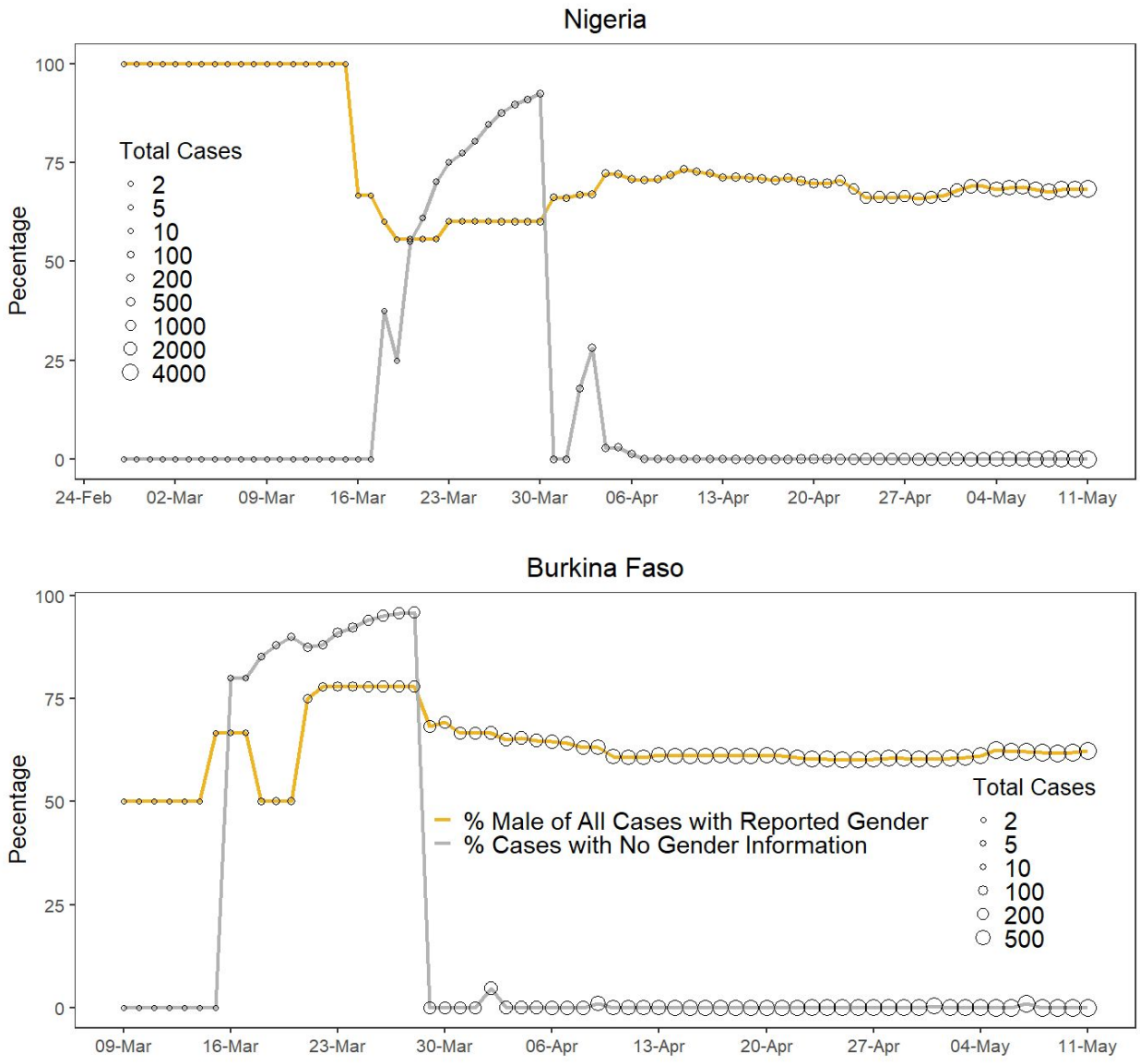


Figure 4. Time series of the percentage of cases with reported gender that were male and percentage of cases with no gender information reported for Nigeria and Burkina Faso.