Determinants of Contraceptive Discontinuation among Homeless Women in Kenya

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Abstract

This paper examines factors affecting contraceptive discontinuity among homeless women in Kenya, using data from a sample of 384 homeless women. The findings were estimated using logistic regression. The estimated results from regression analysis show that living with a partner, drug use, health facility delivery, and knowledge of female sterilization and previously emigrating from an urban area, strongly encourage contraceptive discontinuation. The estimated results further show that being assisted by a midwife during delivery, earning above a dollar a day, and going through neonatal or pregnancy loss reduces incidences of contraceptive discontinuation. The study concludes with implications for policies that will encourage consistent use of contraceptives. These policies include the establishment of family planning programs to curb drug abuse and setting up family planning programs to educate women on the importance of initiating a form of contraception after incidences of abortions, stillbirths, or miscarriages. Other policy recommendations include the establishment of drug rehabilitation centers for women struggling with drug abuse and the provision of alternative sources of income. The government is also advised to train more midwives who can offer home based care for homeless women who cannot visit health centers.

Keywords: Initiation, Miscarriages, Homelessness, Shelter, Nairobi

JEL Classification Codes: I12, I14 & I15

1. Introduction

One of the issues affecting sub-Saharan Africa is high contraceptive discontinuity rates. Studies conducted in sub-Saharan Africa have shown high contraceptive discontinuity rates despite increasing contraceptive prevalence (Belete et al., 2018). Beleta further found that over 36% of contraceptive users in the region have discontinued contraceptives (Belete et al., 2018). Kenya, a region in sub-Saharan Africa recorded a discontinuation rate of 37% in late 2000 (Bradley et al., 2009). The United Nations (1994) asserts that women have the right to choose the number and spacing of children they desire. Contraceptive discontinuity leads to undesired outcomes like miscarriages, abortions, and unwanted pregnancies (Westoff, 2006)[1]. Knowledge of contraceptive choices available allows a user to make informed choices (Belete et al., 2018). Blanc et al. (2002), noted that over half of accidental pregnancies stem from contraceptive discontinuity. Women choose contraception based on their socioeconomic and demographic characteristics (Westoff, 2001). Women also choose to discontinue contraception due to method failure, peer influence, husbands' decisions, medical reasons, et cetera (Blanc et al., 2002). Contraceptive discontinuation can stem from the ease of administration or availability. Steel and Curtis (2003) noted that contraceptives that require users to self-discontinue were more highly discontinued than those that required removal by a specialized physician. Contraceptives that require user attention and effort were highly discontinued than those that required less effort (Darroch, 2011).

Women in general, particularly, homeless women tend to discontinue contraception based on several factors. While reasons range from medical, circumstantial, and personal (Mandle et al., 2017), many other reasons are from a socio-economic perspective. Personal reasons influencing contraceptive switching behaviors include the desire to breastfeed as a means of contraception and distorted religious/personal views towards contraception and reproductive health (Hindin et al., 2014). Contraceptive discontinuity in sub-Saharan Africa often stems from the need to have more children for future security (Modey et al., 2014)[2]. With sub-standard healthcare in sub-Saharan Africa, Curtis et al. (2011) noted that the majority of healthcare providers fail to give needed counseling to patients when they visit health facilities.

Homeless women are characterized by unique reproductive health needs which include mistimed pregnancies,

miscarriages, abortions, survival sex, rape, etc (Gelberg, 2001). Homeless women lack shelter and are often raped and physically abused (Wenzel, 2000). The relationship structure available in the streets gives homeless women limited power to negotiate sex and contraception leading to incidences of unplanned pregnancies (Conde-Agudelo et al., 2006). Homeless women like other sheltered women have the right to space and time births using available contraceptive methods (Kennedy et al.,2014) however, homeless women face unique barriers in the access to reproductive health services (Gelberg, 2001).

The majority of homeless women rarely visit healthcare centers due to fear of stigmatization by healthcare providers who abuse and belittle them (Ayaya and Esamai, 2001). Homeless women complain lack of respect and lack of trust in healthcare workers (Gelberg, 2004). The majority of women practicing prostitution are often ashamed of discussing their sexual lifestyles with healthcare providers (Oliver, 2012). Factors contributing to the high discontinuity of contraception by homeless women include side effects, partners' opinions, cost, storage et cetera (Gelberg et al, 2002). Homeless women who abuse drugs more often suffer low self-esteem and are unable to keep up with doctors' appointments and faithfully take medications administered to them (Pleace et al., 2000). Healthcare providers cite a lack of sufficient training from the Department of Social Services as the reason for the mismanagement of homeless women when they visit health facilities (Dasari et al., 2016).

1. See Westoff (2006) for a better understanding of the consequences of contraceptive discontinuity.

2. Modey et al. (2014) for an extensive insight into why parents in sub-Saharan Africa prefer more children.

1.1 Motivation

Global organizations like the United Nations (UN), have developed programs and policies on universal health coverage with its main focus being health and well-being among other agendas (United Nations, 2015). Homeless women have been socioeconomically and demographically excluded from the provision of reproductive health services (Bailey, 2006). A universal health coverage plan where one is to be left out will be achieved if all women including the homeless women have access to a wide variety of affordable contraception. Women who discontinue contraception for one reason or another should have a readily available option to discourage discontinuation of contraceptives. Davanzo et al. (2014) noted that the majority of women who discontinue contraceptives often deal with unwanted pregnancies and short intervals between pregnancies thus risking adverse health conditions like pre-eclampsia, premature rupture of membranes, and high blood pressure. Globally child spacing achieved by the use of contraceptives has been found to save the lives of slightly over 2 million newly born babies each year (Collumbien et al., 2004). Mortality and morbidity rates in Kenya resulting from unplanned pregnancies can be reduced through improved access and utilization of contraception by all women including homeless women. More so, homeless women like any woman desire to have children and plan their families effectively. Homeless women should have the freedom to choose the type of contraception, and the spacing and number of children they desire. Access to affordable and effective contraceptives has been found to enhance maternal and child health for women leading to happier and healthier families (Zewude et al., 2019).

The majority of street children in Kenya are born to homeless parents. Homeless women may at times discontinue contraception for lack of knowledge or adverse side effects leading to unplanned pregnancies and an influx in street children population (Embleton et al., 2020). Consistent contraceptive use by homeless women can be achieved through the improvement of knowledge and the provision of a wide variety of contraceptive options.

The study also found that research on street families in Africa has been widely carried out on topics related to socio-economic challenges, psycho-social behaviors, human development, social mobility, etc (Zewude et al., 2019; Heckman and Mosso, 2014) However, limited studies have been done on contraceptive use, discontinuity, and switching among homeless women in Kenya. There is a need to examine trends in contraceptive utilization among homeless women to inform healthcare providers about the contraceptive mix preferred by homeless women. This study is also important since barriers to contraceptive discontinuity among homeless women are examined to improve intake and sustain contraceptive use among homeless women.

1.2 Research Questions

The study aims to address the following issues:

    i.   What factors influence contraceptive discontinuation among homeless women in Kenya?.

    ii.   Does literacy level impact contraceptive discontinuation among homeless women in Kenya?.

    iii.   What policy recommendations can minimize the discontinuation of contraceptives among homeless women?

The theoretical framework that will be adopted in this essay is the demand for health model by Grossman (1972), where street women are expected to make decisions to continue or discontinue contraception based on expected utility. Grossman thereafter develops the demand for health equation where health is determined by prices of family planning,

prices of other goods, Income, and other variables.   Homeless women in the model utilize contraception if the utility derived is higher. The study also conducted a robustness check to investigate causal inference of explanatory variables. Using the *stata rreg* command the study found the coefficients used in the study to be robust and plausible.

The marginal effects estimates and the logistic regression estimates were used to jointly estimate contraceptive discontinuity among homeless women in Nairobi, Kenya. The estimates from the study reveal how each explanatory variable impacts a homeless woman's decision to discontinue contraception. Living with a partner, drug use, health facility delivery, knowledge of female sterilization, and previous location were noted to have a positive and significant impact on homeless women's decision to discontinue contraceptives. These results imply that when homeless women abuse drugs they are unlikely to consider important health decisions like contraception. In this case, drugs take precedence over physical and mental health. The issue of health facility visits leading to high rates of discontinuity implies the weaknesses of the health sector in the provision of counseling and treatments in a fair and justified way. Limited knowledge of contraceptive choices like female sterilization points to the need to educate homeless women through campaigns and street visits so that they may make informed decisions.

Further analysis shows other variables having a negative impact on contraceptive discontinuation. These findings indicate areas of interest that should be given priority by stakeholders to reduce incidences of contraceptive discontinuity. The research found being assisted by a midwife during delivery and earning above a dollar a day discourages contraceptive discontinuity. Other unfortunate health concerns such as miscarriages, stillbirths, abortions, and neonatal death reduce contraceptive discontinuity.

This study is unique such that no studies on contraceptive discontinuity have been conducted among homeless women in Kenya. This study gives insights into the attitudes and behaviors of homeless women in relation to homelessness. Unlike other sheltered women, the study found homeless women to be organized in close-knit family structures. The study has brought to light information on factors that encourage contraceptive discontinuation, information that can be utilized by healthcare providers to give tailored contraceptive mix to homeless women. The study encountered several challenges during data collection. Challenges experienced included accessing the study populations since they were not housed in a common location, security challenges, and challenges of language barrier. These limitations were managed by using community health volunteers to locate homeless women and employing more security and language translators.

The study highlights several policy recommendations that include rehabilitation of homeless women and more family planning education for couples rather than individual women. With prior knowledge of contraceptives highly discontinued, the government is advised to utilize information from this study to equip health facilities near slums with a contraceptive mix less discontinued by homeless women (In this case Injectibles). The government can also equip midwives with training on family planning to inform homeless women when they visit for antenatal or postnatal care.

The study is organized such that the first chapter discusses the introduction, the second chapter highlights the literature reviewed, the third chapter discusses the methodology and the fourth chapter presents the results. The final chapter will discuss the conclusions and policy recommendations.

2. Literature Review

2.1 Empirical Literature

Contraceptive discontinuation has been found to have an impact on total fertility rates. Research on 15 countries by Blanc *et al. (*2002) concluded that 20%-40% of unwanted pregnancies can be avoided if women limit contraceptive discontinuation. The study further revealed that 50% of unwanted pregnancies resulted from contraceptive failure or contraceptive abandonment. These findings are strongly supported by the works of Cleland and Cleland & Ali (2004) who found that 84% of unwanted pregnancies resulted from contraceptive discontinuation. Pregnancies resulting from contraceptive discontinuation often end up in abortion or miscarriages. In Romania, over 60% of accidental pregnancies culminating from contraceptive discontinuation were aborted (Creanga *et al.*, 2007). In 2008, Kenya recorded 17% of cases of unwanted pregnancies, 26% of these pregnancies from contraceptive discontinuation. The study further found that 12% of women who discontinued contraception fell pregnant 12 months later (Kenya Demographic and Health Survey (KDHS), 2010)

Studies in less developed countries reveal a prevalent practice of contraceptive discontinuity. Bradley *et al.* (2009)   noted that contraceptive discontinuity in the millennium was highest in the Dominican Republic, Bangladesh, and Columbia at 63%, 49%, and 44% respectively while Ali *et al.* (2012) noted that 20% of Dominican and 3% of Peruvian women who discontinued contraceptives got pregnant.

Reasons for contraceptive discontinuation have been found to vary from one demographic setting to another. Blanchard *et al.* (2016) noted that in 2016, 82.1% of Ghanaian women discontinued traditional methods for more reliable modern contraceptives while 64.1% of these women discontinued modern contraceptives. Modey *et al.* (2014) also found that 70% of Ghanaian women discontinued IUDs, 40% discontinued implants, 50% discontinued injectibles, and 58.2%

discontinued the use of pills. Women with preexisting conditions like epilepsy also discontinued contraception as a result of inconvenience, bloating, pregnancy, discomfort, change in emotions, headaches, problems in administration, forgetfulness, nausea, and insurance at 7.7%, 6.4%, 5.6%,5%, 4.8%, 4.4%, 3.6%,3.7%, 2.1% and 2.5% respectively. (Mandle et al., 2017).

In Kenya studies by researchers like Bradley *et al*. (2009) discovered that by the late 1990s, 21% of Kenyan women had discontinued contraceptives because of negative side effects proportion that grew by 29%   in 2000. By late 2000, 9.14% of women using contraception had discontinued contraceptive usage due to medical reasons and negative side effects. Bradley *et al*. (2009) further noted that over 30% of Kenyan women discontinued the use of the pill.

2.2 Theoretical Literature

The study utilized the rational choice theory that was developed by founding economists like Adam Smith (Raymond, 2003). According to this theory decisions undertaken by each actor collectively gives rise to a particular set of social behavior. Consumers in this case undertake a cost-benefit analysis while selecting their course of action. Consumers are assumed to have complete and transitive preferences. While making choices consumers are assumed to first choose a feasible region (determined by physical or financial constraints) and then make a choice based on ordered preferences (Jan, 2012).

The rational choice theory suggests that the outcomes of a choice are dependent on human actions and the goal may be normative or altruistic (Snidal, 2013). Independent thinkers in support of Snidal suggest that consumption choices are based on a set of consumption axioms and not specific goals (Van Aaken, 2013).

The second theory that will be used to explain the health behaviors of homeless women is the Suchman theory (Suchman, 1964). According to Suchman, a person seeking healthcare services goes through several stages before seeking medical intervention. First, they assess the symptoms, second, they will tend to seek people's opinions to gain knowledge on treatment options and the third stage involves visiting the health facility to seek treatment, followed by consistent follow-ups then finally recovery. According to Suchman, selecting a source of healthcare is dependent on availability, accessibility, social influence, and knowledge (Suchman, 1965).

3. Methodology and Data

3.1 Methodology

Following the demand for health model by Grossman (1972), street women's decisions to continue or discontinue contraception are based on expected utility. Homeless women in this case utilize contraception if utility derived is higher. A household's utility maximization function is therefore given as;

$$U = f (F_h, C) \tag{1}$$

Subject to a budget constraint;

$$M = P_F F + P_J J + P_C C \tag{2}$$

Using equations (1 and 2), the model states the langrage function as follows;

$$L (F, C) = U (F_h, C) + K (M - P_f F - P_J J - P_C C) \tag{3}$$

Solving the langrage, we get the demand for health function as:

$$D = f (P_f, P_j, P_c, Y, V) \tag{4}$$

where:

U: Is the utility of the household

F_h: Family Health

C: The consumption of other market goods.

P_F: Cost of using family planning

P_J: Cost of inputs like knowledge of contraceptives

P_C: Cost of other consumption goods consumed by the household

The logistic regression will be used to analyze the objectives of the study, which are to find determinants of contraceptive discontinuity and the impact of education on contraceptive discontinuity among homeless women in Kenya. The general linear regression model is often expressed as follows:

$$Y_i = \beta_0 + \beta_i X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{ki} + \varepsilon_i \tag{5}$$

where;

β_0 is the intercept

β_i 's is the slope between Y and the X_i that is needed

ε is the error term

The X_i variables are illustrated in the operationalization of variables in *Table 1* below.

During analysis, the model was due to encounter problems relating to sample selection bias, autocorrelation problems, unobserved heterogeneity, and reverse relationships (Heckman, 2010). The model was expected to encounter endogeneity problems if homeless women interviewed were to be extracted from one stratum. Contraceptive discontinuity behaviors may be wrongly interpreted should some behaviors be unobserved. These behaviors include good savings culture, cultural beliefs, or mental health status. These unobserved heterogeneity problems at times lead to inconsistent estimates. To avoid section biases the study conducted a random sampling of homeless women from 8 stratums in Nairobi County. The study later systematically sampled homeless women between the ages of 13 and 50 years from the 8 strata by dividing women into two main categories: Women who still use contraception and women who discontinued contraception within the past 12 months. A correlation test was done to determine the degree of correlation between variables. Variables that correlate were later dropped. A goodness of fit test was done to determine how well the sample fits the population distribution of the homeless in Kenya.

3.2 Data

The study utilized primary data collected from homeless women between 13 and 50 years from Nairobi, county. The survey was undertaken in two stages. The first stage involved random sampling of 7 off-slum settlements in Nairobi and the city's central business district (CBD). The second stage involved selecting households with women between 13 and 50 years old. The data collection process took place from 21st November 2019 to 3rd December 2020. The study used questionnaires grouped into different sections, to ease answering of questions relating to personal reproductive health. The study sampled the number of homeless women to be interviewed using a sampling frame and a sampling formula. The sample size used during the study was determined using Gill *et al*. (2010) formula of sample size selection based on the desired accuracy with a confidence level of 95%. The population of homeless women in Nairobi was estimated to be greater than 10,000 and the level of confidence needed was 95% which corresponds to a Z value of 1.96. Using the Gills formula, the study estimated the sample size as follows:

$$n = p(100-p)\ z^2 / \varepsilon^2 \qquad (6)$$

Where:

n= size of the sample needed for the study

z = standard normal deviate with an expected confidence level of 1.96.

p = Percentage occurrence of a state/ heterogeneity of the population.

ε = percentage maximum error required which is at 5%

$$\text{Therefore: } 1.96^2 * 0.5(0.5)/0.05^2 = 0.9604/0.0025 = 384/16 \qquad (7)$$

= 384.16. Rounding off to the nearest figure =384

Using the above estimate, the number of homeless women interviewed was 384 plus an additional 38 interviewed during the pilot study.

Table 1. Operationalization of variables

Variable	Description and Measure	Expected sign
Contraceptive Discontinuity	A respondent is categorized as either having discontinued contraception or not. A dummy 1 was chosen for contraceptive discontinuation and 0 for discontinuation of contraceptives	
Age of the respondents	Respondents age at last birthday. Represented by age in complete years	+
No of children	Children born alive to the respondent. Represented by complete years	+ or -
Living with a partner:	A respondent is categorized as either living with a partner or not. A dummy 1 was chosen for living with a Partner and 0 for not living with a partner.	+
The education level of the respondent	A Respondent either has Tertiary, Secondary, Primary, or Not Attended School. Represented by complete years	+
Respondents Drug abuse history	A respondent either actively abused drugs is rehabilitated, or has never used drugs	-
Previous Residence	A respondent is categorized as either emigrated from an Urban or Rural Area. A dummy 1 was chosen to represent emigration from an Urban and 0 represents emigration from a rural area.	+ or -
Age at first Birth	Respondent's age at the time she got pregnant with her first child. Represented by age in complete years	+

Miscarriages/Stillbirth/Abortion Incidence	A respondent is categorized as either gone through a Miscarriage, Stillbirth, and Abortion or Not. Dummy 1 is chosen for women who have gone through this experience and a dummy 0 for those who haven't.	-
Neonatal death Incidence	A respondent is categorized as either having experienced neonatal death or not. A dummy 1 was chosen neonatal incidence and for none incidence	-
Knowledge of Female Sterilization	A respondent is categorized as either knowing Female sterilization or not. A dummy 1 was chosen for Knowledge on Female sterilization and 0 for no knowledge	+
Knowledge of Male sterilization	A respondent is categorized as either knowing male sterilization or not. A dummy 1 was chosen for Knowledge on male sterilization and 0 for no knowledge	+
Poverty	A respondent is categorized as either living below poverty line or not. A dummy 1 was chosen for those living below the poverty line and 0 for those above the poverty line	+
Health Facility delivery	A respondent is categorized as either having given birth in the hospital or not. A dummy 1 was chosen for given birth in hospital and 0 for not giving birth in a hospital	+
Visit by Health Worker in the past 1 year	A respondent is categorized as either Visited by a health worker in the past 1 month or not. Dummy 1 was chosen for Health worker visits and 0 no health care workers visits.	+

Note: The signs on the last column are expected signs. They are not actual but rather hypothesized

Source: Authors' computation

4. Results and Discussions

4.1 Descriptive Statistics

The study revealed the average age of homeless women in Nairobi County to be 27 years. The average number of children per homeless woman was found to be 2 children per woman, whereas the age at first birth was 19 years as represented in *Table 2* below. The average homeless woman in Nairobi was found to have attended school on average for 9 years which can be attributed to the free primary education program rolled out by the Government of Kenya in 2003 (Republic of Kenya, 2003). Data collected from Nairobi county's homeless population revealed injectibles to be the most discontinued form of contraception. The study found that 39.72% of homeless women discontinued injectibles, while 17.73% discontinued implants. The least discontinued form of contraception was the emergency pill, intrauterine devices, and lactational amenorrhea at 1.42%, 1.42%, and 2.84% respectively.

The study further noted that the majority of homeless women discontinued contraceptives for medical reasons. Findings reveal that 58.73% of homeless women discontinued contraception for medical reasons, 2.38% discontinued for lack of funds. With rampant cases of unwanted pregnancies reported, 12.7% of homeless women discontinued contraception due to pregnancy-related concerns. The study further noted high literacy levels among street women and their partners. Analysis of education attainment showed that 31.40% of homeless women had attained a secondary level of education. Over 47% had primary education and less than 4% had higher education. The study further noted that partners to street women were relatively educated with over 50% having secondary school level of education. The study also made interesting discoveries on drug use among homeless women. The study noted that 81.54% of homeless women had never abused drugs while 11.85% were actively abusing drugs.

The majority of street women in Nairobi were noted to have immigrated from rural areas. The research found that 53.74% had emigrated from rural areas to Kenya's capital while 46.26% had moved to Nairobi from other urban areas. The study also found that 6.61% of homeless women had been rehabilitation.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	363	27.73829	8.681939	13	50
Number of Children	363	2.261708	1.814717	0	9
Age at first birth	295	19.12881	4.09459	1	29
Living with partner	363	0.661157	0.47397	0	1
Drug use by respondents	361	1.252078	0.567795	1	3
Midwife Assistance	331	0.68278	0.466099	0	1
Miscarriage/Stillbirth/Abortion Incidence	363	0.506887	0.500643	0	1
Child Planned	326	0.576687	0.494844	0	1
Health facility delivery	320	0.79375	0.405246	0	1
Neonatal death incidences	328	0.170732	0.376849	0	1
Knowledge on Female sterilization	363	0.727273	0.445977	0	1
Ever attended school	363	0.983471	0.127674	0	1
Knowledge on Male sterilization	363	0.809917	0.392908	0	1
Knowledge of lactational amenorrhea	363	0.721763	0.448749	0	1
Contraceptive spending	363	0.101928	0.302972	0	1
Poverty code	361	0.537396	0.499292	0	1
Previous locality	363	0.460055	0.49909	0	1
Street Years	356	10.33146	8.083872	0	45
Health worker visit	363	0.319559	0.46695	0	1

Knowledge on implants	363	0.906336	0.291763	0	1
Knowledge on injectibles	363	0.917355	0.275724	0	1
Education level of respondent	363	8.181818	4.135816	0	14
Income Source	339	2.286136	1.078632	1	5

Notes: The maximum and minimum values indicate the limits of each variable in relation to the chosen parameters used in the study.

Source; Author computation

4.2 Determinants of Contraceptive Discontinuity

4.2.1 Impact of Living with a Partner (Married) on Contraceptive Discontinuity

The research revealed that homeless women living with a partner were 2.392 times more likely to discontinue contraception than homeless women without partners. These results collaborate findings by Sato *et al*. (2020) noted that women in unions/married, discontinued contraception to get pregnant. The research further noted that 9.3% of married women in Arusha discontinued contraception with the sole purpose of getting children.

4.2.2 Impact of Drug Abuse on Contraceptive Discontinuity

The study noted that homeless women abusing drugs were 2.174 times more likely to discontinue contraception than homeless women who were not users. These results collaborate with findings by researchers like Terplan *et al.* (2015) who noted that women who abused opiates used contraceptives less consistently than women who never abused opiates (56% vs 81%). Levander *et al*. (2023) also found that women who abused opiates and likewise used contraceptives, were enrolled in an opiate treatment course by healthcare providers. Out of 855 opiate users, 63.20% used contraceptives inconsistently (Levander *et al*., 2023).

4.2.3 Impact of Miscarriages, Abortions, Stillbirth, and Neonatal Death on Contraceptive Discontinuity

The study further noted that the incidence of miscarriage, stillbirth, or abortion decreased the odds of discontinuing contraceptives by 68.54% (odd ratio: 0.3145-1 * 100= - 0.6854). Findings also reveal the odds of contraceptive discontinuity decreasing after neo-natal death incidence by 61.76% (0.3825-1 *100=0.6176) These results collaborate with findings by researchers like Roe, McAllister, Sammel, & Schreiber (2020) who noted that of 40% of women who initiated contraception after miscarriage,14% opted to use long-acting methods of contraception while 18% opted to use short-acting methods (Roe *et al*.,2020). Roe further noted that 8% preferred to use condoms and pills as they were easily discontinued (Roe *et al*.,2020). Shukla *et al*. (2020) also noted of women who lost their children within 28 days of birth, 56.4% used contraception within 24 months while 43.6% discontinued contraceptive use. The study further noted that 33.7% of women choose to continue using contraception after the neonatal death incidence (Shukla *et al.*, 2020).

4.2.4 Impact of Health Facility Delivery/ Midwife Assistance on Contraceptive Discontinuity

The study further noted that giving birth in a health facility increased the odds of contraceptive discontinuity. Homeless women who gave birth in health facilities were found to be 8.457 times more likely to discontinue contraception than women who gave birth elsewhere. Of the total number of homeless women assisted by a midwife during birth, 59.54% (0.4046-1*100= -0.5954) were more likely to discontinue contraception. These findings collaborate the work of researchers like Radovich *et al.* (2019) who noted that public health centers were the main source of free contraception in developing countries with over 56.20% of women accessing contraceptives from these facilities. Giving birth in hospitals is deemed crucial since family planning lessons and free contraceptives are obtained during visits. However, street women face barriers to accessing healthcare. They are often mistreated, discriminated and looked down upon. Research on community satisfaction in Tanzania by D'Oliveira *et al*. (2002) revealed that while 12% of Tanzanians agreed that healthcare workers had good attitudes towards them, over 50% of respondents claimed that healthcare staff showed them no kindness. Purkey *et al*. (2019) noted that healthcare professionals that lack empathy encourage contraceptive discontinuation in users who rely on free contraceptives from health facilities. Qualitative findings from Korogocho slums reveal that homeless women discontinue contraception for fear of stigmatization (*We are hated, I can't master the courage to go and be abused again, Moraa, 34, Korogocho*)

4.2.5 Impact of Knowledge on Female Sterilization Method on Contraceptive Discontinuity

Findings from the research also showed that homeless women with knowledge of female sterilization were 3.1516 times more likely to discontinue contraceptives than women with no knowledge of female sterilization. This is in line with findings by Anita *et al.* (2020) who noted that women who utilized female sterilization as a form of contraception accounted for only 2% of the entire contraceptive user population, despite increasing knowledge on female sterilization. Singh *et al*. (2021) note that over 68% of women sterilized were not informed the method would be permanent. Had they had prior knowledge, female sterilization would least be used.

4.2.6 Impact of Poverty on Contraceptive Discontinuity

There exists a wide gap in contraceptive use and discontinuity among women of different wealth quantiles. The study found that 76.26% (0.237466-1*100 = -0.7626) of homeless women earning above a dollar a day, were less likely to discontinue contraception than homeless women earning below a dollar a day. These findings collaborate with researchers from the United States where Zvavitch *et al.* (2021) noted that 46.3% of women below the poverty line consistently used contraception to avoid the financial burden of unplanned pregnancies. Moreover, over 50.8% of richer women used contraception to plan and space births. The study further found the odds of contraceptive discontinuity to be lower among the rich than among the poor at (an odd ratio of 2.39) and (an odd ratio of 1.76) respectively.

4.2.7 Impact of Geographical Location on Contraceptive Discontinuity

The study further found contraceptive discontinuity to increase if a homeless woman previously lived in an urban area before relocating to Kenya's' capital, Nairobi. The study noted the odds of contraceptive discontinuity increased 2.075 times more if a street woman immigrated from an urban area than if she immigrated from a rural area as shown in *Table 3*. These findings collaborate with research by Dadzie *et al.* (2022) who noted that women residing in the rural regions of Papua New Guinea were less likely to discontinue contraception than women in the urban areas. The odd ratio of contraceptive discontinuity for women in rural areas was noted to be (an odd ratio of 0.78) while the urban women had an (odd ratio of 1.00)

Table 3. Logistic and Marginal estimates of contraceptive discontinuity

VARIABLES	LOGIT (Coefficient)	LOGISTIC (Odd Ratios)	MARGINS (dy/dx)
AGE	0.0547 (0.0413541)	1.056223 (0.0436792)	0.0095029 (0.0070808)
Number of Children	0.211383 (0.170609)	1.235385 (0.2107678)	0.0367235 (0.0295117)
Age at first birth	-0.0338 (0.0526636)	0.9667652 (0.0509133)	-0.005872 (0.0091082)
Living with partner	0.871933* (0.4797911)	2.39153* (1.147435)	0.1514809* (0.0816103)
Drug use by respondent	0.776693*** (0.2974984)	2.174271*** (0.646842)	0.1349348*** (0.0494037)
Midwife Assistance	-0.90475* (0.5364763)	0.4046433* (0.2170815)	-0.157182* (0.0910426)
Miscarriages/stillborn/Aabortion Incidence	-1.15659*** (0.3364689)	0.314558*** (0.105839)	-0.2009337*** (0.0532095)
Child Planned	0.366156 (0.3297614)	1.44218 (0.4755752)	0.0636122 (0.0573359)
Health Facility Delivery	2.134943*** (0.5974588)	8.456564*** (5.052448)	0.3709034*** (0.0957006)
Neonatal Death	-0.96105** (0.477787)	0.3824895** (0.1827485)	-0.1669638** (0.0810678)
Knowledge on female sterilization	1.147905** (0.463786)	3.151584** (1.46166)	0.1994254** (0.0771726)
Ever attended school	-1.33866 (1.723405)	0.2621974 (0.4518723)	-0.2325648 (0.2960852)
Knowledge on male sterilization	-0.25745 (0.7767489)	0.7730184 (0.6004412)	-0.0447272 (0.1350476)
Knowledge on lactational amenorrhea	-0.80143 (0.5880238)	0.4486888 (0.2638397)	-0.1392316 (0.098736)
Contraceptive spending	-0.38877 (0.5034742)	0.6778903 (0.3413003)	-0.0675409 (0.0868639)
Poverty code	-1.43773*** (0.4115791)	0.237466*** (0.0977361)	-0.2497768*** (0.0650278)
Previous Locality	0.730194** (0.3258653)	2.075484** (0.6763282)	0.1268566** (0.0556485)
Street years	0.025159 (0.0224112)	1.025478 (0.0229822)	0.0043708 (0.0038626)
Health worker Visit	-0.1326 (0.3523086)	0.8758137 (0.3085567)	-0.0230369 (0.0612935)
Knowledge on Implants	0.220306 (1.408092)	1.246459 (1.755129)	0.0382738 (0.2447391)
Knowledge on Injectibles	0.600442 (1.084856)	1.822924 (1.977611)	0.1043147 (0.1868738)
Education of Respondent	0.003485	1.003491	0.0006055

	(0.041059)	(0.0412024)	(0.0071426)
Income source	-0.64167*** (0.1830818)	0.5264147*** (0.0963769)	-0.1114766*** (0.0296468)
	-2.20838 (2.514503)	0.1098781 (0.2762888)	
Overall fit of the model	*Number of observations= 266*	*Number of obs = 266* *Wald chi2(17) = 62.61* *Prob > chi2 = 0.0000* *Pseudo R2 = 0.2212*	*Number of obs = 266* *Wald chi2(17) = 62.61* *Prob > chi2 = 0.0000* *Pseudo R2 = 0.2212*

Source; Authors computation

4.3 Diagnostic Check

The goodness of fit of the model was tested using the receiver operating characteristic curve (ROC) curve. The area under the curve was used to determine the predictive power of the model. The model at the 45-degree line indicated no predictive power, while the upward curve indicated higher predictive power. The model used in the study had an area under the curve fitting of 0.8009 which indicates a higher predictive power.

A measure of correlation using the Pearson correlation was done to determine the dependence between variables used in the study. A correlation equivalent of 0.8 or higher was regarded as a higher level of correlation. The study found a low correlation between the variables used in the study. The overall level of correlation being below 0.6.

Heteroskedasticity problem has been noted to cause diverse heterogeneity problems which sometimes are unobserved. Such unobserved characteristics like mental health issues, habits, and beliefs can cause the problem of heteroskedasticity. The model corrected this issue by using the command *vce (robust)* in its regression. Correcting the problem minimized the standard errors.

The model also utilized the Shapiro-Wilk test and tests of Kurtosis and Skewness to test for normality in the model. The null hypothesis stated that the distribution was normally distributed while the alternative hypothesis stated that the distribution was not normally distributed. A Shapiro-Wilk test of over 0.05 was considered a normal distribution and a skewed distribution of between -3 and +3 was considered a normal distribution. A kurtosis of between -10 and +10 was considered for normal distribution. The tests done showed the population of homeless women in Nairobi to be normal distribution

5. Conclusions and Recommendations

This study analyses the determinants of contraceptive discontinuity among homeless women in Kenya. The study found being assisted by a midwife during delivery and having earnings above a dollar a day reduce incidences of contraceptive discontinuity. These factors should be highly encouraged through legislation and programs. Since most homeless women rarely visit health facilities, the government through the Ministry of Health can set aside funds to hire and train more midwives who can offer home-based care for homeless women. These midwives can be used to reach out to homeless women through the introduction of mobile clinics in main street alleys and off-slum settlements of Nairobi County. Some factors that encourage contraceptive discontinuity such as drug abuse should be highly discouraged. The government through the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA), can mitigate drug use through sensitization campaigns, free drug rehabilitation programs, and availing free drugs to mitigate withdrawal symptoms. Such campaigns should focus on the homeless, who should then be offered alternative remedies like jobs, rehabilitation, or counseling. High discontinuation rates stemming from mistreatment by healthcare workers can be dealt with by properly training healthcare workers on empathy and ethical health practices.

The study also noted high discontinuity among married people. The government can encourage contraceptive use by encouraging to partners participate in reproductive health counseling. The Ministry of Health can stress the need for partners to accompany women to clinics for contraceptives and birth-related issues. Informed partners are likely to encourage contraceptive use.

Authors contributions

Ms. Lydia Cheruto Pkaremba was responsible for drafting the manuscript and data collection. Dr. Martine Oleche

Odhiambo and Dr. Elizabeth Owiti were responsible for the study design and revising of the entire manuscript. All authors read and approved the final manuscript. All authors contributed equally to the authorship of this article.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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