Persistence of Child Malnutrition in Malawi: Explanations from Demographic and Health Surveys

Grace Kumchulesi

Abstract

Although improvement of children’s nutrition in Malawi has long been a key policy issue, child malnutrition problem in the country remains serious. This paper set out to understand why child malnutrition in Malawi has remained persistently high over the years. The study focuses on child stunting and underweight. Datasets from Malawi’s DHS for 1992, 2000, 2004 and 2010 were used to investigate this problem. The main finding is that stunting was most prevalent in 2000 and 2004 but child underweight was prominent throughout the period. The reason for this persistence is that the factors that contribute to child malnutrition did not change significantly since 1992. Policies that can change this situation are suggested.

Key Words: Child Malnutrition; Malnutrition Persistence; Malawi

JEL Classifications: I10, I12, I15, I19

1. Introduction

The problem of child malnutrition in Malawi is still significant despite efforts to eradicate it. Between 2015 and 2016, 37% of children under the age of five years were stunted or too short for their age, compared to 47% in 2010 and 48% in 1992 (National Statistical Office & ICF Macro, 2011). The proportion of children wasted remained at about 4% between 1992 and 2015. Despite numerous nutrition policies and programs in various countries, very little is known about why child malnutrition remains a challenge affecting Malawi and many African countries.

Many of the factors that affect child nutrition are rooted in households and communities. Prominent among these are child’s age, gender, parental education, family assets, sanitation,

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and health service availability. This paper seeks to understand how child, household and community level characteristics in Malawi have changed overtime, and how the observed changes might explain why child malnutrition remains a challenge in the country. The rest of the paper is organized as follows. Sections 2 and 3 are devoted to the literature review and research methodology. Section 4 presents study findings and section 5 concludes.

2. Related Literature

A look at malnutrition situation in the neighboring countries shows that Malawi’s case is not peculiar. In Zambia, the decline in the prevalence of stunting among under-five children has not been smooth either. In 1992, 46% of children were stunted. Prevalence went up to 53% in 2001, before reducing to 40% in 2014 (Central Statistical Office, Ministry of Health, & ICF International, 2014). Prior studies have identified a cluster of factors that affect child nutrition status. Prominent among these are household wealth, household access to food, gender and age of household head, and mother’s education (Chirwa & Ngalawa, 2008 and Makoka, 2013). While there is some evidence on determinants of malnutrition, very little is known about its persistence. In Tanzania, Mahimbula and Issa-Zacharia (2010) show that exclusive breastfeeding during the first 6 months is rarely practiced, despite the recommendation by the World Health Organization to that end. Evidence on factors undergirding persistence is hard to find in the literature, as it requires availability good quality longitudinal data.

3. Methodology

Child malnutrition is proxied by standardized anthropometric measures, namely height-for-age Z-score (HAZ), and weight-for-age z-score (WAZ). The Z-scores are calculated from Malawian Demographic and Health Surveys (DHS) data on weight and height of children between 0 and 59 months. HAZ, is a measure of growth. Based on the Multicenter Reference Growth Study and recommended by World Health Organization (WHO), children whose HAZ-score is below minus two standard deviations (-2 SD) are considered short for their age, or stunted, a condition reflecting chronic malnutrition. WAZ represents a measure of underweight. Children whose WAZ-scores are below minus two standard deviations (-2 SD) from the median of the reference population are classified as underweight. Underweight, is an overall indicator of nutritional health.

Model and data

Equation (1) is the nutrition production function that is used to analyze the determinants of child nutritional status.

\[
N_{ij} = I_i^\alpha + H_j^\beta + C_{ij}^\gamma + e_{ij} \quad j = 1,...,k
\]

Where, \(N_i\) is nutritional status of child \(i\) and \(j\) denotes the year of the survey; \(I\) is a vector of child-specific characteristics; \(H\) is a vector of household specific characteristics; \(C\) is a vector of community-level variables, all which influence child nutrition; and \(e\) is an idiosyncratic error term and is assumed to be normally distributed with zero mean and a unit variance, denoted as \(e \sim N(0,1)\). \(\alpha\), \(\beta\), and \(\gamma\) are the parameters to be estimated.
The study uses pooled datasets from the 1992, 2000, 2004 and 2010. The 2010 DHS covered a total of 27,000 households, involving 24,000 female respondents aged between 15 and 49 years and 7,000 male respondents aged between 15 and 54 years. The 2004 DHS captured 11,698 women aged 15-49 years and 3,261 men age 15-54 years. The 2000 DHS covered 14,213 households, 13,220 women age 15-49 years, and 3,092 men age 15-54 years. The 2000 DHS is similar, but much expanded in size and scope, compared to the 1992 DHS. In 1992, 5,323 households were sampled. In these households, 4,849 women age 15-49 years and 1,151 men age 20-54 years were interviewed. These data are nationally representative. The sampling frame used for the 2010 DHS was the 2008 Malawi Population and Housing Census, which was provided by the National Statistical Office and was designed to produce estimates for key health indicators for all the 28 districts in addition to estimates for national, regional, and rural-urban domains (National Statistical Office & ICF Macro, 2011). The earlier DHSs were based on the 1998 Malawi Census. Although these surveys are independent, they can be used to provide a dynamic explanation of persistence of child malnutrition in Malawi.

4. Research Findings

4.1. Descriptive evidence shows that not all forms of child malnutrition are persistent

Table 1 reports the percentages of stunted and underweight children in 1992, 2000, 2004 and 2010. The results show a declining trend in stunting between 1992 and 2000. However, there are minimal differences in the proportion of stunted children in 1992 and 2004 and 1992 and 2010 for those who are moderately stunted. Similarly the proportion of under-five children that are underweight declined over the years. However, the proportion was persistently high for those who were mildly affected.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Mild Stunting</td>
<td>24.8</td>
<td>23.4*</td>
<td>23.8</td>
<td>27.2***</td>
</tr>
<tr>
<td>Moderate Stunting</td>
<td>27.5</td>
<td>25.7**</td>
<td>26.8</td>
<td>27.7</td>
</tr>
<tr>
<td>Severe Stunting</td>
<td>23.8</td>
<td>25.5**</td>
<td>24.6</td>
<td>18.3***</td>
</tr>
<tr>
<td>Mild Underweight</td>
<td>28.4</td>
<td>29.5</td>
<td>29.6</td>
<td>29.5</td>
</tr>
<tr>
<td>Moderate Underweight</td>
<td>14.2</td>
<td>13.5</td>
<td>12.6**</td>
<td>10.1***</td>
</tr>
<tr>
<td>Severe Underweight</td>
<td>6.4</td>
<td>5.5**</td>
<td>4.2***</td>
<td>2.7***</td>
</tr>
<tr>
<td>Observations</td>
<td>3169</td>
<td>9181</td>
<td>8082</td>
<td>4584</td>
</tr>
</tbody>
</table>

Notes: We test the hypothesis that the proportion of malnourished children in 1992 is equal to that of 2000, 2004 and 2010. The significance asterisks are defined as: * p<0.10, ** p<0.05, *** p<0.01.

About a quarter of under-five children were mildly stunted in 1992, 2000 and 2004, compared to 27% in 2010. There is no significant difference in the proportion of children who were moderately stunted in 1992, 2004 and 2010. However, a significant decline was observed from 27.5% in 1992 to 25.7% in 2000. There was also a marked decline in under-five children who were severely stunted between 1992 and 2000 (from 23.8% to 25.5%); and between 1992 and 2010 (from 23.8% to 18.3%). While proportion of those who were severely underweight significantly declined over the years, mild underweight was persistently high, affecting nearly a third of the children below the age of 5.
Figures 1 and 2 show differences in prevalence rates of stunting and underweight in the four survey years by plotting Cumulative Density Functions (CDFs) for malnutrition over time. Looking at the CDFs for stunting in Figure 1, we see that 2010 first order stochastically
dominates 1992. This means that the proportion of children who are stunted is higher in 1992 than in 2010 regardless of the malnutrition cut-off point used. Similarly, 2010 first order stochastically dominates 2000 and 2004. On the other hand, the CDFs for 1992, 2000 and 2004 nearly coincided with each other, indicating that the proportion of children who are stunted either remained the same or minimally changed over these years. The picture is different for underweight. In Figure 2, we see that there is minimal variation in the CDFs for all the survey years, indicating that the proportion for children who were underweight was not very different in the four surveys.

Further, the kernel density plots for each malnutrition indicator are presented in order to get a better sense of the persistence of child malnutrition in the past two decades. While the plots for stunting in Figure 3 show that the distribution is skewed to the right in all the survey years, the plots for underweight show that the indicator is normally distributed in the four years. This suggests that in the past two decades, stunting has been a more serious problem compared to underweight malnutrition. We also observe that the kernel plots for stunting reveal that the 2010 plots are below the plots for the other years for high levels of malnutrition (z-scores $\leq -2$), while the opposite holds for low levels of malnutrition (z-scores $\geq -2$). This implies that there is a higher chance of finding stunted children respectively in 1992, 2000 and 2004 than in 2010. On the other hand, the kernel plots for 1992, 2000 and 2004 are almost similar, indicating that it is equally likely to find stunted children in these years. Again, no consistent pattern of dominance by one survey year emerges for underweight. In Figure 4, the kernel plots highlight the persistence of the underweight problem, as it is equally likely to find underweight children in the four survey years.

A Kolmogorov-Smirnov test of the null hypothesis that the distributions of stunted HAZ-score and WAZ-score for the 2010 and for each one of the other survey years are statistically the same gives a p-value of 0.00 which rejects the null. That is, the distributional differences as depicted by the kernel plots are statistically significant. This suggests that the likelihood

![Kernel density estimate](image)

Figure 3. Distribution of Stunted Children across Years.
of observing a stunted or underweight child in 2010 is different from that in 1992 or 2000 or 2004. However, with 1992 as a comparison year to 2000 and 2004, the p-values indicate that the differences depicted by the kernel plots are not statistically significant. This result continues to highlight the earlier finding that the proportions of stunted and underweight children in 1992 were not different from those in 2004.

Thus, using the Malawi DHS data from 1992, 2000, 2004 and 2010, we are able to show the trend of prevalence of child malnutrition. We have also shown how the determinants of child nutrition status have changed over the years. Descriptive statistics (available on request) show on average, stunting among children under the age of five was below two standard deviations in all the years. Severity of stunting declines gradually between 2000, 2004 and 2010. Similarly, underweight declines gradually between 1992, 2000, 2004 and 2010. The results suggest that the temporal differentials for stunting between 1992, 2000, 2004 and 2010 are small, indicating that the persistence of the stunting problems were intense in all the four survey years.

4.2. Regression estimates confirm uneven persistence of malnutrition and suggest reasons

Ordinary Least Square estimates of the parameters of child nutrition production function (equation 1), available on request, show that age of the child is an important determinant of the child’s height and weight. In both stunting and underweight models, the coefficient on a child’s gender is statistically significant. As expected, parental education background is strongly correlated with child nutrition. Compared to living in the urban areas, rural residence is associated with higher malnutrition prevalence. The wealth coefficient indicates that children living in poor households face significantly higher risks of malnutrition.
Table 2. Summary of Decomposition Results of Stunting and Wasting, 2004 and 2010.

<table>
<thead>
<tr>
<th></th>
<th>Proportion in 2004</th>
<th>Proportion in 2010</th>
<th>Raw Differential</th>
<th>Proportion Explained</th>
<th>Proportion Unexplained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stunting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>26.4</td>
<td>23.7</td>
<td>2.7</td>
<td>94.3 (67.2)</td>
<td>5.7 (32.8)</td>
</tr>
<tr>
<td>Moderate</td>
<td>28.2</td>
<td>26.7</td>
<td>14.0</td>
<td>56.8 (16.8)</td>
<td>43.2 (83.2)</td>
</tr>
<tr>
<td>Severe</td>
<td>24.7</td>
<td>18.2</td>
<td>6.5</td>
<td>94.3 (113.5)</td>
<td>5.7 (−13.5)</td>
</tr>
<tr>
<td><strong>Wasting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>30.0</td>
<td>29.9</td>
<td>0.001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moderate</td>
<td>13.0</td>
<td>9.7</td>
<td>3.3</td>
<td>76.9 (88.8)</td>
<td>23.1 (11.2)</td>
</tr>
<tr>
<td>Severe</td>
<td>4.2</td>
<td>3.0</td>
<td>1.2</td>
<td>101.7 (91.1)</td>
<td>−1.7 (8.9)</td>
</tr>
</tbody>
</table>

A decomposition analysis (based on unreported OLS estimates from equation 1) shows how child nutrition in Malawi evolved between 2004 and 2010.

As is shown in Table 2, both stunting and underweight declined between 2004 and 2010. Taking 2004 as the base year, 94% of the variation in the proportions of mildly and severely stunted children remains unexplained by the factors included in equation (1). However, 56.8% of the variation in moderate malnutrition is explained. Among those mildly underweight, there is no difference in their sample proportions between 2004 and 2010. However, the factors in equation (1) explain 77% of the decline in prevalence of moderate underweight.

5. Conclusion

This paper set out to shed light on the evolution of malnutrition among under-five children in Malawi using the 1992, 2000, 2004 and 2010 DHS datasets. The study focused on two indicators of malnutrition, HAZ for stunting and WAZ for underweight. We investigated the persistence and determinants of child malnutrition since 1992. We have demonstrated persistence of high levels of child malnutrition over the past two decades. Household behaviors and living conditions are apparently responsible for this underdevelopment of Malawian children. Interventions designed to tackle child malnutrition must focus on modifying household behaviors and improving living conditions in households and communities.

References


