

Original Article

The role of rural-urban migration on child survival in Kenya.

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Abstract: Migration in many developing countries is mostly motivated by the need to improve the well-being of individuals or household members. The aim of this study, therefore, was to establish the role of rural-urban migration on child survival in Kenya. Using a sample of 156,977 children pooled from six Demographic and Health Surveys conducted in Kenya between 1989 and 2014 we compared child survival for five sets of paired migration statuses using odds ratios. The results of the odds ratio for the composite analysis show that children born to rural non-migrants, rural-to-urban migrants and urban-to-rural migrants were 31 percent, 15 percent and 33 percent respectively more likely to die compared to those born to urban non-migrants. Children born to rural-to-urban migrants were 12 percent less likely to die compared to those born to rural non-migrant women while survival chances were similar for children born to urban-to-rural migrants and rural non-migrants. When odd ratios are decomposed by socio-economic and health characteristics, the results suggest that most of the rural-to-urban migrants face adaptability challenges in urban region. From these results, we conclude that migration can affect child survival through the socio-economic and environmental adaptability capability of the migrant households. Policies on child survival should therefore aim at bridging the socio-economic gaps between migrant groups. Specifically, the progressive development policies at both national and devolved governance should aim at reducing the geographical socio-economic disparities.

Keywords: Migration, Child survival, Rural region, Urban region, Odds ratio

1.0 Introduction

Child mortality is normally taken as a reflection of the performance of the health systems and the socio-economic conditions of a country or a region [1]. The importance of child survival is undoubtedly demonstrated by the global commitment to the reduction of child mortality provided in the global world development instruments namely; the 1990 World Summit for Children, the 2000 Millennium Development Goal 4 (MDG 4) and now the Sustainable Development Goal (SDG) that appeals for countries to reduce under-five mortality to 25 or fewer death per 1,000 livebirths by 2030 [2]. Countries have made great strides in the reduction of child mortality since 1990. However, this progress in child survival in developing countries is characterized by huge disparities among socially and geographically defined sub-populations [3]. Studies focusing on the child health indicators especially the child mortality between rural and urban regions in sub-Saharan African countries have attracted new attention due to the high levels of urbanization as a result of rural-urban migration. Composite studies on child survival among various rural-urban migration statuses in developing countries show better health outcomes for urban residents compared to rural residents. For instance, a study using Demographic and Health Survey (DHS) data from 17 countries conducted between 1986 and 1990[4] shows that a child born after the mother migrated to urban region had a better survival change compared to those born to rural non-migrant mothers. However, environmental factors such as water and fecal matter disposal were not included in the analytical model. This study was extended [5] by analyzing child survival in 18 African countries, including Kenya, using DHS data collected between 1995 and 2001. The uniqueness of this analysis was that the authors traced the migrant families, to compare the scenarios before and after migration, notably the survivorship of children born before and after migration. Accordingly, children born of urban residents had higher survival chances compared to those born of rural residents. Similarly, children born of rural-to-urban migrants experienced lower mortality risk before migrating

compared to those born of rural non-migrants. After migration, their survival chances improved further to a level similar to that of urban non-migrants. On the other hand, children born of urban-to-rural migrants experienced higher mortality while in urban compared to urban non-migrants. As these urban dwellers migrate to rural areas, the survival chances of their children either improved or remained the same. This points out the disruptive effect of rural and urban migration on child survival. When demographic and socio-economic correlates were controlled, the urban advantage reduced greatly. These results suggest the importance of access to health care services and economic opportunities rather than the place of residence. Further study [6] on effect of maternal migration on child survival using DHS data from 28 sub-Saharan African countries conducted between 2006 and 2016 show that the under-five mortality was significantly higher for rural non-migrants and for rural-urban migrants compared to urban non-migrants even after controlling for utilization of health care services. Kenya was not among the 28 countries.

Studies that have used decomposition approaches when examining factors that affect child survival [7-8] show that health differentials and socio-economic differences were the key factors responsible for child mortality variations among various population segments. In Kenya, a similar study was conducted using 2003 Kenya Demographic and Health Survey (KDHS) data. The study focused on children aged less than two years [9]. The results of the study show higher mortality risk among the children born to urban-rural compared to children born of non-migrant women. The researchers underscored the disruptive effect on migrant's behavior such as temporary residence in more crowded housing (moving to informal urban settlements); mother adjustment to new economic and social constraints which might further disrupt feeding patterns of a newborn. This study focuses on migration over a short period of time and fails to capture the benefits of long-term migration.

Kenya has made significant improvement in child survival with under-five mortality dropping by 24.6 percent while infant mortality dropped by 23.7 percent between 1999-2003 and 2010-2014. This improvement is attributed mainly to increased public health interventions including malaria prevention initiatives such as use of insecticide treated nets (ITNs) in malaria endemic areas, Human Immunodeficiency Virus (HIV) and acquired immunodeficiency syndrome (AIDS) prevention and treatment initiatives, and improved access to water and sanitation [10]. Other studies have associate child mortality decline in Kenya with better utilization of maternal health care services including deliveries in health facilities, deliveries conducted by skilled health providers and uptake of postnatal care services for mothers and newborns; improved behavior in seeking health care services for child illnesses like pneumonia, malaria, and diarrhea [11]. However, these studies did not factor in the role of maternal migration between urban and rural despite rapid urbanization in Kenya fueled by rural-to-urban migration. According to the United Nations [12], the urban population in Kenya increased by 4.36 percent between 2010 and 2015. The rate of urban increase was projected at 4.23 percent between 2015 and 2020, and 4.09 percent between 2020 and 2025. One is thus bound to ask what the role of maternal rural-urban migration on child survival in Kenya is. The study used odds ratio to both composite and to socio-economic and environmental characteristics to provide more insight on the interruptive nature of migration on child survival.

2. Data Source and Analytical Approach

2.1 Data Source

In this study we pooled child mortality data from six Demographic and Health Surveys conducted in Kenya between 1989 and 2014. Demographic and Health Survey (DHS) program is a multi-agency worldwide program that periodically collects, among other information, the full birth history data, mother's current and previous place of residence as well as the duration of stay in the current place. Pooling several data from several surveys provided substantial number of deceased children per migration status and thus reduce standard errors associated with few observations. It was also meant to reduce erraticism effect on migration otherwise observed in a single round of survey. Demographic data is available from the MEASURE DHS repository (<http://www.measuredhs.com>). The data sets are in various packages including Statistical Package for Social Science (SPSS) [13].

2.2 Analytical Approach

This study compared the child survival between various paired migration statuses using odds ratio. Odds ratio is a versatile and robust statistic that is able to measure the strength of association between the exposure and the outcome. For full birth history data, every interviewed woman provides details of every child she has ever had, including the date of birth, sex, whether multiple births, whether alive or dead, date when the child died (for those who died) and their health-related information. From this data we got a summary of the survival status of children; the total number of children dead and those that were alive. Migration status was categorized into four namely, rural non-migrants,

urban non-migrants, rural-to-urban migrants and urban-to-rural migrants. For the purpose of this study, rural non-migrants are women who never moved out of rural to settle in urban region, and urban non-migrants are women who never moved out of urban region to settle in rural region. The rural-to-urban region migrants are women who moved from rural region to settle in urban region after their first birth while urban-to-rural migrants are women who migrated from urban region to rural region after the first birth.

We paired five migration statuses for comparison namely, Rural non-migrants and urban non-migrants, rural-urban migrants and urban non-migrants, rural-urban migrants and rural non-migrants, urban-rural migrants and Rural non-migrants, and urban-rural migrants and urban non-migrants. For every pair of migration status, we computed composite odds ratios that compared child survival between migration statuses. Further, for these pairs of migration statuses, we compared the survival by selected socio-economic and environmental factor using odds ratio. This analysis aimed at providing more insights on the adaptability nature of migration on child survival. For every odd ratio we computed the 95 percent confidence interval to assess the significance of the ratio. The association was considered significant when the associated confidence interval did not include 1.

3. Results

The results of odds ratios and the confidence intervals for both composite and for selected socio-economic and environmental factors are presented in Table 1.

Table 1: Odds ratios on child survival between various migration status

	Odds ratio	95% CI		Odds ratio	95% CI
Rural non-migrants vs Urban non-migrants			Rural-urban migrants vs Urban non-migrants		
Rural non-migrants/urban non-migrants	1.31*	1.24 - 1.38	Rural-urban/urban non-migrants	1.15*	1.05 - 1.26
Education attainment					
No formal schooling	1.11*	1.01 - 1.21		0.94	0.80 - 1.11
Primary education	1.15*	1.07 - 1.24		1.18*	1.05 - 1.34
Secondary or higher	1.30*	1.15 - 1.47		1.21	0.98 - 1.49
Marital status					
Other	1.42*	1.24 - 1.63		1.08	0.86 - 1.35
Never married	0.93	0.70 - 1.24		0.71	0.41 - 1.25
In union	1.39*	1.30 - 1.48		1.16*	1.03 - 1.30
Religion affiliation					
No religion	1.57*	1.11 - 2.21		1.39	0.80 - 2.42
Other religions	4.41*	2.20 - 8.84		6.85*	2.63 - 17.84
Muslim	1.04	0.94 - 1.16		1.05	0.87 - 1.27
Christian	1.38*	1.30 - 1.47		1.18*	1.07 - 1.31
Toilet facilities used					
No toilet facility/other	1.44*	1.27 - 1.64		1.17	0.93 - 1.47
Pit latrine	1.10*	1.03 - 1.17		1.18*	1.06 - 1.32
Flash toilet	1.13	0.95 - 1.34		0.94	0.77 - 1.16
Sources of drinking water					
Other sources	1.45*	1.30 - 1.62		1.23*	1.02 - 1.49
From a well	1.26*	1.11 - 1.43		1.09	0.88 - 1.34
Tapped water	1.03	0.96 - 1.11		1.14*	1.02 - 1.28
Rural-urban migrants vs Rural non-migrants			Urban-rural migrants vs Rural non-migrants		

Rural-urban/rural non-migrants	0.88*	0.82 - 0.95	Urban-rural migrants/ rural non-migrants	1.02	0.95 - 1.10
Education attainment					
<i>No formal schooling</i>	0.85*	0.73 - 0.99		0.86	0.73 - 1.01
<i>Primary education</i>	1.03	0.93 - 1.14		1.26*	1.15 - 1.38
<i>Secondary or higher</i>	0.93	0.77 - 1.13		1.05	0.87 - 1.27
Marital status					
<i>Other</i>	0.76*	0.62 - 0.92		1.14	0.94 - 1.39
<i>Never married</i>	0.77	0.46 - 1.30		1.47	0.80 - 2.70
<i>In union</i>	0.84*	0.76 - 0.92		1.02	0.94 - 1.10
Religion affiliation					
<i>No religion</i>	0.89	0.56 - 1.40		0.50	0.23 - 1.08
<i>Other religions</i>	1.55	0.71 - 3.39		0.53	0.16 - 1.78
<i>Muslim</i>	1.01	0.85 - 1.21		0.87	0.70 - 1.08
<i>Christian</i>	0.86*	0.78 - 0.93		1.07	0.99 - 1.16
Toilet facilities used					
<i>No toilet facility/other</i>	0.81*	0.67 - 0.98		1.04	0.89 - 1.22
<i>Pit latrine</i>	1.08	0.98 - 1.18		1.07	0.98 - 1.17
<i>Flash toilet</i>	0.84	0.66 - 1.05		0.67	0.43 - 1.05
Sources of drinking water					
<i>Other sources</i>	0.85*	0.73 - 1.00		1.11*	1.00 - 1.22
<i>From a well</i>	0.86*	0.72 - 1.03		0.86	0.73 - 1.02
<i>Tapped water</i>	1.11	0.99 - 1.23		0.99	0.84 - 1.16

Urban-rural migrants vs Urban non-migrants

Urban-rural migrants/ urban non-migrants	1.33*	1.22 - 1.45
Education attainment		
<i>No formal schooling</i>	0.95	0.80 - 1.14
<i>Primary education</i>	1.45*	1.30 - 1.63
<i>Secondary or higher</i>	1.36*	1.11 - 1.67
Marital status		
<i>Other</i>	1.63*	1.30 - 2.03
<i>Never married</i>	1.36	0.72 - 2.59
<i>In union</i>	1.41*	1.28 - 1.56
Religion affiliation		
<i>No religion</i>	0.78	0.34 - 1.80
<i>Other religions</i>	2.34*	0.62 - 8.86
<i>Muslim</i>	0.91*	0.73 - 1.13
<i>Christian</i>	1.48*	1.35 - 1.63
Toilet facilities used		
<i>No toilet facility/other</i>	1.36*	1.11 - 1.67
<i>Pit latrine</i>	1.18*	1.06 - 1.30
<i>Flash toilet</i>	0.76	0.49 - 1.17
Sources of drinking water		
<i>Other sources</i>	1.60*	1.39 - 1.84

<i>From a well</i>	1.08*	0.88 - 1.32
<i>Tapped water</i>	1.02	0.86 - 1.21

* Significant association

Accordingly, the summative effect of maternal migration on child survival shows that children born of rural non-migrants have 31 percent higher chances of dying compared to those born of urban non-migrants. When the analysis is done at different levels of the selected socio-economic and environmental factors, the pattern becomes more informative. The disparity in child survival between children born of rural non-migrant women compared to urban non-migrant women between groups with similar level of education increases with increase in education attainment. The disparity ranges from 11 percent more for children born of women with no formal schooling to 30 percent more for children born of women with secondary or higher education. The reverse is true for environmental factors where the child survival gap across children born of rural non-migrant women and urban non-migrant women improves with improved fecal disposal facility and improved sources of drinking water. For social effects, children born of rural non-migrant women who are currently in union and those in other form of marital status (formerly married, divorced, never married) are more likely to die compared to those born of urban non-migrants in a similar marital union. This risk of death is more on children born of those women in other marital status compared to those who are currently in union. Similarly, except for Muslims, children born of rural non-migrants of other religious affiliations are at higher risk of dying compared to their counterparts born of urban non-migrants.

The role of migration on child survival is assessed by comparing survival chances of those children born of migrant women verses those born of non-migrant women in both the region of origin and that of destination. The results show that children born of rural-to-urban migrants are 12 percent less likely to die compared to those born of rural non-migrants. When various levels of socio-economic and environmental factors are separately considered, the risk is mainly at lower levels of these factors such as those with no formal schooling, no toilets and those drawing water from wells and other sources such as surface water sources. In other words, children born of rural out-migrant women have lower chances of dying compared to those born of rural non-migrant women among women with no formal schooling, households with no fecal disposal facility and using other sources of drinking water apart from tapped water.

Similarly, children born to rural-to-urban migrant women are 15 percent more likely to die compared to those born of urban non-migrant women. When various levels of socio-economic and environmental factors are considered, the survival gap is significant mainly on children born to mothers with primary education. Survival gap is also significant for children born of women who are in marital union and among Christians. It is also significant among children from households that use pit latrine for fecal disposal and from those households who use tapped water and those who draw water from other sources.

Next, we examine child survival for urban-to-rural migrants compared to urban non-migrants. The results show that children born of urban-to-rural migrant women are 33 percent more likely to die than those born of urban non-migrant women. When we narrowed the analysis to socio-economic and environmental factors, the survival chances of children born of urban-to-rural migrant women with primary and higher education, married and in other marital unions, those using pit latrine or have no toilet facility, and use water from wells or other sources other than tapped water are comparatively less than those of children born of rural non-migrant women of similar statuses.

The composite results did not provide any evidence to suggest that the child survival between urban-to-rural migrants and rural non-migrants was different. However, the factor level analysis shows elevated mortality among children born of urban-to-rural migrant women with primary education (26%) and who live in households using other sources of drinking water apart from tapped water (11%).

4. Discussions

This study has shown that survival chances of children born to rural non-migrant, rural-to-urban migrants, and those born of urban-to-rural migrants are significantly lower than for those born of urban non-migrant. Children born of rural-to-urban migrants experience better survival chances than those born of rural non-migrant but worse than those born of urban non-migrant women. On the other hand, there is no significant difference in survival for children born of urban-to-rural migrants and those born of rural non-migrants. This scenario suggests the importance of migration in influencing child survival. Further, the study paints a picture of possible circular migration of women who move from rural region with better survival chances than those who are left in the region. When they arrive in urban regions, they are faced with interplays of socio-economic and environmental factors that influence their child survival in different ways from how they were in rural region. Majorly the outcomes are slightly worse. Thus, although child survival for children born to rural out-migrants seems to improve compared to their place of origin, it is worse compared to those

born to urban non-migrant women. By the time women return to rural region, the survival chances of their children are similar to that of rural non-migrant women. This suggests that the survival experience of their children worsened when they moved into the urban region.

The results of this study are consistent with several other studies that show children born of urban-to-rural migrants experienced higher mortality while in urban compared to urban non-migrants but their survival chances improve or remain the same when they move to rural areas [4-6, 9,14]. This finding also concurs with study [9] that showed that children born of migrant mothers had higher risk of dying than those born of non-migrants. Further, a study on the impact of internal migration on under-five mortality in 27 sub-Saharan African countries [6] also shows elevated under-five mortality for rural non-migrant (40 %), rural-urban migrants (43 %) and urban-rural migrants (20 %) compared to urban non-migrant. Decomposition analysis [7,15] suggests that social economic differences including the place of residence, sex of the child, maternal education and household wealth are key factors responsible for rural-urban child mortality variations. Because of failure of corresponding economic growth in urban, most of rural-to-urban migrants end up residing in informal settlements that are characterized with inadequate or altogether lack of basic social amenities [15]. Sprawling of informal settlements in urban areas in Kenya is usually associated with influx of low-income population from rural areas [16]. Similarly, urban-to-rural migrants are mostly those that have not achieved their economic dreams usually from slums with inadequate social services ([17-19].

Comparison of child survival for a similar socio-economic across different migration status gave some striking results. One, the survival gap between children born of rural non-migrant women compared to those born of urban non-migrant women increase with increase in education. These results point out the role of education in influencing other factors such as households' income. This is consistent with several studies which show that education is the most significant indicator of socio-economic status. Maternal education influences child's survival through various pathways including widening health knowledge and household resources that translate to better health seeking behavior[20] The level of risk reduces (except for primary level) when we compared children born to rural-to-urban migrants and urban non-migrants. This study points out to the employment opportunities disparities between rural and urban regions for women with secondary or higher education. When mortality risks for children born to urban-to-rural migrants was compared with that of children born to urban non-migrants, the former had higher risk for both composite and factor level analysis. This suggests the poor living conditions for urban-to-rural migrants while in urban compared to urban non-migrants with similar socio-economic characteristics [15]. For instance, most of them would be slum dwellers with poor sanitation including fecal disposal facilities, water, waste disposal and general household hygiene.

The strength of this study is that we were able to establish the role of migration on child survival using a simple but robust approach. On the other hand, the study did not establish the geographical location where deaths of the children born of migrants occurred. This would introduce biases in computation of odds ratios. Again, in this study we were not able to control for regional related causes of death such as HIV/AIDS that was more associated with urban region in Kenya in 1990s. This can lead to overestimation of the proportion of children dead that were born of urban resident women.

5. Conclusion and Recommendations

Children born to urban non-migrant women had better chances of survival than children born to rural non-migrant women while those born to rural-to-urban migrant women had better survival chances than those born to rural non-migrant women. However, children born of urban-to-rural migrant women had lower survival chances compared to those born of urban non-migrant women. This study points to the possibility of relatively healthier individuals from rural to urban region. Again, the study suggests that urban-to-rural migrants are those who mostly lived in deplorable health conditions that are worse than in rural region. Results of this study affirmed that socio-economic and environmental factors are the key determinants of child survival. From this study and similar earlier studies, it is evident that the place of residence is important in child survival. It does not only influence availability of services but also determines the quality of the services and how those services are accessed and utilized. Migration plays a facilitative role in accessing and utilization of these services. Further study would examine the role of migration on child survival using longitudinal data. It would also focus on establishing the extent of biasness in rural and urban child mortality estimates due to migration. Policies on child survival need to aim at bridging the social economic gaps between various socio-economic groups. Specifically, the progressive development policies at both national and devolved governance should aim at reducing the geographic regional development gaps.

Supplementary Materials: The KDHS data used in this study is available from the MEASURE DHS repository. It can be accessed through <https://dhsprogram.com/data/>.

Author Contributions: A.K and T.A conceptualized this study. A.K provided methodology for the study, undertook data analysis and produced the original draft of the manuscript. T.A and K.M reviewed the draft and provided the input for the final manuscript. All the authors have read this manuscript and approved the version for publication.

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