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Original Article

Understanding the Link between Urban Household Food Insecurity and Contraceptive Use among Reproductive-Age Women in Lideta Sub-City, Addis Ababa, Ethiopia

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Abstract

Introduction: *The enhancement of reproductive health in women can result in an improvement of children's nutritional status resulting in improvement of reproductive health. This association is important for sustainable population growth without overusing resources. This study aims to examine the relationship between household food insecurity and contraceptive use.*

Method: ***A*** *study was conducted on 651 reproductive-age women in three randomly selected Woredas (districts), Lideta Sub-city from February to March 2023. Six Ketenas (villages) were selected using a probability proportional to size technique from three Woredas. Data were collected through a validated survey by trained individuals, and household income and expenditure were used to measure food insecurity access. The Pearson chi-square test (χ^2) and logistic regression were used to examine the relationship between household food insecurity and contraceptive use, considering other covariates.*

Result: *Modern contraception usage was at 50.5% in the study area. Women with food insecurity had only a 32.0% usage rate, while those who were food secure had the higher rate of 68.7%. Women in food-insecure households had a 76.5% lower chance of using modern contraception. Positive attitude, family planning information, partner discussion, income, and childhood mortality were associated with contraceptive use ($p < 0.05$).*

Conclusion: *Use of modern methods of contraception showed a negative correlation with food insecurity. Therefore, addressing household food insecurity as a potential obstacle to the development of family planning services requires comprehensive stakeholder engagement and socio-economic policy intervention.*

Keywords*: Modern contraceptive use; Food insecurity; Lideta Sub-City; Addis Ababa; Ethiopia.*

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Introduction

The world's population has grown significantly; Africa, Asia, and Latin America accounting for 85% of the global population (1). However, these countries face challenges like limited healthcare, education, and resources, exacerbating poverty and food insecurity (2,3). Over 800 million people are undernourished, and 97% accounted in developing countries. Sub-Saharan Africa has the fastest-growing population, but reproductive health status remains insufficient, leading to high birth rates and a cycle of poverty. Investing in reproductive health programs and ensuring contraceptive access is critical for addressing challenges and promoting sustainable development in Sub-Saharan Africa (4).

Ethiopia remains one of the world's most impoverished and food-insecure nations, with 30.8% of its population living below the poverty line for sustenance (4). The contraceptive prevalence rate at the national level is also estimated to be 41% (5). Around 29.3% of the population in Lideta sub-city, one of Addis Ababa's most deprived areas, suffers from food insecurity, indicating a significant food insecurity gap (6). Poverty often leads to challenges in family planning, i.e, families with lower economic status having limited access to services and a higher expenditure on sustenance (7). This can perpetuate a cycle of poverty and food insecurity, further exacerbating the situation in deprived areas like Lideta sub-city. In order to break this cycle, it is critical to implement interventions that not only address immediate food needs but also tackle the root causes of poverty and limited access to resources (7,8).

Demographic and socio-economic factors, such as women's age, education, residency, occupation, marital age, wealth status, family planning discussions, food security status, number of surviving children, media

exposure, men's employment status, and fertility choice, affect modern contraceptive use (9–13). In past and recent studies, the Health Belief Model (HBM), which is a psychological model, was used to predict health behaviors like contraceptive use, particularly with regard to the uptake of health services. Studies in Ethiopia and Ghana showed that women who perceive a high risk of adolescent pregnancy complications are more likely to use contraceptives (14,15).

Poor economic status, household food insecurity, and demographic outcomes (fertility and contraceptive use) are interrelated. Studies in East Africa and Southern Ethiopia have shown that women from lower socio-economic backgrounds exhibit a lower tendency to utilize contemporary contraceptive methods (12). Food insecurity is also associated with higher household fertility, i.e., households with five or more children having a higher likelihood of experiencing food insecurity.

Although various studies have been conducted to show the effects of food insecurity on child health and development (16,17) and pregnancy complication (18,19), insufficient emphasis has been put on investigating the relationship between urban household food insecurity and reproductive health outcomes within scholarly discourse. This study aims to investigate the effect of household food insecurity on contraceptive use in urban settings, providing policymakers and development stakeholders with valuable insights to guide well-informed decision-making and effective interventions.

Materials and Methods

A cross-sectional study was conducted from February to March 2023 in Lideta sub-city, central-western Addis Ababa, focusing on a poor and highly populated district with a population density of 30,960 people per square kilometer, spanning 9.18 sq km (20). The study used a single population proportion formula to determine the sample size, with a margin of error of 5% and a 95% CI with population proportion of 0.5. A design effect of 1.5 was added to reduce variability in the study population. Samples were drawn using a multi-stage random sampling technique.

First, three Woredas (districts) were randomly selected. Then, from each of these three Woredas, two Ketenas (villages) were selected using random sampling method. Then a final sample of 651 respondents was selected from the six Ketenas. The total sample was divided among all the Woredas and then among Ketenas based on their population size. Households from the respective Woreda were selected using a systematic random sampling method based on a sampling frame of house numbers developed from Ketena records. Individual respondents (651 women within the age range of 15 to 49 years who would be either household heads or spouses) were sampled in each household based on their parental role in the family. The outcome variable of this study was contraceptive use. Contraception refers to the deliberate act of preventing conception employing a range of devices, sexual behaviors, spermicides, pharmacological interventions, or surgical procedures.

Therefore, women or couples who are using contraceptive methods to avoid unwanted pregnancy are classified as contraceptive users; otherwise, they are non-users. Predictor variables and covariates include household food insecurity status and other demographic and socioeconomic variables such as age of the mother, marital status, women's education, women's income, religion, work status, age at first marriage, family planning information service, attitude towards contraceptive use (informed), discussion with partner, and childhood mortality.

The study used KoboCollect 3.5 and SPSS 24 software to collect and analyze data, respectively. The Chi -square test (χ^2) was employed to identify the variables that exhibited a statistically significant association with contraceptive utilization Variables with a p-value less than 0.25 were analyzed for multicollinearity using the variance inflation factor. To identify the best independent predictors of contraceptive use, logistic regression with a stepwise selection (LR) method was used.

Measurement of household food insecurity

The Food and Agriculture Organization recommends a caloric value of 2,200 kcal for healthy adult living (21). In Ethiopia, the cost of meeting this threshold is estimated to be around Birr 11,524.52 per year per adult. The threshold determines whether a given household can have enough daily food expenditure (total household income spent on food) to meet its members' minimum daily calorie needs (6,22). Therefore, households that cannot afford the money or are unable to source consumer goods for these daily calorie needs are considered food insecure; otherwise, they are food secure.

However, individual access to food depends on household distribution and gender parity, leading to non-uniform consumption patterns. To identify food-insecure households, an adult-equivalent estimate of the calorie availability scale is used, which narrows the variance between estimated and actual food intake, enabling the discernment of the relative contributions of distinct household members towards the overall dietary pattern .

Results and discussion

Demographic and socio-economic characteristics of respondents

As shown in Table 1, a total of 651 respondents participated in the study. Of these, nearly half, or 48.7%, are between 25 and 34 years old. Of all respondents, single, married, divorced, and widowed account for 114 (17.5%), 434 (66.7%), 87 (13.4%), and 16 (2.5%), respectively. The majority of respondents (39.2%) attended secondary school, followed by primary school (33.2%).

In addition, 8.9% had a diploma or higher and 11.8% had no educational qualifications. Regarding their employment status, around 62.5% of respondents are participating in any income-generating activities, while 37.5% of the respondents are not employed in any labor sector at the time of the survey. The majority of respondents (76.8%) have a favorable attitude toward the use of contraceptives.

Only 12.1% of respondents have at least a history of childhood mortality. Around 62.4% of those surveyed had a free conversation with their partners about modern contraceptive methods, and about 329 (50.5%) used contraceptives to control unintended pregnancy and attain the desired number of children.

The majority of respondents, around 76.7%, earned a monthly income of 0–3000 Birr. The desired number of children for the majority of respondents, around 79.1%, was up to 4 children. Nearly more than half (61.8%) of the respondents had received family planning information in the past 3–4 months. Moreover, measuring a household's food insecurity status also revealed that 68% of the surveyed households were food insecure, and the remaining 32% were identified as foods secured (Table 1).

Table 1: Demographic and socio-economic characteristics of respondents

Variables	Contraceptive use			Chi-square test		Variables	Contraceptive use			Chi-square test	
	Non-user 322 (49.5%)	User 329 (50.5%)	Total 651 (100%)				Non-user 322 (49.5%)	User 329 (50.5%)	Total 651 (100%)		
	%	%	%	(χ^2)	Sig.		%	%	%	(χ^2)	Sig.
Employment status						Family planning information service					
Unemployed	54.9	45.1	37.5			No	73.1	26.3	38.2		
Employed	46.2	53.8	62.5	4.67	0.031	Yes	34.8	65.2	61.8	89.93	0.000
Women income in Birr						Marital status					
0-1500	42.3	57.7	47.3			Married	39.4	60.6	66.7		
1500.0 1-3000	58.1	41.9	29.4			Single	57.9	42.1	17.5		
3000.0 1-4500	65.4	34.6	12.0		0.089	Divorced	81.6	18.4	13.4	66.07	0.000
>4500	41.1	58.9	11.2	21.88		Widowed	87.5	12.5	2.5		
Desired number of children						Children ever born					
0-2	43.7	56.3	40.4			1-4	47.9	52.1	87.0	0.58	0.810
3-4	37.3	62.7	38.7		0.000	>4	49.4	50.6	13.0		
>5	83.1	16.9	20.9	79.88		Attitude toward Contraceptive use					
Age of Mother						Favorable	39.2	60.8	76.8		
20-24	38.2	61.8	5.2			Unfavorable	83.4	16.6	23.2	90.82	0.000
25-29	34.6	65.4	24.5			Discussion with partner					
30-34	37.6	62.4	24.2			No	80.4	19.6	37.6		
35-39	47.5	52.5	21.7		0.000	Yes	30.8	69.2	62.4	150.5	0.000
>40	80.5	19.5	24.5	86.14		History of Child mortality					

Religion						**No**	46.4	53.6	87.9		
						Yes	59.5	40.5	12.1	4.47	0.035
Orthodox	49.3	50.7	67.6			Household food security status					
Protestant	49.1	50.9	17.4								
				0.144	0.989	Food-secure	38.5	61.5	32.0		
Muslim	49.5	50.5	15.0								
Women level of education						Food-insecure	54.6	45.4	68.0	14.79	0.000
Uneducated	66.2	33.8	11.8								
Informal	60.5	39.5	6.6								
Primary	56.0	44.0	33.5								
Secondary	41.6	58.4	39.2	27.68	0.010						
Above Diploma	29.3	70.7	8.9								

Factors of contraceptive use in Lideta Sub-City, Addis Ababa, Ethiopia

A Pearson chi-square test (c^2) was conducted to ascertain potential variables for inclusion in the logistic regression. Utilizing specific criteria, the variables of maternal age, marital status, women's education, women's income, work status, family planning information, attitude regarding contraceptive use, discussion with a partner, household food insecurity status, desired number of children, and childhood mortality were deemed suitable for inclusion in the logistic regression analysis. After adjusting for confounding factors, including maternal age, women's education, women's income, employment status, attitude towards the use of contraceptives, family planning information service, communication with partners regarding modern contraceptive use, household food insecurity status, desired number of children, and childhood mortality, significant statistical associations were observed with contraceptive use at $p<0.05$ (Table 2).

Efforts were made to assess whether or not the necessary assumptions for applying logistic regression were met. In this context, the Hosmer and Lemeshows test of goodness of fit was performed to check the fitness of the model and was found to be 0.339. The Nagelkerke R-squared (R^2) model explained 63.7% of the variation in observed data predicting modern contraceptive use.

Based on the finding, women residing in households with food insecurity had a substantially reduced likelihood, by 76%, to use modern methods of contraception relative to their food-secure counterparts. The history of child mortality was negatively related to the initiative to use modern contraceptives at $P<0.05$. Women with any history of child mortality were 62% less likely to use modern contraceptive methods. Women who were engaged in any income-generating activities were 2 times more likely to use modern contraceptive methods compared to unemployed women. The initiative to use modern contraceptive methods decreased with increasing levels of income.

The result of the logistic regression also showed differences in the probability of using contraceptives for different income levels of women. Increasing the level of women's income from Birr 0–1500 to Birr 1500.01–3000 and Birr 3000.01–4500 reduced the initiative to use contraceptive methods by 74% and 86%, respectively. Likewise, women earning more than Birr 4,500 a month were 89% less likely to use modern contraception than women earning less than Birr 1,000 a month. Women's level of education was positively related to contraceptive use at $p < 0.05$. Raising the level of women's educational achievement, specifically from lack of education to attainment of diplomas and higher degrees, significantly increased the likelihood of adopting modern contraceptive methods by 3.75 times.

The use of family planning information services also had a significant effect on the initiative to utilize modern contraceptive methods. Women using family planning information services were 4.43 times more likely to use modern contraceptive methods compared to those who were not using any kind of family planning service. The discourse and communication exchanged between partners in an intimate relationship were positively correlated with the adoption and use of modern methods of contraception. Women having free discussions with their partner about modern contraceptive methods were 6.29 times more likely to use modern contraceptive services compared to those with no discussion.

The initiative to use modern contraceptives was inversely related to women's age. Taking women's age as a continuous independent variable showed that an increase in women's age was associated with an 8% decrease in modern contraceptive use. Women with positive and favorable

attitudes toward contraceptive use were 6.20 times more likely to use modern contraceptives compared to those with unfavorable attitudes. The results of the study also showed that wanting to have more children was inversely related to contraceptive initiative, and this relationship was significant at 95% CI. Women who want more children are less likely to use modern methods of conception. Women planning to have more than four children were 93% less likely to use modern contraceptives.

Table 2: Coefficients and odds ratio of modern contraceptive use in Lideta Sub-City

Variables	B	Sig.	Exp(b)	95% CI for Exp(b)	
Employment status					
Employed (Unemployed)	0.69	.017	2.00	1.14	3.54
Women income in Birr					
1500.01-3000 (0-1500)	-1.34	.000	0.26	0.14	0.48
3000.01-4500 (0-1500)	-1.99	.000	0.14	0.06	0.31
>4500 (0-1500)	-2.21	.000	0.11	0.04	0.30
Women education					
Informal (Uneducated)	0.87	.147	2.39	0.74	7.79
Primary (Uneducated)	-0.43	.315	0.65	0.28	1.51
Secondary (Uneducated)	0.44	.309	1.55	0.67	3.60
Above Diploma(Uneducated)	1.32	.042	3.75	1.05	13.41
Family planning information service					
Yes (No)	1.49	.000	4.43	2.48	7.92
Attitude towards contraceptive use					
Favorable (unfavorable)	1.83	.000	6.20	3.17	12.13
Discussion with partner					
Yes (No)	1.84	.000	6.29	3.53	11.19
History of child mortality					
Yes (No)	-0.97	.006	0.38	0.19	0.76
Desired no of children					
3-4 (0-2)	-0.46	.098	0.63	0.37	1.09
>5 (0-2)	-2.72	.000	0.07	0.03	0.13
Household food security status					
Food- insecure (Food-secure)	-1.45	.000	0.24	0.12	0.46
Age of women	-0.09	.000	0.92	0.88	0.96

Note: The reference group is listed in the parentheses.

Discussion

The findings of the present study indicated that the prevalence of use of modern contraceptive methods (50.5%) was higher compared to the national level (41%), and Addis Ababa (49%) (23). It is also relatively lower than the previous study conducted in Wolaita zone of Ethiopia and Migori county of Kenya, which was 61.7% and 63%, respectively (12,24), and higher compared to the study conducted in Debre Markos, Ethiopia, which was 41.3%.

The observed variations in contemporary contraceptive use between the present study and the previous one can be attributed to the distinct demographic characteristics of the respective populations and the variations in health interventions used in those areas (25). Notably, differing political frameworks, rules, regulations, and ideologies within distinct nations can significantly influence the utilization pattern of contraceptives (26,27).

The findings of the present study revealed that women from households facing food insecurity intended to exhibit a considerably lower probability, approximately 76% lesser, of using contemporary contraceptive measures compared to those belonging to households with assured access to food resources.

Prior studies showed that women from lower socioeconomic backgrounds were less likely to use modern contraceptive methods (28,29). A study conducted in Wolaita zone of southern Ethiopia showed food security and contraceptive use were positively associated, i.e., women in food secured households used contraception more (12). However, a study conducted in Butajira District, South Central Ethiopia, found an inverse relationship, with women in food insecure households being more likely to adopt family planning methods (30). The observed variability could potentially arise from differences in the demographic, socioeconomic, or cultural variations of women or from other factors pertaining to health, such as disparities in counseling proficiency among health practitioners (31).

The present finding is consistent with the findings of earlier investigations reported (12). It is, however, in contrast to that of another study (30). The plausible explanation for this phenomenon might be that children residing in households experiencing food insecurity are perceived as contributing meaningfully to enhance the socio-economic status of their family (32–34). Moreover, women who belong to households experiencing food insecurity are at a high risk of experiencing negative sexual and reproductive health consequences, including ineffective utilization of contraception and unintended pregnancies.

These outcomes are predominantly attributed to limited decision-making abilities and inadequate communication with their partners (9). The socio-economic status of women is also a significant factor in contributing to their participation in fundamental approaches to regulating fertility and promoting the effective use of progressive healthcare services (35). The study's findings were supported by rigorous statistical analysis and high response rates, but the cross-sectional design of the dataset hindered the ability to establish definitive cause -and-effect relationships between household food insecurity and contraceptive use.

Conclusion

The present study demonstrates that access to modern contraceptive methods is impeded by food insecurity. The integration of suitable strategies aimed at promoting the use of modern contraceptive methods in areas fraught with food insecurity represents a crucial component of interventions geared toward achieving food security. Therefore, it is imperative for any governmental or nongovernmental program, seeking to enhance the use and sustainability of modern contraceptive methods to take into account the food security status of the target location in their family planning service design.

The Woreda Health Office ought to prioritize the contemporary use of contraceptive practices regarding reproductive health services. The promotion of awareness regarding the significance of engaging in conversations on reproductive health issues by mothers and their partners, as well as the active encouragement of women to avail themselves for discussions concerning modern contraceptive methods with healthcare practitioners, should be prioritized. Future studies should use long-term surveys and tools like the Household Food Insecurity Access Scale to ascertain causal relationships among variables and discern the various levels of food insecurity.

Ethics approval and consent to participate

Ethical approval and a letter of support were obtained from IRB of Addis Ababa University, College of Development Studies (Ref No: 31/03/2023), and the Center for Population Studies (Ref No: CDS/CPS/106/15). Letters were distributed to all the respective Woredas. Informed consent was obtained from participants before the commencement of data collection. The purpose of the study was explained to both the respondents and the Woreda experts.

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Availability of data and materials – The data sets used during the current study are available from the corresponding author upon reasonable request.

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