

Supplement on the impact of Non-communicable diseases on COVID-19

26 April 2020

There have been numerous case reports indicating that NCDs are more common among people who have either been hospitalized or died from COVID-19. Systematic reviews have indicated that hypertension, chronic obstructive pulmonary disease, cardiovascular disease, diabetes or a history of smoking are each associated with increased risk of either severe disease or death.¹⁻⁴ While not covered in any of the systematic reviews to date, obesity has also been reported to be more common among cases, particularly in the United States.⁵

The majority of the published literature, however, has not controlled for age or other confounders, making it difficult to assess the true relationship between NCDs and COVID severity or mortality. Age is the strongest predictor of COVID mortality; it is also strongly associated with NCD prevalence. It remains unclear if NCDs are implicated as a cause of severe COVID-19, or if increased age is simply a marker for frailty and waning immune system response, and NCDs are simply “innocent bystanders”.

To date, only seven studies have included analyses that controlled for age and other factors.⁶⁻¹² All but one were in Chinese populations and four of the studies were small, with less than 200 patients. Four found that cardiovascular disease was an independent risk factor for either disease severity or death (one found that heart failure was a significant predictor but not coronary heart disease).^{6,7,10,12} One study found that hypertension was a significant predictor of severity on admission,⁸ and another that history of smoking was a predictor of disease progression.⁹ The one US-based study found that obesity, diabetes, and kidney disease were significant predictors of COVID hospitalization and obesity and diabetes significant predictors of death among those hospitalized.¹⁰

Taken together, these results are suggestive of a link between at least some NCDs and severe or fatal COVID, but results are by no means definitive. Larger, better designed studies, however, are still needed to confirm these preliminary findings.

NCDs in Africa in the context of COVID-19

The burden of non-communicable diseases (NCDs) in Sub-Saharan Africa has increased over the past 30 years. From 1990 to 2017, disability adjusted life years (DALYs) attributed to NCDs rose by 67% and the proportion of all DALYs attributed to NCDs increased from 19% to 30%.¹³ Cardiovascular disease and cancer are the two of the major NCDs, responsible for 13 and 7% of deaths in the AFRO region respectively.¹⁴ Major risk factors for these diseases have risen as well. Approximately 30% of Africans over the age of 18 years have high blood pressure.¹⁵ Estimates of diabetes prevalence range from around 6% in West, East and Central Africa to 10% in women in Southern Africa.¹⁶ Obesity prevalence in women varies locally within the region: obesity prevalence is high in Southern African women (~35%) while closer to 10% in East and Central African women and 15% in West African women. Male obesity rates are relatively lower in all sub-regions).¹⁷

Overall, the total NCD burden in Sub-Saharan Africa is lower than in other parts of the world, particularly those that have been hard hit by COVID-19 to date. For example, in Italy, Spain, the US, and China, NCDs make up around 90% of deaths.¹⁸ Diabetes rates, while rising, appear to be lower than the global average; as is obesity (except in Southern Africa).¹⁶ Much of the lower burden is due to the age

structure of the population and the continued competing burden of communicable, maternal, nutritional and neonatal disorders in Africa.

There are some indications that compared to other regions, Africans of similar ages may be at greater risk of NCDs. For instance, the WHO estimates that the risk of premature mortality due to NCDs is 21% in the WHO AFRO region compared to 18% globally;¹⁹ age-adjusted NCD mortality rates are similarly higher in African countries versus Western countries, despite the lower absolute NCD burden.²⁰ Additionally, hypertension prevalence appears to be higher at younger ages. WHO STEPS surveys in Africa since 2010 have found that between 10 and 19% of younger adults (typically ranging from 18 – 29 or 25 – 34) have hypertension compared to just 7.5% of adults 18 – 39 in the United States.^{21,22} This is particularly problematic because awareness and treatment of hypertension are very low in the region as well (27 and 18% respectively).²³ Assuming continued progress with control of maternal, nutritional, and infectious causes of disability or death, these data suggest that as the continent ages, NCD burden will compose an increasingly larger proportion of overall disease burden.

REFERENCES

1. Roncon L, Zuin M, Rigatelli G, Zuliani G. Diabetic patients with COVID-19 infection are at higher risk of ICU admission and poor short-term outcome. *J Clin Virol.* 2020;127:104354.
2. Singh AK, Gupta R, Misra A. Comorbidities in COVID-19: Outcomes in hypertensive cohort and controversies with renin angiotensin system blockers. *Diabetes Metab Syndr.* 2020;14(4):283-287.
3. Wang B, Li R, Lu Z, Huang Y. Does comorbidity increase the risk of patients with COVID-19: evidence from meta-analysis. *Aging (Albany NY).* 2020;12(7):6049-6057.
4. Zhao Q, Meng M, Kumar R, et al. The impact of COPD and smoking history on the severity of Covid-19: A systemic review and meta-analysis. *J Med Virol.* 2020.
5. Garg S, Kim L, Whitaker M, et al. Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 - COVID-NET, 14 States, March 1-30, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69(15):458-464.
6. Chen R, Liang W, Jiang M, et al. Risk factors of fatal outcome in hospitalized subjects with coronavirus disease 2019 from a nationwide analysis in China. *Chest.* 2020.
7. Du RH, Liang LR, Yang CQ, et al. Predictors of Mortality for Patients with COVID-19 Pneumonia Caused by SARS-CoV-2: A Prospective Cohort Study. *Eur Respir J.* 2020.
8. Li X, Xu S, Yu M, et al. Risk factors for severity and mortality in adult COVID-19 inpatients in Wuhan. *J Allergy Clin Immunol.* 2020.
9. Liu W, Tao ZW, Lei W, et al. Analysis of factors associated with disease outcomes in hospitalized patients with 2019 novel coronavirus disease. *Chin Med J (Engl).* 2020.
10. Petrilli CM, Jones SA, Yang J, et al. Factors associated with hospitalization and critical illness among 4,103 patients with COVID-19 disease in New York City. *Preprint: MedRxiv.* 2020.
11. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet.* 2020;395(10229):1054-1062.
12. Chen C, Chen C, Yan JT, Zhou N, Zhao JP, Wang DW. [Analysis of myocardial injury in patients with COVID-19 and association between concomitant cardiovascular diseases and severity of COVID-19]. *Zhonghua Xin Xue Guan Bing Za Zhi.* 2020;48(0):E008.

13. Gouda HN, Charlson F, Sorsdahl K, et al. Burden of non-communicable diseases in sub-Saharan Africa, 1990-2017: results from the Global Burden of Disease Study 2017. *Lancet Glob Health*. 2019;7(10):e1375-e1387.
14. Institute for Health Metrics and Evaluation. Global Health Data Exchange: GBD Results Tool. <http://ghdx.healthdata.org/gbd-results-tool>. Accessed September 22, 2019.
15. N. C. D. Risk Factor Collaboration. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19.1 million participants. *Lancet*. 2017;389(10064):37-55.
16. N. C. D. Risk Factor Collaboration - Africa Working Group. Trends in obesity and diabetes across Africa from 1980 to 2014: an analysis of pooled population-based studies. *Int J Epidemiol*. 2017;46(5):1421-1432.
17. N. C. D. Risk Factor Collaboration. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *Lancet*. 2017;390(10113):2627-2642.
18. *Noncommunicable Diseases: Country Profiles 2018*. Geneva: World Health Organization;2018.
19. World Health Organization. World Health Statistics data visualization dashboard: Non communicable diseases, 2016. <https://apps.who.int/gho/data/node.sdg.3-4-viz-1?lang=en>. Accessed April 22, 2020.
20. *Global Status Report on noncommunicable diseases* Geneva: World Health Organization;2014.
21. World Health Organization. STEPS Country Reports. <https://www.who.int/ncds/surveillance/steps/reports/en/>. Accessed April 20, 2020.
22. Fryar CD, Ostchega Y, Hales CM, Zhang G, Kruszon-Moran D. *Hypertension Prevalence and Control Among Adults: United States, 2015–2016*. Hyattsville, Maryland: National Center for Health Statistics;2017.
23. Ataklte F, Erqou S, Kaptoge S, Taye B, Echouffo-Tcheugui JB, Kengne AP. Burden of undiagnosed hypertension in sub-saharan Africa: a systematic review and meta-analysis. *Hypertension*. 2015;65(2):291-298.