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Stories of Change: Rwanda

UNDERSTANDING THE DRIVERS OF STUNTING REDUCTION AMONG
RWANDAN CHILDREN FROM 2005 TO 2015

Gayathri V. RAMANI, Jessica M. HECKERT, Ara GO, Elyse IRUHIRIYE,
Emmanuel NIYONGIRA, and Deanna K. OLNEY

INTRODUCTION

Despite significant progress, childhood stunting is still a serious public health concern in Rwanda. To make further progress in reducing child stunting it is essential to understand the context-specific drivers of stunting to devise strategies to address these causes. The primary objective of this study was to assess the drivers of change in stunting reduction among children 0-59 months of age between 2005 and 2015 in Rwanda.

METHODS

For this study, we used Demographic Health Survey (DHS) data from 2005, 2010, and 2014/15. DHS is nationally representative and consists of a wide range of data including children's anthropometric measures as well as factors known to be associated with children's health and nutritional status [1-3].

Our main outcome of interest was stunting (height-for-age Z-score, or HAZ < -2 standard deviations) among children 0-59 months. The predictors of change were chosen based on their known and hypothesized relationships with stunting and their availability in the DHS data. Household level factors included variables such as household wealth, father's education and access to improved water and sanitation facilities. Mother-level factors included height, education, age at childbirth, number of antenatal care (ANC) visits received, quality of ANC, and number of live births. Finally, child-level factors included sex of the child, insurance coverage, and whether the child was born in a medical facility.

The first step in the analysis was to assess the mean for the different indicators to be included in the analyses at each time point (2005, 2010, 2015) and to examine the trends over time in those indicators. The next step was to estimate the relationships between the hypothesized drivers of change and stunting at each time point and for a combined model including all three time points using regression modelling. Additionally, we ran tests to assess whether the relationships between each factor and the outcome variables were significantly different across the three waves of data. Differences across the years were minimal and thus we used the results from the combined model to represent the relationships between the predictor variables and stunting. The final stage in the analysis was to decompose each factor that was estimated to have a significant effect on the outcome variable. This decomposition technique measures the relative contribution that each factor makes in explaining the actual change in the outcome variable. The four-step approach outlined above is known as the regression-decomposition approach and it was previously applied in several South Asian and sub-Saharan African countries [4-7].

RESULTS

Child stunting declined from 51.6% in 2005 to 37.9% in 2015 (**Table 1**). During this time period, insurance and vaccination coverage increased, as did the proportion of mothers who gave birth in a medical facility rather than at home, and who had four or more antenatal care visits. By 2015, Rwandan women were also having fewer children and birth spacing had increased. Lastly, this decade saw improvements in household wealth and both paternal and maternal education.

Table 1. Sample characteristics for decomposition of change in stunting (height-for-age Z-score < -2 standard deviations) of children 0-59 months

	Sample size	2005	2010	2015
Outcome variable				
Stunting	9,907	51.6%	44.3%	37.9%
Household-level factors				
Asset score (0-10)	9,907	0.4	0.5	0.9
Partner's education (y)	9,907	4.3	4.2	4.7
Improved water source	9,907	41.5%	33.8%	37.2%
Improved toilet	9,907	97.0%	98.3%	95.8%
Mother-level factors				
Education (y)	9,907	3.8	3.8	4.5
Attended 4+ ANC visits	9,907	21.4%	34.0%	38.2%
Number of children ever born	9,907	4.5	3.9	3.4
Height (cm)	9,907	157.4	156.8	157.1
Age at birth of child < 20 years	9,907	3.8%	4.2%	4.8%
Age at birth of child > 39 years	9,907	9.1%	6.7%	5.2%
Child-level factors				
Born in medical facility	9,907	27.6%	70.8%	92.1%
Birth interval <24 mo	9,907	18.7%	16.1%	10.7%
Insurance coverage	9,907	46.3%	66.7%	65.7%
Village-level factors				
ANC quality (0-5)	9,907	1.3	3.5	4.0
Vaccination coverage (0-1)	9,907	79%	89%	92%
Open defecation (0-1)	9,907	3.4%	1.3%	3.4%

Source: Authors' calculations from Rwanda DHS

The decomposition analysis revealed that of the factors for which we had data, maternal health factors contributed the most to the decline in child stunting (**Figure 1**). This included the quality of ANC visits received (59%), giving birth at a health facility (18%), and fertility factors such as the total number of children a woman had (6%). At the household level, household wealth (10%) and parental education (4%) were also associated with stunting reduction. Access to improved toilets accounted for a 1% change in stunting between 2005 and 2010. Among the child-level factors, only insurance coverage (4%) was related to the decline in stunting. There was no significant effect of open defecation on stunting. We ran an identical decomposition analysis using child HAZ as the outcome of interest. The results were similar to that of stunting, with additional factors of four or more ANC visits and birth spacing contributing to 3% and 1% of the improvements in HAZ between 2005 and 2015, respectively.

Figure 1. Decomposition of the drivers of change in stunting for children 0-59 months
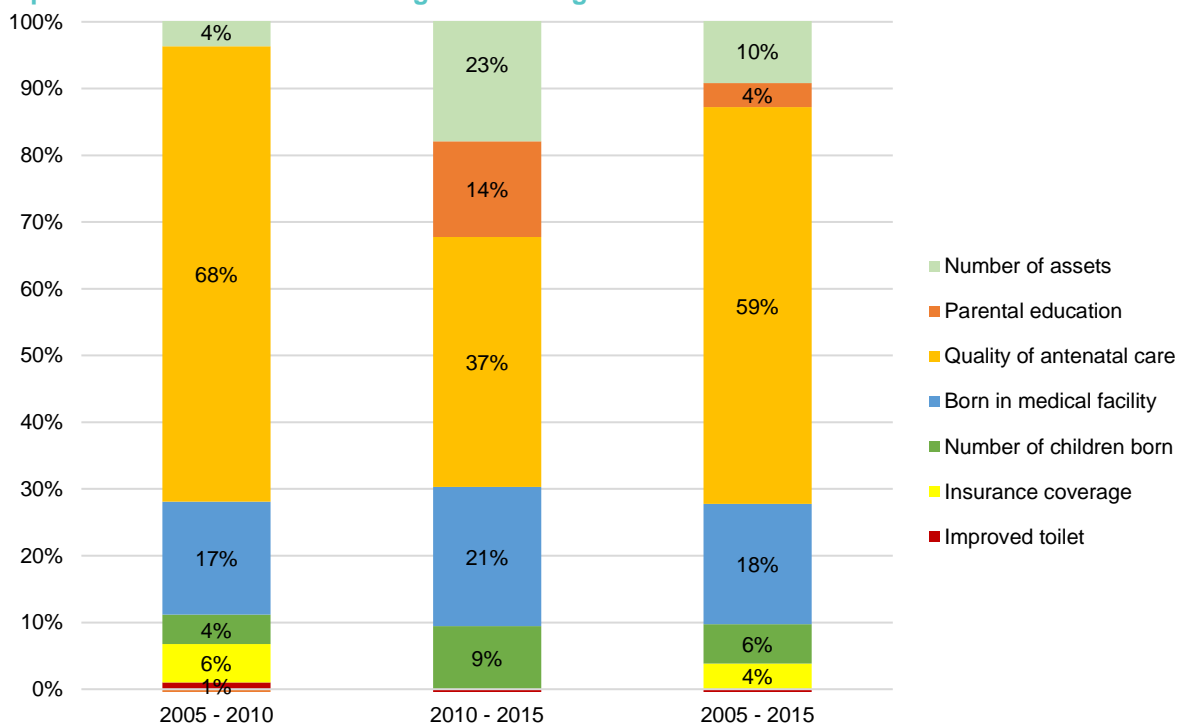
CONCLUSION

Using decomposition analysis, we assessed the relative contribution of household, mother and child-level factors that were significantly associated with the decline in stunting observed in Rwanda between 2005 and 2015. Based on this analysis, the quality of antenatal care and giving birth in a medical facility were the strongest predictors of the improvement in stunting seen across the decade. This study also found that asset accumulation, parental education, insurance coverage, and fertility factors contributed to the improvements in stunting seen between 2005 and 2015.

The results related to antenatal care highlight the importance of quality of care provided. This adds to the current literature that already highlights antenatal care as an important driver of nutritional success [7]. For policy makers and other stakeholders, this result is important as it offers evidence to support more interventions that seek to improve the quality of services being provided to the mothers during their antenatal visits. It is possible the quality of health care for children in infancy and early childhood are equally important, however, we did not have adequate data to assess this. Unlike other studies conducted in South Asian countries [7], we found no relationship between open defecation and stunting in Rwanda. This is likely due to the very low prevalence of open defecation in the country.

An important limitation of this study to note, however, is the lack of available data on several other factors known to be associated with child stunting such as infant and young child feeding practices, disease prevalence, quality of preventive and curative care for children and household-level food security (food consumption, expenditure, etc.), among others.

The results of this quantitative analysis have been combined with the qualitative data to draw conclusions as to what likely led to the changes seen in stunting between 2005 and 2015 and to make recommendations as to what can be done in the future to further improve HAZ scores and further reduce stunting [8,9].

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About the Authors

Gayathri V. Ramani is a Research Analyst, **Jessica M. Heckert** is a Research Fellow, and **Ara Go** is a Program Manager at the International Food Policy Research Institute (IFPRI); **Elyse Iruhiriye** is a PhD Candidate at the University of South Carolina; **Emmanuel Niyongira** is the Country Project Manager for Voice for Change Partnership at SNV Rwanda; and **Deanna K. Olney** is a Senior Research Fellow and Theme Leader for Nutrition-Sensitive Programs at IFPRI. This brief has been prepared based on the Stories of Change Rwanda Final Report (Iruhiriye et al. Forthcoming 2019a). Another brief summarizing the overall results of this report is also available (Iruhiriye et al. Forthcoming 2019b).

Acknowledgements

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