Factors associated with the fertility of internal migrants in Uganda

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Abstract

Migration is associated with the timing and spacing of births and the final number of children born to a woman after migration. This can have an influence on the fertility transition trajectory of a country but fertility studies in Uganda have not explored the fertility of migrant women. in this paper we use the 2016 Uganda and Demographic health survey data to study the fertility of migrant women in Uganda.

We generated four migration streams; rural to rural, rural to urban, urban to rural and urban to urban basing on current residence and type of their previous residence. Migrants were defined as those women whose duration of stay in current place of residence was one year or less. Tfr2 stata module enabled calculation of TFR and ASFR and the reconstruction of fertility since 2001. The Poisson regression model was used to assess the factors associated with fertility using CEB as the fertility measure.

The findings indicated that rural to rural migrant women had the highest TFR (5.9) followed by urban to urban (5.0), urban to rural (4.6) and rural to urban (3.7). there were some differences in the factors associated with fertility of the women in the four migration streams but generally education attainment, ever use if family planning, preferred ideal number of children, marital status were significant in all the categories. There is need for mechanisms to enhance completion of secondary and higher education among women in Uganda and also increased efforts to improve availability, access and affordability of family planning services in rural areas but also strengthen those in the urban areas.

Introduction

Internal migration and its association with fertility and mortality in shaping demographic change has not received adequate attention (de Brauw, Mueller, & Lee, 2014) but migration is associated with the timing and spacing of births and the final number of children born to a woman after migration. This can have an influence on the fertility transition trajectory of a country. In addition, due to the traditional focus of long distance migration as a predominantly male phenomenon, migration studies have largely focused on men. The migrant woman and her role as a migration agent and the social, economic and demographic changes that she experiences after migration has received less attention (Ortensi, 2015). Different theoretical views on the association between migration and fertility have been advanced but the generational, socialization, adaptive and selection model are the four major theoretical models that have generally been used to explain the fertility of migrants and associated comparison with non-migrant fertility (Majelantle & Navaneetham, 2013).

The theoretical models of the association between internal migration and fertility differ in the way they explain the relationship between the timing of migration and changes in the reproductive attitudes and behaviors of migrants. The generational framework is based on the general observation that rural fertility is higher than urban fertility whereas, the socialization contends there are no significant changes in the fertility of migrants and non-migrants irrespective of their duration of stay in the urban area (Majelantle & Navaneetham, 2013). The socialization hypothesis has been supported by findings that fertility levels of migrants vary across origins of the migrants (Adserà & Ferrer, 2016). On the other hand, the adaptation model posits that changes in tastes and adoption of urban fertility norms by migrants occur gradually at destination among the families of migrants themselves and do not require an entire generation to pass before they take place. It assumes that the individual's social context after relocation matters more than his or her childhood environment in determining their fertility (Ortensi, 2015). Among post-war Austrian and Polish female cohorts it was revealed that in both Austria and Poland, people who moved from one place to another adopt the fertility behavior that dominated at the destination (Kulu, 2005, 2006). This provides support for the adaptation assertion but this assertion does not specify how long it will take rural- urban migrants to adapt to small family norms in the urban areas (Majelantle & Navaneetham, 2013).

The last of the four frameworks that we focus on is the selection model which is based on the fact that migration is a selective process. The framework argues that the lower fertility among rural-urban migrants compared to that of native rural stayers is primarily due to the selectivity of the migration process (Majelantle & Navaneetham, 2013). This model is generally used to explain why migrants sometimes have lower fertility levels than those of the population in the country of origin but fails to account for changes in life that occur in the current area of residence. Support for the migration selectivity hypothesis has been found in in Thailand (Goldstein & Goldstein, 1981) with suggestion that migration was either selective of women with low fertility and/or that the migration process itself disrupts childbearing, in the Philippines (Jensen & Ahlburg, 2004) where large fertility declines were reported to accompany post-migration employment with reduced estimated fertility impact if not followed by work for pay and Ghana (Chattopadhyay, White, & Debpuur, 2006).

Individual choices of social locations are associated with diverse social and economic factors such as education levels, nationalities (Mendoza, 2009). Migration is not only the third demographic force that influences demographic change but has also been associated with other dynamics of population change. In the 1980s and 1990s migration from villages and towns was associated with reductions in total fertility rates (TFR) in African cities (Brockerhoff, 1995; Brockerhoff & Yang, 1994). Existing studies (Eryurt & KOÇ, 2012; Jensen & Ahlburg, 2004; Kulu & Washbrook, 2014; Phan, 2014; Werwath, 2011) on the fertility of internal migrants have largely focused on rural-urban migration and its effect on fertility in non-African countries while others (Adsera & Ferrer, 2011, 2014; Adserà & Ferrer, 2016; Bertoli, 2015; Fargues, 2011; Mineau, Bean, & Anderton, 1989) have focused on the fertility of immigrants in industrialized countries. In Africa some studies (Anglewicz, Corker, & Kayembe, 2017; Banougnin, Adekunle, Oladokun, & Sanni, 2018; Chattopadhyay et al., 2006; Gyimah, 2006; Makinwa, 1985; Rokicki, Montana, & Fink, 2014) have found conflicting evidence on the migration-fertility relationship.

Internal migrants in Uganda generally tend to head towards the more commercialized part of Uganda (Nzabona & Maniragaba, 2016). This however applies to the general migration category of men and women. Employing the definition of a migrant as a person who changes his/her usual place of residence by crossing an administrative boundary and residing in a new area for a period of not less than six months or intends to stay in the new area for a period not less than six months,

the 2016/2017 Uganda National Household Survey which is the most recent national survey indicates that females (18%) dominated internal migration compared to males (14%) (UBOS, 2018). Female migration may occur for a number of reasons including marriage, employment, education and others. Studies in other countries such as Ghana, Nigeria and Turkey have documented differential fertility of migrant women but in Uganda, there is paucity of information on the fertility of migrants. This paper explores the factors associated with the fertility of migrant by analyzing the 2016 Uganda Demographic and Health Survey (UDHS). This study focuses on recent migrants whom we define as those that had lived in the current place of residence for not more than 12 months and utilizes two of the three questions that were asked in the UDHS of 2016 to categorize migrants into; rural to rural, rural to urban, urban to rural and urban to urban migrant women. The paper then explores the factors associated with fertility of women in each of the four migrant streams.

Data and methods

Data for this study was sourced from the 2016 Uganda Demographic and Health Survey (UDHS). The UDHS was a national representative survey that collected data from 18,506 women of age 15-49 years using a two-stage cluster sampling procedure that began with the selection of clusters or enumeration areas followed by the selection of households from each cluster (UBOS & ICF, 2018). The data was collected using women's questionnaire and was formally requested from Measure DHS. To account for the complex sampling design used in demographic and health surveys, data weighting was done using the svy command. This study was an analysis of a secondary dataset that is publicly available to researchers. This dataset does not have personal identifiers so as to maintain the privacy of the respondents and was collected by UBOs with technical assistance from ICF and the data collection followed international protocols on research ethics. We sought permission to access and use the dataset from measure DHS through the link https://dhsprogram.com/data/available-datasets.cfm. The required access was subsequently permitted and the conditions for use of the data have been observed.

Variables and measurements

In the 2016 UDHS, women were asked three questions that may be used to study internal migration. These were; *How long have you been living continuously in (NAME OF CURRENT*

CITY, TOWN OR VILLAGE OF RESIDENCE)?; Just before you moved here, did you live in a city, in a town, or in a rural area? and *Before you moved here, which district did you live in?*

The main independent variable for this study was migration status which is a variable that we generated from the question on duration of stay in the current place of residence and the second question on the type of previous residence. The survey question on duration of stay in current residence generated a variable on number of years that the woman had spent in her current residence and this generated data on women who were usual residents, visitors and others depending on the number of years. This question can help to classify the women into migrants and non-migrants. In this study, we focused on recent migration and thus we considered migrants as those women whose duration of stay in current place of residence was one year or less. The women whose duration in current place of residence was more than one year were considered to be non-migrants and hence were excluded from this study so that only migrant women were analyzed. We classified the migrants into four categories of internal migration based on their current residence and type of their previous residence. The generated categories were; rural to rural migrant (women who were currently residing in a rural area and their previous residence was also rural), rural to urban (women who were currently residing in an urban area but their previous residence was rural), urban to rural (women who were currently residing in a rural area but their previous residence was urban) and urban to urban (women who were currently residing in an urban area and their previous residence was also urban).

The independent variables explored in this paper include; current age of the woman, education level, place of residence, wealth class, region of residence, ideal number of children, knowledge about family planning methods, exposure to family planning messages via mass media, current working status, migration status, marital status, age at first sex, and current use of family planning methods and ever use of family planning. The dependent variable in this study was fertility as measured by the total number of children ever born (CEB). CEB is a measure of cumulative fertility. Although we used CEB as the dependent variable, the age specific fertility rates (ASFR) and TFR of the women were computed to demonstrate estimated fertility levels of the migrant women based on births that occurred to them in the three years preceding the survey.

Data analysis

Data analysis involved the generation of frequency distributions, examination of differentials in fertility by migration status and the multivariable regression of fertility. After determining the distribution of women in the various categories of internal migration, a chi square test was used to test the association between selected social, economic and demographic characteristics of the women with their migration status using a 5% level of significance. The age specific and total fertility estimates were obtained using the tfr2 module. The tfr2 module is a Stata command that transforms birth history data into a table of births and exposure and uses a Poisson regression model to compute fertility rates, fertility trends and fertility differentials from a table of births and exposure (Schoumaker, 2013). Tfr2 estimates fertility based on three years preceding the survey. This approach was also used to reconstruct the fertility rate of the migrants for a period of 15 years before the survey.

The fertility differentials were assessed based on children ever born as the outcome variable and a Poisson regression of count outcomes was thus suitable method for analysis. A Poisson regression offset by the natural logarithm of the current age of women to find out the factors associated with fertility for both migrants and non-migrants. Current age of the woman was used as an offset variable because it is highly associated with the outcome variable (CEB) since CEB is likely to be higher among older women compared to younger women. A multivariable Poisson regression model was then run (we run five models) to identify the major predictors of number of children ever born. This analysis identified whether there are differences in the factors associated with fertility of migrants and the four internal migration types explored. We exponentiated the coefficients to yield the incident rate ratio (IRR) to ease interpretation of the results. IRR

$$\ln(\mu_i) = \alpha + X_i\beta_i + \ln(age)$$

In order to determine the factors associated with the fertility of the different categories of the migrant women based on their current and former residence, a Poisson regression model was run independently for rural to rural migrant women, rural to urban migrant women, urban to rural migrant women and the urban to urban migrant women. Our analysis resulted into five regression models. In the first model, all migrant women were analyzed to determine the factors associated with fertility among all migrant women. In our second model, we assessed the association between selected characteristics of rural to rural migrant women and their fertility. The third model examined the association between fertility of rural to urban migrant women with selected

characteristics while the fourth and fifth models respectively explored the factors associated with the fertility of urban to rural and urban to urban migrant women in Uganda. All interpretations are based on the 5% level of significance.

Findings

This study indicates that of the 3,656 weighted sample of migrant women aged 15-49 years, more than four in ten were rural to rural migrants, 19% were urban to urban migrants, 18% were urban to rural while 16% were rural to urban migrants. Figure 1 shows the details.

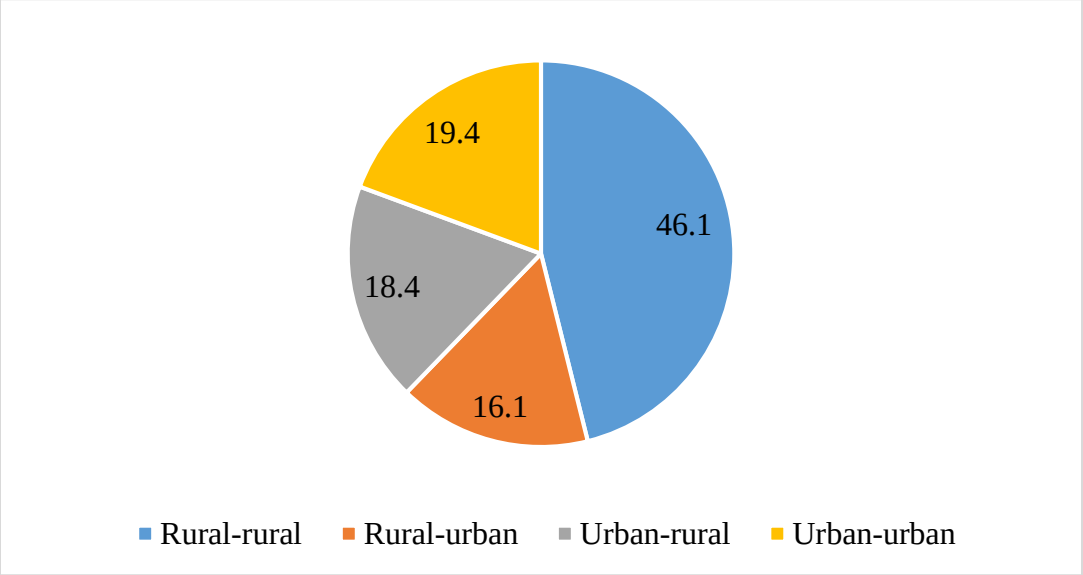

Figure 1: Distribution of migrant women by origin-residence status

Characteristics of the migrant women

The findings on the characteristics of the migrant women indicate that for all the migration streams, majority of the women were aged below 30 years. The chi square test revele a signoficant association ($p<0.0001$) between age and migration status. This is not surprising since migration is generally selective by age. Relatedly, education was associaed with migration status. the finidngs in Table 1 show that more than 6 in 10 rural to rural migrant women had attained primary level of education compared to slighly more than half (51%) of their rural to urban counterparst. The findings however show that among the urban to rural migrant women, slightly less than half (49%) had attained at a secondary level of education while majority (70%) of the urban to urban migrant women had attained at least a secondary level of education. This may suggest that migrants from

rural araes are more likely to have lower levels off education compared to their counterparts whose previous residence is an urban area.

Similarly, the findings show that slightly less than half of the rural to rural migrant women belonged to households in the two lowest categories of wealth quintile but 64% of their rural to urban counterparts belonged to households in the highest wealth quintile. Table 1 also indicates that for all the migration streams, most (70% in the rural to rural category, 62% in the rural to uraban, 56% in the urban to rural and 51% in the urban to urbanwomen were from male headed households. This is related to the nature of the Ugandan societies in which patriachy dominates except in cases of widowhood and some few cases of single motherhood. Table 1 also shows that a significant proportion of the migrant womenb were currently married. Specifically, 63% of the rural to rural migrant women were currently married, 55% of the urban to urban migrants were currently married while 51% of the urban to rural migrants were currently married but 46% of the rural to urban migrants were never married. The findings also show that slighly less than half (48%) of the rural to rural migrant women were in monogamous marriages (they did not have co-wives). However, among the rural to urban, urban to rural and urban to urban migrant women, majority were not sure of whether their husbands/partners had other wives. The Pearson Chi square test shpowed significant relationship between type of marriage and migration status.

The respondents were also asked whether they had ever used or dine anything to avoid or delay pregancy. The fondings showed that ever use of family planning methods and migration status had a signoficant reltaionship. This was also the case for current use of family planning methods. Table shopws that more than half (53% and 55%) of the rural to rural and rural to urban migrant women respectively had never used family planning while 60% and 63% of the urban to rural and the urban to urban migrant women had ever used family planning. Relatedly, the findings indicated that for all the migration types, the proportion of women who were currently using family planning was low (22% among rural to rural, 22% among ruralto urban, 29% among urban to rural and 32% among urban to urban). This may be related to rural-urban differences in the availability, accessibility and affordability of family planning and points to the relative family planning advantage that the urban areas have over rural areas.

We also find that most (63% of rural to rural, 53% of rural to urban, 63% of urban to rural and 58% of urban to urban) of the migrant women reported that they had had their sexual debut aged

15-19 years. Table 1 also shows 55%, 63%, 62% and 61% of the rural to rural, rural to urban, urban to rural and urban to urban migrant women respectively, reported 3-4 children as their ideal number of children. Table 1 shows more details.

Table 1. Selected Socio-demographic characteristics of respondents by Migration status

Characteristics	Migrants			
	Rural-rural (%)	Rural-urban (%)	Urban-rural (%)	Urban-urban (%)
Age (p<0.001)				
15-19	35.2	39.8	28.7	23.2
20-24	30.1	34.0	31.9	35.4
25-29	14.6	14.2	19.0	20.8
30-34	8.8	6.7	10.5	11.1
35-39	6.0	2.7	5.9	5.4
40-44	3.1	1.1	3.4	2.9
45-49	2.3	1.5	0.7	1.2
Education level (p<0.001)				
No education	6.9	4.1	3.4	2.4
Primary	68.7	51.2	47.5	28.0
Secondary+	24.4	44.7	49.2	69.6
Wealth quintile (p<0.001)				
Lowest	24.5	4.4	12.3	1.1
Second	23.6	4.0	13.1	1.5
Middle	20.6	6.5	18.3	2.6
Fourth	19.1	20.9	30.1	13.8
Highest	12.2	64.2	26.2	81.1
Sex of household head (p<0.001)				
Male	70.0	62.0	56.2	51.2
Female	30.0	38.0	43.8	48.8
Marital status (p<0.001)				
Never married	20.6	46.1	27.2	31.8
Currently married	62.6	39.4	54.6	50.6
Formerly married	16.8	14.5	18.2	17.6
Type of marriage (p<0.001)				
Monogamy	48.2	32.6	39.6	39.4
Polygamy	12.9	5.9	11.7	6.0
Not sure	38.9	61.5	48.7	54.7
Ever use of family planning (p<0.001)				
Never used	53.1	55.0	40.2	37.3
Ever used	46.9	45.0	59.8	62.7

Current use of family planning (p<0.001)				
Not using	78.5	77.9	70.9	67.8
Using	21.6	22.1	29.2	32.2
Age at first sex (p<0.001)				
Never had sex	11.5	26.3	10.2	13.3
Below 15	16.9	11.3	14.8	9.4
15-19	63.3	53.4	63.2	57.7
20+	8.3	9.0	11.8	19.6
Ideal number of children (p<0.001)				
0-2 children	7.2	15.5	12.2	14.8
3-4 children	54.8	62.8	62.2	61.2
5+ children	38.1	21.6	25.6	23.9

Fertility of internal migrant women in Uganda

The results in Figure 2 indicate that rural-rural migrant women had a total fertility rate (TFR) of 5.9 children per woman in the three years preceeding the 2016 Uganda Demographic and Health Survey (UDHS). In addition, the TFR of rural to urban migrant women was 3.7 children per woman, that of urban to rural migrant women was 4.6 children per woman while that of urban to urban migrant women was 5.0 children per women. Thus the rural to rural migrant women had the highest fertility rate followed by the urban to urban women, urban to rural women and finally the rural to urban migrant women.

We used the one-way analysis of variance (ANOVA) to test whether there was significant difference in the fertility of the migrant women. The results revealed that the migrant women had statistically significant different fertility ($p < 0.001$) at the 5% significance level.

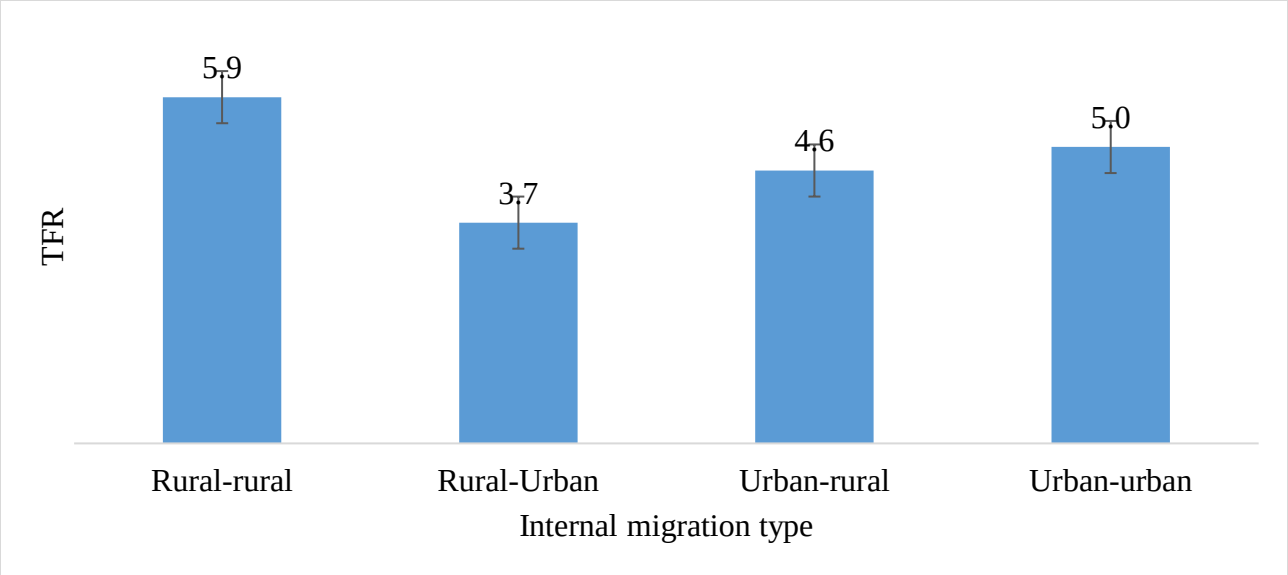

Figure 2. TFR by type of internal migration

The age specific fertility rate (ASFR) in Figure 3 indicates some key variations in the fertility behaviors at various ages but notable variations are seen in the ages younger than 30 years as rural to rural women have higher fertility and the ages between 30 and 35 years.

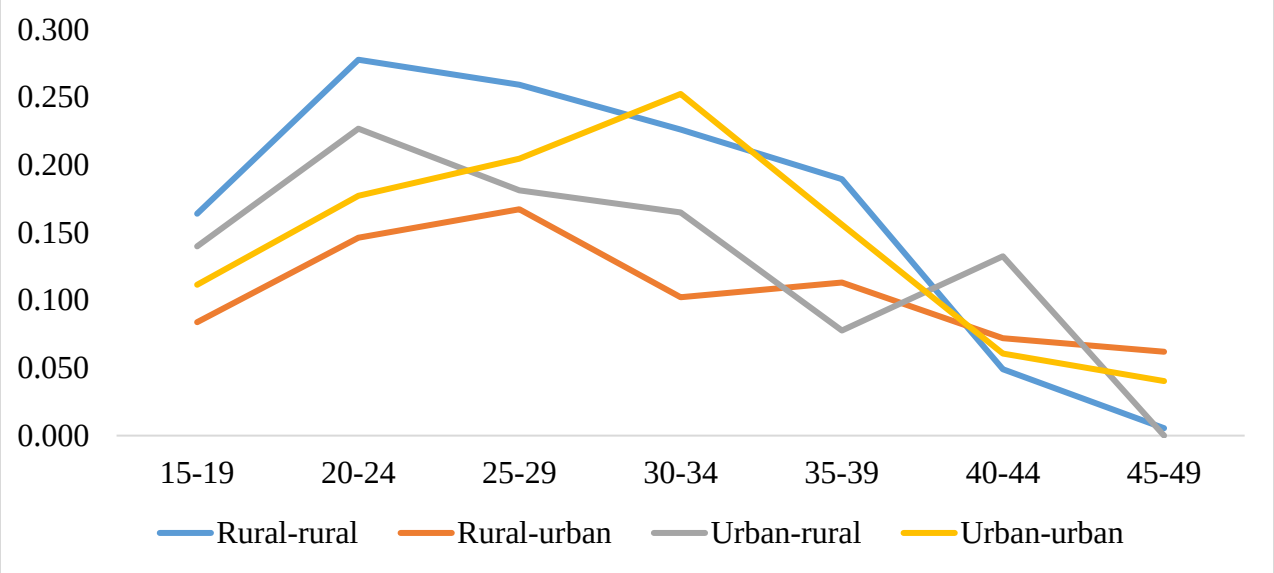

Figure 3. Age specific fertility rates by migration status

Reconstructed fertility rates to show trends of fertility since the year 2001

The total fertility rate of the rural migrants was reconstructed to demonstrate the fertility trends among the migrants since the year 2001. This reconstruction utilized the tfr2 stata module which prepared a table of events and exposure for 15 calendar years preceding the year of the survey

which was 2016 and thus the period covered in the reconstruction was January 2001 to December, 2015. Figure 4 shows the reconstructed TFR

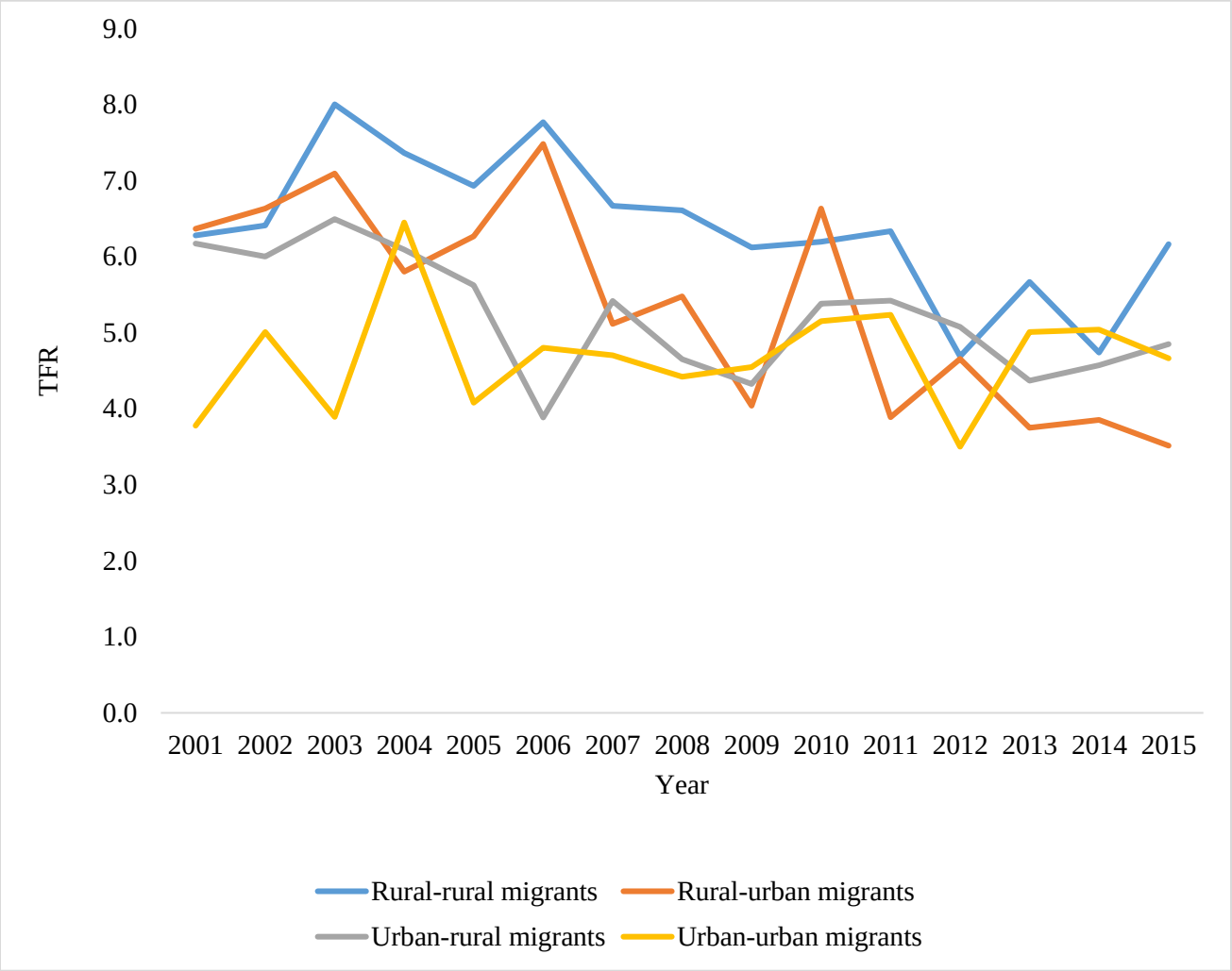

Figure 4. Reconstructed fertility rates of internal migrants for the 15 years preceding the 2016 UDHS

The findings indicate the fertility (TFR) of rural to rural migrant women and that of their rural to urban counterparts has declined since the year 2001 although there is an indication of the rise in the TFR of the rural to urban migrant women between 2009 and 2010 which may point to either true changes in fertility but also possible data quality problems such as displacements and omissions of births, misreporting of women's ages.

Factors associated with the fertility of migrant women

In the first model, a Poisson regression model of CEB was done to determine the factors associated with the fertility of the internal migrant women in Uganda. Our findings indicate that the education level, wealth index, pregnancy termination, knowledge of family planning methods, ever use of family planning, ideal number of children, marital status and type of marriage were the factors that were significantly associated with fertility of the migrant women. There is an indication that the fertility of migrant women reduced with an increase in the level of education attained. The findings also that women in the poor and richest wealth households had significantly lower (IRR of 0.909 and 0.847 respectively) fertility relative to their counterparts in the poorer households. The findings showed that the fertility of migrants who reported to have ever had a terminated pregnancy was 1.069 times that of their counterparts who had never. Furthermore, the migrant women who reported to have knowledge about family planning had higher fertility (IRR=2.616) relative to those that did not have. The fertility of the migrant women who had ever used family planning was 1.607 times that of their counterparts who had never. The findings also indicate that migrant women who preferred at least five children was higher compared to that of those who preferred 0-2 children. Table 2 shows marriage as expected was associated with higher fertility relative to the "never married" fertility and the fertility of women from polygamous marriages was higher than that of the monogamous counterparts as displayed in Table 2.

Table 2: Association between CEB and selected characteristics of all migrant women

Characteristics	IRR	P-value	95% CI
Education level			
No education	1.000		
Primary	0.732	*0.000*	0.659-0.812
Secondary	0.538	*0.000*	0.473-0.612
Wealth index			
Poorer	1.000		
Poor	0.909	*0.038*	0.830-0.995
Middle	0.929	0.100	0.851-1.014
Rich	0.917	0.104	0.827-1.018
Richest	0.847	*0.006*	0.753-0.954
Sex of household head			
Male	1.000		
Female	1.022	0.519	0.956-0.093
Current working status			
Not working	1.000		
Working	1.061	0.120	0.985-1.144
Migration status			
Rural-rural migrant	1.000		

Rural-urban migrant	0.911	0.155	0.801-1.036
Urban-rural migrant	0.980	0.647	0.900-1.068
Urban-urban migrant	1.024	0.703	0.908-1.155
Pregnancy termination			
No	1.000		
Yes	1.069	*0.039*	1.003-1.138
Knowledge of family planning			
No knowledge	1.000		
Has knowledge	2.616	*0.020*	1.166-5.869
Current use of family planning			
Not using	1.000		
Using	1.039	0.240	0.975-1.106
Ever use of family planning			
Never used	1.000		
Ever used	1.607	*0.000*	1.482-1.742
Exposure to family planning messages			
Not exposed	1.000		
Exposed	0.969	0.303	0.914-1.028
Ideal number of children			
0-2 children	1.000		
3-4 children	1.067	0.289	0.946-7.204
5+ children	1.525	*0.000*	1.344-1.732
Marital status			
Never married	1.000		
Currently married	5.685	*0.000*	4.464-7.240
Formerly married	5.762	*0.000*	4.583-7.245
Type of marriage			
Monogamy	1.000		
Polygamy	1.286	*0.000*	1.180-1.400
Not sure	1.213	*0.002*	1.075-1.368

The findings in Table 3 indicate that for the rural to rural migrant women, fertility was associated with; education level attained, wealth, pregnancy termination, ever use of family planning methods, family size preferences, marital; status and type of marriage. Generally, the fertility reduced with an increase in education attainment. Whereas the fertility of women who had attained primary education was 0.721 times that of their counterparts who had attained no education, for women who had attained at least a secondary education it was 0.545 times that of their counterparts with no education. The findings in Table 3 reveals that fertility of women in the poor households was 0.884 times relative to their counterparts from the poorest households. The findings also show that the fertility of women who reported to have ever had a terminated pregnancy (whether induced or spontaneous) was 1.107 times that of their counterparts who had never had. We find that the fertility of rural to rural migrant women who reported that they ever used family planning was 1.8

times that of their counterparts who had never used. Regarding ideal number of children, the findings indicate that the fertility of the rural to rural migrant women whose preferred number of children was 1.646 times that of their counterparts that preferred 0-2 children. Table 3 findings show that as one would expect, the fertility of currently and formerly married women were more than 5 times that of their never married counterparts but women who reported to be in polygamous unions had a fertility that was higher than that of their counterparts in monogamous unions as shown by the IRR of 1.28.

Table 3. Association between CEB and selected characteristics of rural to rural migrant women

Characteristics	IRR	P-value	95% CI
Education level			
No education	1.000		
Primary	0.721	*0.000*	0.628-0.826
Secondary	0.545	*0.000*	0.461-0.643
Wealth index			
Poorer	1.000		
Poor	0.884	*0.017*	0.8000-0.978
Middle	0.915	0.095	0.8240-1.016
Rich	0.925	0.265	0.8070-1.061
Richest	0.905	0.215	0.7730-1.060
Sex of household head			
Male	1.000		
Female	0.944	0.221	0.8610-1.035
Current working status			
Not working	1.000		
Working	1.045	0.420	0.9390-1.162
Pregnancy termination			
No	1.000		
Yes	1.107	*0.031*	1.0090-1.214
Current use of family planning			
Not using	1.000		
Using	0.943	0.175	0.8660-1.027
Ever use of family planning			
Never used	1.000		
Ever used	1.800	*0.000*	1.6260-1.992
Exposure to family planning messages			
Not exposed	1.000		
Exposed	0.934	0.093	0.8630-1.011
Ideal number of children			
0-2 children	1.000		
3-4 children	1.154	0.132	0.9580-1.391
5+ children	1.646	*0.000*	1.3650-1.984

Marital status			
Never married	1.000		
Currently married	5.419	*0.000*	3.7540-7.824
Formerly married	5.726	*0.000*	4.1810-7.841
Type of marriage			
Monogamy	1.000		
Polygamy	1.280	*0.000*	1.1570-1.417
Not sure	1.209	0.073	0.9820-1.488

In model 3, we analyze the factors associated with fertility of recent rural-urban migrant women. Table 4 findings reveal that education level attained by the women, wealth quintile (notably richest wealth quintile), ever use of family planning, ideal number of children, marital status and type of marriage were significantly associated with the fertility. Specifically, the findings in Table 4 show that rural to urban migrant women who had attained primary level of education had lower fertility (0.682) while the women who had attained at least a secondary education had the lowest fertility (IRR=0.508) relative to those with no education. Furthermore, the findings showed that the fertility of rural to urban migrant women from richest households was 0.697 times that of their counterparts in the poorest category. Table 4 also indicates that the rural to urban migrant women who were currently using family or had ever used family planning had higher cumulated fertility compared to their counterparts who were not using or had never used. As expected, currently married and formerly married women had higher fertility compared to their never counterparts. The findings also indicate that the fertility of women in polygamous union was 1.617 times that of their counterparts in monogamy while that of their counterparts who were not sure of whether their husband /partners had IRR that was 1.417 times that of their monogamous counterparts.

Table 4. Association between CEB and selected characteristics of rural-urban migrant women

Characteristics	IRR	P-value	95% CI
Education level			
No education	1.000		
Primary	0.682	*0.009*	0.512-0.909
Secondary	0.508	*0.000*	0.372-0.694
Wealth index			
Poorer	1.000		
Poor	0.969	0.913	0.546-1.720
Middle	0.985	0.939	0.671-1.446
Rich	0.768	0.160	0.532-1.109
Richest	0.697	*0.048*	0.488-0.996

Sex of household head			
Male	1.000		
Female	1.188	0.057	0.995-1.418
Current working status			
Not working	1.000		
Working	0.979	0.813	0.822-1.166
Pregnancy termination			
No	1.000		
Yes	1.140	0.224	0.923-1.409
Current use of family planning			
Not using	1.000		
Using	1.089	0.341	0.914-1.298
Ever use of family planning			
Never used	1.000		
Ever used	1.631	*0.000*	1.266-2.100
Exposure to family planning messages			
Not exposed			
Exposed	1.091	0.337	0.913-1.304
Ideal number of children			
0-2 children	1.000		
3-4 children	1.063	0.725	0.755-1.498
5+ children	1.511	*0.022*	1.061-2.150
Marital status			
Never married	1.000		
Currently married	7.826	*0.000*	4.430-13.824
Formerly married	7.797	*0.000*	4.654-13.063
Type of marriage			
Monogamy	1.000		
Polygamy	1.617	*0.000*	1.272-2.056
Not sure	1.416	*0.016*	1.068-1.878

Factors associated with fertility of recent urban-rural migrant women were modelled in the fourth model. Table 5 findings indicate that the fertility of urban to rural migrant women was associated with education level attained, current use of family planning, ever use of family planning, ideal number of children and marital status. More specifically, the findings reveal that fertility reduced with an increase in education attainment. The fertility of women who had attained primary level of education was 0.672 times that of their counterparts with no education while that of women who had attained at least secondary education was 0.493 times that of their counterparts with no education. The findings also indicate that women who reported that they were currently using family planning methods had higher fertility (IRR=1.233) compared to their counterparts who were not using. In addition, the fertility of women who reported that they had ever used family planning was 1.289 times that of their counterparts who had never used. This may be linked to the

fact that women who have ever had children are more likely to use family planning methods compared to those that have never. This paper also finds that women whose preferred number of children was at least five children had higher fertility (IRR=1.552) relative to their counterparts that preferred 0-2 children.

Table 5. Association between CEB and selected characteristics of urban-rural migrant women

Characteristics	IRR	P-value	95% CI
Education level			
No education	1.000		
Primary	0.672	*0.002*	0.521-0.866
Secondary	0.493	*0.000*	0.372-0.652
Wealth index			
Poorer	1.000		
Poor	0.960	0.746	0.749-1.230
Middle	0.969	0.792	0.764-1.228
Rich	0.928	0.585	0.711-1.213
Richest	0.976	0.852	0.756-1.260
Sex of household head			
Male	1.000		
Female	1.050	0.484	0.916-1.203
Current working status			
Not working	1.000		
Working	1.064	0.500	0.889-1.273
Pregnancy termination			
No	1.000		
Yes	0.970	0.726	0.818-1.151
Current use of family planning			
Not using	1.000		
Using	1.233	*0.008*	1.056-1.439
Ever use of family planning			
Never used	1.000		
Ever used	1.289	*0.017*	1.046-1.589
Exposure to family planning messages			
Not exposed	1.000		
Exposed	1.005	0.951	0.865-1.167
Ideal number of children			
0-2 children	1.000		
3-4 children	1.099	0.514	0.827-1.460
5+ children	1.552	*0.003*	1.156-2.083
Marital status			
Never married	1.000		
Currently married	4.843	*0.000*	3.016-7.776
Formerly married	4.662	*0.000*	3.086-7.042

Type of marriage			
Monogamy	1.000		
Polygamy	1.067	0.448	0.903-1.261
Not sure	1.151	0.357	0.853-1.555

In the fifth model, we examined factors associated with fertility of recent urban-urban migrant women. The findings in Table 6 indicated that the fertility of urban to urban migrant women was associated with secondary education level attainment, ever use of family planning, ideal number of children preferred, marital status and the type of marriage. The findings in model 5 show that the fertility of women who had attained a secondary level of education was 0.673 times that of their counterparts with no education which implies lower fertility among the women with secondary education relative to those with no education. The findings also show that women who had ever used family planning had higher fertility (IRR=1.437) compared to their counterparts who had never used. Furthermore, the fertility of urban to urban migrant women who reported that they preferred at least five (5+) children was 1.39 times that of their counterparts who preferred 0-2 children. The findings show that currently and formerly married urban to urban migrant women had higher fertility compared to their never counterparts. The fertility of women in polygamous unions was 1.4 times that of their counterparts in the monogamous marriages.

Table 6. Association between CEB and selected characteristics of urban-urban migrant women

Characteristics	IRR	P-value	95% CI
Education level			
No education	1.000		
Primary	0.977	0.886	0.713-1.340
Secondary	0.673	*0.019*	0.484-0.937
Wealth index			
Poorer	1.000		
Poor	1.608	0.317	0.635-4.072
Middle	1.175	0.712	0.498-2.770
Rich	1.128	0.776	0.491-2.594
Richest	0.965	0.933	0.422-2.208
Sex of household head			
Male	1.000		
Female	1.128	0.147	0.959-1.327
Current working status			
Not working			
Working	1.133	0.213	0.931-1.377
Pregnancy termination			
No	1.000		

Yes	1.009	0.932	0.825-1.234
Current use of family planning			
Not using	1.000		
Using	1.046	0.580	0.892-1.225
Ever use of family planning			
Never used	1.000		
Ever used	1.437	*0.005*	1.118-1.848
Exposure to family planning messages			
Not exposed	1.000		
Exposed	1.017	0.887	0.811-1.275
Ideal number of children			
0-2 children	1.000		
3-4 children	0.963	0.743	0.770-1.205
5+ children	1.390	*0.003*	1.118-1.729
Marital status			
Never married			
Currently married	6.720	*0.000*	3.931-11.490
Formerly married	6.151	*0.000*	3.635-10.407
Type of marriage			
Monogamy	1.000		
Polygamy	1.451	*0.021*	1.059-1.990
Not sure	1.237	0.066	0.986-1.552

Discussion

This study finds that rural to rural migrant women had the highest fertility rate followed by the urban to urban women, urban to rural women and finally the rural to urban migrant women. We find that the fertility of rural to rural migrant women was associated with; education level attained by the women, wealth index, pregnancy termination, ever use of family planning methods, family size preferences, marital; status and type of marriage. Relatedly, the factors associated with fertility of recent rural-urban migrant women include; education level attained by the women, wealth quintile (notably richest wealth quintile), ever use of family planning, ideal number of children, marital status and type of marriage whereas the fertility of urban to rural migrant women was associated with education level attained, current use of family planning, ever use of family planning, ideal number of children and marital status. On the other hand, the fertility of urban to urban migrant women was associated with secondary education level attainment, ever use of family planning, ideal number of children preferred, marital status and the type of marriage. It is important to highlight here that while education, ever use of family planning, ideal number of children which is a measure of fertility preferences and marital status were significant in all the categories of the migrant women, pregnancy termination was significant only among the rural to

rural migrants while current use of family planning was only significant among the urban to rural group. Type of marriage was insignificantly associated with the fertility of the urban to rural women despite being associated with the fertility of the other three categories of migrant women.

Generally, increased educational attainment was associated with lower fertility. Education was significantly associated with the fertility of migrant women in all the four categories and women who had attained higher levels of education such as those with at least a secondary level of education who had lower fertility compared those with no education. This highlights the role of increased education attainment by women and most notably education beyond the secondary level of education in transitioning to lower fertility. The fertility effect of higher education attainment by women is well documented and we may link this fertility difference to such effects. Education indirectly affects fertility behavior by contributing to delayed first marriage, empowering women to use contraceptives as well as to participate in discussions with their partners about birth control which may lead to increased contraceptive use. This finding disagrees with (Adsera & Ferrer, 2014; Banougnin et al., 2018) who found no association between education and migration-fertility difference but agrees with previous studies that have found that increase in education attainment was associated with fertility reduction in many countries (Beatty, 2016; Dwivedi, Sediadie, & Ama, 2016; Shakya & Gubhaju, 2016; Shapiro & Gebreselassie, 2008; Westoff, Bietsch, & Koffman, 2013; Zhang, 2011).

Our findings indicate that marriage was associated with fertility of all the categories of migrant women with currently and formerly married women having higher fertility than the never married women. We note that this is expected since most births take place within marriages but there are situations in which never married women give birth and may decide to remain unmarried as they raise their children as single mothers. This is expected since marriage is among the proximate determinants of fertility. This finding thus confirms what other studies (Beatty, 2016; Ezeh, Mberu, & Emina, 2009; Rutayisire, Hooimeijer, & Broekhuis, 2014) about the role of marriage as in the levels and trends of fertility. Relatedly, the findings revealed that polygamy was associated with increased fertility among rural to rural, rural to urban as well as urban to urban migrant women. While it may not be conclusive, there seems to a competition for many children among co-wives as a way to keep partners to themselves. This finding is partly in line with those of a study of

determinants of change in fertility in Uganda which also highlighted the importance of type of marital union in fertility studies (Ariho, Kabagenyi, & Nzabona, 2018).

The found that women of all migration types whose ideal number of children was at least five children was associated with higher fertility compared to those who preferred 0-2 children observed fertility differential. This finding is partly linked to the possibility that family size preferences influence opinions, attitudes and motivations for fertility control which often lead to actual utilization of fertility control methods of any kind. Our findings are in agreement with those of other scholars (Banougnin et al., 2018; Bongaarts & Casterline, 2013; Chowdhury, 2010; Ezeh et al., 2009; Lyager, 2010; Ramsay, 2014; Westoff & Cross, 2006) that have also reported the importance of family size preferences in fertility differentials and the general transition to low fertility.

Our findings highlight that ever use of family planning was associated with fertility in all the four categories of migrant women. The findings show that women who reported to have ever used family planning methods had higher fertility compared to their counterparts who had never used. This is most likely because these women may have used family planning to control births after having had a certain number of children since this study used the number if children ever born to model fertility. Furthermore, despite the fertility inhibiting effects of family planning, this study finds that among the urban to rural migrant women, women who were currently using family planning had higher fertility relative to those who were not. This may partly be because these women have already had a certain number of children are thus trying to control births of addition children or they are trying to space the births of children. This may thus imply that women are more motivated to use family planning methods after they have already had some children. This finding is partly in disagreement studies conducted in sub Saharan Africa and elsewhere which have highlighted the fertility inhibiting effect of family planning (Brockerhoff, 1995; Ezeh et al., 2009; Garenne, 2008; Majumder & Ram, 2015; Rutayisire et al., 2014; Westoff & Cross, 2006).

Our findings indicate that household wealth index, was associated with the fertility of migrant women who originated from rural areas (rural to rural as well as rural to urban migrant women). Wealth index is a household level characteristic that is generally known to be a very important factor in the fertility transition due to its association with increased ability and ease to access and obtain quality services such as those to do with fertility regulation. This is partly in line with

findings of studies (Dribe, Hacker, & Scalone, 2015; Neal, Chandra-Mouli, & Chou, 2015; Williams et al., 2013) which have generally highlighted the importance of wealth in predicting fertility levels although these studies have not necessarily been focused on migration and fertility.

This study finds that although pregnancy termination was associated with the fertility of rural to rural migrant women, this was however not the case among the migrants to urban areas or from the urban areas. This study partly agrees with a study on the impact of migration on fertility and abortion in Ghana which revealed that there was an increased risk of pregnancy termination among migrants to Accra but found no significant relationship between fertility and migration to Accra (Rokicki et al., 2014).

The high fertility among urban to urban migrant women has implications for urbanization in the country as together with the rural urban migration, fertility in these areas will be key for the growth in the urban populations as well as the expansion of the urban areas in form of settlement that extends top other rural or semi-urban areas which ultimately also become urban areas. This is also likely to result into new challenges such as; unemployment rates soaring, and in the wake of weak environment management and protection interventions will have serious consequences for climate change as the populations encroach on protected areas including wetlands and other significant ecosystems.

This paper is based on a national representative cross sectional survey and thus the findings may be generalized to the population. Our conceptualization of a migrant considered a person who had lived in the current place of residence for not more than 1 year. This conceptualization potentially leaves out long term migrants or migrants who declared themselves as usual residents in the current place of residence. It is also possible that respondents may not recall the number of years they have consistently lived in the current place of residence. Never the less, this study assesses the association between current migration and fertility of women in Uganda and then classifies the migrant women into; rural to rural migrants, rural to urban, urban to rural and urban to urban and then determines the factors associated with fertility of women in each of the four categories. Secondly we note that the demographic and health survey (DHS) data does not cover sufficient detail that may be helpful in conducting deeper assessment of migration and other indicators that may be related to migration such as numbers of moves made. Thirdly, the topic of migration might be sensitive in some communities due to xenophobic and related tendencies and thus some

respondents may declare themselves as usual residents even when they are recent migrants. Further studies can be conducted to explore this association by classifying long term migrants, short term migrants and non-migrants and also to examine the effect of fertility on migration. Furthermore, our study is limited because of its cross sectional nature which renders it insufficient to draw causal inferences about the fertility behaviors of the migrant women but rather determines associations between migration and fertility.

Conclusions and policy implications

This study finds that migrants have significantly different fertility when compared. Rural to rural migrant women had higher fertility followed by urban to urban migrant women, urban to rural migrant women and was lower in the rural to urban migrant women. This study found that education, ever use of family planning, ideal number of children and marital status were factors that appeared to have a significant association with fertility in all the categories of the migrant women. Other factors that were significant were; pregnancy termination (among rural to rural migrant women), and type of marriage for the rural to rural, rural to urban and urban to urban categories of women; and current use of family planning for the urban to rural migrant women.

This paper reasserts the significant role of education as a key determinant of fertility transition in Uganda. The paper thus calls for continued improvements in access, attendance and completion of secondary schools by all women in Uganda. This presents a viable option for not only the reduction of the country's fertility levels but also has other social and economic effects on the country. Our findings also show the persistent desire for large family sizes as one of those factors that are associated with high fertility. It is also highlighted that a significant proportion of women in the four migration streams preferred 3-4 children although their fertility was higher than that. It is thus imperative that efforts to improve uptake of family planning methods (including traditional methods) by women and their partners especially those in rural areas are strengthened. This calls for improved information, education and communication about family planning through appropriate mass media to influence changes in attitudes towards family planning, large family size preferences and other family and society norms. Well-coordinated family planning that is will also be helpful in reducing pregnancy terminations which are also in a way associated with high fertility.

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