

RESEARCH

Open Access



Modern contraceptive utilization and associated factors among married and cohabiting women in Papua New Guinea: a population-based cross-sectional study

Abdul-Aziz Seidu^{1,2*} , Ebenezer Agbaglo³, Louis Kobina Dadzie¹, Bright Opoku Ahinkorah⁴, Edward Kwabena Ameyaw⁴, Justice Kanor Tetteh¹ and Sanni Yaya^{5,6}

Abstract

Background: Universal access to family planning has been emphasized by the international development agenda, as evident in the Sustainable Development Goal 3.7. This notwithstanding, the use of modern contraceptives has been minimal in low- and middle-income countries, especially in Papua New Guinea. In view of this, we investigated the factors associated with the use of modern contraceptives and the associated factors among married and cohabiting women in Papua New Guinea.

Methods: The study utilised the Demographic and Health Survey data of 2345 women in sexual unions in Papua New Guinea. We employed a descriptive and binary logistic regression analyses. We presented the results as crude Odds Ratios (COR) and adjusted Odds Ratios (AOR), with 95% confidence intervals (CI) signifying level of precision. Level of statistical significance was set at $p < 0.05$.

Results: We found that 74.4% of the women were using modern contraceptives ranging from injectables (44.5%) to other modern methods (0.23%). Women aged 15–19 [AOR = 7.425, 95% CI = 2.853, 19.32], residents of the Highland region [AOR = 1.521, 95% CI = 1.086, 2.131], self-employed women in the agricultural sector [AOR = 1.710, 95% CI = 1.218, 2.400], and women who listened to radio at least once a week [AOR = 1.409, 95% CI = 1.048, 1.895] had higher odds of modern contraceptive usage. However, women in the Islands region [AOR = 0.291, 95% CI = 0.224, 0.377], women whose husbands had higher education [AOR = 0.531, 95% CI = 0.318, 0.886], women in professional/technical/managerial work [AOR = 0.643, 95% CI = 0.420, 0.986], and those with no child [AOR = 0.213, CI = 0.0498, 0.911] had lower odds of modern contraceptive use.

(Continued on next page)

* Correspondence: abdul-aziz.seidu@stu.ucc.edu.gh

¹Department of Population and Health, University of Cape Coast, Cape Coast, Ghana

²College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Queensland, Australia

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



© The Author(s). 2020 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

(Continued from previous page)

Conclusion: Out of the 2345 participants, we found that majority of them were using modern contraceptives and the commonly used modern contraceptive was injectables. Age, region of residence, partner's education, employment, partner's desire for children, and frequency of listening to radio are associated with modern contraceptive usage. Tailored reproductive healthcare should be developed for women who are disadvantaged when it comes to the usage of modern contraceptives in order to boost modern contraceptive use among them. Further investigation is needed to unravel the motivation for the high usage of injectables among married and cohabiting women in Papua New Guinea.

Keywords: Contraceptives, Papua New Guinea, Public health, Global Health, Women

Background

Making access to family planning universal has been an important component of the global development agenda. The International Conference on Population and Development Program of Action, for instance, declared it as a fundamental human right [1–3]. More importantly, the target 3.7 of the Sustainable Development Goals (SDGs) emphasises “the universal access to sexual and reproductive health-care services, including family planning” [4]. In contemporary society, modern contraception is the most preferred option and includes sterilization, intrauterine devices and systems, subdermal implants, oral contraceptives, condoms, injectables, emergency contraceptive pills, patches, diaphragm and cervical caps, spermicidal agents, vaginal rings, and sponge [5]. Utilisation of modern contraception allows couples to determine the number and spacing of their pregnancies. It additionally ensures good health for both mothers and children, by decreasing mortality and morbidity induced by unwanted pregnancies [6–9]. Further, increasing contraceptive use reduces fertility, which indirectly leads to poverty reduction [10].

There has been a flurry of research on modern contraception use all over the world, especially in low- and middle-income countries. Part of such research has focused mainly on reasons for non-use of contraception [11] and factors that positively influence the use of contraception, with others have focused specifically on the influence of social support and parity [12], internal migration, and knowledge of contraceptive use on the use of contraception [13]. In terms of geography, such research has focused on countries such as India [14], twenty-seven sub-Saharan African countries [15], Gambia [16], and Ethiopia [17]. Research by Adebawale et al. [11], for instance, revealed being married more than once and husband's non-approval as barriers to contraception use in Burkina Faso. Women's education [15], parity [17], age, religion, and type of marriage [18] have also been identified as predictors of modern contraceptive use among women.

In the Pacific, previous related studies basically focused on follow-up of a contraceptive outreach program [19], access to contraception and family planning [20],

adolescent fertility and family planning [21], and costs and benefits of reducing unmet need for contraception [10]. To be more specific, in Papua New Guinea, previous related studies focused on women's perspective of family planning [22], and impact of the contraceptive implant on maternal and neonatal mortality [23], but failed to reveal the factors associated with modern contraception use. In the present study, we investigated the factors associated with the use of modern contraception in Papua New Guinea. This study is desirable, given that, as previous studies reveal, Papua New Guinea records low use of modern contraceptive, which has led to a high maternal mortality ratio, estimated to be around 57.3% per 100,000 live births [24]. Thus, revealing factors associated with modern contraception use in Papua New Guinea, as this study aims to do, will not only extend the geographical coverage of research of this kind, but also help health intervention programs aimed at reducing maternal mortality due to unintended pregnancies and abortions in the country.

Materials and methods

Data source

The data used for this study forms part of the 2016–2018 Papua New Guinea Demographic and Health Survey (PDHS), which was collected from October 2016 to December 2018. The survey adopted a two-staged stratified sampling technique. Before the sampling, the provinces in the country were apportioned into urban and rural areas, which yielded 43 strata; however, the National Capital District had only urban areas. A two-staged sampling procedure was used to sample census units (CUs) from each stratum. Stage 1 involved the selection of 800 CUs. This was done through probability proportional to CU size. The second stage saw the systematic selection of 24 households from each cluster through probability sampling, and this yielded a total of 19,200 households. For this study, we focused on women in sexual unions, with “sexual union” defined as marriage or cohabitation, and such women numbered 2345, all of which had complete information on the variables the present study is interested in. Details of the methodology, pretesting, training

of field workers, the sampling design, and selection are available in the PDHS final report [25] which is also available online at: <https://dhsprogram.com/publications/publication-fr364-dhs-final-reports.cfm>.

Variables

Outcome variable

The outcome variable was modern contraceptive utilization. A woman was deemed to be a modern contraceptive user if she uses at least one of the following methods: female sterilization, male sterilization, IUD, injectable, implants, pills, male condom, female condom, emergency contraception, and standard days method. On the other hand, non-users are those who resort to the use of traditional methods such as rhythm method, lactation amenorrhea method, and withdrawal or if she had not been using any type of contraception at all [26–28].

Independent variables

Seventeen independent variables that were theoretically and empirically related to contraceptive usage were considered in this study [27–33]. The variables comprised age, occupation, place of residence, region of residence, marital status, education, partner's education, wealth, age at first sex, age at first childbirth, total children ever born, number of living children, husband's desire for children, decision maker on contraception, frequency of listening to radio, frequency of watching television, and frequency of reading newspaper or magazine. Some of these variables were recoded for meaningful and easy interpretation of results. Age at first sex and age at first childbirth were recoded as 1 = < 18, 2 = 18–24, and 3 = 25+. Total children ever born was coded as 1 = 1–2, 2 = 3–4, and 3 = 5 and above. Number of living children was coded as 1 = No Child, 2 = 1–2, 3 = 3–4, and 4 = 5 and above.

Statistical analysis

Both descriptive and inferential analyses were conducted. The descriptive analysis involved the use of frequencies and percentages to describe the study sample and the prevalence of modern contraceptive usage across all the independent variables. After that, two logistic regression models were built and the results were reported as crude and adjusted odds ratios (see Table 2). The model fitness specification was done with the Hosmer-Lemeshow test while multicollinearity was checked using the variance inflation factor (VIF) which showed no evidence of multi-collinearity. We applied sample weight to take care of areas that were under-sampled and also those that were over-sampled. The SVY command was also used to take care of the multi-stage sampling nature of the survey. STATA Version 14.2 for MacOS was used to carry out the analyses, and statistical significance was declared at p -value less than 0.05.

Results

Prevalence of modern contraceptive use among women in union in Papua New Guinea

Findings on the prevalence of modern contraceptive use are presented in Fig. 1. Injectables were the most widely used modern contraceptive, ensued by implants/Norplant, marked by 44.50 and 40.60% respectively. The least reported was other modern methods (0.23%). In all, 74.37% of the women were using modern contraceptives.

Socio-demographic characteristics of women in sexual union in Papua Guinea and modern contraceptives usage

Modern contraceptive use with respect to socio-demographic characteristics have been presented in Table 1. Contraceptive use dominated among women aged 20–24 (83.0%). Nearly 83.3% of women in skilled

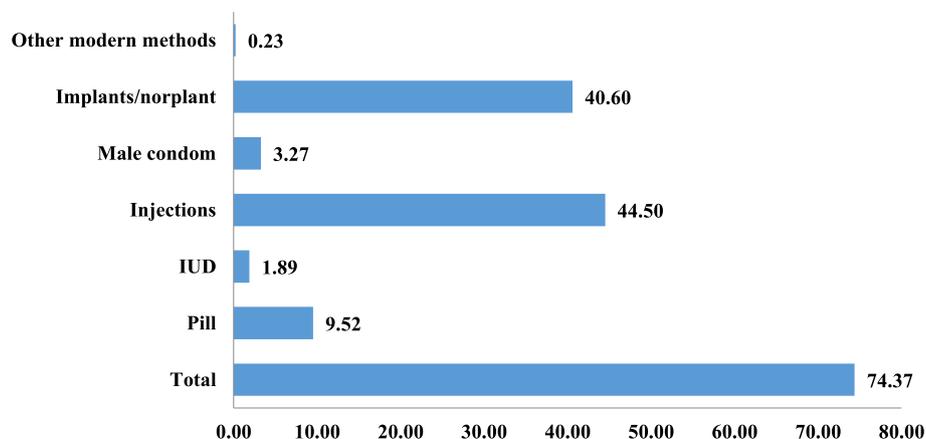


Fig. 1 Prevalence of modern contraceptive use among women in union in Papua New Guinea

Table 1 Socio-demographic characteristics of women in union in Papua New Guinea and modern contraceptives usage (N = 2345)

Variable	Weighted N	Weighted %	Modern Contraceptive use	
			No n(%)	Yes n(%)
Age				
15–19	50	2.1	8 (16)	42 (84.0)
20–24	387	16.5	66 (17.1)	321 (83.0)
25–29	581	24.8	107 (18.4)	474 (81.6)
30–34	549	23.4	146 (26.6)	403 (73.4)
35–39	404	17.2	119 (29.5)	285 (70.5)
40–44	249	10.6	93 (37.4)	156 (62.7)
45–49	125	5.3	62 (49.6)	63 (50.4)
Respondent's occupation				
Not working	1398	59.6	375 (26.8)	1023 (73.2)
Professional /technical/managerial	158	6.7	64 (40.5)	94 (59.5)
Clerical	57	2.4	13 (22.8)	44 (77.2)
Sales	128	5.5	30 (23.4)	98 (76.6)
Agricultural- self employed	317	13.5	58 (18.3)	259 (81.7)
Agricultural – employee	42	1.8	12 (28.6)	30 (71.4)
Services	227	9.7	46 (20.3)	181 (79.7)
Skilled manual	18	0.8	3 (16.7)	15 (83.3)
Residence				
Urban	640	27.3	148 (23.1)	492 (76.9)
Rural	1705	72.7	453 (26.6)	1252 (73.4)
Region				
Southern region	751	32.0	149 (19.8)	602 (80.2)
Highlands region	462	19.7	64 (13.9)	398 (86.2)
Momase region	548	23.4	120 (21.9)	428 (78.1)
Islands region	584	24.9	268 (45.9)	316 (54.1)
Current marital status				
Married	2015	85.9	515 (25.6)	1500 (74.4)
Living with partner	330	14.1	86 (26.1)	244 (73.9)
Highest educational level				
No education	389	16.6	99 (25.5)	290 (74.6)
Primary	1141	48.7	282 (24.7)	859 (75.3)
Secondary	698	29.8	175 (25.1)	523 (74.9)
Higher	117	5.0	45 (38.5)	72 (61.5)
Husband/partner's education level				
No education	260	11.1	48 (18.5)	212 (81.5)
Primary	1037	44.2	292 (28.2)	745 (71.8)
Secondary	820	35.0	186 (22.7)	634 (77.3)
Higher	228	9.7	75 (32.9)	153 (67.1)
Wealth index				
Poorest	268	11.4	74 (27.6)	194 (72.4)
Poorer	335	14.3	73 (21.8)	262 (78.2)
Middle	436	18.6	124 (28.4)	312 (71.6)

Table 1 Socio-demographic characteristics of women in union in Papua New Guinea and modern contraceptives usage (N = 2345) (Continued)

Variable	Weighted N	Weighted %	Modern Contraceptive use	
			No n(%)	Yes n(%)
Richer	637	27.2	158 (24.8)	479 (75.2)
Richest	669	28.5	172 (25.7)	497 (74.3)
Age at first sex				
< 18 yrs	815	34.8	192 (23.6)	623 (76.4)
18–24	1364	58.2	347 (25.4)	1017 (74.6)
25+	166	7.1	62 (37.4)	104 (62.6)
Age at first childbirth				
< 18	419	17.9	91 (21.7)	328 (78.3)
18–24	1539	65.6	376 (24.4)	1163 (75.6)
25+	387	16.5	134 (34.6)	253 (65.4)
Total children ever born				
1–2	925	39.5	218 (23.6)	707 (76.4)
3–4	851	36.3	200 (23.5)	651 (76.5)
5+	569	24.3	183 (32.2)	386 (67.8)
Number of living children				
No child	13	0.6	6 (46.2)	7 (53.8)
1–2	962	41.0	226 (23.5)	736 (76.5)
3–4	857	36.6	206 (24)	651 (76)
5+	513	21.9	163 (31.8)	350 (68.2)
Husband's desire for children				
Both want same	1104	47.1	316 (28.6)	788 (71.4)
Husband wants more	424	18.1	96 (22.6)	328 (77.4)
Husband wants fewer	80	3.4	16 (20)	64 (80)
Don't know	737	31.4	173 (23.5)	564 (76.5)
Frequency of reading newspaper or magazine				
Not at all	1340	57.1	352 (26.3)	988 (73.7)
Less than once a week	551	23.5	137 (24.9)	414 (75.1)
At least once a week	454	19.4	112 (24.7)	342 (75.3)
Frequency of listening to radio				
Not at all	1421	60.6	398 (28)	1023 (72)
Less than once a week	471	20.1	105 (22.3)	366 (77.7)
At least once a week	453	19.3	98 (21.6)	355 (78.4)
Frequency of watching television				
Not at all	1721	73.4	457 (26.6)	1264 (73.4)
Less than once a week	255	10.9	63 (24.7)	192 (75.3)
At least once a week	369	15.7	81 (22)	288 (78)
Decision maker on contraception				
Mainly respondent	659	28.1	146 (22.2)	513 (77.8)
Mainly husband, partner	294	12.5	83 (28.2)	211 (71.8)
Joint decision	1367	58.3	365 (26.7)	1002 (73.3)
Other	25	1.2	7 (28)	18 (72)

manual labour were using modern contraceptives. Modern contraceptive use was high among urban residents (76.9%). Majority (86.2%) of those in the Highlands region were using modern contraceptives. Modern contraceptives was high among married women (74.4%). Women with primary education dominated in modern contraceptive use (75.3%). Modern contraceptive use was high among women whose partners had no formal education (81.5%). Use of modern contraceptives was high for poorer women (78.2%). Modern contraceptive use stood at 76.4% for those below 18 years. Modern contraceptive use was well pronounced (78.3%) among those under age 18. Modern contraceptive use was high for women with 3–4 births (76.5%). Modern contraceptive use was high among women with 1–2 children living (76.5%). A greater section of the women (47.1%) reported that they and their husbands desired children. Meanwhile, modern contraceptive use was common for women whose husbands alone desired children. We found that modern contraceptive use was commonly reported among those who read at least once a week (75.3%) as well as those who listened to radio at least once a week. Similarly, 78.1% of those who watched television at least once a week made use of modern contraceptives. Most of the women made joint decision on contraceptive with their husbands (58.3%). Nonetheless, 77.9% of those who made solo decisions on contraceptives reported usage.

Predictors of modern contraceptive utilization among women in unions in Papua New Guinea

We present the predictors of modern contraceptive use in Table 2. Relative to women aged 45–49, those aged 15–19 had the highest odds of modern contraceptive use [AOR = 7.425, 95% CI = 2.853, 19.32]. In both models, residents of the Highland region had higher odds of modern contraceptive use, compared to those in the Southern region [AOR = 1.521, 95% CI = 1.086, 2.131] but the reverse was the situation for residents of the Islands region [AOR = 0.291, 95% CI = 0.224, 0.377]. Women whose husbands had higher education had less odds of modern contraceptive use, relative to those whose husbands had no formal education [AOR = 0.531, 95% CI = 0.318, 0.886]. Whereas professional/technical/managerial workers had lower odds of modern contraceptive use [AOR = 0.643, 95% CI = 0.420, 0.986], higher odds were noted for women who were self-employed in the agricultural sector, relative to women who were not working [AOR = 1.710, 95% CI = 1.218, 2.400]. Women with no living child were less likely to use modern contraceptives compared to those with five or more children [AOR = 0.213, 95% CI = 0.0498, 0.911]. Conversely, women who did not know their partners' desire for children were more likely to use modern contraceptives AOR = 1.286 95% CI = 1.015, 1.630].

Discussion

This study investigated the prevalence and drivers of modern contraceptive use in Papua New Guinea, a country with a history of low modern contraceptive use amidst high maternal mortality [34]. In all, we found that at least seven out of ten of the women were using modern contraceptives (74.37%). Injectables were the commonly used modern contraceptives. To a larger extent, modern contraceptive use in Papua New Guinea has levitated at a faster pace. When Marie Stopes [34] started its operations in the country in 2006, contraceptive use was a little above 25% and this seems to have tripled in less than two decades.

The modern contraceptive prevalence observed exceeds modern contraceptive prevalence in the Oceanian region (58%) [35]. The prevalence is analogous to the contraceptive prevalence in Northern America (74%) [35]. Just as observed, the 2006 Demographic and Health Survey of Papua New Guinea noted that injectables were the leading modern contraceptives (36.9%) relative to any other method [36]. A Nigeria-based study that employed time-trend analysis on data ranging between 2000 and 2014 similarly noted that injectables were the leading modern contraceptives (40.7%) [37]. The underlying factors for consistency in preference for injectables in Papua New Guinea are, however, not revealed and a qualitative study will be useful in this regard.

Women aged 15–19 had the highest odds of modern contraceptive use, relative to 45–49 aged women. This finding might rationalize the essence of the ongoing advocacies and initiatives by the Marie Stopes International and its sister organisations. Reporting from a Ugandan population-based study, Rutaremwa et al. [38] also realised a descending trend in modern contraceptive use in relation to age. Since 2006, the Marie Stopes International has focused on making reproductive health services easily accessible to young persons, since this category of people was under-served in the past. In 2018, more than one third of the persons that were served by the organisation (37%) were below 25 years. Practically, institution of a specialised hotline, initiation of youth-friendly services, and collaboration with a revered leading religious institution contributed significantly in achieving this milestone [34].

Residents of the Highland region had higher odds of modern contraceptive use, compared to those in the southern region, but the reverse was the situation for residents of the Islands region. Over the years, several reproductive health policies have been instituted since 1908 [39], the most recent of which are the *National Family Planning Policy (2014)*, *National Youth and Adolescent Health Policy (2014)*, *National Sexual Reproductive Health Policy (2014)*, and the *National Health Sector Gender Policy (2014)* [39]. If in spite of all these, women

Table 2 Predictors of modern contraceptive utilization among women in union in Papua New Guinea (*N* = 2345)

Variable	COR[95%CI]	AOR [95%CI]
Age		
15–19	5.167***[2.245,11.89]	7.425***[2.853,19.32]
20–24	4.786***[3.084,7.428]	6.312***[3.591,11.10]
25–29	4.360***[2.897,6.560]	5.333***[3.281,8.669]
30–34	2.716***[1.824,4.046]	2.803***[1.811,4.338]
35–39	2.357***[1.563,3.554]	2.352***[1.544,3.584]
40–44	1.651*[1.069,2.549]	1.500 [0.966,2.330]
45–49	Ref	Ref
Marital status		
Married	1.027 [0.787,1.339]	–
Cohabiting	Ref	Ref
Residence		
Urban	1.203 [0.972,1.488]	–
Rural	Ref	Ref
Region		
Southern region	Ref	Ref
Highlands region	1.539** [1.119,2.118]	1.521* [1.086,2.131]
Momase region	0.883 [0.674,1.157]	1.03 [0.773,1.373]
Islands region	0.297***[0.229,0.372]	0.291***[0.224,0.377]
Highest educational level		
No education	Ref	Ref
Primary	1.04 [0.798,1.355]	1.32 [0.985,1.769]
Secondary	1.02 [0.767,1.357]	1.3 [0.912,1.853]
Higher	0.546** [0.353,0.845]	1.086 [0.577,2.047]
Husband/partner's educational level		
No education	Ref	Ref
Primary	0.578**[0.411,0.813]	0.737 [0.505,1.076]
Secondary	0.772 [0.542,1.099]	0.881 [0.585,1.325]
Higher	0.462***[0.304,0.701]	0.531* [0.318,0.886]
Wealth status		
Poorest	Ref	Ref
Poor	1.369 [0.943,1.988]	–
Middle	0.96 [0.684,1.347]	–
Rich	1.156 [0.838,1.597]	–
Richest	1.102 [0.801,1.516]	–
Employment		
Not working	Ref	Ref
Professional/technical/managerial	0.538***[0.384,0.756]	0.643* [0.420,0.986]
Clerical	1.241 [0.661,2.329]	1.082 [0.519,2.257]
Sales	1.197 [0.782,1.833]	1.299 [0.822,2.054]
Agricultural - self employed	1.637** [1.203,2.228]	1.710**[1.218,2.400]
Agricultural - employee	0.916 [0.464,1.809]	1.246 [0.551,2.817]
Services	1.442*[1.022,2.036]	1.385 [0.944,2.031]
Skilled manual	0.855 [0.220,3.325]	0.646 [0.188,2.223]

Table 2 Predictors of modern contraceptive utilization among women in union in Papua New Guinea (N = 2345) (Continued)

Variable	COR[95%CI]	AOR [95%CI]
Total children ever born		
1–2	1.538***[1.219,1.940]	1.333 [0.496,3.585]
3–4	1.543***[1.218,1.955]	1.485 [0.788,2.800]
5+	Ref	Ref
Number of living children		
No child	0.543 [0.180,1.642]	0.213*[0.0498,0.911]
1–2	1.517***[1.195,1.925]	0.469 [0.175,1.257]
3–4	1.472** [1.154,1.877]	0.665 [0.352,1.258]
5+	Ref	Ref
Age at first sex		
< 18 yrs	1.934***[1.358,2.755]	0.961 [0.616,1.501]
18–24	1.747**[1.247,2.448]	1.158 [0.777,1.727]
25+	Ref	Ref
Age at first childbirth		
< 18	1.909***[1.396,2.610]	0.892 [0.568,1.401]
18–24	1.638***[1.289,2.082]	0.992 [0.722,1.363]
25+	Ref	Ref
Partner desire for children		
Both want same	Ref	Ref
Husband wants more	1.370*[1.054,1.781]	1.318 [0.984,1.765]
Husband wants fewer	1.604 [0.913,2.817]	1.433 [0.764,2.689]
Don't know	1.307*[1.055,1.620]	1.286* [1.015,1.630]
Decision maker for using contraception		
Mainly respondent	1.280*[1.028,1.594]	1.2 [0.934,1.542]
Mainly husband, partner	0.926 [0.699,1.226]	0.923 [0.683,1.247]
Joint decision	Ref	Ref
Other	0.937 [0.388,2.261]	0.876 [0.333,2.303]
Frequency of listening to radio		
Not at all	Ref	Ref
Less than once a week	1.356* [1.060,1.734]	1.320*[1.001,1.741]
At least once a week	1.409** [1.096,1.813]	1.409* [1.048,1.895]
Frequency of reading newspaper or magazine		
Not at all	Ref	Ref
Less than once a week	1.077 [0.857,1.353]	–
At least once a week	1.088 [0.851,1.391]	–
Frequency of watching television		
Not at all	Ref	Ref
Less than once a week	1.102 [0.813,1.493]	–
At least once a week	1.286 [0.983,1.682]	–
N		2345

Source: 2016–18 PNG DHS

Exponentiated coefficients; 95% confidence intervals in square brackets

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

ref. reference, CI confidence interval, COR Crude Odds Ratio, AOR Adjusted Odds Ratios

in some parts of the country exhibit high tendency of modern contraceptive use than others, then the supply or distribution of modern contraceptives should be reconsidered so as to ensure equal access to all women irrespective of geographical location.

Women whose husbands had higher education had less odds of modern contraceptive use, relative to those whose husbands had no formal education. These findings are inconsistent with previous evidence [37, 38, 40]. Education is noted to be a pathway to empowerment over a woman's reproductive health and her holistic wellbeing, and increases awareness of benefits and demerits of contraceptives [38, 41]. These notwithstanding, our finding suggests that highly educated women may be pursuing career and professional objectives and, as such, have limited or no time for contraceptive, relative to low or non-educated women who may not be engaged in highly competitive professions that warrant more commitment.

Whereas professional/technical/managerial workers had lower odds of modern contraceptive use, higher odds were noted for women who were self-employed in the agricultural sector, relative to women who were not working. These variations may be due to preferences of these women. Whilst modern contraceptive is the most preferred [42], some women may prefer either traditional or natural methods for reasons best known to them [43, 44]. We noticed higher odds among women with 3–4 births. However, this observation lost its significance when fitted in the multivariate model variable, which implies that some critical traits of a woman can offset the implication of parity/birth order on her prospects of using modern contraceptives.

Listening to radio at least once a week was associated with higher odds of contraceptive use, compared to not listening at all. Media exposure, such as listening to radio, has similarly been reported to boost modern contraceptive use in Uganda [38]. Some researchers have also contended that mass media enhances demand of services and induces long-term change in behaviour via information, education, and communication initiatives [45].

Strengths and limitations

The study has some limitation worth mentioning. The use of modern contraceptives is subject to social, cultural, and religious interpretations. As a result, a woman may be using contraceptives clandestinely from her partner or family member and may, therefore, not have the courage to report that she uses modern contraceptive [32]. This situation will eventually lead to under-reporting of modern contraceptive use. Secondly, since the information on modern contraceptives and the independent variables was gathered concurrently, attribution cannot be made [32]. These notwithstanding, the study

has some compelling strengths. It provides current information on the type and prevalence of modern contraceptive use in Papua New Guinea. Additionally, the rigour of the methodological approach and representativeness of the survey render its findings and recommendations generalizable to the country and replicable to other Oceania countries.

Conclusion

We strived to investigate the prevalence of modern contraceptive use and underlying factors in Papua New Guinea, a country in the Oceania region. Of the 2345 participants, we found that the majority of the women were using modern contraceptives, with the commonest method being injectables. Age, region of residence, partners education, employment, partner desire for children, frequency of listening to radio are associated with modern contraceptive usage. Tailored reproductive health care should be developed for women who are disadvantaged when it comes to the use of modern contraceptives in order to boost modern contraceptive use among them. Further investigation is needed to unravel the motivation for injectables among these women.

Abbreviations

COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: Confidence Interval; PDHS: Papua New Guinea Demographic and Health Survey; NSO: National Statistical Office

Acknowledgments

We are grateful to MEASURE DHS project for giving us for free access to the original data.

Authors' contributions

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

Funding

The study did not receive any funding.

Availability of data and materials

The dataset can be accessed at https://dhsprogram.com/data/dataset/Papua-New-Guinea_Standard-DHS_2017.cfm?flag=0

Ethics approval and consent to participate

The 2016–2018 PNGDHS report indicated that ethical approval was granted by the ICF Institutional Review Board. Both written and oral Informed consent was sought from all the participants during the data collection exercise including the emancipated adults (i.e those below 16 years). We requested for the dataset on 10th March, 2020 and was granted access. It was kept safe from third parties using 'my lock box' after permission was granted and the data was downloaded.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Population and Health, University of Cape Coast, Cape Coast, Ghana. ²College of Public Health, Medical and Veterinary Sciences, James

Cook University, Townsville, Queensland, Australia. ³Department of English, University of Cape Coast, Cape Coast, Ghana. ⁴School of Public Health, Faculty of Health, University of Technology Sydney, Sydney, Australia. ⁵School of International Development and Global Studies, University of Ottawa, Ottawa, Canada. ⁶The George Institute for Global Health, The University of Oxford, Oxford, UK.

Received: 28 April 2020 Accepted: 15 September 2020
Published online: 18 November 2020

References

- Abrejo FG, Shaikh BT, Saleem S. ICPD to MDGs: missing links and common grounds. *Reprod Health*. 2008;5(4). <https://doi.org/10.1186/1742-4755-5-4>.
- The World Bank. The world bank's reproductive health action plan 2010–2015. Washington DC: The World Bank; 2010.
- Cleland JG, Ndukwu RP, Zulu EM. Family planning in sub-Saharan Africa: progress or stagnation? *Bull World Health Organ*. 2011;89(2):137–43.
- United Nations, Department of Economic and Social Affairs, Population Division. (2019). Family planning and the 2030 agenda for sustainable development: Data booklet. (ST/ESA/SER.A/429). Retrieved from <http://creativecommons.org/licenses/by/3.0/igo>.
- Hubacher D, Trusse J. A definition of modern contraceptive methods. *Contraception*. 2015;92:420–1.
- 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.
- Ahmed S, Li Q, Liu L, Tsui A. Maternal deaths averted by contraceptive use: an analysis of 172 countries. *Lancet*. 2012;380:111–25.
- 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 Organisation. Trends in maternal mortality 1990–2013. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations population division. Geneva: World Health Organisation; 2014.
- Kennedy EC, Mackesy-Buckley S, Subramaniam S, Demmke A, Latu R, Robertson AS, Tiban K, Tokon A, Luchters S. The case for investing in family planning in the Pacific: costs and benefits of reducing unmet need for contraception in Vanuatu and the Solomon Islands. *Reprod Health*. 2013; 10(30) <http://www.reproductive-health-journal.com/content/10/1/30>.
- Adebowale SA, Palamuleni ME. Determinants of unmet need for modern contraception and reasons for non-use among married women in rural areas of Burkina Faso. *Afr Popul Stud*. 2014;28(1):499–514.
- Samandari G, Speizer IS, O'Connell K. The role of social support and parity on contraceptive use in Cambodia. *Int Perspect Sex Reprod Health*. 2010;36(3): 122–31.
- Lindstrom DP, Hernández CH. Internal migration and contraceptive knowledge and use in Guatemala. *Int Fam Plan Perspect*. 2006;32:146–53.
- Chacko E. Women's use of contraception in rural India: a village-level study. *Health Place*. 2001;7:197–208.
- Emina JBO, Chirwa T, Kandala N. Trend in the use of modern contraception in sub-Saharan Africa: does women's education matter. *Contraception*. 2014; 90:154–61.
- Mace R, Collier H. Kin influence on the decision to start using modern contraception: a longitudinal study from rural Gambia. *Am J Hum Biol*. 2009; 21:472–7.
- Alvergne A, Gibson MA, Gurmu E, Mace R. Social transmission and the spread of modern contraception in rural Ethiopia. *PLoS One*. 2011;6(7): e22515. <https://doi.org/10.1371/journal.pone.0022515>.
- Aliyu AA, Dahiru T, Oyefabi AM, Ladan AM. Knowledge, determinants and use of modern contraceptives among married women in Sabon Gari Zaria-northern Nigeria. *J Med Biomed Res*. 2015;14(2):13–21.
- Gupta S, Mola G, Ramsay P, Jenkins G, Stein W, Bolnga J, Black K. Twelve month follow-up of a contraceptive implant outreach service in rural Papua New Guinea. *Aust N Z J Obstet Gynaecol*. 2017;57:213–8.
- Thanenthiran S. Access to contraception and family planning in Asia and the Pacific region. Asian-Pacific resource and research center for women; 2019.
- Kennedy E, Gray N, Azzopardi P, Creati M. Adolescent fertility and family planning in East Asia and the Pacific: a review of DHS reports. *Reprod Health*. 2011;8:11.
- Andajani-Sutjahjo S, Tinning ZM, Smith JF. Exploring Women's Perspectives of Family Planning: A Qualitative Study from Rural Papua New Guinea. *J Int Womens Studies*. 2018;19(6):276–89.
- Gupta S, Ramsay P, Mola G, McGeehan K, Bolnga J, Kelly-Hanku A, Black KI. Impact of the contraceptive implant on maternal and neonatal morbidity and mortality in rural Papua New Guinea: a retrospective observational cohort study. *Contraception*. 2019. <https://doi.org/https://doi.org/10.1016/j.contraception.2019.03.042>.
- WHO. Summaries of the SDG health and health related targets. 2016.
- National Statistical Office (NSO) [Papua New Guinea](PNG) and ICF. Papua New Guinea Demographic and Health Survey 2016–2018. National Report. Port Moresby: PNG: National Statistical Office; 2019.
- Gebre MN, Edossa ZK. Modern contraceptive utilization and associated factors among reproductive-age women in Ethiopia: evidence from 2016 Ethiopia demographic and health survey. *BMC Womens Health*. 2020;20(1): 1–14.
- Avisah PA, Dery S, Atsu BK, Yawson A, Alotaibi RM, Rezk HR, Guure C. Modern contraceptive use among women of reproductive age in Ghana: analysis of the 2003–2014 Ghana demographic and health surveys. *BMC Womens Health*. 2018;18(1):141.
- Beson P, Appiah R, Adomah-Afari A. Modern contraceptive use among reproductive-aged women in Ghana: prevalence, predictors, and policy implications. *BMC Womens Health*. 2018;18(1):157.
- Seyife A, Fisseha G, Yebo H, Gidey G, Gerenseh H. Utilization of modern contraceptives and predictors among women in Shimelba refugee camp, Northern Ethiopia. *PLoS One*. 2019;14(3):1–11.
- Derso T, Biks GA, Yitayal M, Ayele TA, Alemu K, Demissie GD, Kebede A. (2020). Prevalence and determinants of modern contraceptive utilization among rural lactating mothers: findings from the primary health care project in two northwest Ethiopian districts. *BMC Womens Health*. 2020; 20(1):1–6.
- Ajayi AI, Adeniyi OV, Akpan W. Use of traditional and modern contraceptives among childbearing women: findings from a mixed methods study in two southwestern Nigerian states. *BMC Public Health*. 2018;18(1):604.
- Appiah F, Seidu AA, Ahinkorah BO, Baatiema L, Ameyaw EK. Trends and determinants of contraceptive use among female adolescents in Ghana: analysis of 2003–2014 demographic and health surveys. *SSM Popul Health*. 2020;10:100554.
- Asiedu A, Asare BYA, Dwumfour-Asare B, Baafi D, Adam AR, Aryee SE, Ganle JK. Determinants of modern contraceptive use: a cross-sectional study among market women in the Ashiaman municipality of Ghana. *Int J Afr Nurs Sci*. 2020;12:100184.
- Marie Stopes International. Marie Stopes Papua New Guinea. 2019 Retrieved from <https://www.mariestopes.org/where-we-work/papua-new-guinea/> on April 17, 2020.
- United Nations, Department of Economic and Social Affairs, Population Division. World family planning 2017 - Highlights (ST/ESA/SER.A/414). 2017.
- National Statistical Office (NSO). Papua New Guinea Demographic and Health Survey 2006. National Report. Port Moresby: National Statistical Office. p. 2009.
- Taingson MC, Adze JA, Bature SB, Durosinslorun 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 northwestern Nigeria, 2000–2014. *Trop J Obstet Gynaecol*. 2017;34(3):201–6.
- Rutaremwaga G, Kabagenyi A, Wandera SO, Jhamba T, Akiror E, Nviiri HL. Predictors of modern contraceptive use during the postpartum period among women in Uganda: a population-based cross sectional study. *BMC Public Health*. 2015;15(1):262.
- World Health Organization. Papua New Guinea: actions for scaling up long-acting reversible contraception. 2017 Retrieved from https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKewj7ydSv1_LoAhXXSBUIHed4DQQQFJAeegQIAhAB&url=https%3A%2F%2Fapps.who.int%2Firis%2Frest%2Fbitstreams%2F1147870%2Fretrieve&usg=AOvVaw2z1nKP_wVKOCfkGZaQloU on April 18, 2020.
- Creanga AA, Gillespie D, Karklins S, Tsui AO. Low use of contraception among poor women in Africa: an equity issue. *Bull World Health Organ*. 2011;89:258–66.
- Mekonnen W, Worku A. Determinants of low family planning use and high unmet need in Butajira District, South Central Ethiopia. *Reprod Health*. 2011;8:37.

42. WHO (2018). Family planning/Contraception. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/family-planning-contraception> on April 19, 2020.
43. Desta H, Teklemariam G, Yinager W. Barriers to adherence of optimal birth spacing: a qualitative study among mothers and their husbands in Arba Minch Zuria District, Ethiopia. *Am J Health Res.* 2014;2(4):188–95.
44. Tobe A, Nahusenay H, Misker D. Factors associated with modern contraceptive service utilization among married reproductive age women in Melo Koza Woreda, southern Ethiopia. *J Pregnancy Child Health.* 2015;2:128.
45. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet.* 2010;376(9748):1261–71.

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

