Trends of Socioeconomic Disparities in the Kenyan Child Malnutrition Statistics:

An Analysis of the Demographic and Health Survey

Okutse A. O.[1]   Athiany H. K.[1]

[1]Department of Statistics and Actuarial Sciences
Jomo Kenyatta University of Agriculture & Technology

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Introduction

- Child malnutrition remains a dominant challenge in the public health sector globally, with at least one in four kindergarten-age children being stunted (150.8 million) (De Onis, Blössner, and Borghi 2012).

- According to nutrition statistics, 3.62% of all children under the age of five years (15.95 million) are both stunted and wasted, whereas 1.87% of all children (8.23 million) have been reported to be stunted and overweight globally (Global Nutrition Report 2021).

- 1.82 million (out of 7 million) Kenyan children are suffering from chronic malnutrition (stunting)—United States Agency for International Development (USAID)(USAID 2018).

- The burden of undernutrition will cost Kenya in excess of US$38.3 billion in Gross Domestic Product (GDP) between 2010-2030 due to labor and productivity losses.

But what is malnutrition?

Malnutrition relates to:

- "a state of nutrition in which a deficiency, or excess, of energy, protein, and micro nutrient causes measurable adverse effects on tissue/ body form (body shape, size, and composition), function, and clinical outcome" (Stratton, Green, and Elia 2003).

Classifications of malnutrition

1. Undernutrition: attributed to an inadequate intake of food and disease which manifest in children through wasting, stunting, or underweight (United Nations Childrens Fund (UNICEF) 1990).

2. Overnutrition: results from physical inactivity, excessive unhealthy food intake, and is manifested through obesity and overweight (Bhadoria et al. 2015).

3. Micronutrient deficiencies: result from insufficient intake of small nutrients and include deficiencies in iron and vitamin A, among others (Grebmer et al. 2014).

Malnutrition indicators

There are 3 malnutrition indicators:

- Stunting:
  low height for age and reflects
  the growth in linear terms
  achieved at the age at which the
  measurements were taken.
  Normal/moderately stunted if
  HAZ is between -2 and -3
  standard deviations (SD) below
  the WHO child growth median
  or severely stunted if HAZ is less
  than -3 SD below the WHO
  child growth standards median

Remark

This is the best malnutrition
indicator following its insensitivities
to temporal variations in food intake.
All children with HAZ< -2SD
classified as stunted.

Malnutrition indicators

- Underweight: refers to low weight for age resulting from a short-term lack of food.
- Wasting: low height for weight (WHZ)
  severe form of undernutrition resulting from inadequate food intake and infections.

All WAZ and WHZ less than $-2SD$ below the WHO child growth standards median were classifed as underweight and wasting, respectively.

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Problem statement

- Kenya has experienced economic advancements in the recent past graduating to the middle-income status (Jonah, Sambu, and May 2018).

- The middle-income classification status, as any positive change, is expected to translate into the well-being of the country's population.

- With about 25% of the Kenyan child population suffering from acute malnutrition and forecasts showing that malnutrition is likely to cost over \$38 billion between 2010 and 2030, there is a need to explore whether these economic advancements have had the effect of reducing socioeconomic disparities and reducing the incidence of child malnutrition.

- There is a need, in line with Kenya's standard development goals (SDGs), to understand the effect associated with socioeconomic inequities on child nutrition.

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Objectives

- To determine the trends and patterns of socioeconomic disparities in the Kenyan child malnutrition statistics.
- To determine significant determinants of child malnutrition.
- To decompose the percentage contributions of each of the determinants of child malnutrition towards the observed socioeconomic disparities.

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Research methodology

- Set in Kenya, a country with a population of population about 47.5 million [KNBS 2019].
- Population growth rate of about 2.3% p.a. 36.1% of the population living below the poverty line.
- This study employed data from the Kenya Demographic and Health Surveys (KDHS) carried out in 2003 and 2014 (standard DHS).

Measurement of socioeconomic status
We employed a wealth index calculated using principal component analysis (PCA) on collective wealth variables as a proxy for socioeconomic status (Filmer and Pritchett 2001).

Research methodology

Variables

Variables considered were:

A child's age (months), the child's gender, place of residence (urban or rural), the household's religion, maternal education level, and the household's socioeconomic status, the birth order, region, place of delivery, birth interval, and the mother's age at first birth.)

Stunting, wasting, and underweight were employed as the response variables in the analysis of the determinants of child malnutrition.

Analysis of trends of socioeconomic disparities in child malnutrition

The extent and trends of socioeconomic disparities in stunting, underweight, and wasting were quantified using concentration indices (CIs) (O'Donnell et al. 2008; Wagstaff, Paci, and Doorslaer 1991).

As defined by O'Donnel et al. (2008) the CI is given as:

$$C = \frac{2}{\mu} \, cov \, (h, \, r) \tag{1}$$

Research methodology

In 1, μ is the average of malnutrition in under-five children (stunting, underweight, and wasting) whereas h denotes observation-specific child malnutrition, and r is the rank of the socioeconomic status of a household.

Notes:

The CI of a variable lies between -1 and $+1$.
0 suggests perfect equity, negative values suggest a higher concentration of malnutrition among the poorest group, and positive values suggest a higher concentration of inequity amongst the richest socioeconomic groups.

Determinants of child malnutrition

- The viable determinants of child malnutrition were determined using a logistic regression model.
- The outcome variables were converted into a binary form with z scores < -2SD coded as 1 and 0 otherwise.

Research methodology

Decomposing the % contributions

We aimed to explore the contribution of the variables determining malnutrition in children to the observed socioeconomic disparities in the outcome variables (Wagstaff et al., 2003).

Total differential decomposition with Wagstaff correction was used in exploring the contributions of the determinants.

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Results and Discussions

Table 1: Descriptive statistics by malnutrition indicator.

Year	2003		2014	
	Frequency	**Percent (%)**	**Frequency**	**Percent (%)**
Sample size (n)	5 949	22.10	20 964	77.90
Stunting				
No	3 148	65.57	13 607	72.93
Yes	1 653	34.43	5 050	27.07
Underweight				
No	4139	83.70	16195	86.80
Yes	806	16.30	2462	13.20
Wasting				
No	4436	92.80	17635	94.52
Yes	344	7.20	1022	5.48
Sex				
Male	3015	50.68	10633	50.72
Female	2934	49.32	10331	49.28
Residence				
Urban	1534	25.79	6828	32.57
Rural	4415	74.21	14136	67.43

Results and discussions

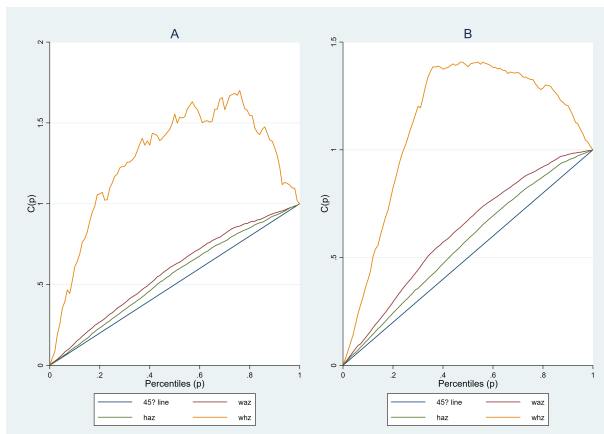**Trends of socioeconomic disparities in child stunting**

Table 2: Percentage child malnutrition proportions in 2003 and 2014

| | Malnutrition proportions (% Standard Error) | | |
	Poorest	Richest	All
Stunting (height for age, <2SD)			
2003	41.59(1.76)	30.92(1.77)	34.43(0.68)
2014	34.18(0.59)	12.92(0.68)	27.07(0.33)
Difference-1	7.41(1.86)*	17.99(1.91)*	7.36(0.76)*
Underweight (weight for age, <2SD)			
2003	23.19(1.49)	15.77(1.38)	16.29(0.53)
2014	21.23(0.51)	4.14(0.41)	13.19(0.25)
Difference-2	1.96(1.57)	11.64(1.44)*	3.10(0.58)*
Wasting (weight for height, <2SD)			
2003	11.31(1.14)	9.38(1.13)	7.19(0.37)
2014	9.38(0.36)	2.93(0.34)	5.47(0.16)
Difference-3	1.93(1.19)	6.46(1.17)*	1.72(0.41)*

Notes: Difference-1, Difference-2, Difference-3: the differences in the percentage proportions of stunting, underweight, and wasting between 2003 and 2014. SD: standard deviation. ***** indicates a significant difference between 2003 and 2004.

Results and discussions

Trends of socioeconomic disparities in child stunting

Figure 1: Concentration curves depicting the disparities in underweight, stunting, and wasting for children under five years between 2003 and 2014 in Kenya by Socioeconomic status (SES).

Results and discussions

Trends of socioeconomic disparities in child stunting

- All CIs were negative suggesting that the problem of malnutrition characterized by stunting, underweight, and wasting is worse among children from the lowest wealth quintiles.

- The absolute values of CIs for stunting and underweight in 2014 were substantially greater than those recorded for 2003 suggesting that the socioeconomic disparities in child stunting and underweight significantly worsened.

- The difference in wasting CI between 2003 and 2014 was not significant.

Results and discussions

Determinants of child malnutrition

Table 3: Determinants of stunting

	Adjusted Odds Ratio	**p-value**
Age (months)	1.12	<0.001*
Religion		
No religion	1.33	0.023*
Roman catholic	1.00	
Mother's education level		
Primary	1.43	0.027*
Higher	1.00	
Birth order	1.02	0.023*
Socioeconomic status		
Poorest	1.82	<0.001*
Poorer	1.59	<0.001*
Middle	1.42	<0.001*
Richest	1.00	

Results and discussions

- There exists a disconnect between economic growth and nutrition status with wealth skewed in favor of the rich.
- The poorest socioeconomic groups have the highest chance of being stunted.
- The rich are capable of affording quality healthcare and food hence less likely to be malnourished (Saxena 2018).
- Future mothers are able to acquire knowledge related to various health issues through which they are able to recognize illnesses and thus seek medical attention for their children (Glewwe, 1999).
- The highest birth orders/age are likely to be unwanted, recieve less attention, and care (Rahman 2016).
  Limited lacteal feeding with births spaced in quick succession is also a predisposing factor (Gudu et al. 2020).
- Some religions impose restrictive ideologies that discourage use of modern medications.

Results and discussions

Decomposition of the contributions of determinants to child stunting

1. The significant determinants of child stunting were decomposed to determine their percentage contributions towards the observed inequalities.

2. Maternal education level and socioeconomic status were the two top contributors towards the observed inequalities in child stunting.

3. Maternal education contributed 0.14% in 2003 and 0.16% in 2014.

4. Socioeconomic status contributed 1.3% in 2003 and 1.5% in 2014. With the economic growth, the distribution in income has become increasingly non-uniform.

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Contributions and limitations

- This study adds substantially to the body of available literature on socioeconomic disparities and child malnutrition.

- Using a representative sample, the study has broken down the determined of child malnutrition in Kenya to decipher the nature of the contributions of the variables to the observed socioeconomic disparities in child stunting and underweight.

- Our paper breaks ground and fosters the extent of knowledge on the causes and changes observed across socioeconomic groups for Kenyan children under the age of five years and highlights the associations between these inequalities and malnutrition in children and is essential in informing public health strategies and policies related to child. nutrition.

Limitation

The study employs a cross-sectional study design and the results cannot be interpreted as suggesting a causal relationship between the socioeconomic indices and child malnutrition.

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Conclusions and policy implications

- Between 2003 and 2014, the socioeconomic disparities in under-five child malnutrition, characterized by child stunting, underweight, and wasting have substantially increased.

- The inequalities between the rich and the poor are fueled by differences in endowments, a great proportion of which is held by the maternal level of education and the socioeconomic status of the household.

- There is a disconnect between economic growth and the equitable distribution of its prospects between social classes.

- The Kenyan government should work in the direction of implementing mechanisms to enhance educational outcomes for the girl child while also enhancing the socioeconomic status of poor households and focusing on older children.

- Targeted poverty eradication, health, and equitable resource distribution strategies.

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The End.
Thank You For Listening!