Household welfare perspective of family planning utilization in Uganda

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Abstract

The rationale for FP use has changed over time to progressively emphasize poverty reduction and welfare improvements. However, literature hasn't largely matched this change. This study, therefore, sought to contribute to this knowledge gap by exploring the impact of FP on household welfare using consumption per adult equivalent as the measure of household welfare. Data from the Uganda National Panel Survey 2018/19 and 2019/20 waves was used, and the analysis was done using pooled ordinary least squares. Results revealed that fewer male headed households and more of the women not using FP were poor as compared to their counterparts. Results also indicated FP use to increase household welfare by 6.4% among all households. This increase is however more significant for rural women. The results thus indicate the potential of using FP to bridge the rural-urban divide.

Keywords*: Family planning; Household welfare; Uganda, Rural livelihoods*

Résumé

La justification de l'utilisation de la PF a changé au fil du temps pour mettre progressivement l'accent sur la réduction de la pauvreté et l'amélioration du bien-être. Cependant, la littérature ña pas largement correspondu à ce changement. Cette étude a donc cherché à contribuer à ce manque de connaissances en explorant l'impact de la PF sur le bien-être des ménages en utilisant la consommation par équivalent adulte comme mesure du bien-être des ménages. Les données des vagues 2018/19 et 2019/20 de l'Enquête nationale par panel de l'Ouganda ont été utilisées, et l'analyse a été effectuée à l'aide des moindres carrés ordinaires regroupés. Les

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résultats ont révélé que moins de ménages dirigés par des hommes et plus de femmes n'utilisant pas la PF étaient pauvres par rapport à leurs homologues. Les résultats ont également indiqué que l'utilisation de la PF augmentait le bien-être des ménages de 6,4 % parmi tous les ménages. Cette augmentation est cependant plus importante pour les femmes rurales. Les résultats indiquent ainsi le potentiel de l'utilisation de la PF pour combler le fossé rural-urbain.

Mots clés : *Planification familiale ; Bien-être des ménages ; Ouganda, Modes de vie ruraux*

Introduction

The 2030 Agenda reiterates that utilization of Family Planning (FP) advances the human right of individuals and households to control family size and attain the preferred birth spacing (United Nations Department of Economic and Social Affairs - UNDESA, 2020; World Health Organization - WHO, 2020a). Given that FP matters in lowering population growth by reducing family size, the use of FP could, therefore, lead to sustainable economic growth and development of any country as well as an increase in households' per capita incomes, consequently improving household welfare (Bailey et al., 2014). Globally, the utilization of FP has been increasing and in 2020, approximately 49% of all the women in the reproductive age of 15 to 49 years were reported to have ever used FP. This however has not been the case for the Sub-Saharan African (SSA) region with only 27.8% of the women in their reproductive age using FP (UNDESA, 2020). A similar situation prevails in Uganda where the use of FP still remains low (39% among women in the reproductive age of 15 to 49 years) and this greatly impedes the country as well as households from achieving full benefits in terms of sustained economic development and welfare improvements respectively (Uganda Bureau of Statistics - UBOS, 2018).

Besides, it is worth noting that households that report deterioration in welfare are more likely to report low or non-utilization of FP, high incidences of illnesses (morbidity), severe illnesses, lack or low levels of education, low incomes, unemployment, and large family sizes (UBOS & ICF, 2018; UBOS, 2018). Therefore, reducing the number of children is very essential in relieving pressure on household resources and this explains why the use of FP is crucial in improving household welfare. This is due to the fact that with the utilization of FP leading to reduced family sizes, consequently, households are able to allocate fewer resources to healthcare services, and at the same time, women are more likely to participate in the labour market, therefore, increasing households' incomes (Babiarz et al., 2017).

Despite the Government's endeavors to improve households' welfare through development programs as well as fertility rate reduction initiatives such as FP utilization, Uganda is still struggling to improve households' welfare which instead has been declining with two in every ten households reported to be living in absolute poverty.

At the same time, Uganda's CPR remains low while the fertility rate of 5.4 children per woman is one of the highest in the world. The low CPR indicates low utilization of FP and is a huge problem that needs urgent intervention in order to realize the welfare effects of FP utilization on households (UBOS & ICF, 2018; UBOS, 2018; Babiarz et al., 2017).

Our study thus contributes to the existing body of knowledge in three ways. First, although FP has been used to successfully limit population growth and family sizes, the rationale for utilizing FP has evolved over time to rivet poverty reduction and household welfare improvements (Barbiarz et al., 2017; Glasier et al., 2006). Nevertheless, the empirical literature on FP utilization has not largely matched this change, with a bulk of empirical literature on FP utilization mostly focusing on its effect on fertility rate, women and children health, and only a handful focus on the effects of FP utilization on household welfare such as Kumara and Samaratunge (2017), Hoque et al. (2015), and Kwesiga et al. (2015). Secondly, most of the studies that relate FP utilization and household welfare use income measures either income, poverty, and wealth index to proxy household welfare. Owing to the fact that income varies over time, the essay deviates from these studies by employing consumption measures specifically, the consumption per adult equivalent, to proxy household welfare. Unlike the income measures, the consumption measures are stable over time. Furthermore, studies conducted in Uganda analyze utilization of FP such as Nuwasiima et al. (2019), Tibaijuka et al. (2017), and Nanvubya et al. (2015), while others focus on the determinants of household welfare such as Khan and Morrissey (2019), Frempongy and Stadelmann (2017), Kwesiga et al. (2015) and Guloba (2014). These studies incoherently associated FP utilization and household welfare. Therefore, none of these studies tried to relate FP utilization and household welfare in Uganda. On the one hand however, with the high population growth rates of 3.26 percent annually in Uganda, coupled with large family sizes, this situation needs to be checked (UNFPA, 2017b). This is because the large family sizes and high population growth will make it harder for the government and households respectively to reduce poverty and improve household welfare. On the other hand, FP remains vital in reducing family sizes, fertility rate and improving household welfare. This study fills a void in literature by riveting FP utilization on household welfare. This study therefore aims to establish the effect of FP utilization on household welfare in Uganda.

Literature

The review of the empirical literature is based on four main factors that influence household welfare namely: family planning factors, fertility factors, household income, and socio-demographic factors. Regarding family planning factors, Joshi & Schultz

(2007) conducted an impact evaluation study to examine the effect of FP interventions on household welfare outcomes in Matlab, Bangladesh using Ordinary Least Squares (OLS) and Generalized least Squares. The results indicated that household welfare in the treatment group improved considerably compared to the control group. This was because the treatment group reported reduced fertility, smaller family sizes, higher incomes, higher asset and wealth accumulation relative to the control group. Similar results are also reported by Lekobane & Seleka (2017) for Botswana. In addition, Bailey et al. (2017) suggest that utilization of FP affects household welfare through two main channels: the first channel being that the use of FP leads to lower family sizes that reduce household expenditures. The second channel then occurs when the use of FP leads to the desired birth spacing that in turn gives parents ample time to participate in the labor market hence increasing household income.

As regards the association of fertility factors (including factors that relate to maternal and child health status such as the type of illness, frequency of hospital admission, and morbidity) with household welfare, Booker et al. (2020) using panel data from 2009 to 2016 found that type of illness had no significant effect on household welfare in the United Kingdom. Kumara and Samaratunge (2017) however found that, in Sri Lanka, the type of illness and frequency of hospitalization imposes a severe burden on household resources, and in most cases, households are forced to forgo food consumption hence reducing household welfare. Also, Hoque et al. (2015) argue that coping strategies adopted by households due to various types of illnesses and increased frequency of hospitalization result in welfare losses.

Several studies such as Achida et al. (2018), Biyase and Zwane (2018), and Mansour (2012) have documented the relationship between household income and household welfare using real per capita income, happiness (measured through social indicators), and per capita income respectively, as the measure of welfare. Their results reveal that there is a positive relationship between income and household welfare. Additionally, studies that relate household income and welfare in Uganda include Tesfaye and Tirivayi (2020), Fiala and He (2016), Ssewanyana and Kasirye (2012), as well as Asiimwe and Mpuga (2007). The studies point to the fact that income increases household consumption expenditure on education, children's clothing, food, and shelter that result in overall welfare improvements.

Regarding the association of socio-demographic factors with household welfare, a number of empirical studies have revealed that socio-demographic factors including characteristics such as marital status (Anyanwu, 2014), age (Sekhampu, 2013; Litchfield & Mcgregor, 2008), education level (Nguyen & Nguyen, 2019; Gounder, 2012), ethnicity (Nguyen & Nguyen, 2019), occupation (Lekobane & Seleka, 2017) and years of marriage as well as household characteristics such as household/family size (Ssewanyana & Kasirye, 2012; Akerele & Adewuyi, 2011) have an association with household welfare. Studies find that increasing household size negatively affects household welfare

as reported in Tanzania (Litchfield & Mcgregor, 2008), Nigeria (Akerele & Adewuyi, 2011), and Fiji (Gounder, 2012), owing to reduction in resources needed to satisfy the needs of every household member. Anyanwu (2014) on the other hand examined the effect of marital status on poverty and household welfare in Nigeria. The study revealed that marriage brings a number of economic and welfare benefits to the household by adding a prospective earner to the household. Ogundari & Aromolaran (2014) for Nigeria, used the double hurdle model to assess the effects of education on household welfare and observed a positive relationship. Similar results are reported for Tanzania (Litchfield & Mcgregor, 2008), Fiji (Gounder, 2012), Ghana, and Uganda (Khan & Morrissey, 2019; Frempongy & Stadelmann, 2017), and Vietnam (Nguyen & Nguyen, 2019). In summary, a conceptual framework reflecting the relationships analyzed in this study based on the review of the empirical literature is presented in Figure 1.

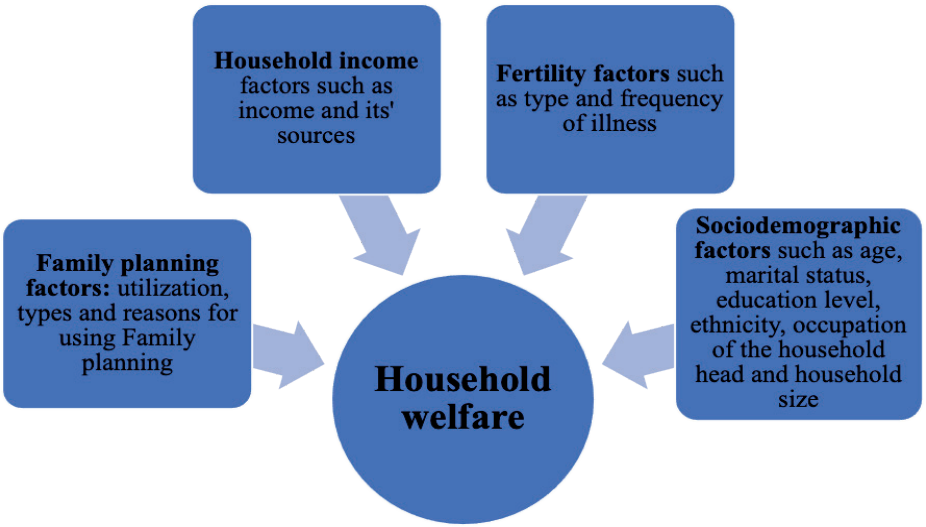


Figure 1: Conceptual framework

Materials and methods

Framework of the study

This study was based on the utility maximization theory where the welfare function takes the form of a utility function as;

$\omega_i = f(x_i, y_i)$ ..... (3.1)

Where, x_i is a vector of consumption goods and y_i a vector for household welfare indicators including income and demographic factors.

According to Jehle and Reny (2011), x_i is obtained by maximizing the utility function $\omega_i = f(x_i, y_i)$ subject to the budget constraint $P_x x_i = m$ which when solved yields;

$x_i = x(P_x, m, y_i)$ ..... (3.2)

Inverting the function gives, $m = m(u, P_x, y_i)$ where m is the household consumption per adult equivalent, a proxy for household welfare, and y_i includes all factors including FP utilization.

In addition to the foregoing, as part of the household, children are believed to take a small proportion or consume less of the total expenditures and are therefore considered as fractions of adults (Appleton, 2001). The adult equivalent scale system thus allocates weights to the different household members by age and the scale ranges from zero to one. Under this system, children will be given smaller weights than adults. The sum of weights is then used to divide household consumption expenditures to arrive at a measure of welfare.

Data source

This study used nationally representative data from the 2018/19 and 2019/20 Uganda National Panel Survey (UNPS) waves which are generated as part of the World Bank Living Standards Measurement Study (LSMS-ISA) initiative. The two waves were implemented among 3100 households in 2018/19 and approximately 3000 households in 2019/20. The surveys comprise of the household questionnaire, woman questionnaire, agriculture and livestock questionnaire, as well as the community questionnaire. For the purpose of our study, we used the household and woman questionnaires as they capture households' information on age, fertility, education levels, occupation status, household incomes, and sources, marital status, household welfare, FP utilization, welfare, and

household consumption expenditures. The 2018/19 and 2019/20 UNPS datasets can be obtained online through the World Bank microdata webpage (https://microdata.worldbank.org/index.php/catalog/).

Study variables

The outcome variable of this study was household welfare, captured as a continuous variable. Owing to the multidimensional characteristic of household welfare, this study restricts itself to a money-metric measure to proxy household welfare which is consumption per adult equivalent (Guloba, 2014; Moratti & Natali, 2012).

The main independent variable was the women's family planning method utilization measured as a dummy variable with "1" representing their use of any form/ method of family planning to avoid or delay pregnancy and "0" otherwise.

Model

The choice of empirical model was based on panel data regression analysis and therefore specified as follows (in equation 1);

$$hhd\ welfare = f(family\ planning\ factors, sociodemographic\ variables, fertility\ factors, household\ income\ factors) + error\ term \quad \ldots\ldots (1)$$

$Sociodemographic\ variables$ include age, marital status, education level, occupation, household size and years of marriage, while $fertility\ factors$ are factors that relate to maternal and child health status such as the type of illness, frequency of hospital admission and that of morbidity). $Household\ income\ factors$ include average monthly household income and the major source of income.

Decomposing equation 1 into specific variables used in this study led to the following:

$$hhd\ welfare = \beta_0 + \beta_1 Age_{it} + \beta_2 M\_status_{it} + \beta_3 Edu_{it} + \beta_4 HHsize_{it} + \beta_5 Freq_{it} + +\beta_6 Income\_source_{it} + \beta_7 Resd_{it} + \beta_8 GenderHH_{it} + \beta_9 FP_{it} + \varepsilon_{it}$$

..... (2)

Where Age, M_status, and Edu, denote the woman's age, marital status, and education level, respectively while Hhsize represents the household size, Freq represents the frequency of hospital admission/morbidity, Income_source represents the women's income sources. Resd represents the place of residence, GenderHH represents the gender of the household head, and FP represents FP utilization.

Diagnostic tests

Model Selection Test

The Hausman test and Breusch-Pagan Lagrange multiplier (LM) test are used to ascertain the suitable model among Random Effects (RE), Fixed Effects (FE), and Pooled Ordinary Least Squares (POLS). The findings from the Hausman test in Table A1 reveal that the p-value is 0.1458 (which is greater than 0.05), therefore, we fail to reject the null hypothesis and confidently state that RE is the most suitable model. Having opted for the RE model, the LM test was then used to decide whether to use POLS or RE, and the results for the test are presented in Table A2. With Prob > chi2 = 1.0000 which is above 0.05, we fail to reject the null hypothesis at a 5 percent level of significance and conclude that POLS is the most preferred model.

Multicollinearity test

Severe multicollinearity causes high standard errors and unexpected signs for the coefficients. To ascertain whether there is presence of multicollinearity, a Pearson correlation matrix and Variance Inflation Factors (VIF) were used. The results in Table A3 show that the mean VIF is 1.56 which is way below the cut-off point of 10, therefore, we confidently conclude that multicollinearity is not a problem for the study results.

Heteroskedasticity test

Heteroscedasticity leads to less efficient estimates. Therefore, Breusch–Pagan/Cook–Weisberg test was carried out to test for heteroskedasticity and presented in Table A4. The results reveal that Prob > chi2 is 0.3709, which is greater than 0.05 (at a 5 percent level of significance). Therefore, we fail to reject the null hypothesis and conclude that heteroscedasticity is not present.

Model specification test

In order to check if the model is correctly specified, two tests were carried out namely; the Link test and Ramsey RESET test, and the results presented in Tables A5 and A6 respectively. The null hypothesis for the two tests states that the model is correctly specified. In addition, the link test generates two variables (_hat and _hatsq) whose probability values must be above 5 percent for the model to be correctly specified. From Table A5, it can be observed that the p-values for _hat and _hatsq are 0.334 and 0.904

which are above 0.05 therefore we conclude that the model is correctly specified. On the other hand, the Prob>F is 0.9205 in Table A6 which is above 0.05 thus we fail to reject the null hypothesis and conclude that the model is correctly specified.

Test for Normality

One of the key assumptions for Ordinary Least Squares is that the data must be normally distributed. To test whether the data is normally distributed or not, we used the Jarque-Bera (JB) test on the predicted residuals. The results from the JB test are presented in Table A7. Table A7 shows that the probability value is 0.8022 (at a 5 percent level of significance), therefore, we fail to reject the null hypothesis for normality and conclude that the data is normally distributed.

Statistical analysis

Our empirical investigation focused on establishing the impact of FPM utilization on household welfare. We first conducted descriptive statistics, then the diagnostic tests including the model selection tests, model specification test, multicollinearity test, heteroskedasticity test as well as the test for normality, and finally adopted the pooled OLS to regress FPM use on household welfare.

Results

Summary statistics

In Table 1, the share of households living in poverty is approximately 18 percent. Additionally, women on average live in households comprising of about 5.8 members with a minimum of 1 member and a maximum of 18 members. Approximately 25 percent of the women reside in urban households while the majority of their counterparts (that is 75 percent) live in rural areas. This concurs with the national statistics that report Uganda's population to be majorly rural with over 76 percent of the total population living in the rural areas (UBOS, 2020a). As regards household headship, the results reveal that the households are predominantly headed by males (68 percent) while only 32 percent of the households are female-headed. The average age of the women is about 32 years. In addition, the majority of the women are married (67 percent) and about 21 percent have never been married, while 9 percent and 3 percent are divorced and widowed correspondingly.

Table 1: Summary statistics for the overall sample

Variable	Obs.	Mean	Std. Dev.	Min	Max
Household Characteristics					
Household Welfare (log)	4072	11.255	0.755	8.426	14.492
Poverty status	4072	0.18	0.384	0	1
Household Size	4072	5.791	2.585	1	18
Location (urban)	4072	0.25	0.433	0	1
Gender of the household head	4071	0.683	0.465	0	1
Women Characteristics					
Age	4072	31.647	9.724	15	49
FP utilization	3578	0.368	0.482	0	1
Employment status	4072	0.127	0.333	0	1
Farming	4072	0.489	0.5	0	1
Property	4072	0.014	0.116	0	1
Transfers	4072	0.002	0.041	0	1
Wage	4072	0.213	0.41	0	1
Non-agricultural earnings	4072	0.236	0.425	0	1
Other Income sources	4072	0.046	0.21	0	1
No formal education	4072	0.098	0.297	0	1
Primary	4072	0.631	0.482	0	1
Secondary	4072	0.215	0.411	0	1
Post-secondary and Tertiary	4072	0.055	0.229	0	1
Never married	4072	0.212	0.409	0	1
Married	4072	0.667	0.471	0	1
Divorced	4072	0.086	0.28	0	1
Widowed	4072	0.035	0.185	0	1

Source: Author's computation based on the 2018/19 and 2019/20 panels

Consumption expenditure per adult equivalent among users and non-users of FPM

Table 2 provides insights into the distribution of income at national level, among users of FP and non-users of FP between the survey periods for the years 2018/19 and 2019/20. In Table 2 the welfare level based on consumption per adult equivalent at the median and other deciles is presented. The results show that welfare increases at all deciles at national level and among users of FP. However, among the non-users, we note a negative change in welfare at the 9th decile (the lower bounds of the 10 percent relatively rich Ugandans) of about 1.6 percent. Nonetheless, Results also indicate an exceptional increase in welfare in 2019/20 from 2018/19 by the category of FP utilization with a strong increase among users in the 7th and 8th deciles compared to non-users, while the non-users had a strong increase for the 1st and 3rd decile compared to the users of FP. Generally, the pattern for users of FP is close to that of the country as a whole than that for non-users where the picture is a little bit different.

Table 2: Consumption expenditure per adult equivalent among users and non-users of FPM

	2018/19	2019/20	%_change
National			
Decile 1	23,211	27,255	17.4
Decile 2	35,735	42,070	17.7
Decile 3	43,520	50,953	17.1
Decile 4	51,638	59,169	14.6
Decile 5	60,721	68,885	13.4
Decile 6	71,614	81,947	14.4
Decile 7	87,632	98,778	12.7
Decile 8	111,279	123,181	10.7
Decile 9	158,873	173,299	9.1
Using FPM			
Decile 1	26,661	31,191	17.0
Decile 2	38,554	45,681	18.5
Decile 3	46,285	54,395	17.5
Decile 4	54,402	62,910	15.6
Decile 5	63,286	72,777	15.0
Decile 6	75,123	86,152	14.5
Decile 7	90,837	102,922	13.3
Decile 8	113,687	127,138	11.8
Decile 9	156,040	170,329	9.2

Not Using FPM			
Decile 1	20,443	24,859	21.6
Decile 2	32,505	38,190	17.5
Decile 3	40,388	47,949	18.7
Decile 4	47,894	55,215	15.3
Decile 5	57,610	63,327	9.9
Decile 6	67,761	74,680	10.2
Decile 7	83,119	89,949	8.2
Decile 8	107,345	113,020	5.3
Decile 9	163,201	160,511	-1.6

Source: *Author's computation based on the 2018/19 and 2019/20 panels*

Poverty status by gender of the household head and by residence

Comparative statistics of poverty status by gender of the household head, area of residence, and FP use are presented in Table 3. The proportion of poor households reduced from 21.9 percent in 2018/19 to 14.1 percent in 2019/20. Other differences in poverty status by gender of household head, area of residence, and FP use can be observed in Table 3. This supports evidence that overall 8 percent of households had moved out of poverty in 2018/19, although, the government of Uganda expects an increase in the poverty numbers due to COVID-19 effects (UBOS, 2020b). In addition, the percentage decline in the proportion of poor households was higher among the users of FP compared to those not using FP with 42.3 percent decline among users compared to the 29.6 percent $[((8.1 - 11.5) \div 11.5) * 100]$ decline among non-users.

Table 3: Poverty status by gender of household head and residence (% of total)

	2018/19			2019/20		
	Poor	**Non-Poor**	**All**	**Poor**	**Non-Poor**	**All**
Gender of Household head						
Female	7.5	23.6	31.1	5.0	27.4	32.4
Male	14.4	54.5	68.9	9.1	58.5	67.6
Area of residence						
Rural	19.5	55.4	74.9	12.6	62.7	75.3
Urban	2.4	22.7	25.1	1.5	23.2	24.7
Any FP use						
No	11.5	32.8	44.3	8.1	32.5	40.6
Yes	10.4	45.3	55.7	6.0	53.4	59.4
All	21.9	78.1	100	14.1	85.9	100

Source: Author's computation based on the 2018/19 and 2019/20 panels

Poverty status by socio-demographic characteristics

Table 4 is a continuation of Table 3 with the overall comparative statistics of poverty status by the socio-demographic characteristics in both panel years (that is with 2018/19 and 2019/20 combined). Table 4 reveals that less male headed households are poor compared to their female counterparts. From Table 4, it is also revealed that 19 percent of the male headed households are poor compared to 21 percent of their female counterparts. It is important to note that poverty deprives households and individuals of the most basic human needs like food, clothing, shelter, and this, in turn, reduces their welfare. However, in most cases males unlike females are well-endowed with resources, while also some women are still faced with gender discrimination that has been identified as one of the key obstacles to overall welfare improvement and poverty alleviation (Shackleton et al., 2011). It is against this backdrop, that we partly attribute the finding that the welfare of the male headed households is slightly better than that of their female counterparts.

Concerning FP utilization, it is evidenced that the majority of the households that report not to use any FPM are poor (23 percent) relative to their counterparts using FP (15 percent). This observation resonates well with the argument by Hakizimana and Odjidja (2021) that low utilization of FP leads to large family sizes that exert a lot of pressure on household resources in terms of educating and feeding so many children and thus leading to high poverty incidences and reduced welfare. Considering the location of the household, fewer urban households were poor (8 percent) relative to rural households (23 percent). This finding is supported by the arguments by Sen et al. (2021) and Bloom et al. (2008) that reveal that urban households unlike their rural counterparts engage in well-paying industrial and non-farm employment opportunities. This, therefore, brings about the association of urban households with higher incomes, higher consumptions per capita, and are thus less likely to be poor as compared to rural households. In addition, it is evidenced that the majority of the women with no formal education are reported to be poor (50 percent) while the least had completed post-secondary and tertiary education (1 percent). In other words, poverty status declines with the education level from 50 percent (no formal education) to 1 percent (completed post-secondary and tertiary education). This is partly attributable to the fact that education provides individuals with better employment opportunities and in turn, they are in a position to secure well-paying jobs (International Labour Organization [ILO], 2020).

Table 4: Poverty status by socio-demographic characteristics

	Household's Poverty Status			Household's Poverty Status	
	Poor (%)	Non-Poor (%)		Poor (%)	Non-Poor (%)
Gender of the household head			Employment Status		
Male	19	81	Employed	20	80
Female	21	79	Otherwise	20	80
Area of residence			Education Level		
Urban	8	92	No Formal Education	50	50
Rural	23	77	Completed Primary	20	80
FP Utilization			Completed Secondary	7	93
Yes	15	85	Completed Post-Secondary and Tertiary	1	99
No	23	77	Income Sources		
Marital Status			Farming	19	81
Never Married	19	81	Property	3	97
Married	20	80	Transfers	0	100
Divorced	12	88	Wages	15	85
Widowed	28	72	Non-Agricultural Enterprises	17	83

Source: *Author's computation based on the 2018/19 and 2019/20 panels*

Income distribution by household size, FP use, gender of the household head, and poverty status

Figure 1 shows the distribution of income (consumption expenditure is used as a proxy for permanent income) by household size, FP use, gender of the household head, and poverty status. Particularly, Figure 1a illustrates the distribution of income by household size for 2018/19 and 2019/20. The distribution indicates an increase in household size between the survey periods. Households with larger numbers of people have low incomes. With regard to income distribution by FP use, Figure 1b indicates that households in which women were not using FPM, had relatively low income (many with less than Ushs.500,000 per month) compared to the households where women were using FPM. On the other hand, as shown in Figure 1c female headed households had relatively low income compared to male headed households, which actually shows the relative vulnerability of these female headed households. Figure 1d also provides insights into the distribution of income by household size and poverty status. The results reveal that the poor have a relatively high number of household members but with an extremely low income below Ushs.100,000 compared to the non-poor households.

Figure 3.2a

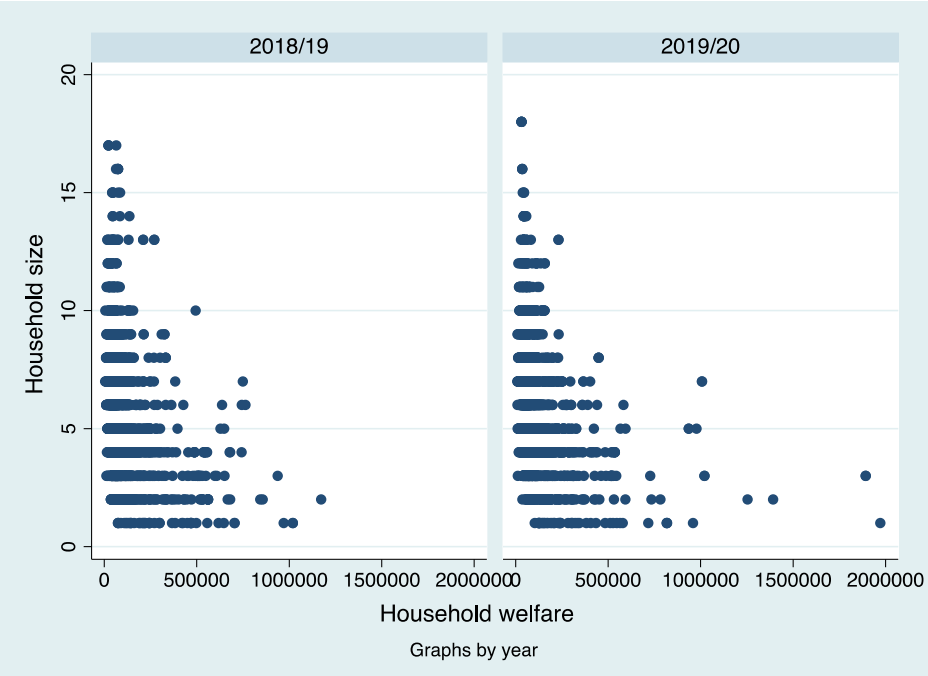


Figure 3.2b

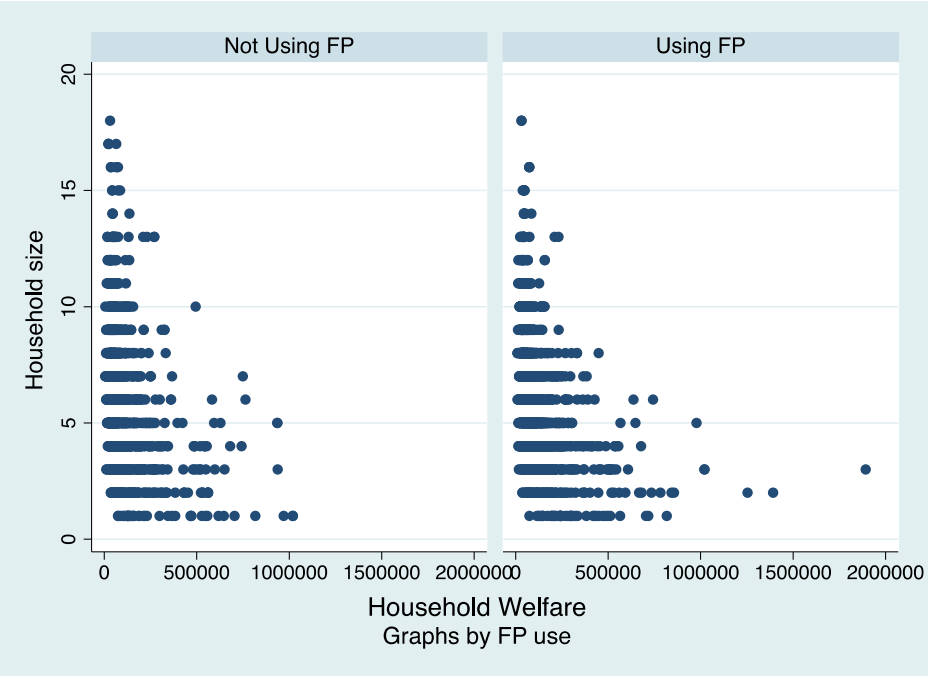


Figure 3.2c

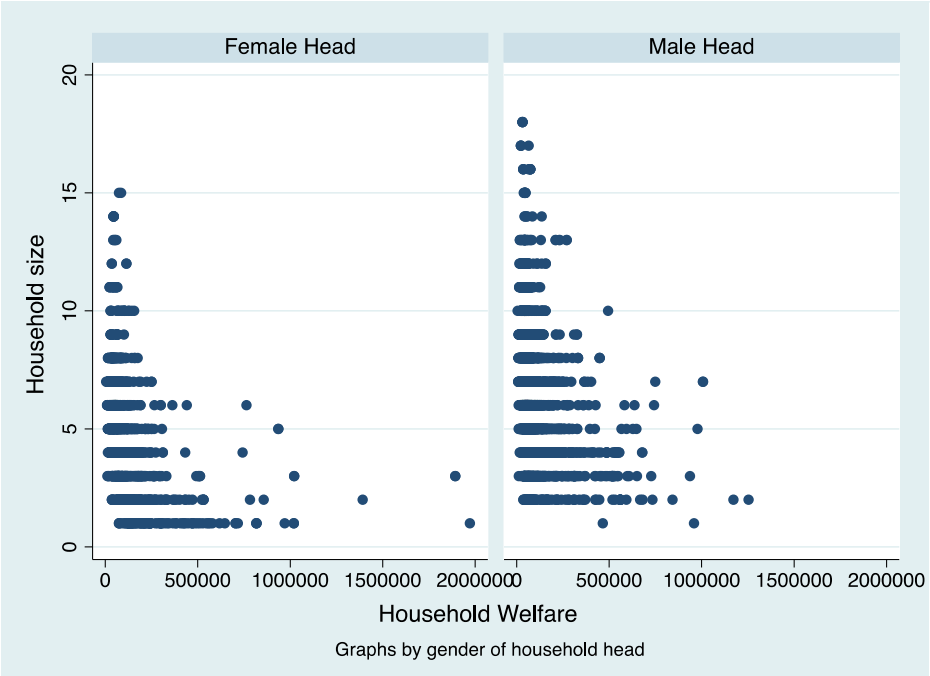
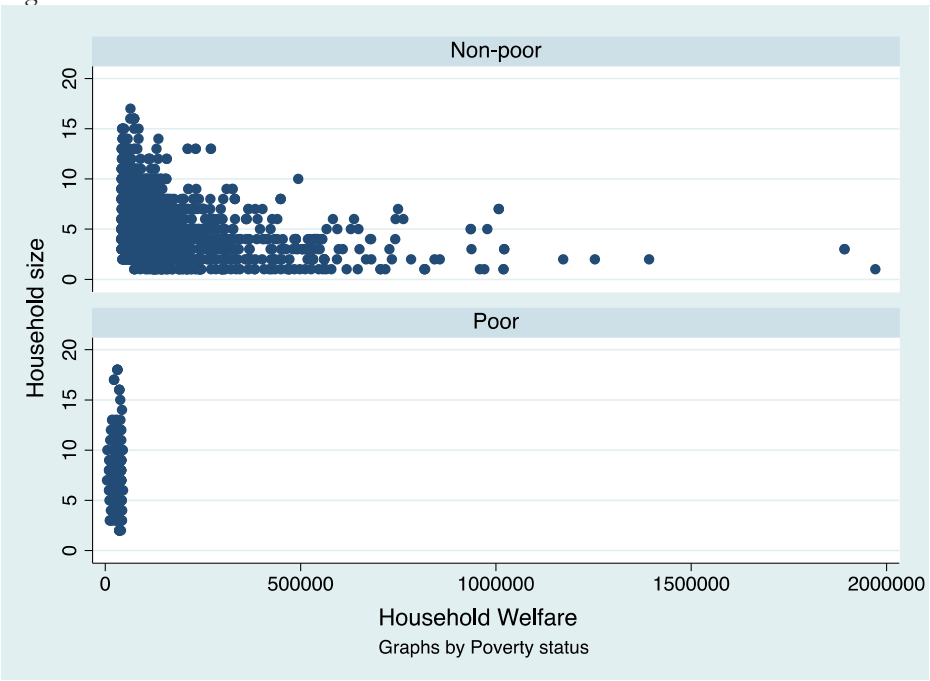


Figure 3.2d



Source: *Author's computation based on the 2018/19 and 2019/20 panels*

Figure 2: Income distribution (Ushs) by household size, FP use, gender of household head, and poverty status

Results from the pooled OLS

In Table 5 we regress the log of welfare on FP use in order to examine whether there FP on its own plays a part in improving household welfare, keeping other factors constant. The results in Table 5 reveal that on its own, FP utilization does not influence household welfare. Therefore, even with the improvements in welfare being greater among FP users as shown in Table 3 and Table 4, we cannot confidently conclude that these improvements in welfare are attributed to FP utilization by itself.

Table 5: Pooled OLS results for the log of welfare and FP use.

Lnwelfare	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
Use	0.0189	0.0220	0.86	0.391	-0.0243	0.0621
_cons	11.2379	0.0204	551.68	0.000	11.1980	11.2778
sigma_u	0.6748					
sigma_e	0.3591					
Rho	0.7793		(fraction of variance due to u_i)			

Source: *Author's computation based on the 2018/19 and 2019/20 panels*

With the inclusion of other explanatory variables in the model for household welfare, the findings in Table 6 reveal that utilization of FP positively influences household welfare (6.4 percent welfare improvement). This is partly explained by the fact that the use of FP lowers the number of children that in turn frees up household resources for food and non-food consumption. Similarly, the use of FP results in the desired birth spacing that in turn gives parents ample time to participate in the labour market and earn income. These results are also reported in a similar study by Bailey et al. (2017) where the study found out that the use of FP freed up household resources and led to extra income due to increased labour market participation thereby improving household welfare. On the other hand, the results in Table 6 also reveal that FPM utilization is significant in explaining increases in household welfare only among women in rural households. This finding shows that FPM could be used to bridge the urban-rural divide in Uganda.

Table 6: Results for the Pooled OLS Model for the log of welfare

Lnwelfare	All (1)	Non-Poor (2)	Poor (3)	Urban (4)	Rural (5)
FPM Utilization	0.064*	0.065	-0.010	-0.022	0.079**
		(0.046)	(0.033)	(0.084)	(0.038)
Household size	-0.105***	-0.023***	-0.084***	-0.137***	-0.097***
		(0.009)	(0.007)	(0.017)	(0.007)
Urban Location	0.266***	-0.028	0.268***		
		(0.071)	(0.038)		
Gender of the Household Head	0.050	-0.027	0.007	-0.023	0.068
		(0.056)	(0.040)	(0.100)	(0.045)
Lnage	0.228***	0.160	0.172***	0.216	0.243***
		(0.097)	(0.063)	(0.173)	(0.072)
Frequency of hospitalization	0.004**	0.001	0.005**	-0.005	0.006**
		(0.003)	(0.002)	(0.006)	(0.002)
Educational attainment (No Education)					
Completed Primary	0.308***	0.199***	0.036	0.883***	0.261***
		(0.054)	(0.059)	(0.218)	(0.054)
Completed Secondary	0.660***	0.389***	0.323***	1.245***	0.593***
		(0.092)	(0.068)	(0.223)	(0.070)
Post-Secondary and Tertiary	1.130***	0.622**	0.761***	1.786***	0.994***
		(0.309)	(0.089)	(0.244)	(0.121)
Income source (Farming)					
Property	0.390**	-0.014	0.395***	0.403**	
		(0.306)	(0.148)	(0.196)	
Transfers	0.377		0.262	0.384	0.427
			(0.237)	(0.439)	(0.370)
Wage	-0.036	-0.087	-0.002	-0.030	-0.012
		(0.054)	(0.041)	(0.111)	(0.047)
Non-agricultural earnings	0.118***	-0.082	0.124***	0.232**	0.048
		(0.056)	(0.040)	(0.108)	(0.046)
Other Income Sources	0.071	-0.172	0.015	-0.105	0.133
		(0.0180)	(0.064)	(0.160)	(0.082)
Marital status (Married monogamously)					
Married Polygamous	-0.001	-0.085	0.048	0.146	-0.026
		(0.054)	(0.043)	(0.119)	(0.047)
Divorced/ Separated	0.052	0.179*	-0.030	0.053	0.046
		(0.097)	(0.057)	(0.134)	(0.069)
Widowed	0.010	-0.071	0.080	0.383**	-0.113
		(0.096)	(0.086)	(0.185)	(0.096)
Never Married	0.147**	0.089	0.127**	0.273*	0.111
		(0.088)	(0.058)	(0.143)	(0.068)

*Note: *** p<0.01, ** p<0.05, * p<0.1*

Source: Author's computation based on the 2018/19 and 2019/20 panels

From Table 6, it is revealed that household size has a negative implication on household welfare (about 10.5 percent welfare loss) among all women. The results also reveal that household size has a negative impact of 2 percent, 8 percent, 9 percent, and 14 percent, on household welfare among women living in non-poor, poor, rural, and urban households respectively. This observation is attributed to the fact that household size squeezes household resources that forces households to lower their consumption levels thus reducing household welfare. These results are in conformity to those reported by studies by Gounder (2012), Akerele and Adewuyi (2011), as well as Litchfield and Mcgregor (2008). The authors consistently agreed that welfare deteriorates with an increase in household size. The authors further argued that an increase in household size significantly reduced resources needed to satisfy the needs of every household member thereby lowering household welfare.

The results also reveal that an increase in the frequency of hospital admissions leads to a welfare gain of about 0.4 percent. This is partly due to the fact that healthcare services serve as inputs to women's good health. Thus, frequent hospital admissions would increase utilization of healthcare services that in turn improve women's health and they thus are able to participate in the labour market and earn incomes. This in turn improves the individual and overall household welfare. These results are in line with Grossman (1972) who contended that individuals obtain utility (welfare) by demanding healthcare services. On the contrary, however, Kumara and Samaratunge (2017) found that, in Sri Lanka, frequency of hospitalization imposes a severe burden on household resources and in most cases, households are forced to forgo food consumption hence reducing household welfare. Regarding age and frequency of hospitalization in regressions 2, 3, 4, and 5, an increase in age and frequency of hospitalization is associated with an enhancement in household welfare of 17.2 percent and 0.05 percent respectively among the poor households and 24.3 percent and 0.06 percent respectively among urban households. Similar findings for age, are reported by Sekhampu (2013) and Litchfield and Mcgregor (2008).

Regarding education level, the results reveal that education positively affects welfare. Households whose women had completed primary education, secondary education, and tertiary education reported 30.8 percent, 66 percent, and 113 percent registered welfare gains relative to their counterparts without any formal education respectively. The magnitude of the coefficients as seen in Table 6 increases with the increase in education level for women living in the non-poor, poor, urban, and rural households as well. Similar findings of the increase in years of schooling enhancing household welfare are reported by Khan and Morrissey (2019), Nguyen and Nguyen (2019) as well as Frempongy and Stadelmann (2017).

Regarding income sources, income sources from property and non-agricultural earnings positively affect household welfare (welfare gains of 39 percent and 11.8 percent respectively) relative to income from farming. Incomes from property and non-agricultural earnings increases household consumption expenditure on education,

children clothing, food, and shelter that result in welfare improvements. Income sources from property and non-agricultural earnings among the poor positively affect household welfare (welfare gains of 39.5 percent and 12.4 percent respectively) relative to income from farming. Similarly, Nguyen and Nguyen (2019) found out that both agricultural/ farm and non-farm income sources enhance household welfare. however, in their study, they report that farm income sources had a larger impact on household welfare relative to non-farm income sources (from formal and self-employment income) which is the opposite case with our findings. Also, income sources from property and non-agricultural earnings among the urban households positively affect household welfare (welfare gains of 40.3 percent and 23.2 percent respectively) relative to income from farming.

As regards marital status, although weakly significant, being a *non-poor* divorcee and being an *urban* never married is associated with a welfare improvement of 17.9 percent and 27.3 percent respectively compared to their married counterparts. Also, at the 5 percent level of significance, being a *poor* never married, and being an *urban* widow positively affects household welfare (welfare gains of 12.7 percent and 38.3 percent respectively) relative to their married counterparts. Lastly, being never married has a positive impact on household welfare (increases welfare by 15 percent) compared to being married among all women. This finding is supported by Akerele and Adewuyi (2011). This can be explained by the fact that, depending on the household earnings as well as the number of children, the marrieds have to cut the combined household income and benefits in order to cater for all household members. On the other hand, this finding contradicts with Lekobane and Seleka (2017) and Anyanwu (2014) who report that marriage is associated with better welfare outcomes as a result of wealth accumulation from both parties while Achida et al. (2018) and Ratcliffe et al. (2002) found no relationship.

Conclusions and policy recommendations.

Our study uses the Uganda National Panel Survey data for 2018/19 and 2019/20 to document the impact of FPM utilization on household welfare. Similarly, the socio-demographic characteristics that affect household welfare are explored. First, the study reveals that majority of the households where the women live are located in rural areas. At the same time, the results also reveal that fewer urban households are poor compared to rural households. The results also reveal that majority of the households are male headed, with fewer male headed households reported to be poor compared to the female headed households. In addition, the results also reveal that only a third of the women are using FPM, more of the women not using FP are poor, and more women with no education are poor. This implies that policies should be designed towards enhancing access to FPM and making them affordable especially to the women in rural areas. Similarly, the results reveal that the use of FPM use alone does not play a significant role in welfare improvement.

However, when modeled with other variables FPM use improves household welfare among all women but is more significant among rural women.

Also, regarding socio-demographics and other characteristics, living in the urban area, increases in age, being educated (completed primary, completed secondary, post-secondary, and tertiary education) as well as having property and non-agricultural enterprises improve household welfare. However, an increase in household size leads to a deterioration in household welfare. Therefore, policies that aim at improving educational attainment and improving accessibility and affordability of FPM, especially in the rural areas as well as programs geared towards wealth creation and gender-based poverty interventions are highly recommended especially among female headed households in Uganda. In the educational sector, the thinking and value system of both parents and their children need to be urgently reorientated through mass educational campaigns regarding the importance of education and the need for parents to insist on their children going to school at least up to their first degree. Also, FP programs should aim to improve not only knowledge but also acceptance and practice of FP.

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Appendices

Table A1: Results from the Hausman Test
b = Consistent under H0 and Ha; obtained from xtreg.
B = Inconsistent under Ha, efficient under H0; obtained from xtreg.
Test of H0: Difference in coefficients not systematic
Chi2(18) = (b-B)'[(V_b-V_B) ^(-1)](b-B) = 25.63
Prob > chi2 = 0.1076

Source: *Author's computation based on the 2018/19 and 2019/20 panels*

Table A2: Results from Breusch-Pagan Lagrange multiplier (LM) Test for Random Effects

Variable	Var	SD=sqrt (Var)
Lnwelfare	0.5203	0.7213
e	0.3075	0.5545
u	0.0000	0.0000
Test: Var(u) = 0		
chibar2(01) = 0.00		
Prob > chi2 = 1.0000		

Source: *Author's computation based on the 2018/19 and 2019/20 panels*

Table A3: Results for the Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
FP Utilization	1.15	0.866415
Primary	2.47	0.405093
Secondary	2.46	0.407112
Post-Secondary and Tertiary	1.50	0.664519
Married	2.71	0.368767
Divorced	2.07	0.482158
Widowed	1.83	0.546401
Age	1.68	0.595204
Household Size	1.17	0.854848
Gender of the Household Head	1.57	0.637338
Employment Status	1.21	0.829349
Location	1.28	0.781970
Non-Agricultural Enterprises	1.25	0.799886
Wages	1.33	0.749165
Property	1.10	0.910710
Others	1.18	0.846165
Transfers	1.02	0.978129
Frequency	1.03	0.970042
Mean VIF	1.56	

Source: Author's computation based on the 2018/19 and 2019/20 panels

Table A4: Results from Breusch–Pagan/Cook–Weisberg Test for Heteroskedasticity

Assumption: Normal error terms
Variable: Fitted values of Lnwelfare
H0: Constant variance
Chi2(1) = 0.80
Prob > chi2 = 0.3709

Source: Author's computation based on the 2018/19 and 2019/20 panels

Table A5: Result from the Link Test for model specification

Lnwelfare	Coefficient	Std. Err.	T	P>t	[95% Confidence Interval	
_hat	1.141	1.161	0.980	0.334	-1.231	3.512
_hatsq	-0.006	0.051	-0.120	0.904	-0.111	0.098
_cons	-0.791	6.560	-0.120	0.905	-14.188	12.606

Source: Author's computation based on the 2018/19 and 2019/20 panels

Table A6: Results from the Ramsey RESET Test for Omitted Variables

Omitted: Powers of fitted values of Lnwelfare
H0: Model has no omitted variables
F (3, 16) = 0.16
Prob > F= 0.9205

Source: Author's computation based on the 2018/19 and 2019/20 panels

Table A7: Pearson's Matrix of Correlations (For FPM utilization and Household Welfare)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Household's Welfare	1.000										
2. Family Planning Utilization	0.110	1.000									
3. Marital Status	0.039	0.144	1.000								
4. Income Source	0.212	0.095	0.025	1.000							
5. Frequency	0.020	-0.044	0.087	-0.026	1.000						
6. Employment Status	0.034	-0.002	0.089	0.156	-0.040	1.000					
7. education Level	0.418	0.125	-0.169	0.179	-0.068	0.094	1.000				
8. Age	0.030	0.126	0.507	0.020	0.074	0.061	-0.177	1.000			
9. Gender of the Household Head	-0.095	0.032	-0.330	-0.200	0.027	-0.225	0.077	-0.135	1.000		
10. Household Size	-0.422	-0.074	-0.197	-0.151	0.007	-0.168	-0.019	-0.037	0.284	1.000	
11. Location	0.358	0.065	0.021	0.305	-0.016	0.057	0.292	-0.044	-0.084	-0.140	1.000

Source: Author's Computations based on the 2018/19 and 2019/20 panels