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Levels, Spatial and Temporal Variations, and Associated Factors of Twin Excess Mortality From Ages 0–5 in Sub-Saharan Africa: Analyses of National Surveys From 42 Countries

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1- INTRODUCTION & CONTEXT

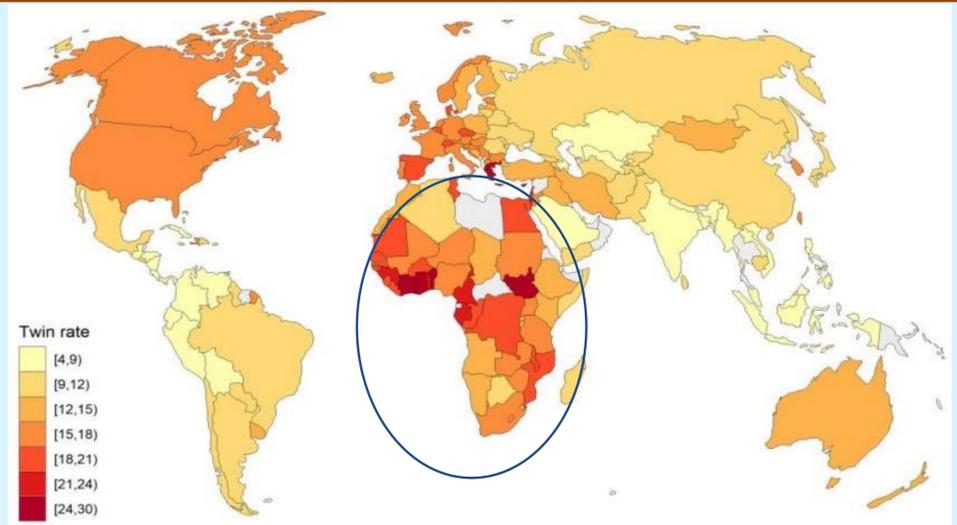
Twin births may be a public health problem: they are more fragile and have higher mortality risk than singletons, at least before the age of 5.

In SSA, the health of twin births is of greater concern:

- area with the highest twinning rate: 17.5‰ in 2016 (Ouedraogo, 2020), while the world average was 12‰ (Monden et al., 2021);
- there, child mortality is already higher than elsewhere in the world: in 2017, half of all under-5 deaths worldwide occurred SSA (WHO, 2018); 10% of these deaths were twins (Monden & Smits, 2017).

While studies on under-5 excess mortality among twins in SSA exist, few have examined its evolution over time. This research aims to:

- study the trend of twins' excess mortality (1986-2016);
- study the variation in under-5 excess mortality of twins over age;
- analyse the factors of excess mortality among twins.



2- DATA

The data used in our research are from national surveys, specifically Demographic and Health Surveys (DHS, www.dhsprogram.com), and Multiple Indicator Cluster Surveys (MICS, www.mics.unicef.org):

- these are large surveys with national coverage, and they are carried out around the world;
- we used data from **156 national surveys from 42 countries** conducted between 1986 and 2016;
- data includes 2,425,072 children of which 3.47% (84,047) were born from twin pregnancies and 0.06% (1,491) are triplets or more;
- overall, 11% of the children died before the age of 5, of these 12% among singletons and 29% among twins.

3- METHODS

We estimated under-5 mortality rates (U5MRs) compared between twins and single children:

- using a method proposed by Measure DHS: U5MR is obtained by combining the death probabilities from age intervals (months) 0-1, 1-2, 3-5, 6-11, 12-23, 24-35, 36-47 and 48-59;
- **SSA-aggregated level:** estimation of U5MRs for 1990s, 2000s and 2010s; then we used the actuarial life table method to build age-specific mortality curves (0 to 5 years of age);
- **country level:** U5MR by survey.

We used a Cox regression to analyse the factors associated with excess mortality among twins.

4- KEY FINDINGS

Result 1: A decrease in mortality rates

U5MRs fell considerably in SSA between 1986 et 2016, among both singletons and twins (Fig.1. & Fig.2.). But, the ratio between twins' U5MR and that of singletons (i.e., twins' excess mortality) increased from 2.3 (CI=2.2 - 2.4) in 1990s to 2.8 (CI=2.7 - 2.9) in 2010s (Fig.2.).

Fig.1. Spatial and temporal variations in U5MR in sub-Saharan African countries

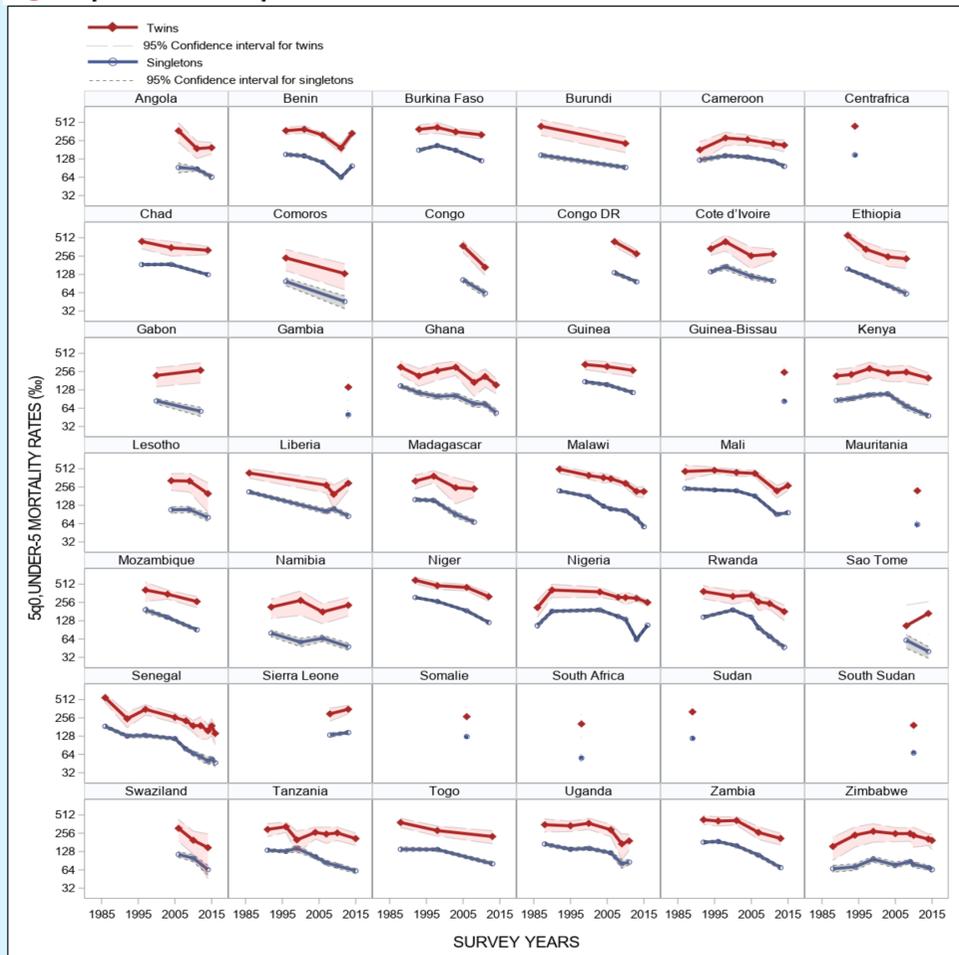
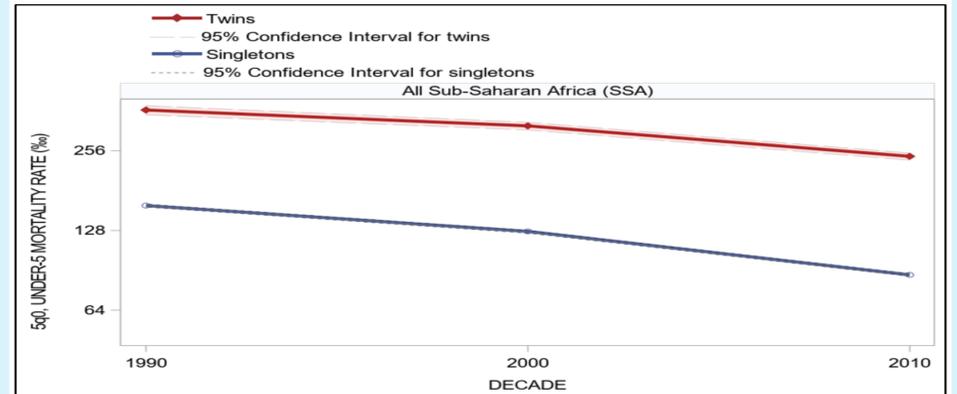
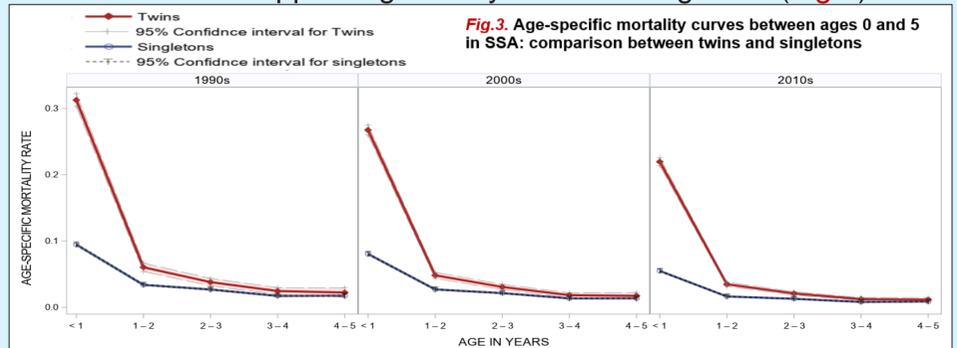


Fig.2. Change from 1990s to 2010s in U5MR in SSA - aggregated data from 42 countries



Result 2: Decline in excess twin mortality with age

- The difference in mortality rates between twins and singletons is very large during the first year of life.
- But it's rapidly reduced by age: after the age of 2, it will be very small without disappearing entirely before the age of 5 (Fig.3).



Result 3: Factors of excess mortality among twins

- All else being equal, the adjusted Hazard Ratio (HR) of twins is 3.2 times higher (2.9-3.3; $p < 0.001$) than that of singletons.
- Main factors associated with excess mortality risks among twins are a set of biomedical and nutritional variables: low birthweight, non-caesarean delivery, few antenatal visits, non-breastfeeding.

5- CONCLUSION

- **Under-5 mortality rate decreased significantly in sub-Saharan African countries (1986 to 2016).** But, this decrease is relatively greater among singletons than among twins.
- **Biomedical and nutritional variables group** in general, and the non-breastfeeding and the non-caesarean delivery in particular, are the **main factors associated with higher mortality risks among twins** than singletons.

6- REFERENCES

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