Understanding the mortality impact of COVID-19 from a population-based survey in Kilifi County

Key Messages
- We conducted a survey among residents of Kilifi Health and Demographic Surveillance System to compare mortality in 2020 with historical data.
- Annual incidence of mortality among Kilifi Health and Demographic Surveillance System (KHDSS) residents was no higher in 2020 compared with previous years.
- Acute Respiratory Infection (ARI) increased between 2012 and 2016 (for reasons unknown) but no further increase was noted after 2016 and in particular no increase in 2020.
- Surveys may not detect slight increases in mortality, and further surveillance is needed as the COVID epidemic progresses.

Introduction
- The primary means of monitoring the toll of the COVID-19 pandemic has been through counts of cases and deaths.
- Kenya has data on cases and deaths, limited testing capacity leads to underestimates of case numbers and may also lead to underestimates of the death rate.
- Unreliable Civil Registration data and the negative impact of pandemic control measures on utilisation of health services further limit the accuracy of routine data for monitoring deaths.
- Population-based surveys may complement these data for determining mortality during the COVID-19 pandemic.
- Since 2000, KEMRI-Wellcome Trust Research Programme has supported a Health and Demographic and Surveillance System (KHDSS) with regular surveys to capture vital events among 300,000 residents of Kilifi County, linked to morbidity and mortality surveillance at Kilifi County Hospital.
- We have analyzed the trends in mortality and causes of death using verbal autopsy from community-based surveys in the KHDSS from 2003 to 2020 to understand the impact of the pandemic on mortality in the KHDSS community.

Findings
- The annual incidence of mortality among KHDSS residents did not increase in 2020 compared with previous years (Figures 1 and 3).
- Acute Respiratory Infection (ARI) increased between 2012 and 2016 (for reasons unknown) but no further increase was noted after 2016 and in particular no increase in 2020.
- There was an apparent reduction in deaths due to acute respiratory illness in the 5-14 age group in 2020, but the significance of this one variation among the many trends examined is unclear.
- There was no obvious change in pattern of the causes of death in any other age groups.
- Surveys from other Demographic and Surveillance platforms and population-based studies will help to validate the results of this report.
**Figure 1.** Annual mortality rates in KHDSS from 2003 – 2020 (all ages).

**Figure 2.** Stacked bar graphs of mortality fractions for leading causes of death (all ages).

ARI – acute respiratory illness

Absolute numbers of deaths are given in figures over each bar.
Figure 3. Annual mortality rates in KHDSS for seven age groups from 2003 – 2020.
ARI – acute respiratory illnesses

Absolute numbers of deaths are given in figures over each bar

**Figure 4.** Stacked bar graphs showing mortality fractions for leading causes of death by age group
Assumptions and Implications

• We have assumed that all 2020 deaths have been recorded.
• Based on observations from previous years, we anticipate a small number of unregistered deaths that occurred in 2020 to be captured in forthcoming survey rounds. However, this is not expected to alter the results that we have reported.
• Approximately 80% of all deaths are typically followed up for verbal autopsy but for 2020 verbal autopsy coverage was 60% due to increased difficulties in conducting fieldwork with COVID-related restrictions. We do not think this will affect the representativeness of the findings because of the random assignment of interviews across the KHDSS reducing the potential for selection bias.
• The KHDSS community is predominantly rural. The trends should therefore not be generalized to urban settings where the virus had spread more extensively at the time of the survey.
• Surveys from other DSSs and population-based studies will help to validate the results of this report.

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