HEALTH, MORBIDITY, AND MORTALITY WORKING GROUP: EAPS

Seasonality of mortality and uncertainty in death caused by COVID-19 disease in India

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Introduction

COVID-19 is expected to have claimed the life loss of about 1.8 million people worldwide in 2020. In many nations, seasonal/monthly fluctuations in mortality have been investigated, but not in India until recently. Seasonal mortality trends in India may differ from those in other industrialized nations. Other variables, such as regional and geographic characteristics and the significance of seasonal fluctuation in yearly mortality in India, are still being discussed. How do these variables interact to form a causal relationship? This study examines monthly death rates and their contributions to changes in e_0 and $e_0^\dagger$ in India from 2015-16 to 2019-21 to shed light on this topic.

Objective

- Examining the changes in e_0, G_0 and $e^\dagger$ from 2015-16 to 2019-21 in India.
- Assessing the age-specific percent contributions to differences in e_0 and $e^\dagger$ by sex, age groups, and months between 2015-16 to 2019-21.
- Assessing the age-specific contributions to rural-urban differentials in e_0 and $e^\dagger$ by sex, age groups, and months between 2015-16 and 2019-21.
- Assessing the age-specific contributions to male-female differentials in e_0 and $e^\dagger$ by sex, age groups, and months between 2015-16 and 2019-21.

Methods

- ASDR was computed by sex and residence in India.
- The ASDRs of India are further split by months
- we constructed abridged life tables for India using Chiang (1972) methodology.
- The life expectancy at birth (e_0) and life disparity at birth ($e_0^\dagger$) a measure of the average number of life-years lost at birth is estimated
- Decomposition analysis is used by quinquennial age groups and months to calculate the age-month specific contributions to the changes in e_0 and $e_0^\dagger$

Fig. 1: Age-Month specific contributions to the rural-urban differential in e_0, India, by sex, 2015-16.

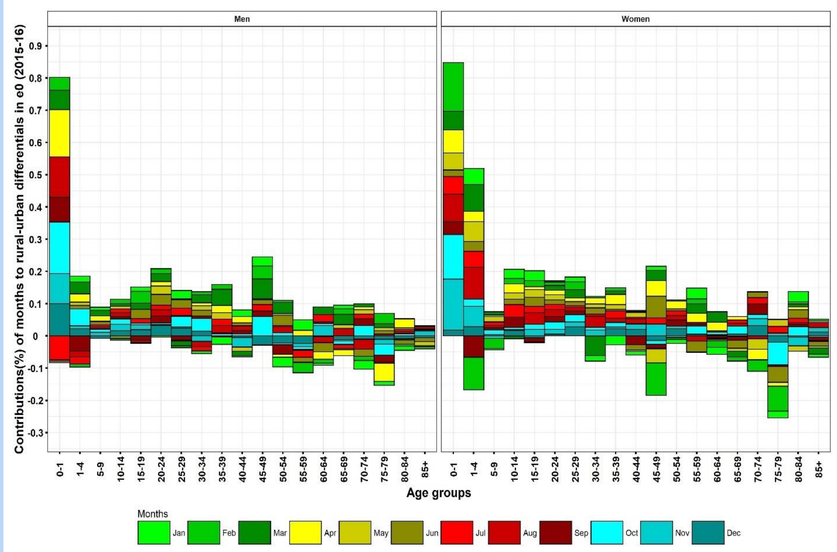


Fig. 2: Month-wise contributions to the rural-urban differential in $e^\dagger$, India, by sex, 2015-16.

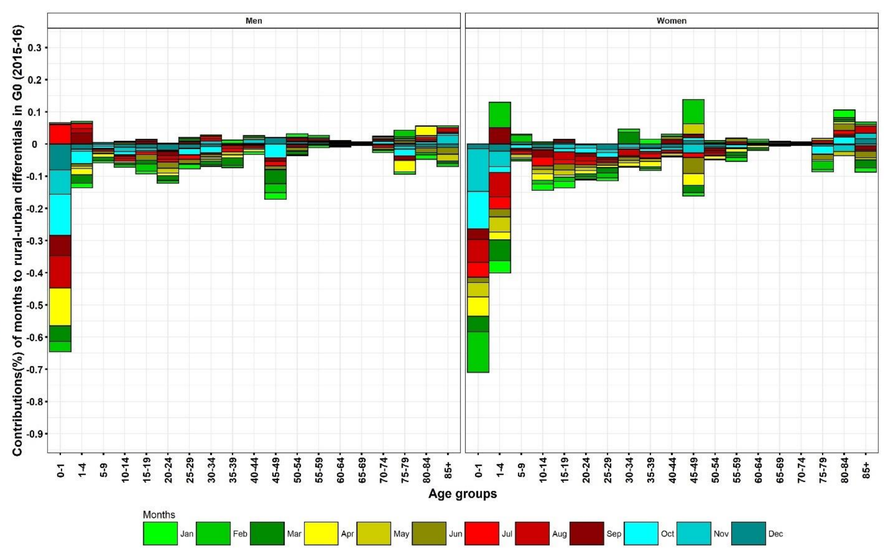


Fig. 3. Month-wise contributions to the rural-urban differential in e_0, India, by sex, 2019-21.

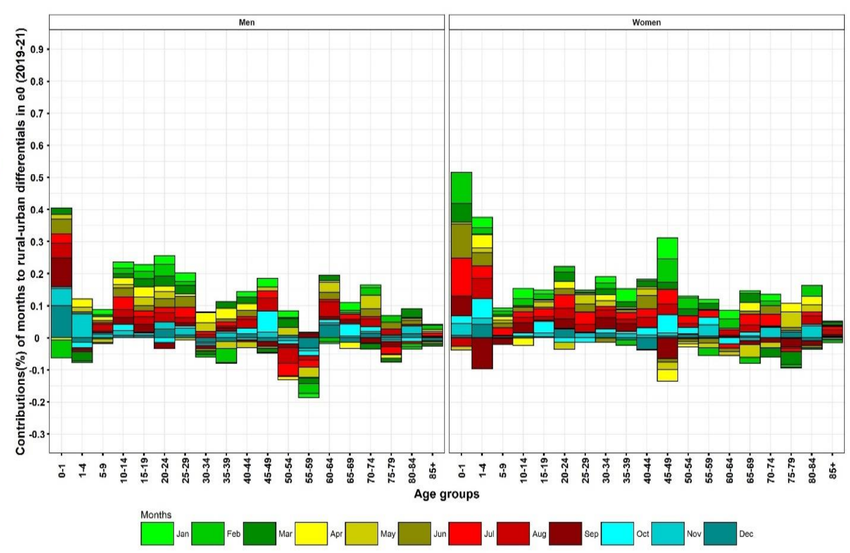


Figure 4: Month-wise contributions to the rural-urban differential in $e^\dagger$, India, by sex, 2019-21.

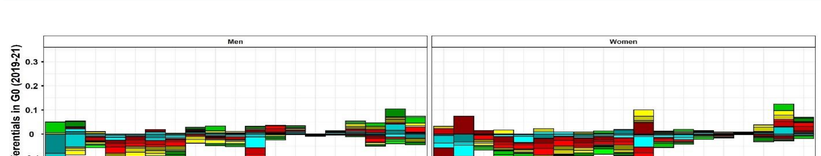


Figure 5: Month-wise contributions to sex differential in e_0, India, by residence, 2015-16

Figure 6: Month-wise contributions to sex differential in $e^\dagger$, India, by residence, 2015-16

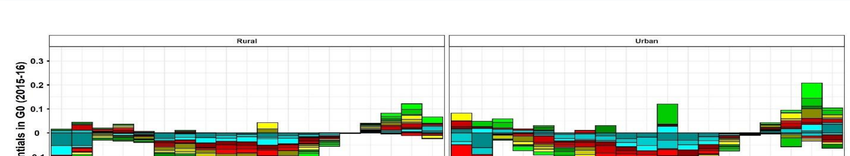


Figure 7: Month-wise contributions to sex differential in e_0, India, by residence, 2019-21

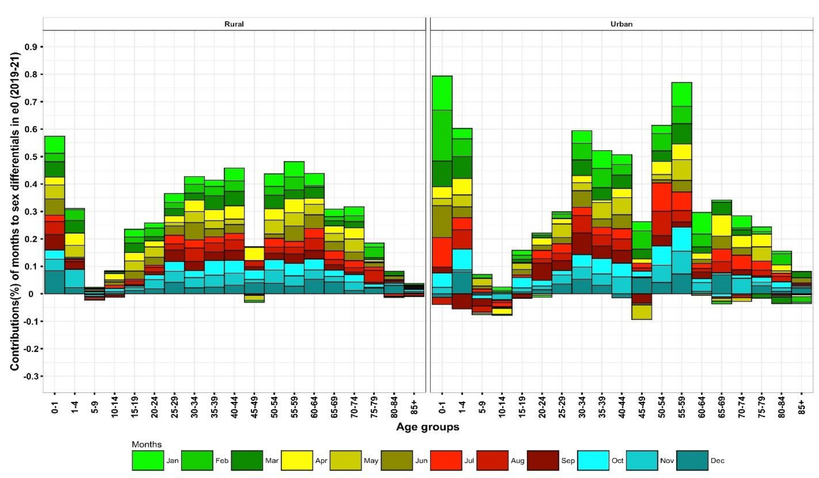


Figure 8: Month-wise contributions to sex differential in $e^\dagger$, India, by residence, 2019-21

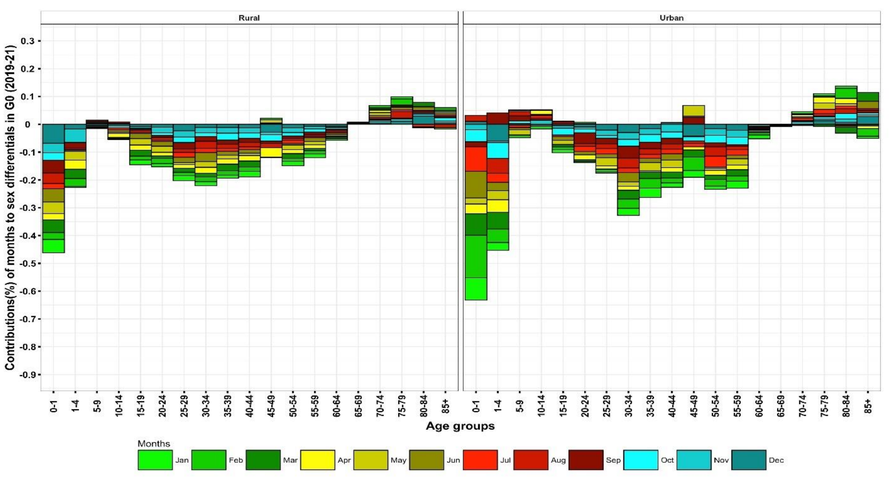


Figure 9: Month-wise contributions to differences in e_0 between 2015-16 to 2019-21, India, by residence and sex

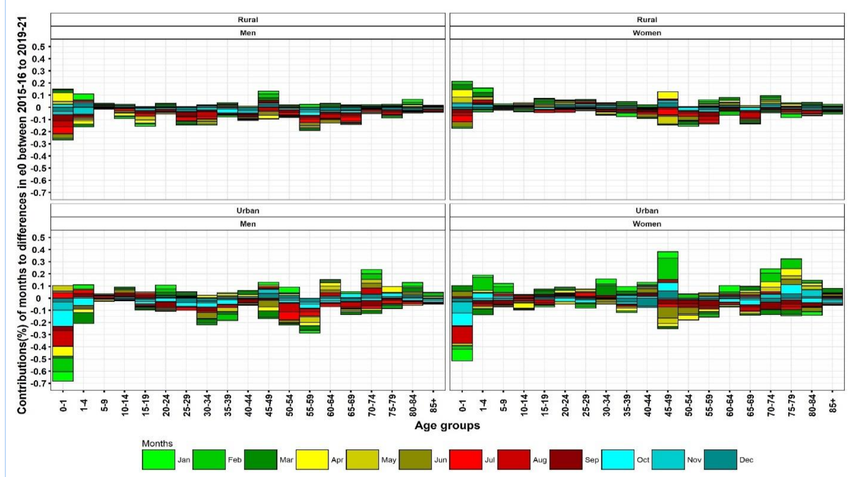
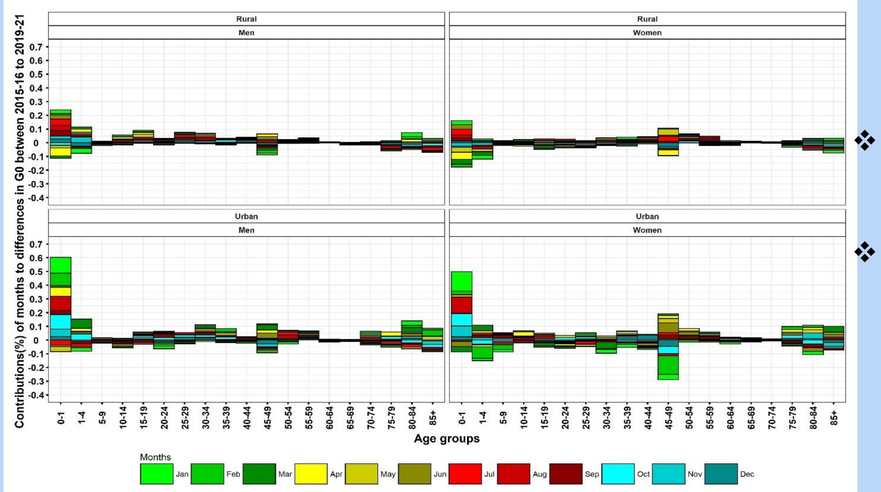


Figure 10: Month-wise contributions to differences in $e^\dagger$ between 2015-16 to 2019-21, India, by residence and sex



Results

- The findings show that the largest Age-month specific contributions to the rural-urban differentials in e_0 and $e_0^\dagger$ in the early and young-adult age group were contributed during the first and fourth quarters for India as a whole in the year 2015-16 (Figure1 & Figure2).
- In the year 2019-21, early and young adult age-group are contributed through the first and third quarters for India as a whole for rural-urban differentials in e_0 and $e_0^\dagger$ (Figure3 & Figure4).
- The age-month specific contributions to sex differentials in e_0 and $e_0^\dagger$ show that middle and older adult age groups in rural and urban areas make significant contributions indicating more deaths in men than in women every month in 2015-16. The sex differential in e_0 is stronger in rural areas than in urban areas. Other than old-adult and middle-age groups, rural regions exhibited little contributions throughout 2015-16 (Figure 5 & Figure 6).
- In the year 2019-21, age-month specific contributions to sex differentials in e_0 and $e_0^\dagger$ for rural and urban areas in India depict that the middle age group made significant contributions in the first and fourth quarters, followed by the second and third quarters; the older adult age group made larger contributions in the fourth and second quarters. In rural areas, sex differentials in e_0 and $e^\dagger$ are greater than in urban areas. Rural regions contribute little throughout the year except for older adults and middle-aged groups (Figure 7 & Figure 8).
- Between 2015-16 to 2019-21, age-month specific contributions to differentials in e_0 show a considerable difference in e0 for both males and females in rural and urban areas, as the age-specific contributions are negative across most age groups. The negative age-month specific contributions show more deaths across most age groups each month during the current year, 2019-21, compared to the base year 2015-16 (Figure 9)
- Similarly, between 2015-16 and 2019-21, age-month specific contributions to differentials in $e_0^\dagger$ show a considerable difference in $e^\dagger$ for both males and females in rural and urban areas, as the age-specific contributions are positive across most age groups. The positive age-month specific contributions show more deaths across most age groups each month during the current year, 2019-21, compared to the base year 2015-16 (Figure 10).