ORIGINAL RESEARCH ARTICLE

Female Migration, Local Context and Contraception Use in Urban Mozambique

Boaventura M. Cau

Departamento de Geografia, Universidade Eduardo Mondlane, Maputo, Mozambique and Centro de Pesquisa em População e Saúde, Maputo, Mozambique

***For Correspondence:** *E-mail: boaventura.cau@uem.mz;* Phone: +258-21493256

Abstract

Although there are studies of the influence of rural-urban migration on contraceptive use in Africa, one question poorly explored is how the urban destination context shapes rural-urban migrants' use of contraceptives. Using data from the 2003 Mozambique Demographic and Health Survey, we examine the effect of community context in urban areas on recent female migrants' use of modern contraceptives. We find that recent female migrants, particularly newer migrants, have disadvantages in using modern contraceptives. We also find that the context of migrants' receiving areas in urban areas shapes migrants' use of contraceptives. Living in a community with high percentage of women who discussed family planning with others, in a community with high level of female education or in a wealthy community has a positive effect on using modern contraceptives. While residing in a community with major transport problems has a negative effect. The study finds, however, that it is the persisting high level of strong fertility desires which is a major barrier to contraceptive use in urban communities. *(Afr J Reprod Health 2016; 20[1]: 52-61).*

Keywords: Female migration, contraception, urban areas, Mozambique.

Résumé

Bien qu'il existe des études sur l'influence de l'exode rural-urbain sur l'utilisation des contraceptifs en Afrique, une question mal explorée est la façon dont le contexte de la destination urbaine façonne l'utilisation de contraceptifs chez les migrants ruraux-urbains. En utilisant les données de l'Enquête sur la santé et la démographie du Mozambique de 2003, nous examinons l'effet du contexte communautaire dans les régions urbaines sur l'utilisation des contraceptifs modernes sur les migrantes récentes. Nous constatons que les migrantes récents, , surtout les nouvelles migrantes, éprouvent des inconvénients à l'utilisation des contraceptifs modernes. Nous constatons également que le contexte des migrants des régions d'accueil dans les régions urbaines façonne l'utilisation des contraceptifs chez les migrantes. Le fait d'habiter dans une communauté avec un pourcentage élevé de femmes qui ont discuté la planification familiale avec d'autres personnes, dans une communauté avec un haut niveau d'éducation des femmes ou dans une communauté riche a un effet positif sur l'utilisation des contraceptifs modernes, alors que le fait d'habiter dans une communauté qui a d'importants problèmes de transport a un effet négatif. L'étude constate, cependant, que c'est le niveau élevé persistant des forts désirs de fécondité qui constituent un obstacle majeur à l'utilisation de la contraception dans les communautés urbaines. *(Afr J Reprod Health 2016; 20[1]: 52-61).*

Mots-clés: migration féminine, contraception, régions urbaines, Mozambique.

Introduction

The African continent is one of the regions of the world with the highest urban growth[1,2]. Although natural population growth in cities is the major driver of urban population growth in Africa[3,4], an important part of the African urban population growth is driven by rural-urban migration[3,5]. Most rural-urban migrants in Africa live in slums and peri-urban areas with improper transportation infrastructure and poor quality health services[6]. In comparison to urban non-migrants, rural-urban migrants in Africa and other developing regions of the world are typically disadvantaged in many features of reproductive health. In sub-Saharan Africa, May and McCabe reported that rural-urban migrants lacking accurate information about HIV/AIDS and its prevention were at heightened risk of getting HIV/AIDS and other sexually transmitted diseases in Tanzania[7]. In a study of rural-urban migration and premarital pregnancy in Kenya, Xu and colleagues found that women who experienced one or two moves or those whose most recent move occurred in the past seven to

twelve months were at an elevated risk of premarital pregnancy compared to non-movers[8]. The disadvantages of rural-urban migrants in reproductive health outcomes were reported in other developing regions. For example, Zheng and colleagues reported that rural-urban migrant women in China lacked basic information about reproduction including about where and how to get contraceptives[9].

The literature typically seeks to explain the relationship between rural-urban migration and contraceptive use following three hypotheses – the selectivity hypothesis, the disruption hypothesis and the adaptation hypothesis[10-13]. The selectivity hypothesis claims that rural-urban migrants are a selected group in terms of unobserved and observed characteristics such as age, education and marital status that make rural-urban migrants use of contraception more similar to that of the population in urban areas of destination. The disruption hypothesis argues that shortly after migration, an interruption in the supply of contraceptives can lower rural-urban migrants' use of contraceptives[10]. Finally, the adaptation hypothesis states that rural-urban migrants will gradually adapt to a pattern of higher use of modern contraceptives typical of urban areas. One question less explored in the literature is how the destination context influences the adaptation process of rural-urban migrants' use of contraception.

Although there are studies of the influence of rural-urban migration on contraceptive use in Africa[5,11-13] there is still a limited understanding of how the urban destination context shapes rural-urban migrants' use of contraceptives. As rural-urban migration in Africa and other developing countries is still a significant phenomenon[3,14], a better understanding of contextual factors that constraint or encourage the use of contraception among rural-urban migrants may have implications for improving the reproductive health experience of this group in urban areas. In this study we investigate how the community context of urban destination areas shapes female rural-urban recent migrants' use of modern methods of contraception in Mozambique.

Mozambique, a country of southern Africa with about 26 million inhabitants, exemplifies most African countries with considerable rural-urban migration and diverse living conditions in urban areas. The urban population in Mozambique has increased from 9% in 1975[15] to 30% in 2007[16]. Mozambicans are moving to urban areas in search of employment opportunities, access to health services and education[17]. Yet, most rural-urban migrants in Mozambique end up in informal settlements. In 2005 it was estimated that about 80% of urban population in Mozambique was in informal settlements[18]. Most informal settlements in Mozambique are densely populated, lacking adequate transportation infrastructure, proper sanitation, access to potable water and with limited availability of health care services[18,19].

Despite slight decline of total fertility in urban areas from 5.1 in 1997 to 4.5 in 2011, total fertility rate in urban areas remains high in Mozambique[20]. In rural areas, total fertility rate in Mozambique has increased from 5.8 in 1997 to 6.6 2011[20]. In part, this may be due to the low use of modern methods of contraception in Mozambique. Although the family planning program in Mozambique has more than 30 years it has had little success in increasing the use of modern methods of contraception. In 2011, the proportion of women married or in union using modern methods of contraception in Mozambique was 21% in urban areas and 7% in rural areas[20]. Recently, the government of Mozambique has launched a new strategy aimed at increasing access and use of family planning services[21]. Examining how the context shapes female rural-urban migrants' use of modern contraceptives in urban settings may have implications for the development of local level efforts to promote reproductive health of female migrants in urban areas.

Conceptual Framework

This study is informed by the notion that space and place have an impact on health outcomes such as contraceptive use[22]. Indeed, Macintyre and Ellaway have argued that "where you are" and "who you are" influence health outcomes[23]. The effects of place on health outcomes have been explained using two main ways. On the one hand, there is the idea that geographical patterning of health outcomes is due to clustering of individuals with similar attributes[24-26]. This perspective argues that the association between place and health outcomes is related to shared attributes among place's residents[21,23]. On the other hand, there is

the idea that there are place's physical and social opportunity structures that shape health experiences of whole groups over and above the influence of aggregate individual characteristics[24-26].

The approaches presented above suggest that characteristics of urban areas could shape the contraceptive experience of female rural-urban migrants over and above their individual characteristics. For example, communities in urban areas with high prevalence of high female socioeconomic status, female autonomy or better availability of information and high quality family planning services might enable female rural-urban migrants' access to contraceptives than those communities without those characteristics. Higher levels of female socioeconomic status – e.g., as measured by female education, female autonomy and quality family planning services in the community have been associated with using modern methods of contraception[27-29]. As higher status women are typically higher users of modern contraceptives, migrants living in communities with a high prevalence of higher status women could acquire "knowledge and attitudes" relevant for using modern contraceptives "by communication or observation" of such women[27]. In addition, the greater prevalence of higher status women could generate a high demand for modern family planning services, a fact that could favor the use of modern methods of contraception by migrants living in those areas. Similarly, female rural-urban migrants whose destination are urban communities with high fertility desires could be in a normative environment that is discouraging of using contraceptives[30,31] than female rural-urban migrants that went to communities with lower fertility desires. It has been argued that community prevalence of believes in favor of small family size may encourage fertility-limiting behaviors such as using modern contraceptives[30].

However, among rural-to urban migrants it could be argued that the challenges imposed by community context for using contraceptives in urban areas could be most felt by very recent female rural-urban migrants. Those are the one who are most likely to be different from long-time female urban residents because very recent female rural-urban migrants may be the one who still need to learn navigating constraints from the urban milieu and to be accustomed to urban ways of living. As Brockerhoff has argued, recent female rural-urban migrants might not use contraceptives due to "unawareness or inaccessibility of sources, or from lack of sufficient financial resources to pay for services before employment is secured"[5]. In addition, the vulnerability of newer recent female rural-urban migrants is likely to vary with the characteristics of communities of destination in urban areas. For example, those whose destination are slums or peri-urban areas with improper transportation infrastructure and poor quality health services are likely to face strong challenges for using modern methods of contraception[6]. Such challenges could include lower access to accurate information about contraceptives, lower variety of contraceptive methods offered locally and higher travelling costs to reach better quality contraceptive outlets[32].

Following the framework presented above, first we hypothesize that at individual-level, all things equal, female rural-urban recent migrants will be less likely to use modern methods of contraception than long-time female urban residents. However, after considering female rural-urban recent migrants' duration of stay in urban areas, only very recent female rural-urban migrants will be significantly different from long-time female urban residents in the use of modern methods of contraception, net of demographic and socioeconomic characteristics. Second, at community-level, we expect that female rural-urban recent migrants residing in communities of greater accessibility to family planning information will be more likely to use modern methods of contraception than their counterpart, adjusting for demographic and socioeconomic characteristics. Third, female rural-urban recent migrants residing in communities characterized by higher levels of community female socioeconomic status and female autonomy will be more likely to use modern methods of contraception, controlling for demographic and socioeconomic factors. Fourth, we expect female rural-urban recent migrants in communities of greater desired family size to be lesser users of modern methods of contraception than their counterpart, net of demographic and socioeconomic factors. Finally, residing in communities of greater family planning quality is expected to be positively associated with female rural-urban recent migrants' use of modern methods of contraception, net of demographic and socioeconomic controls. Again, we expect that, all things equal, very recent female rural-urban

migrants are the one who are likely to be different from long-time female urban residents.

Data and Methods

Data

Although the recent Demographic and Health Survey (DHS) in Mozambique was in 2011, it did not collect information about the duration of stay in the current place of residence[20]. Thus, in this study we use data from the 2003 Mozambique's DHS. This is a nationally representative, probabilistic sample selected in three stages (details about the 2003 Mozambique DHS study may be found elsewhere[33]).

Of the 12,418 surveyed women aged 15-49 years, 5380 were urban residents[33]. Among the 5380 urban residents, we excluded those not having sex, pregnant women, postpartum amenorrheic, infecund or menopausal women, women having infrequent sex or breastfeeding because they were considered not at risk of using modern contraceptives. The analytic sample was 2040 women. Of those women, 446 were recent migrants and 1594 long-time urban residents. As we were interested in the effect of community context on the use of modern methods of contraception by recent female rural-urban migrants, female rural-urban migrants with six or more years in urban areas were considered as long-time female urban residents (together with female urban-natives and female urban-urban migrants). This approach is based on the assumption that female rural-urban migrants with six or more years in urban areas may have already adapted themselves to the urban environment in comparison to newer female rural-urban migrants.

Measures

Use of a modern method of contraception is a dichotomous measure indicating whether an eligible woman aged 15-49 years was using a modern method of contraception at the time of the survey. This is the study outcome measure. The modern contraceptives methods with available data were Pills, IUD, injectables, male condoms, female sterilization, implant/norplant and female condoms.

Principal predictor variable–migration status

Migration status is a dichotomous variable that divides women into recent migrants and long-time urban residents. Because we are interested in the effect of recent female rural-urban migration, only female rural-urban migrants with less than six years in urban areas were considered as recent migrants. Rural-urban recent migrant women were further divided according to duration of stay in urban areas of destination into those who were in urban areas for less than 3 years and those who had 3 or more years in urban areas. The need to separate these two groups of recent female rural-urban migrants was to take into account their differing experience of living in urban areas – which we argue, may have implications in contraceptive use.

Community-level predictor variables

There are four community characteristics of interest which are likely to influence recent female rural-urban migrants' use of contraception in urban areas: (1) accessibility to family planning information in the community; (2) community socioeconomic status and female autonomy; (3) community fertility desires; and (4) accessibility and quality of family planning services in the community. To measure these characteristics, community-level predictor variables were created by averaging individual-level data to the DHS sample cluster (which in the present study was considered to represent a community), using all surveyed women where possible. The community-level predictors of interest were measured as follows:

Accessibility of family planning information

Measured as the percentage of women exposed to family planning messages in the community and the percentage of women who discussed family planning with others in the community.

Community socioeconomic status and female autonomy

Measured considering: (1) Mean years of education in the community and (2) the percentage of richest households in the community. Community female autonomy was measured by computing the percentage of women in the community that husband/partner or someone else has a final say on visits to family or relatives.

Community fertility desires

Measured considering the mean desired family size in the community. Finally, to measure *the*

accessibility and quality of family planning services, the percentage of women in the community that reported that having to take transport is a major problem for getting medical help for themselves when sick and the percentage of women in the community visited by a family planning worker in the 12 months prior to the survey were used.

Individual-level predictor variables

Individual-level variables that are likely to be associated with recent female rural-urban migrants' use of a modern method of contraception were considered. These include women's age, women's parity, women's desired family size and women's marital status. A woman's exposure to family planning messages (having heard about family planning in few months prior to the survey on the radio, or on the television, or in a newspaper or magazine), and a woman's discussion of family planning messages with others. Other controlling variables were a woman's household wealth position (richest household or not richest household), a woman's autonomy (whether husband/partner or someone else as a final say on visits to family or relatives, with "Yes", meaning that she has less autonomy), woman's education, whether a woman considers that taking transport is a major problem for getting medical help when sick, and whether a woman was visited by a family planning worker in the 12 months prior to the survey.

Analysis

Community-level and individual-level data were used to fit random intercept logistic regression models in Stata Version 11. First, we estimate the effect of being recent female rural-urban migrant on the use of modern methods of contraception in urban areas without considering migrants' demographic and socioeconomic characteristics. Second, we examine female rural-urban recent migrants' use of modern contraceptives net of individual-level factors. Third, we examine the mediating role of each of community-level characteristic of urban areas on female rural-urban recent migrants' use of modern contraceptives net of demographic and socioeconomic factors (Models 3-6). Finally, we present a full model which assesses the effect of being recent female rural-urban migrant on the use of modern methods of contraception adjusting for all variables considered in the study. Characteristics of the sample are shown in Table 1.

Table 1: Selected Descriptive Statistics of the Sample

	Modern Methods of Contraception		
Variable	**Uses (n=1003)**	**Does not Use (n=1037)**	**Total (n=2040)**
Non-migrant	50.4	49.6	1594
Migrant	44.6	55.4	446
Migrant for 3 to 5 years	52.2	47.8	184
Migrant for less than 3 years	39.3	60.7	262
Woman's age			
15-19	47.3	52.7	529
20-29	53.0	47.0	785
30-49	46.4	53.6	726
Woman's parity			
0	46.5	53.5	662
1-2	48.7	51.3	676
3 or more	52.1	47.9	702
Woman's desired family size (mean; standard deviation)	3.8 (1.7)	4.2 (2.0)	2040
Woman's Marital status			
Married or in Union	45.1	54.9	996
Not married	53.1	46.9	1044
Woman exposed to FP			
No	43.1	56.9	666
Yes	52.1	47.9	1374
Woman discussed FP with others			
No	40.6	59.4	1128
Yes	49.1	50.9	912
Woman's level of education			
No Education	26.9	73.1	212
Some education	51.8	48.2	1828
Woman's Household Wealth Position			
Low	27.3	72.7	468
High	55.1	44.9	1572
Woman's husband/partner or someone else has a final say on visits to family or relatives			
No	49.8	50.2	1098
Yes	48.4	51.6	942
Taking transport to HF			
No Problem	50.4	49.6	1648
Major Problem	43.9	56.1	392
Woman was visited by a FP worker			
No	48.0	52.0	1845
Yes	60.5	39.5	195

Results

Table 2 presents random intercept logistic regression results of modern contraceptive use in Mozambique by female migration status. The results are shown as odds ratio. In this study, we

Table 2: Random Intercept Logistic Regression Results of a Woman's Decision to Use a Modern Method of Contraception, 2003 Demographic and Health Survey, Mozambique (Odds Ratio)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Woman's Migration Status							
Non-Migrant (Ref.)	1	1	1	1	1	1	1
3 to 5 Years Migrant	1.049	1.097	1.076	1.084	1.068	1.084	1.079
Less than 3 Years Migrant	0.574**	0.609**	0.606**	0.615**	0.611**	0.603**	0.618**
Woman's age							
20-29 (Ref.)		1	1	1	1	1	1
15-19		1.085	1.088	1.139	1.142	1.091	1.154
30-49		0.494**	0.475**	0.455**	0.438**	0.489**	0.434**
Woman's parity							
1-2 (Ref.)		1	1	1	1	1	1
0		0.619**	0.631**	0.594**	0.609**	0.627**	0.596**
3 or more		2.427**	2.493**	2.472**	2.549**	2.433**	2.553**
Woman's Marital status							
Married or in Union (Ref.)		1	1	1	1	1	1
Not married		1.563**	1.512**	1.475**	1.486**	1.554**	1.460**
Woman exposed to FP							
No (Ref.)		1	1	1	1	1	1
Yes		1.125	1.157	1.142	1.162	1.124	1.193
Woman discussed FP with others							
No (Ref.)		1	1	1	1	1	1
Yes		1.724**	1.572**	1.647**	1.611**	1.701**	1.588**
Woman's desired family size		0.936*	0.947	0.962	0.991	0.941†	0.990
Woman's level of education							
No Education (Ref.)		1	1	1	1	1	1
Some education		1.683**	1.677**	1.478*	1.548*	1.661**	1.497*
Woman's Household Wealth Position							
Low (Ref.)		1	1	1	1	1	1
High		2.291**	1.950**	1.546**	1.731**	2.181**	1.579**

Notes: FP=Family Planning; HF=Health Facility

Table 2: Continued

Woman's husband/partner or someone else has a final say on visits to family or relatives						
No (Ref.)	1	1	1	1	1	1
Yes	0.947	0.951	0.986	0.948	0.939	0.992
Taking transport to HF						
No Problem (Ref.)	1	1	1	1	1	1

Major Problem		0.964	1.000	1.043	1.102	1.052	1.061
Woman was visited by a FP worker							
No (Ref.)		1	1	1	1	1	1
Yes		1.377 †	1.390†	1.437*	1.371†	1.369†	1.400†
COMMUNITY-LEVEL VARIABLES							
Accessibility to FP information							
% of women exposed to FP messages			0.415				0.519
% of women who discussed FP with others			1.030**				1.006
Household SES and Women's Autonomy							
Mean years of female education				1.335**			1.114
% of richest households				2.912**			1.359
% of women husband/partner or someone else has a final say on visits to family or relatives				0.708			0.504
Fertility desires							
Mean women's desired family size					0.395**		0.500**
Accessibility and quality of FP							
% say having to take transport is major problem for getting medical help for self						0.289*	1.290
% of women visited by FP worker						1.426	0.958
Intercept	0.969	0.261**	0.154**	0.044**	12.051**	0.330**	3.754
Community-level random intercept (standard Errors)	0.838(0.088)	0.610(0.087)*	0.535(0.081)*	0.428(0.078)*	0.327(0.083)*	0.606(0.085)*	0.286(0.088)*
Log Likelihood	-1346.300	-1267.055	-1253.482	-1237.532	-1228.324	-1263.816	-1224.025
N	2040	2040	2040	2040	2040	2040	2040

Notes: †- p<0.1; *- p≤ 0.05; **- p≤ 0.01; FP=Family Planning; HF= Health Facility; community-level random intercept in standard deviations.

hypothesized that among recent female rural-urban migrants only newer recent female rural-urban migrants will be significantly different from long-time female urban residents on using modern contraceptives. We assess this hypothesis in Model 1 and 2. Model 1 finds that female rural-urban migrants with less than 3 years in urban areas are 43% less likely to use modern methods of contraception than long-time female urban residents.Model 1 also shows that female rural-urban recent migrants with 3 to 5 years in urban areas are not significantly different from long-time female urban residents on using modern contraceptives. Controlling for other factors in Model 2, we find that the odds of using modern methods of contraception among female rural-urban recent migrants with less than 3 years in urban areas are lower by 39% in comparison to the reference group. Again, we find no statistically significant difference between female rural-urban recent migrants with 3 to 5 years in urban areas and long-time female urban residents. The findings in Model 1 and 2 confirm our expectation that newer female rural-urban migrants are substantially disadvantaged

in using modern methods of contraception in urban areas.

In Models 3-6 we assess how the community context of female rural-urban recent migrants' urban destinations shapes their use of modern methods of contraception. In particular, we explore whether the disadvantages that we observed among newer recent female rural-urban migrants (those with less than 3 years in urban areas) in Models 1 and 2 may be partially explained by each of the characteristics of communities of urban destinations. In Model 3 we estimate the mediating role of accessibility to family planning information in the community, adjusting for demographic and socioeconomic factors. We find that net of individual-level characteristics, newer female rural-urban migrants are significantly less likely to use modern methods of contraception than long-time female urban residents. We also find that those living in communities with high percentage of women who discussed family planning with others are more likely to use modern methods of contraception than their peers residing in communities with low percentage of women who discussed family planning with others.

In Model 4, we assess the mediating effects of community socioeconomic status and female autonomy, net of demographic and socioeconomic factors. We see that female rural-urban recent migrants with less than 3 years in urban areas continue to be negatively associated with using modern methods of contraception net of individual-level characteristics. Model 4 also reveals that residing in a community with high level of female education or in a wealthy community has a positive effect on using modern contraceptives. Community-level female autonomy has no significant association with using modern methods of contraception, accounting for other factors.

In Model 5 in which we assess the mediating influence of desired family size in the community, we find that on average, each additional desired child in the community decreases the odds of using modern methods of contraception by about 60%, adjusting for individual-level factors. Model 6 assesses the mediating influence of accessibility and quality of family planning services. We find that those living in communities with major problems of transport are substantially less likely to use modern methods of contraception, net of demographic and socioeconomic factors. Although being in the expected direction, the percentage of women in the community that were visited by family planning workers in 12 months before the survey does not reach statistical significance. Finally, Model 7 examines the effect of being recent female rural-urban migrant on the use of modern methods of contraception adjusting for all characteristics considered in this study. Newer female rural-urban migrants continue to be substantially disadvantaged in using modern methods of contraception compared to long-time urban residents. Interestingly, however, all community-level factors previously significant lost their statistical significance except the prevalence of desired family size in the community, which continues to have a substantial influence on the use of modern methods of contraception. Excluding the prevalence of desired family size in the community from the full model, most of other community-level variables become statistically significant (results not shown).

Most of the Models in the study show a significant community-level random intercept, which suggests that even considering the included variables there is still variation across communities in the use of modern methods of contraception. For example, the standard deviation of 0.286 in the final Model indicates that the odds of using modern methods of contraception for a woman in a community standing one standard deviation above the mean are approximately 33% higher compared to her peer in an average community [exp(0.286)=1.33].

Discussion and Conclusion

In this study we hypothesized that among recent female rural-urban migrants there might be differences in using modern methods of contraception owing to the duration of stay in urban areas. Newer recent female rural-urban migrants – e.g., those with less than 3 years in urban areas – might encounter several barriers to using modern methods of contraception. Some of those barriers might include the lack of proper knowledge about family planning services in the new destination area or having to live far from health care services. The analysis we presented above showed that it is the newer female rural-urban migrants – e.g., those with

less than 3 years in urban areas – who are most vulnerable to non-using modern contraception. Indeed, recent female rural-urban migrants with less than 3 years in urban areas are about 39% less likely to use modern methods of contraception than long-time female urban residents. We also found that female rural-urban migrants with 3 to 5 years in urban areas are not significantly different from long-time female urban residents in respect to using modern methods of contraception. It is likely that female rural-urban migrants with 3 to 5 years in urban destinations may have gotten some job or made strides in learning to navigate the constraints faced by recent female migrants in urban areas. Lee and Pol have argued that accessing jobs in urban areas encourages rapid adaptation to urban lifestyle including the use of contraceptives[34].

This study adds to previous studies of the relationship between rural-urban migration and contraception use in sub-Saharan Africa by specifically examining how the characteristics of destination communities in urban areas may mediate recent female rural-urban migrants' use of modern methods of contraception. We found that living in a community with high percentage of women who discussed family planning with others, in a community with high level of female education or in a wealthy community has a positive effect on using modern contraceptives net of other factors. It is possible that living in a community with elevated levels of higher status women (e.g., those communities with higher levels of female education or wealthy women) may increase access to modern contraceptive through generating a higher demand for such services. Furthermore, higher status women could diffuse to lower status women information about contraceptive use and availability[27].

This study also found that residing in a community with major transport problems was highly associated with less use of modern methods of contraception adjusting for other factors. The association between residence in a community with major transportation problems and lower use of modern methods of contraception could be due to the lower supply of contraceptives in such communities and to the inability of female residents on those communities to reach high quality health care units and other outlets of modern contraceptives owing to transportation barriers. Indeed, previous studies have indicated that most rural-urban migrants in sub-Saharan Africa (especially newer migrants) tend to live in peri-urban areas with inadequate transportation infrastructure and poor quality health care services[6].

When considering all the individual and community-level variables, this study found that among community-level characteristics of destination areas, only residence in a community with a higher concentration of women with higher levels of desired family size kept a statistically significant association. We found that net of all variables, on average, each additional desired child in the community reduced the odds of women's use of modern methods of contraception by about 50%. The overwhelming negative influence of desired family size on the odds of using modern methods of contraception may be revealing the strong pronatalism which is still dominant in most of urban sub-Saharan Africa. Although fertility has been decreasing in urban sub-Saharan Africa, in most cases, the pace of reduction has been slower due to the strong desire for children and its negative influence on using modern contraceptives[35]. Previous studies have found that strong fertility desires are substantially negatively associated with using modern contraceptives[30].

Overall, the findings regarding rural-urban female migrants' use of modern contraceptives in urban Mozambique appear to be consistent with rapid adaptation to urban conditions as after 3 years in urban areas, migrants behave like natives and settled migrants. As rural-urban migration in Africa continues significant and urban fertility continues high in many countries of the region, these findings may have implications for understanding the dynamics of fertility in urban areas and for promoting the reproductive health of recent migrants in those areas.

References

1. UN-Habitat. *The State of African Cities 2010: Governance, Inequality and Urban Land Markets.* UN-Habitat, Nairobi. 2010.
2. Beauchemin, C. Rural-urban migration in West Africa: towards a reversal? Migration trends and economic situation in Burkina Faso and Côte d'Ivoire. *Population, Space and Place* 2011; 17:47-72.

3. The Cities Alliance. *The Urban Transition in Sub-Saharan Africa: Implications for Economic Growth and Poverty Reduction*. The Cities Alliance, Washington, DC. 2006.
4. UN-Habitat. *The State of African Cities 2014: Re-imagining Sustainable Urban Transitions*. UN-Habitat: Nairobi. 2014
5. Brockerhoff M. Fertility and family planning in African cities: the impact of female migration. *Journal of Biosocial Science* 1995a; 27:347-358.
6. Zulu EM, Beguy D, Ezeh AC, Bocquier P, Madise NJ et al. Overview of migration, poverty and health dynamics in Nairobi City's slum settlements. Journal of Urban Health: Bulletin of the New York Academy of Medicine 2011; 88: s185-s199.
7. May A, McCabe JT. City work in a time of AIDS: Maasai labor migration in Tanzania. *Africa Today* 2004; 51(2): 3-32.
8. Xu H, Mberu BU, Goldberg RE, Luke N. Dimensions of rural-to-urban migration and premarital pregnancy in Kenya. *Ann Am Acad Pol Soc Sci*. 2013; 648(1): 104-119.
9. Zheng Z, Zhou Y, Zheng L, Yang Y, Zhao D, Lou C, Zhao S. Sexual behaviour and contraceptive use among unmarried, young women migrant workers in five cities in China. *Reproductive Health Matters* 2001; 9(17): 118-127.
10. Jensen ER, Ahlburg DA. Why does migration decrease fertility? Evidence from the Philippines. *Population Studies* 2004*;* 58:219-231.
11. Lee BS. The influence of rural-urban migration on migrant's fertility behavior in Cameroon. *International Migration Review* 1992; 26(4): 1416-1447.
12. Brockerhoff M, Yang X. Impact of migration on fertility in sub-Saharan Africa. *Biodemography and Social Biology* 1994; 41(1&2): 19-43.
13. Chattopadhyay A, White MJ, Debpuur C. Migrant fertility in Ghana: Selection versus adaptation and disruption as causal mechanisms. *Population Studies* 2006; 60(2): 189-203.
14. Sijuwade PO. The economic implications of rapid urban growth in the third world countries. *Anthropologist* 2010; 12(2): 79-85.
15. United Nations. *World Urbanization Prospects: the 2009 Revision*. United Nations: New York. 2010.
16. Instituto Nacional de Estatística. *III Recenseamento Geral da População e Habitação 2007: Resultados Definitivos – Moçambique*. Instituto Nacional de Estatística: Maputo. 2010.
17. UN-Habitat. *Mozambique: Mozambique Urban Sector Profile*. UN-Habitat: Nairobi. 2007.
18. UN-Habitat. *World urbanization prospects: the 2007 Revision*. United Nations: New York. 2008.
19. Jenkins P. In search of the urban-rural frontline in post-war Mozambique and Angola. *Environment and Urbanization* 2003; 15(1):121-134
20. Ministério da Saúde, Instituto Nacional de Estatística and ICF International. *Moçambique Inquérito Demográfico e de Saúde 2011*. ICF International: Calverton. 2013
21. Ministério da Saúde. *Estratégia de Planeamento Familiar e Contracepção 2011-2015 (2020)*. Ministério da Saúde: Maputo. 2010.
22. Andrews GJ, Moon G. Space, place and the evidence base: Part I – an introduction to health geography. *Worldviews on Evidence-Based Nursing* 2005; 2:49-107.
23. Macintyre S, Ellaway A. Neighborhoods and health: an overview. In: Kawachi I, Berkman LF (eds.), *Neighborhoods and Health*. Oxford: Oxford University Press, 2003, 20-42.
24. Bernard P, Charafeddine R, Frohlich KL, Daniel M, Kestens Y et al. Health inequalities and place: a theoretical conception of neighbourhood. *Social Science and Medicine* 2007; 65:1839-1852.
25. Macintyre S, Ellaway A, Cummins S. Place effects on health: how can we conceptualise, operationalize and measure them? *Social Science and Medicine* 2002; 55:125-139.
26. Cummins S, Macintyre S, Davidson S, Ellaway A. Measuring neighbourhood social and material context: generation and interpretation of ecological data from routine and non-routine sources. *Health & Place* 2005; 11:249-260.
27. Moursund A, Kravdal O. Individual and community effects of women's education and autonomy on contraceptive use in India. *Population Studies* 2003; 57(3):285-301.
28. DeRose LF, Ezeh AC. Decision-making patterns and contraceptive use: evidence from Uganda. *Popul Res Policy Rev* 2010; 29:423-439.
29. Seiber EE, Bertrand JT. Access as a factor in differential contraceptive use between Mayans and Ladinos in Guatemala. *Health Policy and Planning* 2002; 17(2):167-177.
30. Ezeh AC. Polygyny and reproductive behavior in sub-Saharan Africa: a contextual analysis. *Demography* 1997; 34(3):355-368.
31. Harbour C. Normative influence and desired family size among young people in rural Egypt. *Studies in Family Planning* 2011; 42(2):107-116.
32. Okech TC, Wawire NW, Mburu TK. Contraceptive use among women of reproductive age in Kenya's city slums. *International Journal of Business and Social Science* 2011; 2(1):22-43.
33. Instituto Nacional de Estatística, Ministério da Saúde and ORC Macro. *Moçambique Inquérito Demográfico e de Saúde 2003*. Instituto Nacional de Estatística: Maputo. 2005.
34. Lee BS, Pol, LG. The influence of rural-urban migration on migrants' fertility Korea, Mexico and Cameroon. *Population Research and Policy Review* 1993; 12(1): 3-26.
35. Bongaarts J, Casterline J. Fertility transition: is sub-Saharan Africa different? *Population and Development Review* 2013; 38 (Suppl.): 153-168.