

RESEARCH

Open Access



# Contraceptive discontinuation among women of reproductive age in Papua New Guinea

Louis Kobina Dadzie<sup>1†</sup>, Abdul-Aziz Seidu<sup>2,3,4†</sup> , Bright Opoku Ahinkorah<sup>5†</sup>, Justice Kanor Tetteh<sup>1\* </sup>,  
Tarif Salihu<sup>1</sup>, Joshua Okyere<sup>1</sup> and Sanni Yaya<sup>6,7</sup>

## Abstract

**Background:** Papua New Guinea has one of the lowest contraceptive prevalence rates among women of reproductive age in the Western Pacific Region and this makes contraceptive discontinuation in this country a critical public health issue worth studying. This study sought to assess the factors associated with contraceptive discontinuation among women of reproductive age in Papua New Guinea.

**Methods:** The data used for the analysis were obtained from the Papua New Guinea Demographic and Health Survey which was conducted in 2016–2018. The outcome variable for this study was contraceptive discontinuation among women of reproductive age. Crude odds ratios and adjusted odds ratios with 95% confidence intervals were estimated using binary logistic regression.

**Results:** About 33.26% of the women discontinued injectables, 19.15% discontinued pills and 3.77% discontinued other contraception methods. Women aged 20–24 [aOR = 2.12, CI = [1.04,4.31] through to those aged 30–34 [aOR = 1.98, CI = 1.03,3.79] had higher odds to discontinue contraceptive usage compared to those aged 45–49. Women with no information on choice of contraception [aOR = 2.85, CI = 2.31,3.51], those with two or more births in the last five years [aOR = 2.35, CI = 1.65,3.35] and those living in the Highland region [aOR = 1.71, CI = 1.28,2.29] were more likely to discontinue contraceptive usage compared with those with information on contraceptive choices, those with no births and those living in the Island region respectively. However, women in the rural areas [aOR = 0.78, CI = 0.61,0.99], women using LARC [aOR = 0.10, CI = 0.06,0.15], injectables [aOR = 0.43, CI = 0.30,0.63] and other modern contraception methods including condom [aOR = 0.22, CI = 0.15,0.34] were less likely to discontinue contraceptive usage.

**Conclusion:** A nationwide mass education on the benefits of contraception is recommended for the Papua New Guinea National Department of Health to tackle the key findings of this study which were high contraceptive discontinuation prevalence with lack of information on choice, disproportionately high contraceptive discontinuation rate in the Highland Region and the desire to give birth to more than two children as some factors associated with contraceptive discontinuation in Papua New Guinea.

<sup>†</sup>Louis Kobina Dadzie, Abdul-Aziz Seidu and Bright Opoku Ahinkorah contributed equally to this work.

\*Correspondence: [kanorpd@gmail.com](mailto:kanorpd@gmail.com)

<sup>1</sup> Department of Population and Health, University of Cape Coast, Cape Coast, Ghana

Full list of author information is available at the end of the article



**Keywords:** Contraceptive Discontinuation, Family Planning, Papua New Guinea, Global Health

## Background

Family planning (FP) is fundamental to achieving the Sustainable Development Goals (SDGs), particularly (SDG 3), which focuses on ensuring good health and wellbeing. Globally, it has contributed to reductions in unplanned pregnancies, unwanted pregnancies, maternal deaths and under 5 mortality [1, 2]. Access to quality sexual and reproductive healthcare services, including modern contraception is sturdily interconnected with women's and children's health, poverty, education, gender equality and human rights [2]. Women and girls who have access to contraceptives are more likely to realize higher socioeconomic status through education, employment, empowerment, and these quicken the progress of the country by reducing healthcare expenditures [3]. Lack of access and inconsistent use of contraception by women lead to majority of unintended pregnancies and unsafe abortions which eventually result in poor maternal and child health outcomes, affecting the progress of a country [3]. Hence, greater access to and consistent utilization of contraception are fundamental in the decline of unintended pregnancies and abortions.

In spite of women's desire to delay or limit childbearing, contraceptive discontinuation presents a vital public health issue [4]. Contraceptive discontinuation indicates an imperative reproductive health concern that has an adverse consequence on women's reproductive health outcomes [5]. A greater percentage of contraceptive discontinuation that happens when women do not wish to get pregnant is frequently linked with unintended pregnancies, unwanted births and unsafe abortions which have augmented menaces of pregnancy and childbirth-related maternal morbidity and mortality, as well as poor infant and child health outcomes [6, 7]. The effect of FP programs can be adversely influenced by contraceptive discontinuation which has consequences for economic growth.

Dynamics of contraception, including discontinuation, switching, and failure are significant indicators to detect gaps in public health programs on FP needs of women and couples [5]. In a Demographic and Health Survey (DHS) analysis carried out in 34 countries, the authors found that among women who had ever utilized a modern method, approximately 38% discontinued using a modern method, notwithstanding the ongoing desire for FP, and previous use accounted for more than 50% of all women with unmet need in 16 of the countries [8]. Additionally, it was indicated that unmet need was found to be high where contraceptive discontinuation is high and

contraceptive prevalence is low [9]. Conversely, an analysis of DHS datasets in 14 countries reported that a significant number of women who had not switched to another contraceptive method remained at higher risk for pregnancy [10].

Several studies [11–13] have concentrated globally on identifying the reasons for discontinuation of diverse methods of contraception. The choice to continue or discontinue the use of contraceptives can be induced by a number of factors including, age of woman, number of living children (parity), desired number of children, having television and radios, decision-maker to use contraceptive, husband/ partner support, perceived benefit to the FP, perceived contraceptive harm, duration of contraceptive use, counseling on FP and contraceptive side effects, experience of side effects, access and availability of different type of contraceptive [7, 10, 11, 14]. In a study involving 36 low-and middle-income countries, the authors found that about 2% of unintended pregnancies in the preceding 5 years were because of discontinuation of traditional methods, 18% were because of discontinuation of short-acting modern methods, and 2% were because of long-acting methods.

Additionally, a study involving 25 low and middle-income countries indicated that an estimated 38% of women discontinued contraceptive use within 12 months, 55% within 24 months, and 64% within 36 months. Discontinuation rates within 12 months were greatest among condom users (50%) and lowest among intrauterine device (IUD) users [5], whereas about 40% of users of the pill, injectables, periodic abstinence, and withdrawal discontinued within 12 months. Discontinuation due to health concerns /side effects, a method related reason, was the most common reason for discontinuation [5]. Hence, minimizing early discontinuation among women presently utilizing contraception can be an operative approach in decreasing unmet need and unintended pregnancies [15].

Papua New Guinea is one of the countries in the western pacific region that still encounters substantial challenges in access to family planning services [16]. The country has a contraceptive prevalence rate of 20%-24% (rural–urban) [17] with unmet need for contraception at 25% [18]. This contributes to high maternal mortality ratios (MMR), estimated to be between 300 per 100,000 in urban settings and 900 per 100,000 in rural settings [18]. Due to this, the WHO has suggested consistent use of contraception, as one of the strategic approaches for reducing maternal mortality in the country [17, 19–21].

To help understand why national contraceptive roll out and programs in the past in PNG has not yet produced the best outcome, we sought to assess some factors associated with contraceptive discontinuation in PNG in order to inform policies and programs targeted at increasing family planning utilization among women of reproductive age.

## Methods

### Data source and study design

The study was a cross-sectional study that used data from Papua New Guinea Demographic and Health Survey (PGDHS), which was conducted in 2016–2018. The main aim of the PGDHS is to provide current information on basic demographic and health indicators such as contraception. Inner City Fund (ICF) provided technical assistance for the survey through the Demographic and Health Survey Programme. The provinces in the country of focus were further divided into 43 strata, paying attention to urban–rural differentials; however, the National Capital District did not have any rural strata. Each stratum provided samples of census units. The first stage involved the use of a probability proportional-to-size sampling. The second stage of the sampling involved the selection of 24 households from each of the clusters, using an equal probability systematic selection, with the resulting sample being about 19,200 households. About 17,505 households were selected for the sample, 16,754 of which were occupied and 16,021 of the occupied households were interviewed, with a response rate of 96%. From these households, 18,175 women of reproductive age were identified for individual interviews, with 15,198 women completing the interviews at a response rate of 84%. The sample used in this study was 4362. Details of the methodology, pretesting, training of field workers, the sampling design, and selection are available in the PGDHS final report which is also available at <https://dhsprogram.com/publications/publicationfr364-dhs-final-reports.cfm>. We relied on the “Strengthening the Reporting of Observational Studies in Epidemiology” (STROBE) statement in writing the manuscript.

### Variables

#### Outcome variable

The outcome variable for this study was contraceptive discontinuation among reproductive-age women (15–49 years). This was measured as the percentage of reproductive-age women who used a method of contraception in the last 5 years prior to the survey, but discontinued using within 12 months after beginning to use it.

### Explanatory variables

Age, marital status, educational level, place of residence, occupation, wealth index, region, exposure to family planning messages, knowledge on family planning, information on choice of contraception, decision maker for using contraception, births in last five years, number of living children, desire for more children and type of contraceptive method comprised the explanatory variables (See Table 1). These variables were informed by previous studies and a priori [4, 22, 23].

### Analysis

Data were extracted from the women’s file and cleaned. We made use of the DHS calendar file and created the event file in order to analyze the contraceptive discontinuation events among women aged 15–49 who used contraception in 5 years before the survey and discontinued within 12 months after beginning its use. Discontinued events was the unit of analysis for further exploration. Frequency counts and percentages were estimated for categorical variables. Multicollinearity check showed no evidence of multicollinearity after using the Variance Inflation Factor (VIF). Both bivariate and multivariable logistic regression modelling were done. Reference categories were informed by previous studies and a priori. Crude odds ratios (cOR) and adjusted odds ratios (aOR) with 95% confidence intervals (CI) were estimated. Sampling weight was assigned at various levels of the analysis to account for over- and under-sampling of some areas within the study settings while the svy command was used to take account of the complex sampling procedure. Data were processed and analyzed using Stata Version 14.0 and statistical significance was declared at  $p < 0.05$ .

### Ethics approval

ICF Institutional review board approved the survey. Informed consent was obtained from all the respondents before the commencement of interviews with each respondent. Further information about the DHS data usage and ethical standards are available at <http://goo.gl/ny8T6X>.

### Results

From Fig. 1, 33.26% of the women discontinued injectables, 19.15% discontinued pills and 3.77% discontinued other contraception methods. The major reason for discontinuing contraception were other factors which were not specified and those who did not cite a reason. Aside that, desire to become pregnant (15.66%) and

**Table 1** Socio-demographic, reproductive and obstetric characteristics of reproductive age women in Papua New Guinea, 2016-2018 PGDHS (weighted)

Variable	Freq	Percent
<b>Age in 5-year groups</b>		
15–19	137	3.1
20–24	811	18.6
25–29	1,124	25.8
30–34	1,066	24.4
35–39	751	17.2
40–44	344	7.9
45–49	129	3.0
<b>Marital status</b>		
Living together	553	12.7
Married	3,437	78.8
Never married/widowed/divorced/separated	371	8.5
<b>Highest educational level</b>		
No education	686	15.7
Primary	2,220	50.9
Secondary	1,212	27.8
Higher	244	5.6
<b>Place of residence</b>		
Urban	700	16.0
Rural	3,662	84.0
<b>Occupation</b>		
Not working	2,694	61.8
Working	1,668	38.2
<b>Wealth index</b>		
Poorest	563	12.9
Poorer	741	17.0
Middle	872	20.0
Richer	1,046	24.0
Richest	1,141	26.2
<b>Region</b>		
Southern region	1,071	24.6
Highlands region	1,518	34.8
Momase region	1,071	24.5
Islands region	702	16.1
<b>Exposure to family planning messages</b>		
No	3,312	75.9
Yes	1,050	24.1
<b>Knowledge of family planning</b>		
Poor	914	21.0
Good	3,448	79.0
<b>Information on choice</b>		
No	2,439	55.9
Yes	1,923	44.1
<b>Decision maker for using contraception</b>		
Mainly respondent	809	18.6
Mainly husband/partner	435	10.0
Jointly	2,042	46.8
Others	1,076	24.7

**Table 1** (continued)

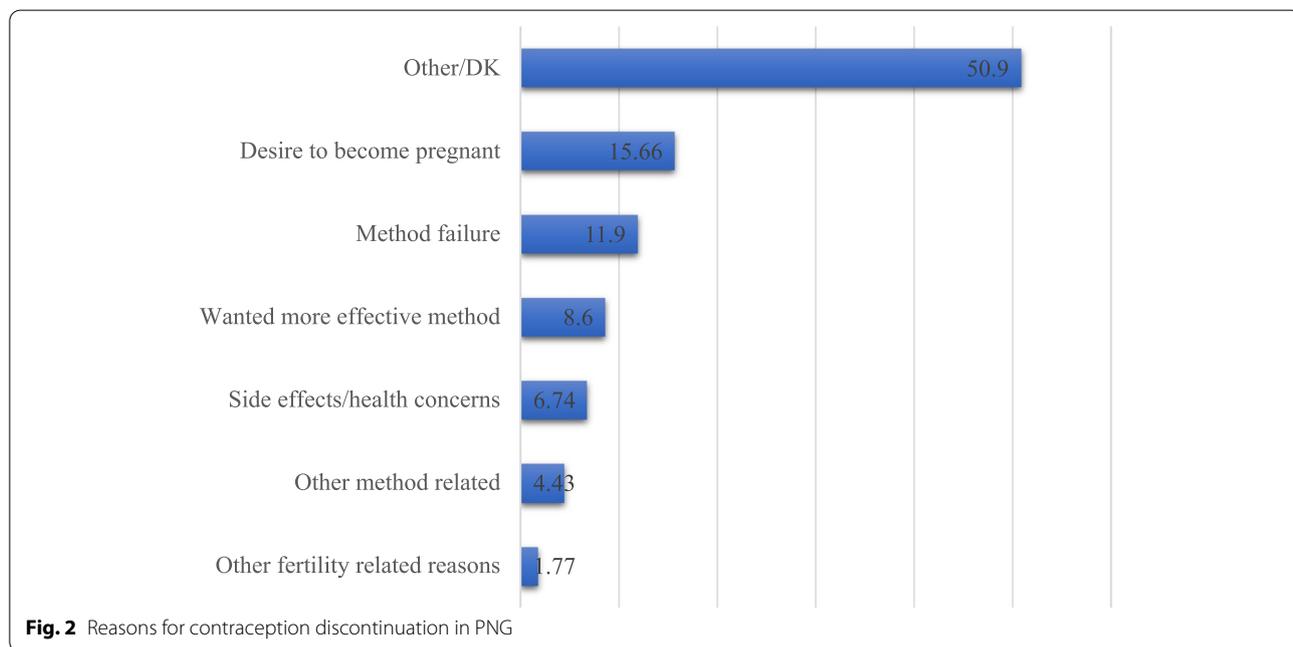
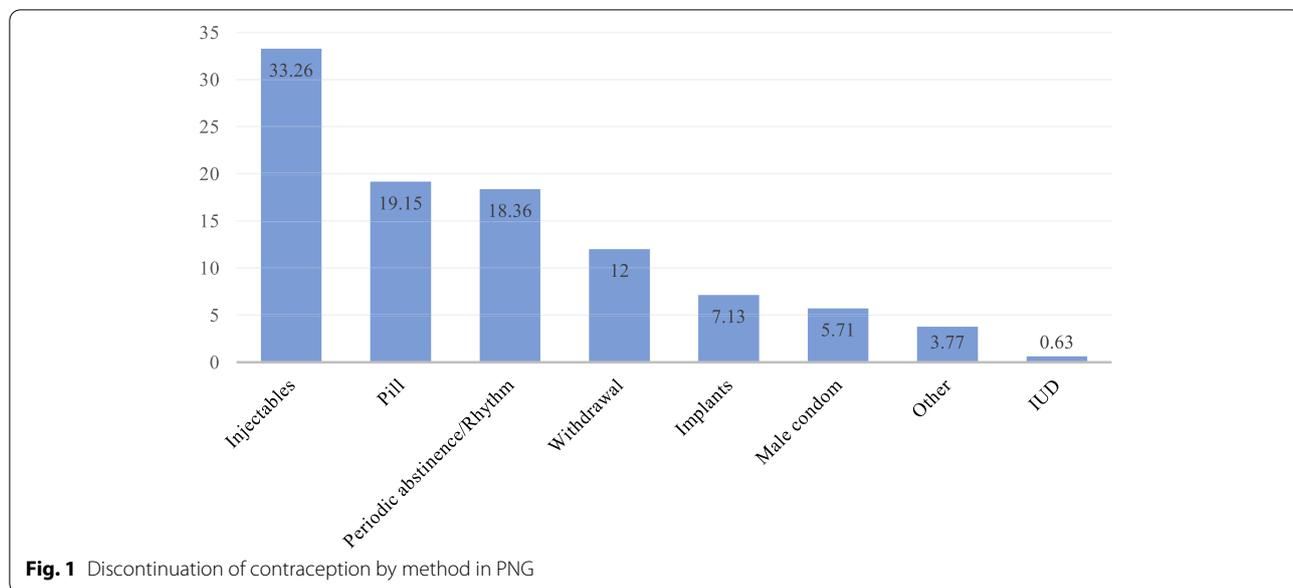
Variable	Freq	Percent
<b>Births in the last five years</b>		
None	650	14.9
1	2,129	48.8
2+	1,583	36.3
<b>Number of living children</b>		
None	192	4.4
1	711	16.3
2	858	19.7
3	927	21.3
4+	1,674	38.4
<b>Desire for more children</b>		
Wants within 2 years	199	4.6
Wants after 2+ years	824	18.9
Wants no more children	1,694	38.8
Undecided	1,645	37.7
<b>Method</b>		
LARC	1,067	24.5
Pills	469	10.7
Injectables	1,262	28.9
Other modern methods including condom	751	17.2
Traditional method	813	18.6

LARC Long Acting Reversible Contraceptive

method failure (11.9%) were cited as the main reasons (see Fig. 2).

### Socio-demographic, reproductive and obstetric characteristics of reproductive age women in Papua New Guinea

Table 1 shows the socio-demographic, reproductive and obstetric characteristics of reproductive age women in PNG. Approximately 26% of the women were aged 25–29. More than half (78.8%) of the respondents were married while 50.9% had primary level of education. Majority (84%) lived in the rural area. The highest proportion of the respondents (61.8%) were not working and those in the richest wealth index constituted 26.2%. The highest proportion (34.8%) were in Highlands Region. Also, 75.9% were not exposed to family planning messages but 79% had good knowledge on family planning. Again, 55.9% had no information on choice. Those who made decisions for using contraceptives jointly had the highest proportion (46.8%) and 48.8% had one birth in the last 5 years. Those who had more than four living children accounted for 38.4% while the desire for no more children accounted for 38.8%.



**Factors associated with contraceptive discontinuation among women in Papua New Guinea**

The regression analysis showed that women aged 20–24 [aOR = 2.12, CI = [1.04, 4.31]] through to those aged 30–34 [aOR = 1.98, CI = 1.03, 3.79] had higher odds to discontinue contraceptive usage compared to those aged 45–49. Women with no information on choice of contraception [aOR = 2.85, CI = 2.31, 3.51], those with two or more births in the last five years [aOR = 2.35,

CI = 1.65, 3.35] and those living in the Highland region [aOR = 1.71, CI = 1.28, 2.29] were more likely to discontinue contraceptive usage compared with those with information on contraceptive choices, those with no births and those living in the Island region respectively. However, women in the rural areas [aOR = 0.78, CI = 0.61, 0.99], those who are undecided in their desire for more children [aOR = 0.61, CI = 0.37, 1.00], women using LARC [aOR = 0.10, CI = 0.06, 0.15], injectables [aOR = 0.43, CI = 0.30, 0.63] and other modern methods

**Table 2** Bivariate and multivariate analysis for contraceptive discontinuation among reproductive age women in Papua New Guinea, 2016-2018 PGDHS (weighted)

Variable	Contraceptive discontinuation	
	cOR	aOR
<b>Age in 5-year groups</b>		
15–19	1.89 [0.79,4.51]	1.01 [0.39,2.61]
20–24	3.69*** [1.92,7.11]	2.12* [1.04,4.31]
25–29	3.81*** [2.03,7.16]	2.30* [1.19,4.47]
30–34	3.10*** [1.66,5.81]	1.98* [1.03,3.79]
35–39	2.27* [1.19,4.32]	1.71 [0.89,3.28]
40–44	1.68 [0.85,3.34]	1.33 [0.66,2.69]
45–49	1 [1.00,1.00]	1 [1.00,1.00]
<b>Marital status</b>		
Living together	1.03 [0.67,1.56]	0.75 [0.47,1.20]
Married	1.74** [1.24,2.44]	1.1 [0.76,1.60]
Never married/widowed/divorced/separated	1 [1.00,1.00]	1 [1.00,1.00]
<b>Highest educational level</b>		
No education	0.48* [0.26,0.90]	0.62 [0.30,1.28]
Primary	0.6 [0.33,1.09]	0.76 [0.39,1.47]
Secondary	0.61 [0.34,1.13]	0.83 [0.43,1.58]
Higher	1 [1.00,1.00]	1 [1.00,1.00]
<b>Residence</b>		
Urban	1 [1.00,1.00]	1 [1.00,1.00]
Rural	0.81* [0.67,0.98]	0.78* [0.61,0.99]
<b>Occupation</b>		
Not working	0.93 [0.76,1.15]	
Working	1 [1.00,1.00]	
<b>Wealth index</b>		
Poorest	1 [1.00,1.00]	
Poorer	1.05 [0.75,1.47]	
Middle	0.95 [0.67,1.34]	
Richer	0.93 [0.68,1.28]	
Richest	0.95 [0.67,1.35]	
<b>Region</b>		
Southern region	1.03 [0.83,1.28]	1.23 [0.95,1.59]
Highlands region	1.49** [1.15,1.94]	1.71*** [1.28,2.29]
Momase region	0.70** [0.54,0.91]	0.85 [0.63,1.14]
Islands region	1 [1.00,1.00]	1 [1.00,1.00]
<b>Exposure to family planning messages</b>		
No	0.8 [0.63,1.00]	
Yes	1 [1.00,1.00]	
<b>Knowledge of family planning</b>		
Poor	1 [1.00,1.00]	
Good	1.25 [0.99,1.57]	
<b>Information on choice</b>		
No	2.45*** [2.01,2.99]	2.85*** [2.31,3.51]
Yes	1 [1.00,1.00]	1 [1.00,1.00]
<b>Births in the last five years</b>		
None	1 [1.00,1.00]	1 [1.00,1.00]
1	1.3 [0.97,1.75]	1.07 [0.77,1.50]
2+	2.93*** [2.15,3.99]	2.35*** [1.65,3.35]

**Table 2** (continued)

Variable	Contraceptive discontinuation	
	cOR	aOR
<b>Number of living children</b>		
None	1 [1.00,1.00]	1 [1.00,1.00]
1	1.3 [0.69,2.46]	1.12 [0.56,2.27]
2	1.89* [1.02,3.51]	1.11 [0.54,2.28]
3	1.6 [0.86,3.00]	0.89 [0.43,1.87]
4+	1.29 [0.70,2.37]	1.06 [0.50,2.26]
<b>Desire for more children</b>		
Wants within 2 years	1 [1.00,1.00]	1 [1.00,1.00]
Wants after 2+ years	0.95 [0.59,1.51]	0.86 [0.52,1.43]
Wants no more children	0.9 [0.59,1.38]	0.96 [0.59,1.58]
Undecided	0.53** [0.34,0.82]	0.61* [0.37,1.00]
<b>Method</b>		
LARC	0.09*** [0.06,0.13]	0.10*** [0.06,0.15]
Pills	1 [1.00,1.00]	1 [1.00,1.00]
Injectables	0.44*** [0.32,0.62]	0.43*** [0.30,0.63]
Other modern methods including condom	0.16*** [0.11,0.24]	0.22*** [0.15,0.34]
Traditional method	0.82 [0.59,1.16]	0.9 [0.61,1.33]
pseudo R-sq		0.197

Exponentiated coefficients; 95% confidence intervals in brackets

cOR Crude odds ratio, aOR Adjusted odds ratio

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

including condom [aOR = 0.22, CI = 0.15, 0.34] were less likely to discontinue contraceptive usage (Table 2).

## Discussion

PNG has one of the lowest contraceptive prevalence rates in the Western Pacific Region which makes contraceptive discontinuation in this country a critical public health issue worth studying [21]. This study, therefore, assessed the factors associated with contraceptive discontinuation among women of reproductive age in PNG, which is crucial in enabling family planning programs to identify appropriate strategies to improve continuous contraceptive utilization [9, 24].

We found that about 56.18% of reproductive age women in PNG discontinue contraceptive use which is alarming considering the fact that globally, it is projected that only about 38% of contraceptive users discontinue use of a method within the first 12 months [8]. This finding is also disturbing because Jain et al. [8] have further reported that findings from a survey involving reproductive age women from 34 low and middle income countries (LMICs) shows that 38% of women with unmet need of family planning were prior contraceptive method users who had discontinued use. Considering that the Oceania region has one of the lowest contraceptive prevalence globally (57.8%) [25], a higher prevalence of

discontinuation is a major source of worry. The discontinuation prevalence found in this study is also higher than those reported in other LMICs such as Bangladesh [26], Kenya [24], Ethiopia [4], Zimbabwe, Armenia, Egypt and Colombia [27]. The plausible reasons could be inadequate information on choice, low socioeconomic status, sociocultural factors, high illiteracy levels of many reproductive aged women coupled with many barriers women face in accessing healthcare including family planning services in PNG [16, 28–30].

With regards to method specific discontinuation, it is not surprising that in this study about 33.26% of women discontinued using the injectables as it is reported in a previous study that the injectables is the most widely used contraceptive method in PNG [28]. The finding that injectables is widely the most discontinued contraceptive method among women of reproductive age is also corroborated by previous studies in Nigeria [31] and Bangladesh [26]. Injectables could be short term and may not require medical intervention (Health professionals) to discontinue unlike the implant and IUD. This probably makes it easier for women to discontinue. However, we found that reproductive age women who were using LARC, injectables and other modern methods including condom were less likely to discontinue. The plausible reason could be that women who were still using

contraceptives have been using these methods for a while and they know the benefits associated with its use and so discontinuation becomes a disincentive.

Findings from this study further shows that women living in the Highlands region had higher odds of contraceptive discontinuation. This could possibly be attributed to high prevalence of poor utilization of family planning services and high prevalence of low knowledge about family planning services among both men and women in the Highlands region of PNG [30]. Comprehensive knowledge about FP is often a pathway to women's empowerment over their reproductive health and holistic wellbeing which increases awareness of benefits and de-merits of contraceptives and subsequently aiding their decision making. Our finding is substantiated by findings from a previous study in PNG by Seidu et al. [28]. In the Highlands region, the odds of contraceptive uptake is high but poor knowledge and inadequate information on choice coupled with poor family planning services or access could plausibly explain the high contraceptive discontinuation rates.

Consistent with previous studies [32, 33], we also observed that reproductive aged women in PNG with no information on choice were more likely to discontinue contraceptive use compared to their counterparts who had information. Timely and accurate information is key with regards to contraceptive uptake. Information on choice empowers women to select the method that best satisfies their personal, reproductive and health needs based on a thorough understanding of their contraceptive options [34]. When women are well informed to make their own decision, it increases their confidence and commitment to their health care decisions and thereby reducing the odds of discontinuation. Women of reproductive age are more likely to use contraceptive and stay with it if they receive adequate information on choice.

Furthermore, women with two or more parity within the last 5 years preceding the DHS were more likely to discontinue contraceptive use within the first 12 months. This finding is consistent with findings from studies in other LMICs [4, 13, 22, 35]. The desire to have more children is the motivation for contraceptive discontinuation for some women. For example, in Indonesia, a study reported that women who wanted more children had lower odds of using contraceptives compared to those who reported not wanting more children [36]. Generally, women may discontinue contraceptive use immediately they develop the desire to have more children and easy to discontinue methods such as condoms, pills and injectables only exacerbate the situation.

### **Strength and limitations of the study**

Causal inferences cannot be made from this study because of the cross-sectional study design that was employed. Also, due to the retrospective nature of the study, there is the potential for recall bias. Nevertheless, this study provides a nationally representative coverage of contraceptive discontinuation among women of reproductive age in PNG.

### **Conclusion and implications for PNG**

We found that about 56.18% of reproductive age women in PNG discontinue contraceptive use within the first 12 months. Also, the odds of discontinuation were higher among women residing in the highlands, those with no information on choice and those with two or more births within the last five years preceding the 2016-2018 PGDHS. However, those who were using LARC, injectables and other modern methods including condom were found to be less likely to discontinue. The findings of this study has several multifaceted implications for PNG.

To reduce the prevalence of contraceptive discontinuation in PNG, the National Department of Health (NDOH) in PNG needs to intensify education on the benefits of contraceptives and choice. A nationwide mass education on contraceptives will empower women with enough information to overcome misconceptions and misunderstandings thereby making discontinuation unattractive and a disincentive. The NDOH should develop a nationwide comprehensive communication and advocacy strategy that will be implemented at all levels including local levels and in the Highland Regions. The nationwide education should pay critical attention to long term methods such as the IUD and LARC which often requires health professional intervention to either use or discontinue so that women who may want to discontinue as a result of misinformation or misconceptions could be counseled and helped. Paying special attention to these methods is also important because in this study, we observed that reproductive aged women who were using LARC and IUD were less likely to discontinue their use. The nationwide mass education on the benefits of contraceptives will also solve the issue with many reproductive aged women lacking information on choice and discontinuing with contraceptive usage. The nationwide mass education should also pay attention to region specific contraceptive and family planning needs. For example, in this study we observed that contraceptive discontinuation was high among women living in the highlands region. The PNG National Health Information System also needs to be updated to include implant insertions especially as findings in this study have highlighted that women using this method are less likely to discontinue. Adequate information on all the methods will help women to make informed

choices and empower them to dispel misconceptions that often robs them of the true benefits of contraceptives.

#### Abbreviations

aOR: Adjusted Odds Ratio; CI: Confidence Interval; CI: Confidence intervals; cOR: Crude odds ratios; DHS: Demographic and Health Survey; EA: Enumeration areas; FP: Family planning; ICF: Inner City Fund; IUD: Intra Uterine Device; LMICs: Low-and-middle-income countries; PGDHS: Papua New Guinea Demographic and Health Survey; PNG: Papua New Guinea; SDG: Sustainable Development Goals; VIF: Variance Inflation Factor.

#### Acknowledgements

We are grateful to MEASURE DHS for granting us free access to use the data for our study.

#### Authors' contributions

Conception and design of study: AS; analysis and/or interpretation of data: LKD and AS, drafting the manuscript: LKD, AS, BOA, JKT, TS, JO, and SY, revising the manuscript critically for important intellectual content; LKD, AS, BOA, JKT, TS, JO, and SY. All authors have read and approved the final manuscript.

#### Funding

Not Applicable.

#### Availability of data and materials

The dataset supporting the conclusions of this article is available online at <https://dhsprogram.com/data/dataset/PapuaNewGuinea>

#### Declarations

##### Ethics approval and consent to participate

ICF Institutional review board approved the survey. Informed consent was obtained from all the respondents before the commencement of interviews with each respondent. Further information about the DHS data usage and ethical standards are available at <http://goo.gl/ny8T6X>.

##### Consent for publication

Not Applicable.

##### Competing interests

The authors declare that they have no competing interests.

##### Author details

<sup>1</sup>Department of Population and Health, University of Cape Coast, Cape Coast, Ghana. <sup>2</sup>Department of Estate Management, Faculty of Built and Natural Environment, Takoradi Technical University, Takoradi, Ghana. <sup>3</sup>Centre For Gender and Advocacy, Takoradi Technical University, Takoradi, Ghana. <sup>4</sup>College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, QLD, Australia. <sup>5</sup>School of Public Health, Faculty of Health, University of Technology Sydney, Sydney, Australia. <sup>6</sup>School of International Development and Global Studies, University of Ottawa, Ottawa, Canada. <sup>7</sup>The George Institute for Global Health, Imperial College London, London, UK.

Received: 7 May 2021 Accepted: 28 February 2022

Published online: 02 June 2022

#### References

- Starbird E, Norton M, Marcus R. Investing in family planning: key to achieving the sustainable development goals. *Glob Health Sci Pract*. 2016;4(2):191–210. <https://doi.org/10.9745/GHSP-D-15-00374>.
- New JR, Cahill N, Stover J, Gupta YP, Alkema L. Levels and trends in contraceptive prevalence, unmet need, and demand for family planning for 29 states and union territories in India: a modelling study using the family planning estimation tool. *Lancet Glob Health*. 2017;5:e350–8.
- Kaye K, Gootman JA, Ng AS, Finley C. The benefits of birth control in America: getting the facts straight. The National Campaign to prevent teen and unplanned Pregnanc. Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy; 2014.
- Belete N, Zemene A, Hagos H, et al. Prevalence and factors associated with modern contraceptive discontinuation among reproductive age group women, a community based cross-sectional study in Humera town, northern Ethiopia. *BMC Womens Health*. 2018;18:190. <https://doi.org/10.1186/s12905-018-0663-4>.
- Ali MM, Cleland J, Shah IH. Causes and Consequences of Contraceptive Discontinuation: Evidence from 60 Demographic and Health Surveys. Geneva: World Health Organization; 2012. [http://www.who.int/reproductivhealth/publications/family\\_planning/9789241504058/en/](http://www.who.int/reproductivhealth/publications/family_planning/9789241504058/en/).
- Ersek JL, Brunner Huber LR, Thompson ME, et al. Satisfaction and Discontinuation of Contraception by Contraceptive Method Among University Women. *Matern Child Health J*. 2011;15:497–506. <https://doi.org/10.1007/s10995-010-0610-y>.
- Sedgh G, Singh S, Hussain R. Intended and unintended pregnancies worldwide in 2012 and recent trends. *Stud Fam Plan*. 2014;45(3):301–14.
- Jain AK, Obare F, RamaRao S, Askew I. Reducing unmet need by supporting women with met need. *Int Perspect Sex Reprod Health*. 2013;39:133–41.
- Jain AK, Mahmood A, Sathar ZA, Masood I. Reducing unmet need and unwanted childbearing: evidence from a panel survey in Pakistan. *Stud Fam Plan*. 2014;45(2):277–99.
- Hameed W, Azmat SK, Ali M, Hussain W, Mustafa G, Ishaque M, et al. Determinants of method switching among social franchise clients who discontinued the use of intrauterine contraceptive device. *Int J Reprod Med*. 2015;2015.
- Mahumud RA, Hossain G, Sarkar AR, Islam N, Hossain R, Saw Aik S, Khan J. Prevalence and associated factors of contraceptive discontinuation and switching among Bangladeshi married women of reproductive age. *Open Access J Contracept*. 2015;6:13.
- Barden-O'Fallon J, Speizer IS, Calhoun LM, Corroon M. Women's contraceptive discontinuation and switching behavior in urban Senegal, 2010–2015. *BMC Womens Health*. 2018;18:1–9.
- Safari W, Urassa M, Mtenga B, Changalucha J, Beard J, Church K, Zaba B, Todd J. Contraceptive use and discontinuation among women in rural north-West Tanzania. *Contracept Reprod Med*. 2019;4:18.
- Thobani R, Saleem Jessani IA, Reza S, Sami N, Rozi S, Abrejo F, et al. Factors associated with the discontinuation of modern methods of contraception in the low income areas of Sukh Initiative Karachi: a community-based case control study. *PLoS ONE*. 2019;14(7):e0218952.
- Jain AK, Winfrey W. Contribution of contraceptive discontinuation to unintended births in 36 developing countries. *Stud Fam Plan*. 2017;48:269–78.
- Gupta S, Bernays S, Black KI, et al. Community attitudes and gendered influences on decision making around contraceptive implant use in rural Papua New Guinea. *Reprod Health*. 2020;17:136. <https://doi.org/10.1186/s12978-020-00985-w>.
- Alkema L, Kantorova V, Menozzi C, Biddlecom A. National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. *Lancet*. 2013;381:1642–52.
- Mola G, Kirby B. Discrepancies between national maternal mortality data and international estimates: the experience of Papua New Guinea. *Reprod Health Matters*. 2013;21(42):191–202. [https://doi.org/10.1016/S0968-8080\(13\)42725-8](https://doi.org/10.1016/S0968-8080(13)42725-8) PMID: 24315074.
- Ahmed S, Choi Y, Rimon JG, et al. Trends in contraceptive prevalence rates in sub-Saharan Africa since the 2012 London Summit on family planning: results from repeated cross-sectional surveys. *Lancet Glob Health*. 2019;7:e904–11. [https://doi.org/10.1016/S2214-109X\(19\)302001pmid:http://www.ncbi.nlm.nih.gov/pubmed/31109881](https://doi.org/10.1016/S2214-109X(19)302001pmid:http://www.ncbi.nlm.nih.gov/pubmed/31109881).
- Sanga K, Mola G, Wattimena J, et al. Unintended pregnancy amongst women attending antenatal clinics at the post Moresby general hospital. *Aust N Z J Obstet Gynaecol*. 2014;54:360–5.
- World Health Organization. Papua New Guinea: actions for scaling up long-acting reversible contraception. Manilla: Regional Office for the Western Pacific; 2017.
- Tin KN, Maung TM, Win T. Factors that affect the discontinuation of family planning methods in Myanmar: analysis of the 2015–16 Myanmar

- Demographic and Health Survey. *Contraception and reproductive medicine*. 2020;5(1):20. <https://doi.org/10.1186/s40834-020-00126-5>.
23. Mekonnen BD, Wubneh CA. Prevalence and associated factors of contraceptive discontinuation among reproductive-age women in Ethiopia: using 2016 Nationwide Survey Data. *Reprod Health*. 2020;17:175. <https://doi.org/10.1186/s12978-020-01032-4>.
  24. Ontiri S, Were V, Kabue M, Biesma-Blanco R, Stekelenburg J. Patterns and determinants of modern contraceptive discontinuation among women of reproductive age: Analysis of Kenya Demographic Health Surveys, 2003–2014. *PLOS ONE*. 2020;15(11):e0241605. <https://doi.org/10.1371/journal.pone.0241605>.
  25. United Nations (UN). United Nations Department of Economic and Social Affairs PD. World Family Planning 2017—Highlights (ST/ESA/SER.A/414). 2017. [https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2020/Jan/un\\_2017\\_world\\_familyplanning\\_highlights.pdf](https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2020/Jan/un_2017_world_familyplanning_highlights.pdf).
  26. Alam Mahumud R, Hossain G, Razzaque Sarker A, Islam N, Hossain R, Saw A, Khan J. Prevalence and associated factors of contraceptive discontinuation and switching among Bangladeshi married women of reproductive age. *Open Access J Contracept*. 2015;6:13–9. <https://doi.org/10.2147/OAJC.S76070>.
  27. Castle S, Askew I. Contraceptive discontinuation: reasons, challenges, and solutions. New York: Population Council. 2015. <https://www.emeraid.com/insight/content/doi/10.1108/JHASS-09-2019-0056/full/html>. Accessed 12 Mar 2022.
  28. Seidu A-A, Agbaglo E, Dadzie LK, Ahinkorah BO, Ameyaw EK, Tetteh JK, Yaya S. Modern contraceptive utilization and associated factors among married and cohabiting women in Papua New Guinea: a population-based cross-sectional study. *Contracept Reprod Med*. 2020a;5(1):1–11. <https://doi.org/10.1186/s40834-020-00125-6>.
  29. Seidu AA, Agbaglo E, Dadzie LK, Ahinkorah BO, Ameyaw EK, Tetteh JK. Individual and contextual factors associated with barriers to accessing healthcare among women in Papua New Guinea: insights from a nationwide demographic and health survey. *Int Health*. 2020b. <https://doi.org/10.1093/inthealth/ihaa097>.
  30. Kura S, Vince J, Crouch-Chivers P. Male involvement in sexual and reproductive health in the Mendi district, Southern Highlands province of Papua New Guinea: a descriptive study. *Reprod Health*. 2013;10:46. <https://doi.org/10.1186/1742-4755-10-46>.
  31. Taingson MC, Adze JA, Bature SB, Durosinlorun AM, Caleb M, Amina A, Kana MA, Lydia A. Trend of modern contraceptive uptake and its predictors among women accessing family planning service in a tertiary hospital in North-western Nigeria, 2000–2014. *Trop J Obstet Gynaecol*. 2017;34:201–6.
  32. Ahinkorah BO, Seidu AA, Appiah F, et al. Individual and community-level factors associated with modern contraceptive use among adolescent girls and young women in Mali: a mixed effects multilevel analysis of the 2018 Mali demographic and health survey. *Contracept Reprod Med*. 2020;5:27. <https://doi.org/10.1186/s40834-020-00132-7>.
  33. Nsanya MK, Atchison CJ, Bottomley C, Doyle AM, Kapiga SH. Modern contraceptive use among sexually active women aged 15–19 years in North-Western Tanzania: results from the adolescent 360 (A360) baseline survey. *BMJ Open*. 2019;9: e030485. <https://doi.org/10.1136/bmjopen-2019-030485>.
  34. Kim YM, Kols A, Mucheke S. Informed choice and decision making in Family Planning Counseling in Kenya 24. *International family planning perspective*. 1998;24(1):35–42.
  35. Bekele T, Gebremariam A, Tura P. Factors associated with contraceptive discontinuation in Agarfa district, Bale zone, South east Ethiopia. *Epidemiology (sunnyvale)*. 2015;5(179):104172.
  36. Withers M, Kano M, Pinatih GNI. Desire for more children, contraceptive use and unmet need for family planning in a remote area of Bali. *Indonesia J Biosoc Sc*. 2010;42:549–62. <https://doi.org/10.1017/S0021932010000052>.

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more [biomedcentral.com/submissions](https://biomedcentral.com/submissions)

