Effect of mother's migration on under-two mortality in Kenya

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Abstract

This study examines the effect of mothers' migration status controlling for other proximate factors (socio-economic, environmental and bio-demographic characteristics) on under two mortality in Kenya. Data used were drawn from 2003 Kenya Demographic Health Survey with focus on infants and children below two years in age. A total of 5949 infants and children born five years before the survey are used in the analysis. Cox proportional hazard model is used to assess the relative effect of the migration status (migrant or non-migrant) of the mother on survival rates controlling for other explanatory variables. The general results shows that children of migrant mothers especially those of urban-rural migrants face a higher mortality risk compared to those of non-migrant mothers. The results show that failure to account for migration may alter the estimation of urban-rural differentials in childhood mortality.

Introduction

A number of studies have recently underscored the importance of parental migration on survival status of infants (Fara and Preston, 1982; Mensch, *et al*., 1985; Brokerhoff, 1995; Mbackz, *et al*., 1992; Milafu, 1998;), with some indicating that migration can enhance survival chances of children by introducing the migrant parent to new job opportunities or community, good climatic region or better health services. On the other hand, given that migration involves dislocation and disruption, there is also a possibility that it can have negative effects on health and subsequently infant and child survival, particularly during times of socio-economic and political crises (Aman *et al*., 2002). Despite these conflicting findings, there is scarce literature on migration-child survival interrelationships that can provide empirical evidence to support either of these conjectures. The main objective of this paper is to examine whether child survival differ significantly among migrants and non-migrants in Kenya. It specifically examines the effect of short time migration of survival status of toddlers (children under the

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age of 2 years). Such results are important in the estimation and analysis of regional differentials in early childhood mortality outcome in a number of census and household surveys. Given the social-cultural structure of Kenya, infants and other early-aged children live with their mothers, at least, for the first very few years of life. The norms and values in Kenya typically and unconditionally demand that the woman take care of the newly born child, rather than the man or any other member of the extended family. Child fostering is not a viable option in Africa with children under age 5. The role of a mother thus has a community-wide meaning. This is because in a typical Kenyan tradition, child nurturing is the sole responsibility of the mother and after reaching the age of two years children's attachment to mothers starts diminishing as other factors take control as relying on others or probably another birth has occurred, hence not so much physically being with the mothers.

Conceptual issues on migration – childhood survival linkages

In order to understand the role of migration on childhood mortality, it is important to example some of the conceptual linkages on factors affecting early-childhood mortality in general. The analysis of risk factors affecting childhood mortality has led demographers to classify risk factors into two: endogenous factors that are biologically linked particularly those that precede or are associated with birth, and exogenous factors attributable to the post natal environment (Wolpin, 199□). This classification has led demographers to associate the causes of death by age patterns (neonatal and post neonatal) although some factors are associated with both conditions. Studies on childhood mortality – migration linkages posit that the effect of migration affects the postnatal environment (Brokerhoff, 1994; 1995).

It is more likely that infants and/or toddlers of migrant mothers are suddenly exposed to new environments that may threaten or enhance their health (Brockerholf, 1995). For example, infants may be exposed to new infectious disease agents in their new residence. On the other hand migrants may have made such a move to secure employment and may leave their infants under different care giving arrangements. A migrant mother who seeks work outside the home may abruptly terminate breastfeeding at the time of the move as the mother adjusts to new economic and social constraints. Similarly, some of the moves may be beneficial to the child. For example, a mother moving from rural to urban area may move to areas with better health care facilities or may adapt to new environment and change to better behaviors towards utilization of health care facilities. However, Brokerhoff (1995) argued that there has been no systematic analysis that can prove conclusively that migrants change their behavior, or improve their standard of living, as a result of changing locations. This is in conformity to the fact that sometimes migrants do not readily adapt to new environs and if change occurs it is in the long run. On the other hand, being a selected group, with desires for upward social mobility, and more educated than those members who remain behind in

the places of origin, migrants have characteristics that predispose to adjustment and adaptation to the new environment- (Brockerhoff 1995). Migration related distal factors may affect the health status of an infant or a toddler through either maternal or biodemographic factors (Mosley and Chen, 1984) or may be exposed to new environment factors that may ultimately influence their health.

Data and methods of analysis

The data for this study is drawn from the Kenya Demographic and Health Survey of 2003 which provide detailed information on maternal and child health, mortality, birth histories and characteristics of eligible women ages 15-49 and their spouses. This study uses data on birth histories to examine infant and child mortality disparities among migrants and non migrants. A total of 5949 infants and children born five years before the survey are used in the analysis. These births are analyzed according to the following migration typologies of the mothers of the children: urban-urban, rural-rural, rural-urban, urban-rural, urban non-migrants and rural non-migrants.

The main objective of this study was to examine the effect of migration on survival status of children under 2 years of age. The selection of two years was partly chosen due to data limitations on the occurrence-exposure of the event under study as well as examining the effect of temporal migrations.

Description of model

The proportional hazards model developed by Cox (19□2) is used for censored data to estimate the effects of individual characteristics on survival time without having to assume a specific parametric form for the distribution of time until the event occurs.

The Cox Proportional hazard model is used in this study to analyze the chance of a child dying between birth and two years preceding the survey. Since migrant mothers may have moved at any time in the five years, their calendar period for exposure to risk of child mortality is roughly similar to that of non-migrant mothers. A series of Cox models are fitted to estimate the relative risk of a child dying within age of two, in the five-year period preceding the survey. The hazard model is preferred for this study because it allows for the simultaneous incorporation of all the used age intervals and also allows for the utilization of both censored and uncensored survival cases in the data set.

Scope and limitation

The KDHS data does not contain information on frequency of moves, date and place of birth, or reasons for moving. Previous place of residence, usual place of residence and duration of stay of the mother will be used to measure migration status. This is the migrtion of mother after the birth of child. (Caldwell, 1986; Du Toit, 1990).

Demographic and Health Surveys data is known to be less appropriate for time series analysis and there are very few studies with time varying factors (Becher *et al*., 2004). It is worth noting that the main limitation of migration information obtained from data on place of birth is that we get the last migrations but not all migrations. This

study does not distinguish the types of urban or rural locations (settlement) in which migrant reside, that is whether there are informal or formal entitlements.

Preliminary analysis

Characteristics of the study population

Table 1 shows the distribution of the study population and their characteristics. Out of the 5949 children, 8% died within the first two years of life while 0.□ percent died between age two and five years, ie. 8.□% of the children died in their early childhood. About 48 percent of the children were born to rural women who never migrated. All other migration status categories form less than 20 percent of the children. About 58 percent of mothers had primary level of education, and 20 percent no education.

Mothers in professional employment were less than 20 percent, 38 percent were unemployed and 43 percent were in agriculture or other menial jobs. Concerning the economic status of the mother, 44 percent were poor, 38 percent rich, 18 percent average.

Out of the 5959 births, □ percent had a previous birth interval below 1□ months. Nearly half the children were born 24 months after their preceding sibling birth. In the succeeding birth intervals, the majority (68 percent) were last births. The high proportion, (35%) of children were of birth order 2-3; 25 percent of the births were first order births with birth orders of 4 and above at almost 40 percent.

Table 1 Distribution of the study population and their background characteristics

Characteristic	Number	Percent %
Age of Child		
0-23 months- dead	462	□.8
24-59 months-dead	40	0.□
Alive	544□	91.6
Migration Status		
Rural non Migrants	2863	48.1
Urban non Migrants	□41	12.5
Urban-urban Migrants	434	□.3
Urban-rural Migrants	3□□	6.3
Rural-urban Migrants	359	6.0
Rural-rural Migrants	11□5	19.8
Socio-economic		
Mother's education		
No education/Pre school	1210	20.3
Primary	3456	58.1
Secondary/Higher	1283	21.6
Mother's Occupation		

No work	2260	38.0
Agric/Dom/Manual/Others	2561	43.0
Professional	1128	19.0
Economic Status		
Poor	2616	44.0
Middle class	10□□	18.1
Rich	2256	3□.9
Bio-demographic		
Mother's age at birth		
<19	8□2	14.□
20-34	4311	□2.5
35 & above	□66	12.9
Preceding birth intervals		
<1□	42□	□.2
18-23	624	10.5
>24	3400	5□.2
First births	1498	25.2
Succeeding birth intervals		
<1□	318	5.3
18-23	420	□.1
>24	1166	19.6
Last birth	4045	68.0
Birth Order		
1	1488	25.0
2-3	2105	35.4
4-5	1184	19.9
6+	11□2	19.□
Environmental		
Water Source		
Well	1139	19.1
Surface/others	3183	53.5
Pipe	162□	2□.3
Fecal disposal		
Pit toilet/Latrine	3823	64.3
None/Others	1583	26.6
Flush	543	9.1
Total	5949	100

Source: KDHS-2003

Bivariate results

Table 2 shows the preliminary bivariate analysis of facts affecting infant survival in the first 23 months of life. The bivariate results are indicative of gross effects of the selected variables on the risk of death before 24 months of life. Most of the results show the expected direction. Children whose mothers migrated from urban-rural had a relative risk of death about 90 percent higher than those of rural non-migrants. There is however no significant difference between children within the other migration typologies. The results of the gross effects of other variables are in the expected direction. Children whose mothers have no education have lower survival chances compared to those with higher education. The same can be noted of the bio-demographic such as the effect of short previous birth intervals and birth order.

Table 2 Bivariate Cox proportional hazard model

Covariate	Relative risk of death for children, aged 0-23 months (B)	-2Log likelihood
Migration Status		**7981.676**
Rural non migrants (ref)		
Urban non migrants	-0.104	
Urban-urban migrants	0.186	
Urban-rural migrants	.653***	
Rural-urban migrants	0.168	
Rural-rural migrants	-0.048	
Mother's education		**7989.45**
No education/Pre School (ref)		
Primary	-0.15□	
Secondary/Higher	-.490***	
Mother' work Status		**7997.802**
No work (ref)		
Agriculture/others	-0.04	
Professional	0.1□6	
Economic Status		**7998.807**
Poor(ref)		
Middle class	-0.108	
Rich	-0.145	
Source of Water		**7995.542**
Surface/others (ref)		
Well	-.240*	
Piped	0.015	
Fecal disposal		**7995.399**

Open place/others (ref)		
Pit latrine/Toilet	-.401**	
Flush toilet	0.048	
Preceding birth intervals		**7958.989**
First births (ref)		
<1□ months	.893***	
18-23 months	.463***	
>23 months	0.013	
Succeeding birth intervals		**7806.02**
Last births (ref)		
<1□ months	1.835***	
18-23 months	1.011***	
>23 months	0.1□3	
Birth Order		**7985.85**
1(ref)		
2-3	0.093	
4-5	0.043	
6+	.4□0***	
Maternal age at birth		**7995.85**
<19 years (ref)		
20-34 years	-0.0□1	
35+ years	0.226	

Note: Ref= reference category; Standard errors are in parenthesis; Factor significant levels: - *= p<0.1; **=0.05; ***= 0.01.

Results of multivariate analysis

Results of multivariate analysis are presented in Table 3. The results are presented in four columns (models 1-4) display different explanatory models to compare the additive effects of migration measures and overall predictive power. Model 4 specifies the full model, in which the average early child mortality in Kenya is conditional upon the two-year period. Models 1 and 2 display the risk of dying by migration status and socio economic characteristics, with and without water and toilet effects, while models 3 and 4 test whether migrants' and non migrants' differentials in mortality remain significant with and without water and toilet effects.

In Model1, children of mothers who are urban-rural migrants are more than twice as likely to die by 24 months compared to the rural non migrants. The same results are depicted in subsequent Models 2 to 4. In Model 3, which controls for socio-economic and bio-demographic factors, the results show a persistent increase in mortality risk with hazard ratios of 1.62 for urban-urban migrants, 2.4 for rural-urban migrants and 1.45 for rural-urban migrants as compared to children of

rural non-migrants respectively.

Results from Model 4 show that children from migrant mothers (with exception of rural to rural) still have worse survival as compared to those from non migrants. The mortality risk is highest among urban to urban migrants however, the effect is weakly significant. The most consistent difference however occurs among the rural to urban migrants.

Table 3 Multivariate Cox proportional hazards models

Covariates	**Relative risk of death for children, aged 0-23 months**			
Migration status	Model 1	Model 2	Model 3	Model 4
Rural non migrants -ref	1.000	1.000	1.000	1.000
Urban non migrants	1.026(.025)	1.143(.134)	.989(-.011)	1.101(.096)
Urban-urban migrants	1.494(.401)***	1.□32(.549)**	1.622(.483)***	1.852(.616)*
Urban-rural migrants	2.154(.□6□)*	2.121(.□52)*	2.40□(.8□9)*	2.385(.869)*
Rural-urban migrants	1.382(.323)	1.505(.409)***	1.451(.3□2)***	1.555(.442)***
Rural-rural migrants	.990(-.010)	.989(-.011)	1.185(.169)	1.180(.166)
Maternal education				
Secondary/Higher-ref	1.000	1.000	1.000	1.000
No education/pre school	1.882(.632)*	1.880(.631)*	1.466(.383)***	1.44□(.369)***
Primary	1.519(.418)**	1.461(.3□9)**	1.408(.342)**	1.358(.306)***
Mother's occupation				
No work-ref	1.000	1.000	1.000	1.000
Professional	.□46(-.292)***	.□45(-.295)***	.□51(-.28□)***	.□55(-.281)***
Agriculture/others	.□69(-.263)***	.□52(-.285)***	.805(-.21□)	.□91(. -234)***
Economic status				
Rich-ref	1.000	1.000	1.000	1.000
Poor	1.161(.150)	1.0□4(.0□1)	.96□(-.033)	.89□(-.108)
Middle class	1.111(.106)	1.038(.038	1.001(.001)	.940(-.062)
Water source				
Piped-ref		1.000		1.000
Surface/others		1.193(.1□6)		1.10□(.102)
Well		1.2□9(.246)***		1.203(.185)
Type of toilet facility				
Flush toilet-ref		1.000		1.000
Open place/others		1.389(.328)		1.448(.3□0)
Pit latrine/toilet		1.261(.232)		1.38□(.32□)
Maternal age at birth				
<19 years-ref			1.000	1.000
20-34 years			1.012(.012)	1.034(.033)
35+ years			.863(-.14□)	.881(-.12□)

Preceding birth intervals				
First births-ref			1.000	1.000
<1□ months			.□20(-.328)***	.□15(-.335)***
18-23 months			.504(-.685)*	.498(-.69□)*
>23 months			.001(-6.802)	.001(-6.□85)
Succeeding birth intervals				
Last births-ref			1.000	1.000
<1□ months			.42□(.-851)*	.429(-.846)*
18-23 months			.199(-1.616)*	.198(-1.620)
>23 months			.164(-1.810)*	.165(-1.804)*
Birth order				
6+			1.000	1.000
2-3			1.148(.138)	1.136(.128)
4-5			1.619(.482)*	1.58□(.462)**
-2 log likelihood	**7958.630**	**7951.550**	**7721.497**	**7715.840**
X^2	**45.578**	**52.395**	**414.609**	**419.667**
Df.	**11**	**15**	**22**	**26**
Sig.	**0.000**	**0.000**	**0.000**	**0.000**

P< 0.01 ***, P< 0.05 as ** p<0.01 *
Note: Ref= reference category; Standard errors of relative risk are in parenthesis;

The effects of the control variables were in the expected direction and show that mother's education, water source, mother's work status, type of toilet facility, birth intervals and birth order have significant effects on childhood survival. Children of mothers with no or primary education are likely to experience higher risk of mortality of about 88 and 50 percent respectively as indicated in models 1 and 2 when only socio-economic related variables are controlled for while in models 3 and 4, the average odds of child survival were about 40 percent higher for children of mothers with no education and those with primary level of education compared to those with secondary education and above. Children whose mothers were migrants had elevated risk of dying compared to non migrants. The risk was even higher for urban rural migrants.

Discussion

Available literature indicates that many rural residents who move to the cities do so with expectations of higher earnings and an improved life cycle but eventually end up in worse off states than their places of origin (Behm and Vallin, 1982; Davis, 19□3; Hobcraft , *et al*., 1984; WHO, 1991; Harpham , *et al*, 1991; Brokerhoff , 1995). It also conforms with studies in informal settlements in Nairobi the largest city in Kenya that effect of mother's migration on childhood mortality is a persistent disadvantage of children born to migrant mothers irrespective of the length of stay in the receiving zone (Adama, *et al*., 2004). However, it may

be the fact that majority of migrants end up settling in a similar or even worse off condition than that of their previous residence. Palloni (1981) study underscored the importance of social circumstances in which the mother lives and concluded that in poorer settings, the less or uneducated mothers were far greater disadvantaged with respect to survival chances of their children compared to more educated.

Thus the observed elevated risk of death among children of mothers who migrate to urban areas lends support to the hypothesis that rapid in-migration to towns and cities of developing countries may lead not only to such well-known problems as shortages of housing, jobs and social services, and to environmental degradation (UN 1993), but also to increased threats to the health of children of migrants population (Bogin, 1988).

The other forms of migration also appeared to have delirious effect of survival status of the toddlers. However, empirical evidence form literature is scarce of the effects of these other migration patterns. A number of factors may be probably responsible to varying degrees, for short-term increases in migrant child mortality. Immediate exposure to new environment may partly explain the relative difference particularly when act of migration may have disrupted the usual life cycle behaviors 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 newborn. It is important to note the rural to rural migrants remain similar to the non migrants indicating that the disruptive effect is more critical if it is between rural and urban residence.

Conclusion and recommendations

This study has implications for analyses of rural- urban differentials in mortality experiences. Failure to account for migrations masks the true urban- rural differences in mortality experience. In addition, DHS-like data do not provide sufficient information to analyse long - term effects of migration.

From a policy point of view, results highlight the need to target migrant groups within urban areas in the provision of health care services and other social services. The disruptive effect may be severely undermining the survival status of many migrant children hence the need to develop educative programs to mitigate the negative factors associated with migration.

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Authors' contributions

E.B. Otieno Onyango:

Participated in the origination of the research idea and played lead roles in conducting litera-

ture review, data analysis, writing the results and discussion sections.

Agwanda T.O:

Participated in creating Migration Typologies, data analysis and writing the results section.

Murungaru Kimani & Anne Khasakhala:

Participated in understanding the concepts and paper editing/peer review;

Bonface Koyugi:

Participated in interpreting results in the models and writing the discussion section.

All authors read and approved the final manuscript.

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