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Forced Migration and Under-five Mortality: A Comparison of Refugees and Hosts in North-western Uganda and Southern Sudan‡

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Abstract. Millions of people around the world live as displaced persons, often for lengthy periods of time. Little, however, is known about the correlates of health outcomes in displaced populations. This research article used data from north-western Uganda and southern Sudan to understand if and how forced migration and resulting residential arrangements impact under-five mortality for long-term displaced and corresponding host populations. Multivariate logistic regression revealed that over the long-run forced migration and residential arrangement did not significantly impact under-five mortality.

Key words: displaced persons, forced migration, under-five mortality

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Résumé. Dans le monde, il existe des millions de personnes déplacées, souvent pour de longues périodes de temps. On connaît peu de choses cependant sur les effets de ces mouvements sur la santé des populations concernées. Cet article s'appuie sur des données du nord-ouest de l'Ouganda et du sud du Soudan pour comprendre si la migration forcée et les conditions d'habitat qu'elle impose ont un effet sur la mortalité en-dessous de 5 ans dans les populations déplacées et dans les populations d'accueil. Grâce à une régression logistique multivariée, on constate que ces facteurs n'ont pas d'effet significatif sur la mortalité infanto-juvénile.

Mots clés: migration forcée, mortalité infanto-juvénile, personnes déplacées

1. General introduction

1.1. NUMBERS OF DISPLACED PERSONS

Each year new accumulations of people are forcibly displaced from their homes as long-standing problems within or between countries remain unresolved and new problems emerge. Some displaced persons will return home quickly but the world is increasingly seeing more and more long-term displacement. Most of today's displacements have resulted from intense and long-standing conflicts that remain largely unresolved. Underlying causes for these conflicts are a complex interplay of political, economic, ethnic and environmental pressures (Loescher, 1993; UNHCR, 1993).

Estimates of the numbers of refugees by the United States Committee for Refugees (USCR) and the United Nations High Commissioner for Refugees (UNHCR) are 13.0 million and 10.4 million in 2003 (USCR, 2003; UNHCR, 2003). The difference in numbers illustrates the difficulty in counting displaced persons. The USCR also estimated the number of internally displaced persons to be 21.8 million in 2003. Approximately 30 million people around the world are displaced.

1.2. STUDY OBJECTIVES

Despite the large number of those displaced and the often lengthy periods of displacement, little is understood concerning the health status of long-term displaced populations.[1] Quality data on displaced populations is lacking, which has made it difficult to study correlates of health outcomes. It is likely that factors that are associated with health outcomes in developing countries are also significant in long-term displaced populations, but there are several factors specific to migrant situations that have never before been thoroughly researched. Displaced persons find themselves in a variety of situations in their countries of asylum – some are settled in large transit camps, others reside in more permanent settlements and many settle on their own. Some refugees are clearly visible, while others are indistinguishable from the host population. Some displaced persons receive relief aid while many more do not. The type of settlement of displaced persons and whether or not they receive any relief aid may also impact the host population. Particular interest in the humanitarian field has concerned the effect of residential arrangement upon the well being of displaced persons and the effect of the presence of refugees upon the host population. Such research is important in determining how policy can be used to improve health outcomes in displaced populations. This article researches these issues by comparing under-five mortality in southern Sudan and north-western Uganda among 'stayees' (those who did not leave home), settled refugees, self-settled refugees, hosts living in the presence of settled refugees, hosts living in the presence of self-settled

refugees and hosts living in the absence of refugees. Under-five mortality was chosen as the outcome of interest because it is often used as an indicator of a country's health status.

2. Conceptual framework

2.1. CORRELATES OF INTEREST

To study under-five mortality the Mosley and Chen (1984) proximate determinant framework was used as a guide. The underlying premise of the framework is that distal (or social and economic) determinants of child health operate through a common set of biological or proximate determinants to impact child mortality. The distal determinants are individual, household and community factors. The five groups of proximate determinants are maternal factors, environmental contamination, nutrient deficiency, injury and personal illness control.

Forced migration changes residential arrangement, which may act through the distal determinants to influence child mortality. This article studies the possibility that forced migration and residential arrangement impact under-five mortality even after other proximate and distal factors have been controlled.

A key focus of this research is the separation of individual and household factors from community factors because of different policy implications. Associations of community factors with child mortality would call for much different changes than associations with individual and household factors. For example if it is found that residential arrangement or community factors are significant correlates, then drastic policy changes may be needed. If it is found that individual and household factors are most important, however, then programs targeting individuals within their existing residential arrangements may be emphasised.

2.2. THE IMPORTANCE OF RESIDENTIAL ARRANGEMENT

There has been a debate in the humanitarian aid field concerning the effect of settlement versus self-settlement upon refugees and concerning the effect of refugees upon the host population. Many relief organisations prefer that refugees settle in camps or assisted settlements because they are easier to count and are more visible. Camp arrangements and assisted settlements may also facilitate the provision of services and some degree of security (Harrell-Bond, 1994). The refugee camp has been the standard approach for settling displaced persons. A particularly successful example of this approach is the handling of the 10 million refugees who fled from former East Pakistan to India in 1971. The refugees were placed in 1,000 camps along the border and

returned home to Bangladesh 10 months later (Gardner et al., 1972; Seaman, 1972; van Damme, 1995). The Bangladeshi refugee crisis was successfully managed because the refugees were spread over many small camps and the problem was of relatively short duration (van Damme, 1995). Today, however, it is not uncommon to find people who have been refugees well over 10 years and who live in camps or settlements with tens of thousands of other refugees.

The UNHCR has three durable solutions for refugees: voluntary return to the country of origin; settlement in the country of first asylum; and resettlement in a third country. The preferred option is voluntary return, but when this is an inviable solution settlement in the country of first asylum is the next choice. Camps are meant to be a short-term solution, but when repatriation becomes elusive the question of how long to keep refugees in camps becomes important. Harell-Bond (1994) and van Damme (1995) have suggested that keeping refugees in camps may be detrimental to their health because of resultant dependency, passivity and over-crowding. A comparison of acute malnutrition during the emergency phase of several crises lends some support to their argument. The prevalence rates of acute malnutrition were lowest in the two populations where refugees were self-settled in rural villages rather than placed in camps (Toole, 1993), but selection effects could have also played a role.

Countries of asylum may prefer camps for safety reasons. Sometimes refugees themselves include persons who may have perpetrated violence as was the case for many Rwandan refugees in the Democratic Republic of the Congo (Virmani, 1996; Zolberg et al., 1989). Even a suspicion of violence performed by refugees can give impetus for the host country government to be vigilant. After the 1981–1982 exodus of refugees from Arua District to Yei River District, Sudanese officials wanted the Ugandans to stay in camps so that their activities could be monitored. It was feared that because the refugees included some of Idi Amin's ex-soldiers, they might be plotting an attack against the Ugandan government for which the Sudanese government could be blamed (Virmani, 1996).

Kibraeb (1991) has called the debate between settlement and self-settlement the most sustained controversy in African refugee studies. A simple dichotomisation, however, is detrimental to a deeper understanding of the life situation of refugees (Virmani, 1996). For example many of the Sudanese refugees studied in this article have members of their household who spend part of their time in a settlement and part of their time outside looking for work. Other families register at the settlement to receive food rations but usually live as 'self-settled refugees'. These families often will not admit this for fear of losing food rations. Though it is important to study child mortality differences between settled and self-settled refugees, the distinction is not always clear.

2.3. HOST POPULATIONS

Despite the increasing attention given to refugees, the needs of the host population are often neglected. The developing world hosts the majority of the world's refugees. The impact of refugees on the host country is particularly important because receiving states are often resource poor. Though the better off among the hosts may gain from the services provided to refugees, the poorer hosts can lose out from competition for food, work, wages, services and common property resources (Chambers, 1986). A large refugee influx could immediately and negatively affect the environment and physical resources, local administrative units, the local economy, health and social services and transport and communication systems (Simmance, 1987). Over longer periods of time it is perceivable that the attention refugees bring to an area could result in the improvement of services and infrastructure if humanitarian organisations work to build the capacity of the local population. There is some indication that self-settled refugees have the potential to benefit the overall host population. Refugees from Liberia and Sierra Leone spontaneously settled in border villages and medium sized towns in Guinea. Instead of creating camps, UNHCR provided support to villages that welcomed refugees. The results were that refugees boosted rice production, and the health care facilities in the refugee-affected areas were the best in the country and served both the host and refugee populations (van Damme, 1995).

3. Background information

3.1. SUDAN – THE HOME OF THE WORLD'S LONGEST CIVIL WAR

Sudan, the largest country in Africa, covers nearly one million square miles. The Nile River flowing from south to north traverses a country varied in both landscape and ethnic and cultural composition. The land varies from arid desert in the north to savanna and grassland in the centre to forests and lush, fertile land in the south. The north covers two-thirds of the area, but the majority of the natural wealth (i.e. gold, lumber and fertile land) is found in the south. Throughout history leaders in the north have exploited the wealth of the south, and this exploitation is one of the underlying causes of the current civil war.

Sudan has a population of approximately 38 million and is one of the most sparsely settled countries in the world. Within Sudan there are more than 450 ethnic groups who speak 133 different languages. Much of the diversity is found in the 9–10 million persons originating from the south (Peterson, 1999; Virmani, 1996). Islam is the state religion, but only 60% of the Sudanese are Muslims. Christians account for approximately 4–5% of the population, and the remainder follows traditional religions (Human

Rights Watch, 1996; The Economist Intelligent Unit, 1995). The Northerners are mostly Muslim and identify themselves as Arab or African-Arab. The Southerners are composed of Nilotics, Bantu and a small percentage of Sudanic people.

Civil war first broke out in 1955, 1 year prior to independence and lasted until 1972. A period of peace lasted for 10 years, after which civil war resumed in 1983 and has been ongoing since. The key factors in the war had been the Khartoum government's desire to impose Islam including sharia law upon the south and their desire for the South's resources. In efforts to obtain oil-rich or fertile land, the Khartoum government has conducted extermination campaigns to drive Southerners away from their villages. The southern cause has been led by the Sudan People's Liberation Army (SPLA), however, dissent within the SPLA has resulted in many factions of this rebel group fighting among themselves. The tension is largely based upon tribal identity, and the Khartoum government has exploited age-old antagonisms between tribes in an attempt to create even more division. The result is that all sides in this civil war have intended to destroy the livelihoods of communities deemed to be supporters of their enemies. All sides in this war have been guilty of killing civilians, manipulating relief aid, conscripting young men and children, raping women, burning villages and stealing livestock. At the end of 2003 approximately 475,000 Sudanese were refugees mostly in Uganda, the Democratic Republic of Congo, Ethiopia and Kenya and up to four million were internally displaced, making Sudan the country with the largest number of internally displaced persons (IDPs) (USCR, 2003). USCR has estimated that 1.9 million people have died between 1983 and 1998 because of the civil war.

With immense international pressure for peace, a formal peace agreement was signed on January 9, 2005 in Nairobi, Kenya by the Khartoum government and the SPLA. A sign of hope looms for Sudan.

3.2. UGANDA – TURMOIL IN THE NORTH

Like Sudan, Uganda has seen its share of turmoil. Many Ugandans were killed or forced to flee the country during the reigns of Idi Amin, the second President (1971–1979), and Milton Obote, who was both the first (1966–1971) and third President (1980–1985). Both dictators are estimated to have been responsible for the deaths of 100,000–500,000 persons during their time in power. Both Amin and Obote were from the North, but from different tribal groups. Amin was a Kakwa (Sudanic tribal group) from what was then West Nile. Obote was a Langi (Nilotic tribal group) from what was then Acholi. Many of the people killed or displaced during Amin's reign were from the Nilotic tribes, but as Amin became more paranoid and sensitive to criticism he targeted anyone he felt could be a threat to his power, including

Uganda's intellectuals. During Obote's second term in power his army attacked civilians in the West Nile region in an effort to take revenge on 'Amin's people'. More refugees were created during Obote's term as his weak and ill-organised army struck at civilians instead of the many active guerrilla groups (Amaza, 1998; Minority Rights Group, 1984). In Sudan alone there were estimated to be at least 300,000 refugees by 1984 mostly from the West Nile District (Harrell-Bond, 1986). Obote was removed from power by the National Resistance Army (NRA), which also played an instrumental part in removing Amin from power. The NRA was led by Yoweri Museveni, a Bantu from south-western Uganda, who has been president since 1986.

Today Uganda has a population of about 25 million and is considered to have one of the fastest growing economies in Africa. Though most of Uganda is peaceful, parts of the North remain under turmoil. In Obote's home area the rebel group, the Lord's Resistance Army (LRA), hopes to overthrow Museveni and rule Uganda according to the Ten Commandments. The LRA is known for brutal attacks against civilians from their own tribal groups and has been responsible for the internal displacement of between 600,000 and 700,000 Ugandans in northern Uganda and 20,000 Sudanese in Sudan (USCR, 2003). The LRA often hides and trains in remote areas of South Sudan. Thus a peace deal in Sudan could also bring hopes of peace for northern Uganda.

3.3. THE UGANDA–SUDAN BORDER

The Uganda–Sudan border was a boundary created with little regard for the people it separated (Kabwegyere, 1995). The border is approximately 270 miles long and has been a source of instability for at least the past 100 years (Taha, 1978). Both countries have shared some similar internal problems. The political isolation of the southern Sudanese and northern Ugandans has resulted in a great deal of cross border activity (Woodward, 1991). Post-independence relations between the two countries have vacillated between peace and confrontation with the later prevailing (Ofransky, 2000). The Khartoum government holds the belief that the Ugandan government supports the SPLA. The Ugandan government holds the belief that the Khartoum government supports the LRA. Despite the Ugandan and Sudanese governments' hatred for one another, Uganda and Sudan have always harboured each other's refugees, and they tend to co-operate on refugee matters. Many relief organisations that work in Sudan have bases in Uganda. There are an estimated 170,000 Sudanese refugees in northern Uganda (USCR, 2000). Many Ugandans have been refugees in South Sudan during the turmoil surrounding the reigns of Amin and Obote. Refugees in both countries have received warm welcomes, largely because of shared tribal identities. Many Sudanese who had hosted Ugandan refugees in the 1980s would themselves become refugees in Uganda in the 1990s (Amaza, 1998; Ofransky, 2000).

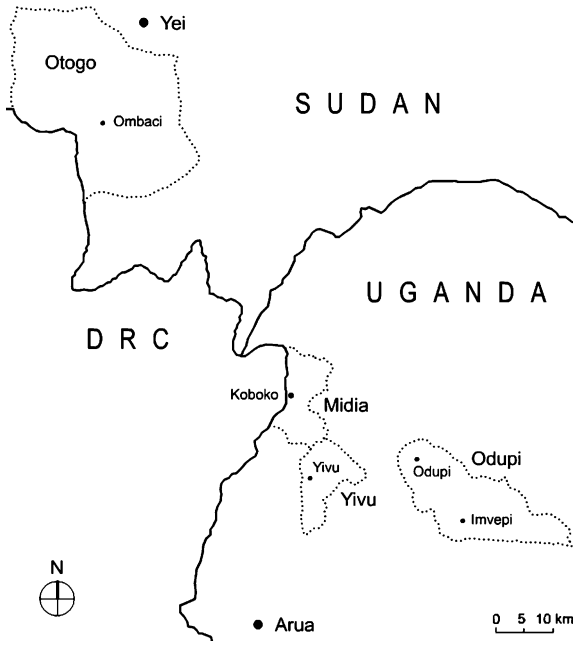

Figure 1. Map of the study population.

4. The study: summary and results

4.1. FIELDWORK

Data for this study came from the Demography of Forced Migration Project (DFMP), a study aiming to document mortality, fertility and health outcomes in the refugee and national populations of Arua District, Uganda, and Yei River District (Otogo Payam), Sudan (see Figure 1). Fieldwork for this project was conducted between September 1, 1999 and March 4, 2000. The Uganda–Sudan border has seen many mass movements of people over the past few decades. Many of the Ugandans in Arua were formerly refugees in Yei River District, Sudan in the 1980s. Most have repatriated back to their homes so in a sense they have a complete migration history (from home to exile and back to home).[2] Now many Sudanese from Yei River District have become long-term refugees in the Arua District, so the former hosts have now become the hosted. Because the Sudanese have been in Arua for many years it was possible to study the effects of post-emergency residential arrangement on mortality, fertility and health outcomes.

The study employed a retrospective and cross-sectional survey approach to obtain information on fertility, mortality, migration and other individual, household and community factors. The questionnaire had eight modules: (1) background/household economics, (2) pre-migration history, (3) migration

history, (4) post-migration, (5) child health, (6) reproductive health, (7) security and the (8) security migration history. Modules were asked to both men (20–55) and women (15–49) except for the child health module, which was only administered to women.

A major limitation of this study in general is survivor bias. Information was collected only from surviving men and women. This is a limitation in terms of this particular study because information concerning orphans was not available. It is likely that the under-five mortality rates for orphans differ from non-orphans.[3]

4.2. STUDY POPULATION

This study captured information from different groups of Ugandan nationals and Sudanese refugees allowing for comparisons between nationals and refugees, self-settled and settled refugees,[4] nationals living in the presence of refugees and nationals living in the absence of refugees, and refugees and those remaining in their country of origin. The six study populations (or strata) were the following:

(1) Ugandans living in the absence of refugees (Yivu)
(2) Ugandans living in the presence of settled refugees (Odupi)
(3) Ugandans living in the presence of self-settled refugees (Midia)
(4) Sudanese refugees living in a settlement (Imvepi)
(5) Sudanese refugees who are self-settled (Koboko)
(6) Sudanese currently in Sudan (Yei)

In order to capture persons from each of the six desired study populations, this study employed a multi-stage sampling frame. These six categories also indicated persons living in specific counties or geographic areas. Within the counties clusters at the village level were randomly selected, and within the villages households were randomly selected. A total of 2525 women and 814 were interviewed in Lugbara (spoken by the Ugandan study populations) and Juba-Arabic (spoken by the Sudanese study populations). Interviews were carried out by men and women from the study population areas.

4.3. ANALYSES

Stata statistical software was used to clean and analyse the data. The analysis presented in this study was a means to assess how proximate and socioeconomic factors such as individual, household and community factors impact child mortality for long-term displaced and affected national populations. The impact of forced migration and residential arrangement was studied after controlling for individual, household and community factors. Analysis was restricted to 2252 children who were born within 5 years of the time of the survey.

4.4. DESCRIPTION OF THE MODEL

Logistic regression was used to model the probability of dying for children born in the 5 years since the time of the survey. Logistic regression was suitable because the outcome, the probability of dying, has a binomial distribution. Stata's 'svy' or survey command was used to account for intracluster correlation within the multistage sampling design of the study (Stata Corporation, 1999).

4.5. OUTCOME VARIABLE

The outcome variable was whether or not a child born in the last 5 years (since January 1995) was alive at the time of the survey. There were 197 deaths to 2252 children.

Because none of the children completed exactly 5 years of age, these data were right censored. In order to account for the censoring, age spells were treated as units of observation rather than children. The age spells used were 0–1, 2–3, 4–11, 12–23, 24–35 and 36–47 months to reflect the neonatal period, early infancy, late infancy and early and late childhood. The interval of 48–60 months was excluded because no children in the child health section of the survey completed exactly 5 years of age.

Adjusting for censoring and expansion of the data sets there were 153 deaths and 8,051 observations. The small number of deaths and large number of observations mean that the analysis had low power. Thus, the analysis can only indicate large differences within categories of the covariates and small differences would not been detected.

4.6. EXPLANATORY VARIABLES: INDIVIDUAL

The individual/household variables that were studied were education, occupation, child's age, child's gender and mother's marital status. Because levels of education were so low in this population, education was studied as a dichotomous variable with the categories of no education versus some education. The occupation variable had five categories – agriculture, trading, brewing alcohol, contract labour and professional/artisan. The categorisation was important because families involved in these occupations had different access to cash. Those with a steady access to cash might find it easier to purchase medicines for sick children or obtain the necessary transportation to seek care. As mentioned earlier children contributed observations to age spells of 0–1, 2–3, 4–11, 12–23, 24–35 and 36–47 months. Child's gender was included to study whether there was a sex differential in mortality. Mother's marital status was included to understand whether being in a formal partnership was protective in terms of child mortality.

4.7. EXPLANATORY VARIABLES: PROXIMATE

The explanatory variables studied were parity, mother's age at birth and tetanus immunisation. The parity variable reflected the birth order of the child and was categorised into birth order 1, 2–4 and 5+. Mother's age was studied as her age at the time of the birth of the child and not her age at the time of the interview. Tetanus immunisation was also studied as a dichotomous variable. A limitation of the variable was that there is no distinction between the number of doses received.

4.8. EXPLANATORY VARIABLES: HOUSEHOLD

The household variables that were studied were separate room for cooking, toilet, water source, ownership of a radio, and sex of household head. Poor air quality can lead to environmental contamination so whether or not a household has a separate room for cooking is an important variable. Toilet was a dichotomous variable indicating whether or not a respondent's household had a toilet facility (all households with toilet facilities had a pit latrine or shared a pit latrine with a neighbour). A limitation of this variable is the mere presence of a toilet does not automatically make a household more hygienic. Water source was classified as either good quality or poor quality. Source of water does not imply anything about how water is handled or whether drinking water is boiled, but this variable does make a crucial distinction between those who have access to clean water and those who do not. The ownership of a radio variable served two purposes. It served as an indicator of wealth and was also used to represent a household's access to information. Sex of household head was studied because female-headed households are often considered more vulnerable in settings of conflict. The variable was included in the analysis to determine if the consequences of this vulnerability transfer to child mortality.

4.9. EXPLANATORY VARIABLES: COMMUNITY

Two community variables were studied – time to the nearest health centre, and time to school. Time to the nearest health centre represents access to health care services. This variable was dichotomised into 30 min or less and greater than 30 min. The areas sampled for this research were extremely rural with very little infrastructure (no paved roads, no running water and no electricity) so time to the nearest school was used as an indicator of development in the community. Families closer to schools also may have more access to information concerning child health. This variable was also dichotomised into 30 min or less and greater than 30 min.

4.10. EXPLANATORY VARIABLES: MIGRATION

Three migration variables were studied – migration/reproductive history, place of current residence, and migration-child. They are described in the following paragraphs.

The 'migration/reproductive history' variable was a classification of women based upon the correspondence of reproductive years and their migration history. To study the impact that migration has upon long-term child mortality, women were divided into several categories based upon where they spent most of their reproductive years. The categories were based upon their migration history and upon their answers to the following two questions:

Q308. Now, I would like to ask you about your home and the places you have lived in. Have you always lived in (name of current place of residence) since birth?

Q309. Do you consider (name of current place of residence) to be your home?

Home is a concept that is difficult to define in many cultures, so what constituted 'home' was left largely to the respondents. From qualitative research it was discovered that 'home' was generally considered the place where a person spent his or her childhood and where his or her parents were settled. Women were first dichotomised by whether or not they had ever left home.[5] The categories were further broken down according to the places women spent most of their reproductive years (ages 15–49). A simple differentiation between 'home' and 'away from home' was made. Many women have made multiple moves during their lifetimes but because the sample size is not large enough, the number of movements was not used to classify women.

This variable may make it possible to understand if and how migration impacts cumulative child mortality. Based upon the classification scheme presented in the previous paragraph, women were classified into five categories: 'stayees', 'displaced before age 15', 'returnees before age 15', 'returnees after age 15' and 'displaced after age 15'. A description of the categories is the following:

(1) 'Stayees' are women who never migrated. All their reproductive years were spent at home
(2) 'Displaced before age 15' are women who migrated and had all their reproductive years after leaving home (these women are currently refugees)
(3) 'Returnees before age 15' are women who migrated, repatriated and had all their reproductive years after repatriating
(4) 'Returnees after age 15' are women who migrated and had reproductive years at home, were then away from home and finally at home again

(5) 'Displaced after age 15' are women who had reproductive years at home and away from home (these women are currently refugees).

The 'place of current residence' variable referred to where a respondent was living at the time of the survey and captures several interesting issues because all respondents interviewed in one place represent Sudanese in one type of residential arrangement or Ugandans with a specific exposure or non-exposure to refugees. As mentioned in Section 4.2, for Sudanese respondents there were three separate categories to determine whether they were currently living in Sudan, living in a settlement or living in a self-settlement. For the Ugandan population there were three categories to represent no exposure to refugees, exposure to settled refugees and exposure to self-settled refugees. The variable also captures nationality and follows the stratified sampling frame of the study population. So the variable represents a distinct area and perhaps may capture community differences between the six areas in addition to settlement pattern for Sudanese and exposure to refugees for the hosts. The breakdown of categories is the following:

Yivu: Ugandans living in the absence of refugees
Odupi: Ugandans living in the presence of settled refugees
Midia: Ugandans living in the presence of self-settled refugees
Imvepi: Sudanese refugees living in a settlement
Koboko: Sudanese refugees who are self-settled
Yei: Sudanese who were living in Sudan at the time of the survey.

The 'migration-child' variable represents whether a child ever forcibly migrated or not. Information for this variable was obtained by comparing how long the mother lived in the current place of residence with the child's birth date.

5. Results

5.1. THE BIVARIATE ANALYSIS

Results from the univariate and bivariate analyses are presented in Table 1. It must be mentioned that what is presented is not a true bivariate analysis because age of the child is always controlled for. Some of the standard errors are rather large reflecting the low power in this study.

Of the individual variables only one category of the occupation variable and three of the child age categories were significant. Women whose families were involved in agricultural activities have children with higher mortality than women whose families are involved in non-agricultural activities. The negative difference in log odds is only statistically significant for women in families who brew alcohol compared to those in agriculture.[6] Three catego-

Table 1. Univariate and bivariate analysis of under-five mortality of children born in the past 5 years

Covariate	N	Coefficient	Std. err.
Individual			
Education			
None	3,603	–	–
Some	4,444	−0.283	0.174
Occupation			
Agriculture	5,150	–	–
Trading	780	−0.034	0.322
Brewing alcohol	871	−0.531**	0.228
Contract labour	900	−0.327	0.274
Professional/artisan	321	−1.234	0.763
Child's gender			
Female	3,976	–	–
Male	4,042	−0.131	0.160
Child's age			
0–1	2,221	–	–
2–3	2,006	−0.689***	0.280
4–11	1,642	0.674**	0.235
12–23	1,152	0.729**	0.255
24–35	701	−0.327	0.328
36–47	329	0.306	0.553
Mother's marital status			
Single/widowed/divorced	931	–	–
Married	7,051	0.074	0.245
Proximate determinants			
Parity (birth order)			
1	1,249	–	–
2–4	3,586	−0.007	0.225
5+	3,216	−0.167	0.184
Mother's age at birth			
10–19	354	–	–
20–24	643	0.208	0.238
25–29	666	0.516**	0.218
30–34	343	0.126	0.290
35+	235	0.290	0.359
Tetanus immunisation			
No	747	–	–
Yes	7,210	−0.776***	0.217

Table 1. Continued

Covariate	N	Coefficient	Std. err.
Household factors			
Separate room for cooking			
No	2,625	–	–
Yes	5,413	−0.104	0.162
Toilet			
No facility	831	–	–
Shared or own pit latrine	6,963	−0.141	0.285
Water source			
Poor quality	2,794	–	–
Good quality	4,995	−0.501**	0.192
Ownership of a radio			
No	5,375	–	–
Yes	2,442	0.031	0.148
Sex of household head			
Female	927	–	–
Male	7,214	−0.006	0.305
Community factors			
Time to health centre			
> 30 min	6,469	–	–
< = 30 min	1,582	−0.276	0.240
Time to school			
> 30 min	3,448	–	–
< = 30 min	4,603	−0.503***	0.157
Residential arrangement			
Migration-child			
No migration/voluntary migration	5,795	–	–
Forced migration	2,226	−0.153	0.275

* $p < 0.10$; ** $p < 0.05$; ***$p < 0.01$.

ries of the child's age variable were significant. The odds ratio was 0.51 for children 2–3 months compared to 0–1 months ($e^{B} = \exp(-0.689) = 0.51$, $p < 0.01$)[7] which fits with the knowledge that risks of mortality tend to be highest for children under 1 month in most populations. Mortality of children 4–11 months and 12–23 months, however, was significantly higher than for children in the neonatal period. These intervals are much longer than the 0–1 and 2–3 month intervals so these findings are also not surprising. Child's gender was not significant, thus indicating no apparent sex differential in mortality. Mothers with some education had children with lower mortality than mothers without an education but this finding was not statistically

significant. Marital status had a high standard error and was therefore left out of the multivariate analysis.

Of the proximate determinants mother's age at birth and tetanus immunisation were significant. All categories of mother's age at birth were positively associated with mortality compared to mothers 10–19, though only the association for the category 25–29 was significant. Most women in the 10–19 category, however, were 17–19 so they are not as young as the category name seems to indicate. Tetanus immunisation was a protective factor with an odds ratio of 0.46 for children whose mothers were immunised compared to those who were not ($e^{B} = \exp(0.776) = 0.46$, $p < 0.01$). Tetanus immunisation and the age spell 0–1 were interacted to understand if immunisation was most important for protecting children in the neonatal period (since this is when most deaths due to tetanus occur). This interaction was insignificant with a coefficient of 0.673 and a standard error of 0.439. This suggests that tetanus immunisation is serving as proxy for some selection factors, which make children whose mothers received tetanus immunisation different from those who do not.

The household factors of separate room for cooking, toilet, ownership of a radio, and sex of the household head were all insignificant. The variables, toilet and ownership of a radio, had high standard errors and were therefore left out of the multivariate analysis. Having a clean source of water proved to be a protective factor with an odds ratio of 0.61 ($e^{B} = \exp(-0.501) = 0.61$, $p < 0.05$).

The community factor, time to school, was significant. Those living 30 min or less from a school had children with only one third the mortality risks of those living more than 30 min from a school ($e^{B} = \exp(-0.503) = 0.61$, $p < 0.05$). Time to health centre was not significant.

The migration-child variable was not significant, but the place of current residence and migration/reproductive history variables were significant depending upon what was used as reference. The reference categories for the place of current residence and migration/reproductive history variables were altered so that each category served as the reference. These results are presented in Figures 2 and 3. Based upon these findings it is apparent that the risks of child mortality were lowest in Koboko where the self-settled refugees reside, and highest in Midia where the Ugandans exposed to the self-settled refugees reside. All categories of Sudanese children had significantly lower mortality than Ugandan children in Midia. Ugandan children in Odupi (exposed to settled refugees) and Midia (exposed to self-settled refugees) and the Sudanese in Yei had significantly higher risks than self-settled refugee children in Koboko. Comparisons among Ugandans with differing exposures to refugees were not significant.

REFERENCE CATEGORY						
Comparison	Yivu	Odupi	Midia	Imvepi	Koboko	Yei
Yivu	---------	Lower	Lower	Higher	Higher	Higher
Odupi	Higher	---------	Lower	Higher	Higher**	Higher
Midia	Higher	Higher	----------	Higher**	Higher***	Higher*
Imvepi	Lower	Lower	Lower**	----------	Higher	Lower
Koboko	Lower	Lower**	Lower***	Lower	---------	Lower**
Yei	Lower	Lower	Lower*	Higher	Higher**	----------

*p<.10 **p<0.05 ***p<0.01

Note: Yivu (Ugandans not exposed to refugees); Odupi (Ugandans exposed to settled refugees); Midia (Ugandans exposed to self-settled refugees); Imvepi (settled Sudanese refugees); Koboko (self-settled Sudanese refugees); Yei (Sudanese living in Sudan) (See Figure 1 for map of the study population).

Figure 2. Matrix of direction and significance of comparisons of 'place of current residence'.

The analysis also suggested that children of women 'displaced before age 15' have the lowest mortality risks, but only comparisons with 'returnees before age 15' and 'returnees after age 15' were significant. 'Returnees after age 15' had children with the highest mortality risks, but only comparisons with those 'displaced before age 15' and 'displaced after age 15' were significant.

5.2. THE MULTIVARIATE ANALYSIS

Three multivariate models were tested in order to study the theory behind the conceptual framework. Model 1 presents only the individual, proximate and household factors. Model 2 adds community factors to understand if these factors are significant net of individual, proximate and household factors. Model 3 adds migration factors to understand if migration is important after all other factors are controlled. The significance or lack of significance of

REFERENCE CATEGORY					
Comparison	Stayees	Displaced before 15	Returnee before 15	Returnee after 15	Displaced after 15
Stayees	----------	Higher	Lower	Lower	Higher
Displaced before 15	Lower	----------	Lower**	Lower***	Lower
Returnee before 15	Higher	Higher**	----------	Lower	Higher*
Returnee after 15	Higher	Higher***	Higher	----------	Higher**
Displaced after 15	Lower	Higher	Lower*	Lower**	----------

*p<.10 **p<0.05 ***p<0.01

Figure 3. Matrix of direction and significance of comparisons of 'migration/reproductive history'.

Table 2. Multivariate analysis of under-five mortality of children born in the past 5 years

	Model 1		Model 2		Model 3	
	Coeff.	Std. err.	Coeff.	Std. err.	Coeff.	Std. err.
Sample size	7605		7605		7501	
Constant	−3.050***	0.465	−2.957***	0.463	−2.643***	0.755
Individual						
Education						
None	–	–	–	–	–	–
Some	−0.233	0.181	−0.238	0.177	−0.217	0.186
Occupation						
Agricultural	–	–	–	–	–	–
Trading	0.089	0.314	0.105	0.317	0.267	0.352
Brewing alcohol	−0.456*	0.229	−0.402	0.250	−0.320	0.236
Contract labor	−0.263	0.293	−0.227	0.322	0.035	0.382
Professional/artisan	−1.151	0.796	−1.131	0.808	−0.958	0.831
Child's gender						
Female	–	–	–	–	–	–
Male	−0.122	0.142	−0.117	0.138	−0.098	0.135
Child's age						
0–1	–	–	–	–	–	–
2–3	−0.786**	0.304	−0.787**	0.305	−0.794**	0.303
4–11	0.696***	0.231	0.697***	0.233	0.669**	0.239
12–23	0.788***	0.255	0.786***	0.255	0.750***	0.258
24–35	−0.227	0.331	−0.231	0.333	−0.230	0.339
36–47	0.378	0.547	0.370	0.547	0.382	0.565
Proximate determinants						
Parity (birth order)						
1	–	–	–	–	–	–
2–4	−0.313	0.250	−0.319	0.252	−0.351	0.244
5+	−0.731***	0.252	−0.741***	0.252	−0.735***	0.246
Mother's age at birth						
10–19	–	–	–	–	–	–
20–24	0.243	0.282	0.263	0.270	0.236	0.268
25–29	0.774***	0.267	0.804***	0.262	0.752***	0.261
30–34	0.505	0.350	0.529	0.340	0.420	0.330
35+	0.516	0.459	0.540	0.448	0.418	0.460
Tetanus immunisation						
No	–	–	–	–	–	–
Yes	−0.710**	0.250	−0.693**	0.247	−0.673**	0.250

Table 2. Continued

	Model 1		Model 2		Model 3	
	Coeff.	Std. err.	Coeff.	Std. err.	Coeff.	Std. err.
Household factors						
Separate room for cooking						
No	–	–	–	–	–	–
Yes	−0.234	0.182	−0.231	0.180	−0.226	0.177
Water source						
Poor quality	–	–	–	–	–	–
Good quality	−0.471**	0.207	−0.364*	0.210	−0.434	0.259
Sex of household head						
Female	–	–	–	–	–	–
Male	−0.032	0.279	−0.033	0.302	−0.220	0.259
Community factors						
Time to health center						
> 30 min			–	–	–	–
< = 30 min			−0.056	0.278	0.037	0.294
Time to school						
(> = 30 min)			–	–	–	–
< = 30 min			−0.346*	0.173	−0.296	0.174
Residential arrangement						
Migration/reproductive history						
Stayees					–	–
Displaced before age 15					0.234	0.711
Returnees before age 15					0.187	0.284
Displaced after age 15					0.296	0.244
Returnees after age 15					0.344	0.719
Current place of residence						
(Yivu) – Ugandans unexposed to refugees					–	–
Odupi – Ugandans exposed to settled refugees					0.205	0.402
Midia – Ugandans exposed to self-settled refugees					0.278	0.456
Imvepi – settled Sudanese refugees					−0.491	0.795
Koboko – self-settled Sudanese refugees					−0.722	0.796
Yei – Sudanese in Sudan					−0.362	0.504
Migration-child						
Forced migration					–	–
No migration/voluntary migration					−0.254	0.296

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

these factors could be essential in determining appropriate policy. These models are presented in Table 2.

In Model 1 the only statistically significant individual variables were the dummy category of brewing alcohol and some of the child age intervals. Children in the 2–3 month interval have lower mortality than in the 0–1 month interval, but children in the 4–11 and 12–23 month intervals had higher mortality. Education and child's gender were both insignificant.

In Model 1 the dummy category of birth order 5+ gained significance. Children of birth order 5+ had an odds ratio of 0.48 compared to children of birth order one ($e^B = \exp(-0.731) = 0.48$, $p < 0.01$). Children of birth orders 2–4 also had a lower odds of mortality, but this finding was not statistically significant. The mother's age at birth categories of 25–29 remained positively associated with mortality with an odds of 2.17 compared to mothers age 10–19 ($e^B = \exp(0.774) = 2.17$, $p < 0.01$). Tetanus immunisation remained protective for all children. Children of immunised mothers had an odds of mortality of 0.49 compared to children of unimmunised mothers ($e^B = \exp(-0.710) = 0.49$, $p < 0.05$). The only significant household factor was having a clean water source which resulted in an odds of mortality of 0.62 for households with a clean source compared to those with a poor source ($e^B = \exp(-0.471) = 0.62$, $p < 0.05$). Neither having a separate room for cooking nor the sex of the household head were significant.

In Model 2 brewing alcohol fell slightly below significance, but the other covariates that were statistically significant in Model 1 retained their significance. The p-value for water source, however, rose from $p < 0.05$ to $p < 0.10$. Time to health centre was not significant, but children who lived close to school had significantly lower mortality than those who lived far away ($e^B = \exp(-0.346) = 0.62$, $p < 0.05$).

In Model 3 none of the migration variables were statistically significant. Table 2 only presents results with Yivu as the reference for place of current residence and 'stayees' as the reference for the migration/history variable, but all categories of both variables were alternated as the reference to study comparisons of specific groups. No significant comparisons were found except that children in Yei had lower mortality than children in Midia ($e^B = \exp(-0.640) = 0.52$, $p < 0.01$). The bivariate analysis had also revealed that Ugandan children in Midia had the highest mortality.

The community variable of time to school and the household variable of water source become just marginally insignificant both at $p < 0.11$. Tetanus immunisation remained protective with an odds ratio of 0.51 for children of mothers immunised for tetanus compared to children whose mothers' were not immunised ($e^B = \exp(-0.673) = 0.51$, $p < 0.05$). The proximate determinant variables of mother's age of birth category of 25–29 and birth order 5+ retained the significance levels they had in Models 1 and 2. The child age intervals of 2–3, 4–11 and 12–23 also retained their significance.

6. Conclusion

6.1. DISCUSSION OF THE ANALYSES

The lack of significance of the migration variables presented in this analysis is quite revealing. The findings seem to suggest that there is not much difference in being a stayee, refugee or host in terms of recent child mortality after controlling for other factors. The long-term consequence of being displaced is not dire in terms of recent child mortality. Much of this study population has been living in their current place of residence for at least 3–4 years so once the physical effects of the actual migration have diminished and individuals begin building new homes in their place of asylum, being a refugee in and of itself is not necessarily negative. These findings provide an alternative view to the frequent image of all refugees as helpless and passive. Refugees and displaced persons have suffered intolerably yet despite what they have suffered many have shown an incredible resiliency and a capacity to rebuild their lives. Given enough time and support, it seems that even people who have gone through incredible hardship are able to move forward. Thus, to view refugees as helpless and passive is not a fair assessment.

A key reason for the similarity between the stayees, refugees and hosts in terms of child mortality is that the Ugandan hosts are poor, the Sudanese in Sudan are poor and the Sudanese refugees are poor. The media and sometimes humanitarian organisations as well often focus attention on refugees not realising that host populations and people in the country of origin often face the same issues as refugees in settlements – lack of infrastructure and facilities, lack of health care access and malnutrition. Some studies of displaced populations focus on the findings of high under-five mortality rates without seeming to realise that in many non-displaced populations in developing countries children under-five also suffer high mortality. The possible indicators in the data that children in Midia may suffer higher mortality than refugee populations may be a specific cause for concern because these children are living in the presence of self-settled refugees who do not receive food aid or much assistance from relief organisations. This population may be suffering the negative consequences of refugees such as crowding and competition for jobs but not benefiting from some of the positive consequences such as attention from relief agencies. On the other hand it is quite possible that there are factors other than the presence of refugees inherent in the place of current residence variable which may be elevating the risks.

The settled and self-settled refugees did not differ in terms of child mortality. As mentioned previously there is much overlap between the refugees in these two places of residence and perhaps the issue of settlement and self-settlement is too complicated to be studied as a simple dichotomy. Many

families had some relatives who stayed in Imvepi but other relatives who lived in Koboko. Because of the extended family network in Africa, relatives often help one another. The distance between Imvepi (the settlement) and Koboko (the self-settlement) is not great (about 3 h by vehicle) so perhaps it would have been more ideal to study a settlement and self-settlement that were much further apart.

The lack of significant differences in the migration/reproductive health variable is not surprising. A woman's entire migration history should not heavily affect the mortality of her most recent children if she has been living in the same place of residence for some time. Only about 27% of the interviewed women had migrated due to force after the birth of the index child. The lack of significance of the migration-child variable suggests that migration is not necessarily a negative event. Of course the actual migration event is often traumatic, but over the long run being able to flee may be more beneficial than remaining behind in dire situations of war and conflict.

The factors that were significant included proximate determinants, individual, household and community factors. Having access to cash, immunisation services and clean water are important for children's health. Development and information about child health also appeared to be significant as evidence by the importance of being close to a school. Some policy and programmatic suggestions can be made from these findings. Relief organisations should not narrowly focus on refugees to the exclusion of hosts and stayees. All populations need access to these basic services.

6.2. FINAL THOUGHTS

This is one of the first studies of its kind concerning the impact of forced migration upon long-term child mortality. Some of the substantive findings from the multivariate analysis may not be generalisable to other displaced populations, but the methods are intended for use in any long-term displaced population.

Several proximate and distal factors were correlated with mortality and as mentioned previously could be key policy targets. Overall the migration variables were often not significant in this study, but they should be studied in the future because each forced migration setting is unique. Despite the limitations of this study, it is hoped that this research has added to what little is known concerning the correlates of child mortality in displaced populations.

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Notes

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[1] Long-term is taken to mean 6–12 months because this is when the emergency phase of forced migration settings typically ends.

[2] The Arua District has been peaceful in recent years and has not been affected by LRA activity. The Arua District was formerly part of the West Nile District and was also the birthplace of Idi Amin.

[3] Possible ways to include orphaned children in a future study would be to ask adults taking care of the orphans about the survival status of the orphan's siblings. Alternatively, orphaned children could be included in a birth history analysis along with a respondent's biological children. Yet another option would be to ask respondents about the survival of their siblings and about all children ever born to sisters who reached the age of 15.

[4] In this study population settled refugees received food rations while self-settled refugees did not receive food rations.

[5] Respondents who moved but considered their new place of residence to be home were not included in this analysis. These respondents moved for voluntary reasons.

[6] This finding may seem curious but families who brew alcohol typically sell it for cash. It would be dangerous to advocate brewing alcohol as a profession, however, because of negative repercussions that could result from the profession. Qualitative interviews in Uganda revealed that excessive alcohol consumption by men is considered a serious problem in terms of their work and family life.

[7] In the equation B represents the coefficient to be exponentiated.

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