Social, Economic, Demographic Factors and Proximate Determinants of Fertility in Papua Province

Syahmida S Arsyad, Darojad Nurjono Agung Nugroho, Arga Nugraha

Population Research and Development Centre, National Family Planning and Population Board, Jakarta, Indonesia

Corresponding Author: Darojad Nurjono Agung Nugroho (email: darojad.n@gmail.com)

Abstract

The research on proximate determinants of fertility was carried out based on the condition of fertility in Papua which is still high compared to national figures and the use of modern contraception tends to decrease according to several periods of Indonesian Demographic and Health Surveys (IDHS). The purpose of this study is to examine the relationship between social, economic, demographic factors and the proximate determinant of fertility in Papua. This study is a secondary data the 2017 IDHS, analysis using descriptive and multivariate with multiple logistic regression test. The results show that Papuan women's education has a dominant effect on the duration of marriage and the use of contraception. The higher education level will likely increase the use of contraception and the length of marriage. This can be used as a foothold in the planning and implementation of population control programs, in this case, is the regulation and restrictions on future births. Birth control programs through the Population, Family Planning, and Family Development Program need to synergize with other government programs, especially with the Education Program for Papuan women in planning, implementing, monitoring, and evaluating programs of course. An approach to traditional leaders is needed since customs and traditions greatly affect all aspects of Papuan people's lives. The traditional leader's advice and suggestions are very well heard by people. The traditional leader's communication, information dissemination, and education to program targets really need to be strengthened. This method is certainly implemented by all levels of the program area, but especially in the field lines that are very close to the target.

Keywords: fertility; Papua; married woman; Family Planning

Introduction

The total fertility rate (TFR) both nationally and in Papua Province fluctuates. Nationally, fertility in Indonesia has decreased for three decades (1987-2019) according to the 1987 Indonesian Prevalence Survey (SPI) and the 1991, 1994, 1997, 2002/2003 Indonesian Demographic Health Survey (IDHS). The decline in the birth rate in Indonesia has stagnated (fertility stalling) during the three survey periods (IDHS 2002/2003, IDHS 2007, IDHS 2012) of 2.6 children per woman. However, this figure has decreased to 2.4 children per woman (BPS et al., 2018). The declining fertility for decades between

2002/2003 to 2012 can be the result of strengthening family planing progamme in the field from mass family planning service, pick up service approach and increase of long term contraception. Meanwhile, the fertility rate in Papua Province also fluctuates based on several periods of the IDHS (Figure 1).
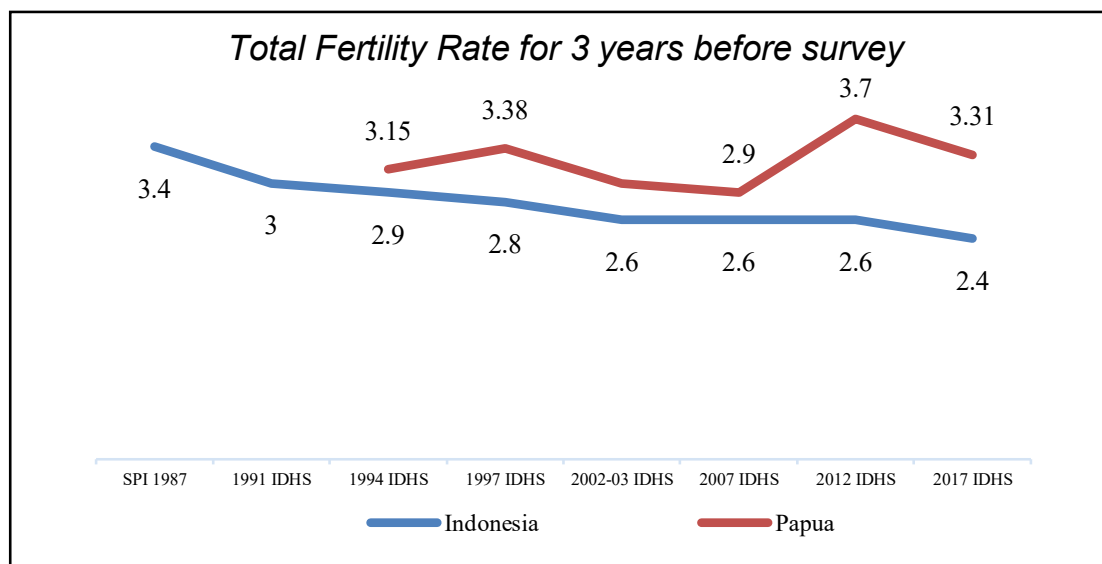

Figure 1. Trends in fertility in Indonesia and Papua Province

Based on several periods of IDHS, the fertility rate in Papua province also fluctuates, i.e., 3.15 children per woman (IDHS 1994), 3.38 (IDHS 1997), 2.9 (IDHS 2007), 3,7 (IDHS 2012), 3,31 (IDHS 2017) .This condition makes researchers want to know more deeply what factors influence it. Likewise, the percentage of the use of a family planning method in Papua Province seems to fluctuate according to 3 periods of the IDHS. The percentage of use of a family planning method decreased to 22 percent (2012 IDHS) from 38 percent (2007 IDHS). However, the percentage of usage has increased to 38 percent. This description is also found in the percentage of use of modern family planning methods. The percentage of using modern family planning methods from 25 percent (2007 IDHS) decreased to 18 percent (2012 IDHS), then rose again to 36% (2017 IDHS). However, this is not the case with the use of traditional family planning methods. The percentage of use of traditional family planning methods decreased drastically from 14% to 3% (2012 IDHS) and this condition remained at 3% according to the 2017 IDHS (Figure 2).
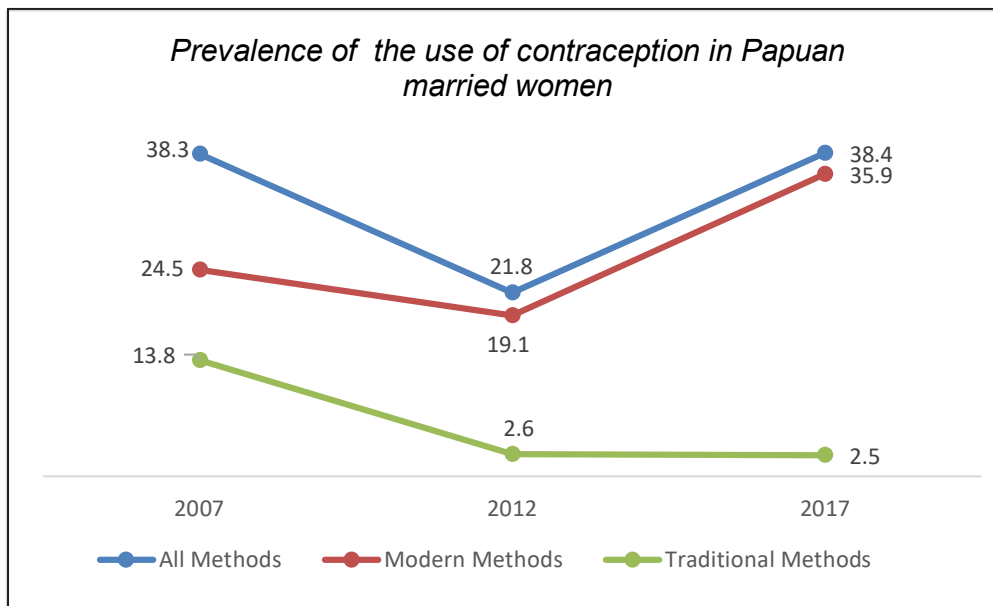
Figure 2. Use of Contraception in Papua Province

The description of fluctuating fertility requires research that examines the determinants of fertility, either directly (the proximate determinant) of fertility or indirectly. The direct determinants of fertility are certainly influenced by background characteristics, which are indirect factors that determine fertility. Analysis of fertility decomposition with data from the 2017 IDHS (BPS et al., 2018) shows that in Papua, fertility in married women is higher than the total fertility rate. The high total fertility rate in Papua is due to the high proportion of marriages with a marriage index close to 1 (Cm=0.77). The use and effectiveness of contraception is low with a high index of non-contraception (Cc=0.65). The average number of children a woman has during her reproductive years without contraception and without intentional abortion. The average number of children a woman has during the reproductive period without contraception, without intentional abortion, and without breastfeeding is quite high at 7.7 with a fairly high index of infertility during breastfeeding at 0.86.

The use and effectiveness of contraception in suppressing natural fertility is the weakest in Papua (TNMFR=0.50), and natural fertility (fecundity rate=0.43) without breastfeeding is the weakest in Papua (fecundity rate=0.43) (Samosir, 1994). This research is a study that studies the relationship between background characteristics and determinants of fertility based on the results of the 2017 IDHS. The purpose of this research is to study the relationship between social, economic, demographic factors to the proximate determinants of fertility in Papua Province. The scope of this research is to present the relationship of background characteristics (social, economic, demographic) to the determinants, which in this case are marital status, contraceptive use, experience of abortion and breastfeeding in Papua Province.

Literature Review

There are several theories that explain the factors that affect fertility, either directly or

indirectly, which are also known as direct and indirect determinants. Variables in direct determinants are commonly called intermediate variables (Davis & Blake, 1956), or proximate determinants (Bongaarts, 1978a; Rogers & Stephenson, 2018) which directly affect fertility. According to Davis and Blake, there are 11 intermediate variables that affect fertility which are grouped into three stages of the reproductive process, namely: the occurrence of sexual intercourse (intercourse variables); occurrence of conception (conception variables); and pregnancy and birth (gestation variables) or successful pregnancy. Davis and Blake's theory was developed by John Bongaarts,(Bongaarts, 1978b; Bongaarts & Potter, 1983) in the form of a simple comprehensive model between the determinants of fertility and fertility rate.

Furthermore, Bongaarts developed another model of the relationship between TFR and the determinants of fertility, namely the proportion of marriage, use of contraceptive methods, abortion experience, and infertility after childbirth or during breastfeeding (Bongaarts, 1978b, 2015). The conceptual framework developed by Bongaarts for calculating fertility rates uses four indices: $TFR = C_m \times C_c \times C_a \times C_i \times TF$. The explanations are: TFR = total fertility rate (total fertility rate); C_m = marital index; C_c = index of noncontraception; C_a = abortion index; C_i = index of infertility during breastfeeding; TF = total fecundity rate.

Each index is estimated from zero (0) to 1 (one), with zero indicating a greater effect on inhibiting fertility and one indicating a lower inhibitory effect. Other variables included in the calculation are a). Total marital fertility rate (TMFR); b). Total natural marital fertility rate (TNMFR); c). Total fecundity rate (TF).

The intermediate determinant formula developed by Bongaarts has been used by many experts in order to identify the reasons for the decline in fertility. One of them is (Samosir, 1994) as analyzed the decomposition of fertility based on the 1991 and 2017 IDHS nationally and provincially. The results of the analysis conducted by Samosir (Samosir, 1994), the pattern of marriage, the pattern of use and effectiveness of contraception, and the pattern of infertility during breastfeeding are intermediate determinants in Indonesia. Ronald Freedman (Semahegn et al., 2018) put forward the theory that the intermediate variables that directly affect fertility are basically also influenced by the norms prevailing in a society. A person's fertility behavior is influenced by existing norms, namely the norms about the size of the family and the intermediate variables themselves. Furthermore, norms regarding family size and intermediate variables are influenced by fertility levels.

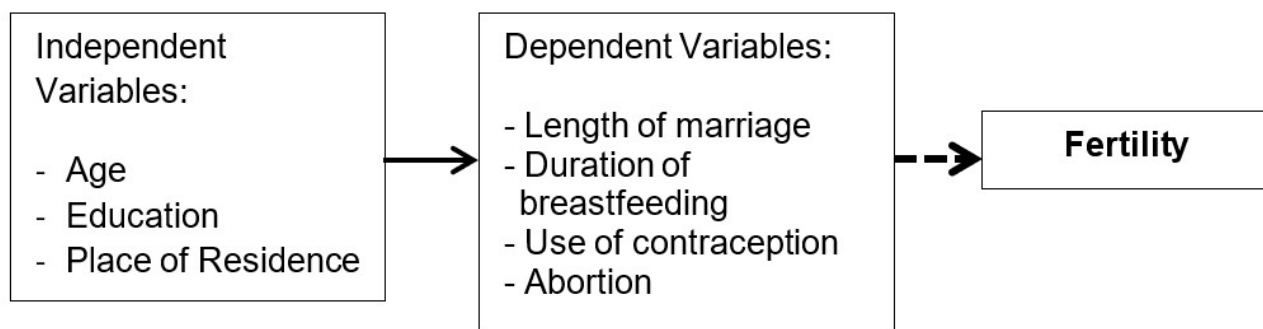Based on various theories, the conceptual framework of this research is:


Figure 3. Conceptual Framework

Methods

This study is a secondary data analysis with data sources from the 2017 Indonesian Health Demographic Survey (IDHS), especially Papua Province data with a cross-sectional design aimed at describing a portrait of phenomena in the population at a certain time. (Aggarwal & Ranganathan, 2019; Robert Ho., 2006). The variables studied in this research are based on the availability of IDHS data. The dependent variable of the determinants of fertility consists of length of marriage, duration of breastfeeding, use of contraception, and accidental abortion. The independent variables are social, economic, and demographic consisting of age, education, place of residence, and wealth status. The number of samples in this study was adjusted based on the dependent variables. The number of samples after being weighted for the dependent variable; 1). "length of marriage", "use of contraception" and "abortion" were 489 married women; 2). "Duration of breastfeeding" were found in 214 women who have got married and had breastfeeding. Data analysis was carried out in 3 stages, namely univariate, bivariate, and multivariate analysis. The statistical test was performed using Chi-Square with an alpha of 5 percent. This statistical test was used to test the hypothesis of the relationship between the independent variable and the dependent variable which is categorical data. Furthermore, multivariate analysis usied multiple logistic regression test. The data were then processed using Stata version 15.

Findings

Distribution of Dependent Variables

The distribution of the percentage of length of marriage in Papua Province looks the same, between marriage lengths less than the median (19 years) and the same as and greater than the median. Fifty-three percent of Papuan women breastfeed more and the same as the median (13 months). Most Papuan women do not use contraceptive and ninety-four percent of Papuan women do not have abortions (Figure 4).
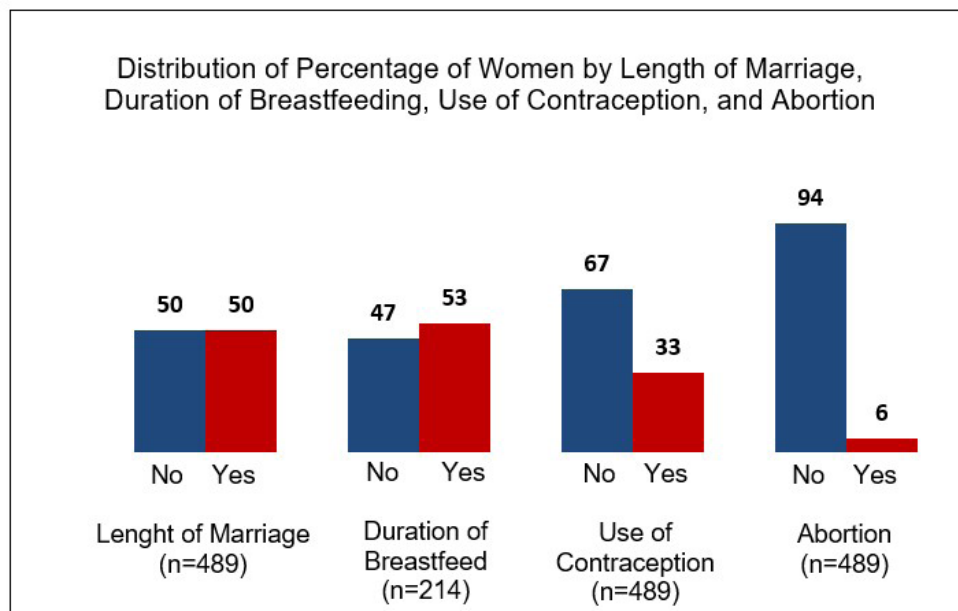
Note: Median length of marriage =19 years old; Median duration of breastfeeding =13 month

Figure 4. Determinant of Fertility in Papua Province

Distribution of Independent Variables

This section presents the distribution of the independent variables according to each dependent variable. As previously explained, the dependent variables are four variables in the proximate determinant developed by Bongaarts. The four dependent variables are: 1). Length of marriage (duration of marriage); 2). Duration of breastfeeding; 3). Use of contraception; 4). Abortion. Meanwhile, the independent variables are the characteristics of women's social, demographic and economic background, which in this case include: age at first marriage; education; residence; wealth status.

Distribution of background characteristics in married women

Considering the dependent variable, length of marriage, use of contraception, background characteristics of women, more than half of the age of the women when they got married for the first time were 19 years old and older (≥ median). More than half of the women also graduated from elementary and middle school. The majority of women lived in urban areas. Meanwhile, women are generally in poor status (Figure 5).
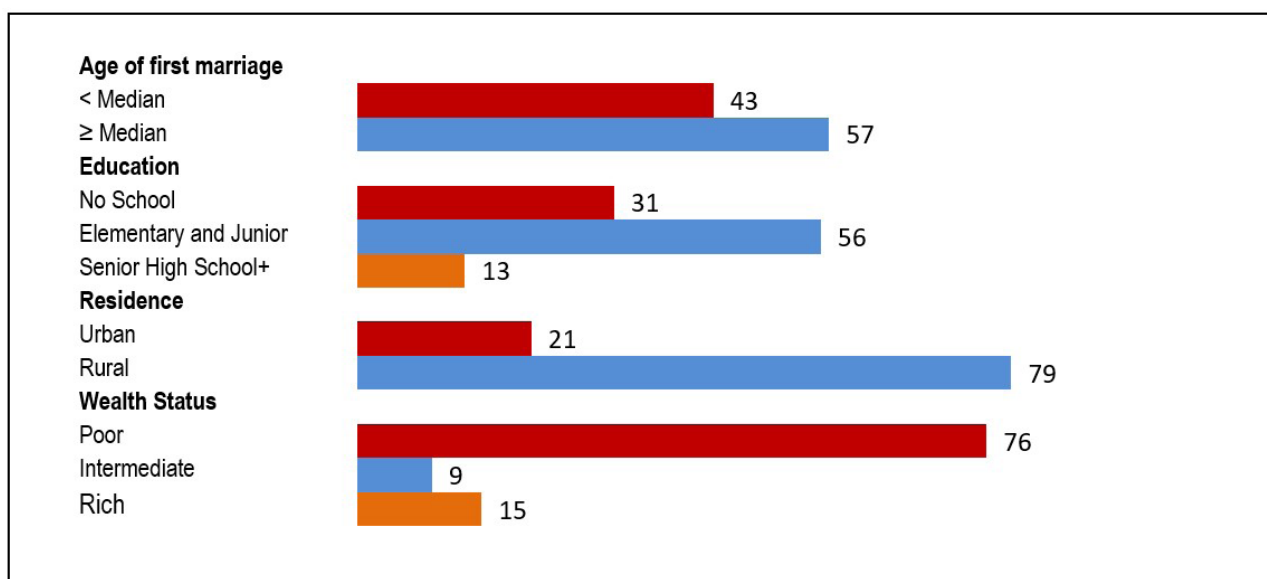
Note: The sample of women according to the dependent variable: length of marriage, use of contraception, abortion (n = 489)

Figure 5. Distribution of the percentage of currently married women by background characteristics in Papua Province, 2019 IDHS

If the background characteristics of women according to the dependent variable of breastfeeding duration, more than half of age of women when they got married for the first time were 19 years old and over. Sixty percent of the educated women have completed elementary and junior high school. The vast majority of women live in rural areas. Seventy-eight percent of women are in poor economic conditions (Figure 6).
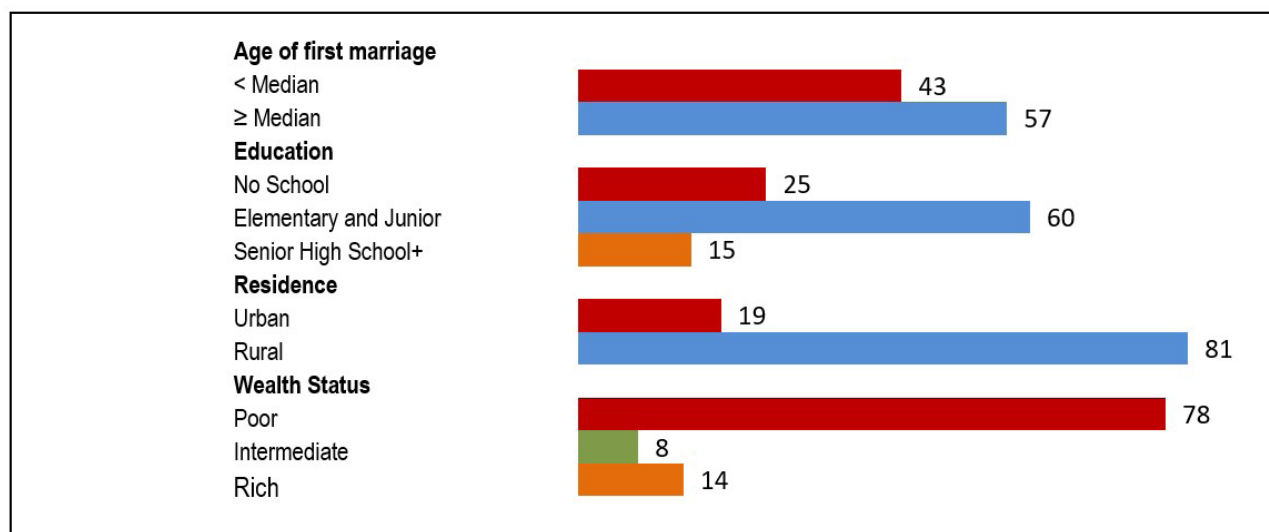
Note: The sample of women according to the dependent variable: length of marriage, use of contraception, abortion (n = 489)

Figure 6. Distribution of the percentage of married women by the length of breastfeeding in Papua Province, IDHS 2019

Bivariate Analysis

Analysis of the relationship between length of marriage and background characteristics of women showed that age at first marriage (p-value = 0.004) and high school education and above (p-value = 0.0001) had a significant relationship with length of marriage (Table 1).

Table 1. Length of Marriage by Background Characteristics, 2017 IDHS

Background Characteristic	Length of Marriage				Total	%	Odds Ratio	95% CI	p- value
	< median		≥ median						
	n	%	n	%					
Age of First Marriage									
<Median	89	42.65	120	57.35	209	100			
≥Median	156	55.88	124	44.12	280	100	0.59	0.41-0.84	0.004
Education									
No School	63	41.34	90	58.66	153	100	*Ref		
Elementary and Middle School	134	49.14	139	50.86	273	100	0.73	0.49-1.09	0.123
Senior high school +	48	76.29	15	23.71	63	100	0.22	0.11-043	0.0001
Residence									
Urban	55	54.01	47	45.99	102	100			
Rural	190	49.22	197	50.78	387	100	1.21	0.78-1.88	0.390
Wealth Status									
Poor	181	48.75	191	51.25	372	100	*Ref		
Intermediate	25	60.08	17	39.92	42	100	0.63	0.33-1.21	0.168
Rich	39	52.01	36	47.99	75	100	0.88	0.54-1.44	0.605
Total	245	50.22	244	49.78	489	100			

Meanwhile, the variables of age at first marriage, education, place of residence, and wealth status did not have a significant relationship with the length of breastfeeding (p-value > 0.05) (Table 2).

Tabel 2. Duration of Breastfeeding by Background Characteristics, 2017 IDHS

Background Characteristic	Duration of Breastfeeding				Total	%	Odds Ratio	95% CI	p-value
	< median		≥ median						
	n	%	n	%					
Age of First Marriage									
<Median	46	51.04	45	48.96	91	100			
≥Median	55	44.32	68	55.68	123	100	1.31	0.76-2.26	0.331
Education									
No School	29	52.86	25	47.14	54	100			
Elementary and Middle School	57	45.01	70	54.99	127	100	1.37	0.72-2.59	0.333
Senior high school +	15	46.14	18	53.86	33	100	1.31	0.55-3.13	0.545
Residence									
Urban	22	53.41	20	46.59	42	100			
Rural	79	45.69	93	54.31	172	100	1.36	0.69-2.69	0.373
Wealth Status									
Poor	78	46.28	90	53.72	168	100			
Intermediate	9	57.75	7	42.25	16	100	0.63	0.23-1.76	0.378
Rich	14	46.41	16	53.59	30	100	0.99	0.46-2.16	0.989
Total	101	47.18	113	52.82	214	100			

The relationship between the use of contraception and background characteristics showed that elementary, junior high and high school education (p-value = 0.0001), place of residence (p-value = 0.015) and intermediate and rich wealth status (p-value = 0.002) were associated with the use of contraception (Table 3).

Table 3. Use of Contraception by Background Characteristics, 2017 IDHS

Background Characteristic	Use of Contraception				Total	%	Odds Ratio	95% CI	p-value
	No		Yes						
	n	%	n	%					
Age of First Marriage									
<Median	144	68.76	65	31.24	209	100			
≥Median	183	65.59	97	34.41	280	100	1.15	0.79-1.69	0.461
Education									
No School	130	84.88	23	15.12	153	100			
Elementary and Middle School	161	59.13	112	40.87	273	100	3.88	2.34-6.43	0.0001
Senior high school +	36	57.50	27	42.50	63	100	4.15	2.13-8.08	0.0001
Residence									
Urban	58	56.78	44	43.22	102	100			
Rural	269	69.63	118	30.37	387	100	0.57	0.37-0.90	0.015
Wealth Status									
Poor	267	71.89	105	28.11	372	100			
Intermediate	20	47.27	22	52.73	42	100	2.85	1.49-5.46	0.002
Rich	40	53.49	35	46.51	75	100	2.22	1.34-3.69	0.002
Total	327	66.95	162	33.05	489	100			

Furthermore, age at first marriage, education, place of residence, and wealth status were not significantly related to the incidence of abortion (p value > 0.05) (Table 4).

Table 4. Abortion Incidence by Background Characteristics, 2017 IDHS

Background Characteristics	Abortion				Total	%	Odds Ratio	95% CI	p-Value
	No		Yes						
	n	%	n	%					
Age of First Marriage									
<Median	195	93.40	14	6.60	209	100			
≥Median	264	94.27	16	5.73	280	100	0.86	0.41-1.81	0.691
Education									
No School	144	94.61	9	5.39	153	100			
Elementary and Middle School	255	93.20	18	6.80	273	100	1.28	0.55-2.98	0.567
Senior high school +	60	95.20	3	4.80	63	100	0.89	0.23-3.41	0.860
Residence									
Urban	94	92.46	8	7.54	102	100			
Rural	365	94.28	22	5.72	387	100	0.75	0.32-1.75	0.498
Wealth Status									
Poor	350	94.26	22	5.74	372	100			
Intermediate	39	93.32	3	6.68	42	100	1.18	0.32-4.28	0.805
Rich	70	92.41	5	7.59	75	100	1.35	0.52-3.51	0.539
Total	459	93.90	30	6.10	489	100			

Multivariate Analysis

The dominant factor according to the dependent variable on length of the marriage is high school education and above with OR = 0.22. This means that the women with high school education and above are likely to be married for more than 19 years, 0.22 times lower than women who do not attend school. Meanwhile, according to the dependent variable, the duration of breastfeeding does not appear to be the dominant factor because the p-value is > 0.05 (Table 5).

The dominant factor according to the dependent variable of the use of contraception, which became the dominant factor was elementary and junior high school education with OR = 3.43. This means that women with elementary and junior high school education have a 3.43 times higher chance of using contraception than women who do not attend school. Furthermore, the women with high school education and above with OR = 3.20 (95% CI 1.53-6.68), meaning that the women with high school education and above have a 3.20 times higher chance of using contraception than women who do not attend school. In the multivariable results, abortion status was not the dominant factor because the p value was > 0.05 (Table 5).

Table 5. Multivariate Analysis Modeling

Background Characteristic	Length of Marriage		Duration of Breastfeeding		Use of Contraception		Abortion	
	p-Value	OR CI 95%	p-Value	OR CI 95%	p-Value	OR CI 95%	P-Value	OR CI 95%
Age of First Marriage								
<Median	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff
≥Median	0.053	0.69 (0.47-1.01)	0.327	1.35 (0.74-2.44)	0.873	0.97 (0.63-1.47)	0.641	0.83 (0.38-1.82)
Education								
No School	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff
Elementary and Middle School	0.105	0.70 (0.46-1.08)	0.319	1.41 (0.72-2.75)	0.0001	3.43 (2.04-5.79)	0.735	1.17 (0.48-2.87)
Senior high school +	0.0001	0.22 (0.11-0.46)	0.553	1.36 (0.49-3.76)	0.002	3.20 (1.53-6.68)	0.746	0.78 (0.18-3.45)
Residence								
Urban	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff
Rural	0.694	0.89 (0.49-1.61)	0.309	1.62 (0.64-4.13)	0.587	1.18 (0.65-2.14)	0.675	0.78 (0.25-2.46)
Wealth Status								
Poor	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff	*Reff
Intermediate	0.698	0.86 (0.40-1.84)	0.547	0.70 (0.22-2.23)	0.031	2.25 (1.08-4.69)	0.918	1.08 (0.25-4.64)
Rich	0.408	1.32 (0.68-2.56)	0.823	1.13 (0.39-3.24)	0.110	1.69 (0.89-3.23)	0.747	1.23 (0.35-4.28)

Discussion

The analysis of the intermediate determinants shows that most of the reproductive years of Papuan women with status "married" contributes greatly to childbearing. In other words, there is a high chance of high fertility in Papua. Women who do not use modern methods of contraception and do not breastfeed their children make a major contribution to births in Papua. The use of contraception in Papua appears to have contributed to the decline in fertility in the 2012 and 2017 IDHS. This is indicated by the increasing trend of contraception use according to the 2017 IDHS from the 2012 IDHS and in line with the declining total fertility rate in the 2017 IDHS from the 2012 IDHS.

Theoretically, this is in line with the study showing that the use of contraception is one of the variables that are directly related to fertility conditions (Arsyad & Nurhayati, 2016). There are other direct factors, which in this case is the factor of length of marriage that has been described previously (Bongaarts, 2015; Bongaarts & Potter, 1983). The contribution of the use of contraception has a very large influence on fertility in Bangladesh (Hasan et al., 2018). Use of ontraception is a determining factor for fertility decline, apart from age at first sexual intercourse, gender of the head of the family, women working in rural areas of Uganda (Ariho et al., 2018).

Meanwhile, research using surveillance methods in the Eastern Ethiopia region found a large contribution of the use of contraception among married women to fertility. Married women who use contraception are significantly associated with not wanting to have more children (Semahegn et al., 2018). Similarly, women in sub-Saharan African countries who come from the upper wealth index status tend to delay the age of first marriage and use contraception. This certainly plays a major role in contributing to low births (Finlay et al., 2018). The use of contraception also contributes the most to reducing fertility in Bangladesh (Haq, 2018). This is also in line with Rogers and Stephenson (2018) who use the Bongarts proximate determinant calculation method, in Asia, South Africa, Latin America and the Caribbean, increasing the use of contraception and delaying the age of marriage are the most influential

factors on fertility (Rogers & Stephenson, 2018). The same finding in Ethiopia, the use of contraception contributed significantly to the decline in the fertility (Laelago et al., 2019). The role of the use of contraceptionas a determinant of fertility decline is very large, as shown in the results of the proximate determinant analysis in Eswatini (Chemhaka & Odimegwu, 2019). The same picture is found in Ethiopia, the use of contraception has been an important factor in the decline in fertility for a decade (Ahmed Shallo, 2020). Age at first marriage is related to the length of the reproductive period experienced by a woman (Bongaarts, 2015). The results of the proximate determinant analysis based on the Bongarts calculation model show delays in age at marriage and the use of contraception as important factors in reducing fertility in Peninsular Malaysia, Sub-Saharan Africa and Pakistan (Finlay et al., 2018; Nasir, Jamal Abdul; Hinde, Andrew; Padmadas, 2015; Tey NP, Ng ST, 2012).

Furthermore, this condition certainly raises a question as to what factors influence the length of the marriage, duration of breastfeeding, use of contraception, and abortion among women in Papua. The results of the analysis based on the 2017 IDHS provide an illustration that women with high school education and higher appear to be 0.22 times less likely to be married for more than 19 years than women who are not in school. Having previously explained, the lenghth of a woman's marriage in Papua has a dominant contribution to fertility.

Two things can be noted from the results of this study. First, it indicates that Papuan women with higher education had a lower probability of contributing to marriage duration. The second one is that the education that Papuan women have completed shows that education for Papuan women is very essential in birth control. Educational program interventions for Papuan women are not only required to have 9 years of education but are even

higher. In fact, Papuan women's education is still low and customs greatly characterize the condition of women, especially to be able to achieve higher education in Papua (Arsyad & Nurhayati, 2016).

Based on the description of the discussion, the determinants of fertility in Papua Province cannot only be studied from direct factors or proximate determinants, but it is very necessary to explore information from indirect factors. This can also be clarified by the results of previous studies on the determinants of fertility which were carried out through a qualitative approach(Arsyad & Nurhayati, 2016). The results of the study found that customs color all aspects of family life in Papua Province. It also confirms that the role of traditional leaders in are very influential as the tribal leaders.

Conclusion

The Bongarts theory says that fertility is influenced by direct factors or intermediate determinants(Arsyad & Nurhayati, 2016) and indirect factors that can contribute to these direct factors(Lailulo & Sathiya Susuman, 2018). Furthermore, from the results of the analysis of this study, it can be concluded that the education of Papuan women as an indirect factor determining fertility has a dominant effect on the duration of marriage and the use of contraception. This is what can be used as a foothold in the planning and implementation of population control programs, which in this case is the regulation and restriction of future births.

Recommendation

Recommendations that can be submitted based on the results of this study are as listed follows:
1) As previously mentioned, there is population control programs implemented by the National Population and Family Planning Board, namely the

Population, Family Planning and Family Development Program. The results show that Papuan women's education is significantly related to methods in the use of contraception. Therefore, the program should be carried out in synergy with other local government programs, especially in this case with the Education Program for Papuan women. Synergistic in this regard, starting from planning, implementing, monitoring and evaluating the program, of course

2) Arsyad and Nurhayati found that local customs and culture colors all aspects of Papuan life as previously stated. It is obvious that, in this case, traditional leaders have an important role. However, the strategy that can be used to approach traditional leaders considering that customs greatly affect all aspects of the life of the Papuan people. The approach strategy to traditional leaders and community leaders has been used since the beginning of the Family Planning Program as a population control program conducted by the BKKBN.

3) The communication, information, and education (CIE) program is a strategy that has been successfully carried out by the population control program by the BKKBN in addition to family field workers as the spearhead of the program. This has been said before. Therefore, CIE programs and the role of the family planning field workers need to be strengthened to reach program targets. This method is of course implemented by all levels of the program area, but especially in field lines that are very close to the target.

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