

#### The Excess Mortality of Twins Compared to Singletons From Birth to Age 5 in Sub-Saharan Africa: Analysis of Health and Demographic Surveillance Systems (HDSS) Data

Adama Ouédraogo, Gilles Pison, Abdramane Soura, Sophie Le Coeur, Valérie Delaunay, Ane Fisker, Kassoum Dianou

#### ▶ To cite this version:

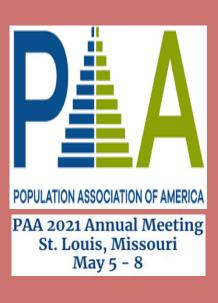
Adama Ouédraogo, Gilles Pison, Abdramane Soura, Sophie Le Coeur, Valérie Delaunay, et al.. The Excess Mortality of Twins Compared to Singletons From Birth to Age 5 in Sub-Saharan Africa: Analysis of Health and Demographic Surveillance Systems (HDSS) Data. Population Association of America (PAA) Annual Meeting, May 2021, St. Louis, Missouri (Virtual), United States. , 2021. hal-03243685

HAL Id: hal-03243685

https://hal.science/hal-03243685

Submitted on 31 May 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# THE EXCESS MORTALITY OF TWINS COMPARED TO SINGLETONS FROM BIRTH TO AGE 5 IN SUB-SAHARAN AFRICA (SSA) Analysis of Health and Demographic Surveillance Systems (HDSS) Data

Adama OUEDRAOGO ab, Gilles PISON ac, Abdramane B. SOURA d, Sophie LE CŒUR a, Valerie DELAUNAY e, Ane FISKER f and Kassoum DIANOU d

<sup>a</sup> The French Institute for Demographic Studies (INED), France | <sup>b</sup> Paris 1 Panthéon-Sorbonne University, France | <sup>c</sup> The French Museum of Natural History (MNHN), France | <sup>d</sup> Higher Institute of Population Studies of the University of Ouagadougou (ISSP), Burkina Faso | <sup>e</sup> The French National Research Institute for Sustainable Development (IRD) | <sup>f</sup> University of Southern Denmark | Email: adama.ouedraogo@univ-paris1.fr

Data from 2 HDSSs

vere not suitable for

survival analysis

Limited number of co

variables: 3 HDSSs

excluded

# ined ( ) INSTITUT NATIONAL D'ÉTUDES DÉMOGRAPHIQUES

Data acquired directly from the

HDSSs: 6 HDSSs

Survival curves on factors

associated with excess twin

mortality: 4 HDSSs

Cox regression on factors

associated with twin excess

nortality: only Bandim's HDSS









## 1- INTRODUCTION & CONTEXT

This research follows on from a previous study we did on the excess mortality of twins in **SSA**, using national surveys (Ouedraogo et al., 2021). The issue was that of **excess twin mortality**, universally known, but which is more worrying in SSA for several reasons:

- It's the area with the highest twinning rate: around 17.5‰ in 2016 (Ouedraogo, 2020);
- child mortality is there higher than anywhere else.

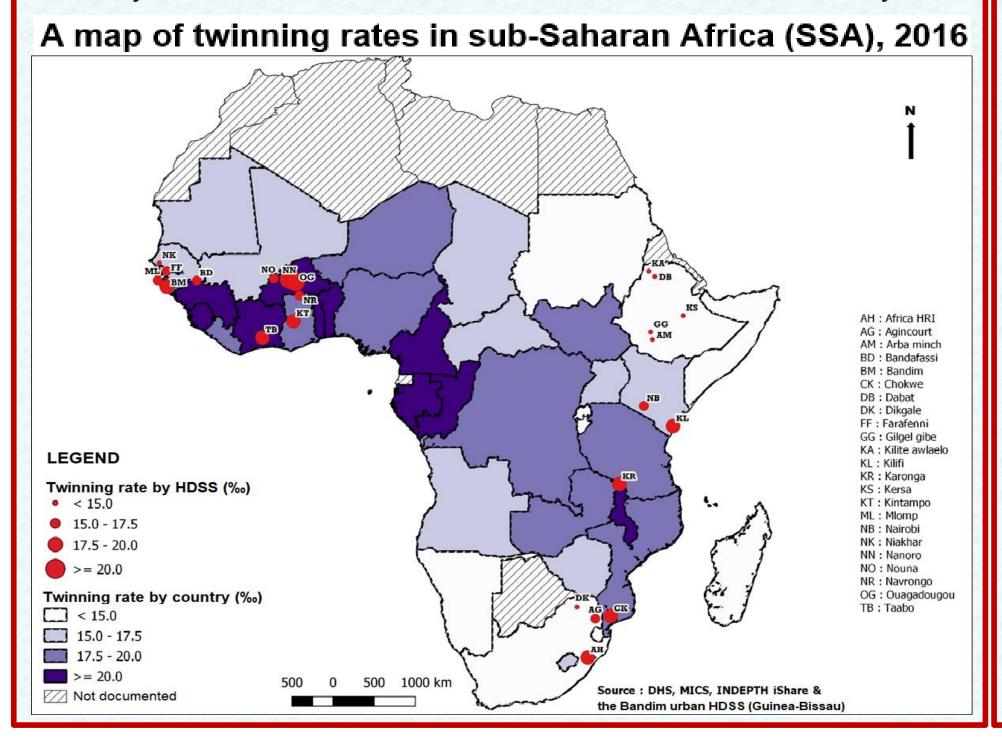
SSA context is also one of **imperfect data**: national surveys are less reliable (accuracy of: birth dates, age at death, etc.) and civil registration is weak.

Here we decided to use **HDSS** data (considered to be of better quality) to confirm and complete the previous findings (from national surveys). An HDSS is a data collection system that consists in a long-term prospective follow-up of the entire population of an area.

However, HDSSs are not nationally representative and do not cover the whole of SSA. But they are sufficiently diverse to illustrate heterogeneous contexts and convergence at the continental level (Bocquier et al. 2019).

#### This research aims to:

- estimate comparative survival curves of twins and singletons (0-5 years old) over the period 2010 – 2014;
- analyse their evolution over time (1995-2014);
- study the factors associated with twin excess mortality.



#### 2- DATA & METHODS

Data used are those of the 21 HDSSs of the INDEPTH network (International Network for the Demographic Evaluation of Population and Their Health). They come from two sources: INDEPTH iShare online data (<a href="https://www.indepth-ishare.org/">https://www.indepth-ishare.org/</a>) (A) and data obtained directly from some HDSSs (B).

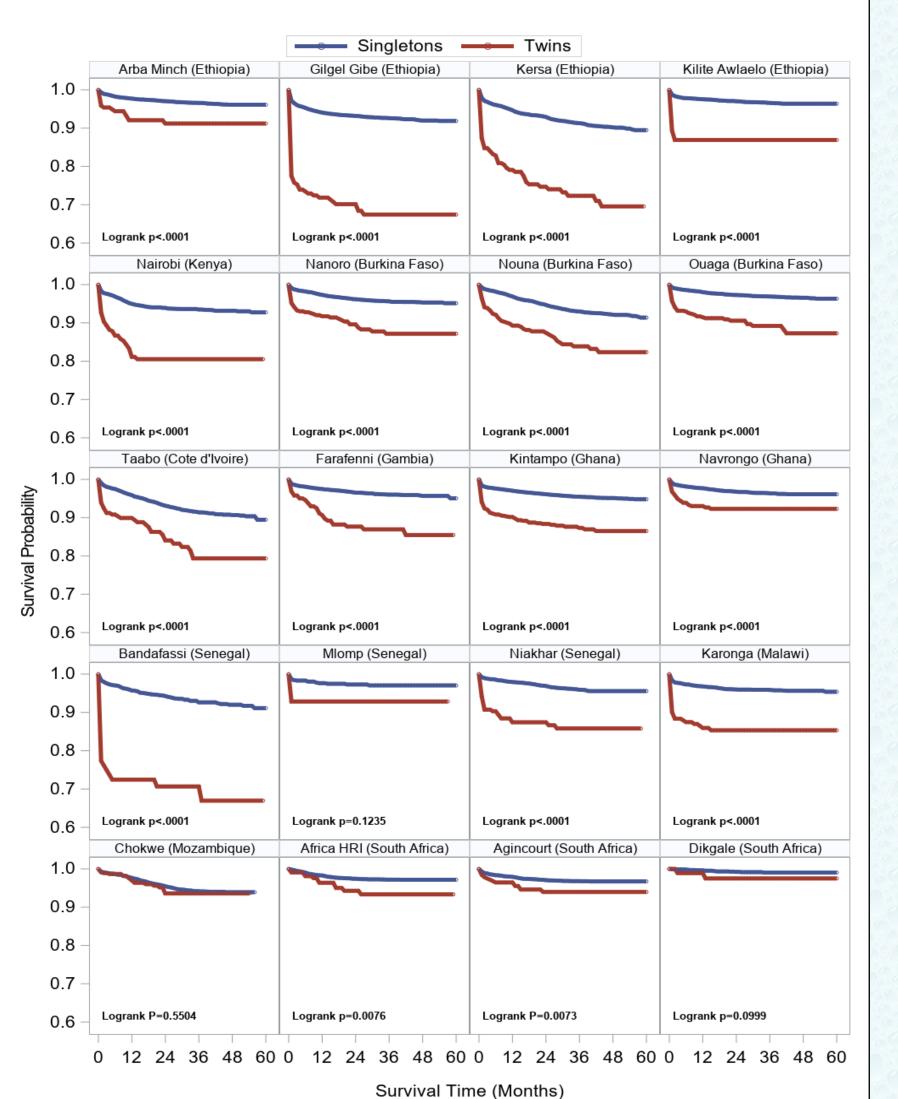
The HDSS data are longitudinal, so we used survival analysis methods to study them:

- actuarial life table method to build survival curves.
- Cox regression to analyse the factors associated with excess mortality among twins.

## 3- KEY FINDINGS

Result 1: twin children have significantly lower survival probability than non-twin children in SSA according to HDSSs data (2010-2014)

Survival curves from 0 to 5 years old for twins and singletons from 20 HDSSs in Sub-Saharan Africa (period: 2010- 2014)



# Result 2: an increase in the survival probability of children over time (1995-2014)

Data analysis plan

Sub-Saharan African

HDSSs members of the

INDEPTH network: 37

Data uploaded from

INDEPTH iShare: 27

Estimation of under 5

survival curves (period: 2010 - 2014): 20 HDSSs

Evolution of survival

curves from 1995 to 2014

only the 6 oldest HDSSs

10 Sub-Saharan

frican HDSSs had no

data on iShare

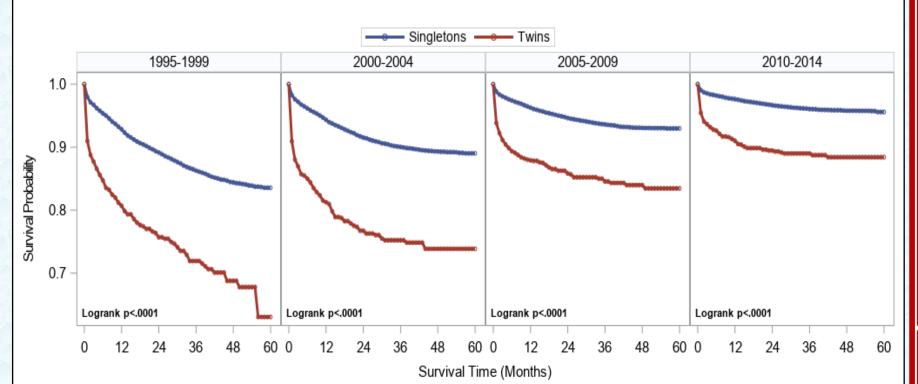
Low data quality: 7

HDSSs were excluded

4 recent HDSSs have

been excluded

Survival curves from 0 to 5 years old for twins and singletons in 6 oldest HDSSs in SSA - aggregate change between 1995 and 2014



Result 3: a set of biomedical variables (low birthweight, preterm births and home delivery) are main factors associated with excess mortality risks among twins (in Bandim HDSS)

Variables				Adjusted Hazard Ratio (HR)					
	Unadjusted Hazard Ratio		By biomedical co- variables		By biomedical and demographic co- variables		By biomedical, demographic and socio-cultural co- variables		
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% C	
[winship	7 [					_	TI.		
Twin				1.15-1.57	1.43 ***		1,42 ***	1,22-1,66	
Singleton		Ref		Ref		Ref		Ref	
Preterm birth		į.		D C	II .	D C		D C	
No	_			Ref	2 40 444	Ref		Ref	
Yes			3.33 ***	2.70-4.10	3.40 ***	2.72-4.21	3,50 ***	2,80-4,35	
Birthweight	1.4	1		D-£		D-f	1	D of	
« Normal » birthweig	nt			Ref 1.84–2.25	2 00 ***	Ref	2.01 ***	Ref	
Low birthweight		1	Z.U4 ***	11.84-2.23	L-00 ***	1.82-2.22	∠,U1 ***	1,82-2,23	
Place of delivery			1 24 **	1.05 1.50	1.10	0.00 1.00	1.00	0.01 1.00	
Home		1	1.24 **	1.05-1.50	1.10	0.92-1.30	1,08	0,91-1,30	
Health Service	-	:		Ref		Ref	1	Ref	
Sex of child	_								
Male	-				1.14 ***	1.06-1.23	1.13 **	1,05-1,22	
Female	_					Ref		Ref	
Maternal age	-					1.04.1.04	1.10+	1.00.100	
<20 years old	_				1.14 **	1.04-1.24	1.12 *	1,02-1,22	
20-39 years old	-				1.20	Ref		Ref	
>=40 years old	_				1.20	0.95-1.55	1.21	0,94-1,55	
Year of birth Year of birth	-				0.956 ***	0.95-0.961	0.955 ***	0,95-0,96	
Mother's education					0.930	0.93-0.901	0.933	0.95-0.90	
Formal education							32	Ref	
None							1.74 ***	1.42-2.13	
Mother's ethnicity								12.12.2.2.	
Balanta							0.98	0.80-1.21	
Mancanha							0.92	0.75-1.13	
Mandinga								Ref	
Mandjaco							1.20 *	1.00-1.44	
Papel							1.21 *	1.02-1.43	
Fulani							0.88	0.73-1.06	
FILIATII	-11	l l			II		0.00	0.75 1.00	

### 4- CONCLUSION

Our results from 21 HDSSs in SSA confirm that twin children have significantly lower survival probability than non-twin children.

We also found a significant increase in survival probability over time (1995-2014) for both twins and singletons in these HDSSs.

Our results show an important role played by low birthweight, preterm births and home delivery in explaining the excess mortality of twins. However socio-demographic factors such as child gender, maternal age, and mother's ethnicity should be taken into account, even if they play a less important role.

Our findings are in line with those found by using national survey data (Ouedraogo et al., 2021).

#### 5- REFERENCES

- Ouedraogo, A., Pison, G., Le Cœur, S., & Soura, A. "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". Poster presentation at the Population Association of America annual meeting, May 5-8, 2021.
- Ouedraogo, A. (2020). Démographie et santé des jumeaux en Afrique subsaharienne. [Thèse]. Paris: Université Paris 1 Panthéon Sorbonne.
- Bocquier, P., Ginsburg, C., Menashe-Oren,
  A., Compaoré, Y., & Collinson, M.: "The
  Crucial Role of Siblings on Child Survival:
  Evidence from 29 Health and Demographic
  Surveillance Systems in sub-Saharan
  Africa". Presentation at the 8th African
  Population Conference, Entebbe, Uganda,
  18-22 November 2019.