

Individual and Regional Factors that Affect Fertility Rates in Five Provinces of Indonesia

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Abstract

Background: This research paper aims to investigate the individual and regional factors that affect fertility in Indonesia. **Methods:** This was a cross-sectional study that analysed data from the 2002-2003, 2007, and 2012 Indonesian Demographic and Health Surveys and the 2012 National Family Planning Coordinating Board Routine Report regarding contraceptive services. The selection criteria for the sample population were married women considered to be of child bearing age (between 15 and 49 years), who had delivered at least one child. Analysis was completed using multilevel logistic regression. **Results:** Results show that regional factors that affect fertility are influenced by the contraceptive prevalence ratio. The individual factors that affected fertility were the job status of the participant's husband, the level of education attained, the perceived ideal number of children, intervals between births, and previous experience of child mortality. **Conclusions:** Both central and local governments of provinces with high fertility rates appear to have a lower socio-economic status and require strategic plans that increase expectant mother's participation in education. It is recommended that the National Family Planning Coordinating Board address high fertility rates in Indonesia by way of education. Women of child bearing age who have a low socio-economic status and education level should be targeted to reduce the perceived ideal number of children to 2 and to achieve longer birth intervals (more than 36 months).

Keywords: fertility, demography, health survey

Introduction

The 2012 Indonesian Demographic and Health Survey (IDHS) showed that the total fertility rate (TFR) in Indonesia was 2.6 children per woman. Furthermore, results from the IDHS between 1991 and 2012 showed that total fertility rates in Indonesia were relatively stable, ranging from 3.02 (1991), 2.85 (1994), 2.78 (1997), 2.56 (2002), 2.59 (2007), and 2.60 (2012). Although TFR across Indonesia have declined slightly in the past ten years, there were five provinces that experienced changes outside the norm. South Sumatera and Bangka Belitung experienced an increase in fertility between 2002 and 2012 with a TFR above the national average. Whilst Bengkulu, West Java, and South Kalimantan provinces experienced decreased fertility rates that were lower than the TFR of Indonesia between the same years.¹ Increased fertility rates can have a large impact on national progress and development. A nation with high fertility rates may struggle to support the increased health needs and economic burdens when compared with nations with lower fertility rates. Countries with high fertility rates often experience increased rates of

maternal and child health problems, larger proportions of the population identifying in the low socio-economic demographic, and environmental problems.²⁻⁴

Factors that influence the level of fertility are usually individual and regional factors. Individual factors include access to family planning programs and support, level of education attained, occupation, socio-economic status, and place of residence. Studies have shown that women of child bearing age (WCBA) who obtain family planning advice from mass media outlets, join family planning support groups, have obtained higher levels of education, identify in higher socio-economic groups, and those who reside and work in urban areas tend to have lower fertility rates.⁵⁻⁸ Additionally, women that are respected by their husbands and have a voice within their household, birthed their first child at an older age, have intervals between births of more than 3 years, and those who have experienced child mortality also have lower fertility rates.⁹⁻¹¹

Research conducted in Eastern Africa found that a lack of access to health reproductive services and subsequent

unmet needs are regional factors that affect fertility levels.⁹ Reproductive health services include family planning services, the number of family planning field workers (PLKB) available, and access to adequate contraceptive methods.¹² A higher percentage of contraceptive method use at a community level is a large factor influencing fertility rates.¹³ Current research regarding fertility rates focuses largely on individual factors, however community based research that focuses on regional factors is needed to assess the determinants of fertility more accurately and comprehensively.

Methods

This was a cross-sectional study that investigated WCBA using the 2002/2003, 2007, and 2012 IDHS at an individual level and the National Family Planning Coordinating Board's (BKKBN) Report of Feedback and Contraceptive Services, 2012, at the regional level. Data was obtained from five provinces, Bangka Belitung and South Sumatera that have increased fertility rates, and South Kalimantan, Bengkulu, and West Java that have decreased fertility rates. The individual factors that were assessed are access to mass media and family planning support, degree of education, employment status, socio-economic status, place of residence, empowerment within the home, age at the time of first birth, interval between births, the perceived ideal number of children, and child mortality rates. The regional factors that were assessed included proximity of family planning services, ratio of PLKB per village, available stock of effective contraceptives, and contraceptive prevalence ratio (CPR). Access variables were only available in 2012 because the National Family Planning Coordinating Board only have the data for 2012, as such two models of analysis were used, one for 2002 to 2012 and one for 2012 only. This research used

univariate analysis for descriptive information, t-test and cross tab analysis for descriptive information between two variables, and multilevel regression logistics to analyse the determinants of fertility based on individual and regional levels.

First model of analysis for individual factors

$$\text{logit } (y_{ij}) = \beta_{0j} + \beta_1 x_{1ij} + e_{ij} \tag{1}$$

Second model of analysis for regional factors

$$\beta_{0j} = \beta_o + u_j \tag{2}$$

Combined models of individual and regional factors

$$\text{logit } (y_{ij}) = \beta_o + \beta_1 x_{1ij} + e_{ij} \tag{3}$$

Results

Analysis revealed the distribution of TFRs and trends in different provinces. Table 1 shows the distribution of the sample population between provinces with 74.6% residing in the West Java Province and only 2.4% residing in Bangka Belitung. Table 2 shows that provinces with decreased fertility rates tend to have less children and vice versa.

Table 3 outlines that provinces with lower fertility rates tend to have more access to information about family planning from mass media outlets, i.e. the radio, when compared with provinces that have higher rates of fertility. Provinces with decreased of levels fertility had more WCBA that were supported by their husband and family or had access to family planning services. WCBA that were not working, and those in lower socio-economic populations were more likely to have higher fertility

Table 1. Distribution of Sample Population According to Province, 2002-2012

Percentage (%)	Number (7,474)	Province
13.8	1,032	South Sumatera
3.2	243	Bengkulu
2.4	177	Bangka Belitung
74.6	5,577	West Java
6.0	445	South Kalimantan

Source: IDHS 2002, 2007, 2012

Table 2. Distribution of Total Fertility Rate Trends Based on Number of Live Births

Total Fertility Rate Trends		Variable
Decrease (%)	Increase (%)	
		Number of Live Births
66.9	60.3	1-2
26.5	32.0	3-4
6.6	7.7	>5

Source: IDHS 2002, 2007, 2012

Table 3. Correlation between Individual Factors and Total Fertility Rate Trends from 2002 to 2012

Total Fertility Rate Trends		Variable
Decrease (%)	Increase (%)	
56.3	34.8	Information Regarding Family Planning Received from radio/television/newspaper
		Information Regarding Family Planning According to Individual Media Type
16.2	9.3	Received from Radio
53.2	31.5	Received from Television
15.5	9.0	Received from Newspaper
		Components of Family Planning Support
54.5	48.9	Discusses family planning freely with husband, family, and/or colleagues
98.6	99.2	Husband gives permission for subject to control family planning
54.2	48.8	Positive support of family planning from husband, family, and/or colleagues
42.2	39.8	Women of Childbearing Age with higher levels of education
46.9	47.9	Husband with higher levels of education
44.1	62.3	Women of Childbearing Age employed
97.3	98.9	Husband employed
54.4	31.9	Middle to upper socio-economic status
54.9	35.6	Resides in urban areas
		Empowerment Scores of Women of Childbearing Age
21.4	27.8	Low (score <8)
40.6	41.6	Middle (score 8-9)
38.0	30.7	High (score 10-11)
		Components Regarding Empowerment of Women
17.2	13.3	Woman is able to decide about her own health care
23.9	21.6	Woman is in control of household expenditures
34.1	37.3	Woman is in control of daily expenditures
14.5	21.1	Woman is able to freely visit her family
31.8	37.2	Woman is in control of which foods to prepare
75.8	73.4	Woman has experienced domestic violence because she left the house without her husband's permission
74.3	67.1	Woman has experienced domestic violence because her husband believes she has neglected their children
95.5	90.1	Woman has experienced domestic violence as she has argued with her husband
89.7	85.8	Woman has experienced domestic violence because she has refused sexual activity
97.0	93.8	Woman has experienced domestic violence due to burning food whilst cooking
35.9	32.5	Woman is able to safely refuse sexual activity because she felt tired or unwell
38.9	39.2	Aged over 21 when she gave birth to her first child
67.7	54.8	Interval between births of ≥ 36 months
47.1	39.5	Perceived ideal number of children ≤ 2
17.3	16.1	Previous experience of child mortality

Source: IDHS 2002, 2007, 2012

rates. Conversely, those residing in urban areas and subjects who reported higher levels of empowerment and decision-making within the household had lower fertility rates. Additionally, longer intervals between births and the perceived ideal number of children were lower in provinces with decreased fertility rates.

Data outlined in Table 4 shows that provinces with decreased fertility levels usually had access to family

planning services (85.02%), a ratio of PLKB of 4 for every village, and stock of the oral contraceptive pill (9.9%). Additionally, these provinces also had available stock of intramuscular contraceptives (3.8%), intrauterine devices (0.04%), condoms (0.17%), and contraceptive implants (0.08%). Despite the average unmet need in provinces with high fertility rates, there was still a decrease in fertility of 8.67% and 62.64% when using modern contraceptives.

Results show that younger WCBA with 2 children or less, who have increased fertility rates, are more likely to use modern contraceptives than those with decreased fertility rates. As such, provinces with increased fertility rates can reduce their level of fertility and provinces with low fertility rates can increase them by avoiding contraceptive use.

Table 5 outlines the four variables of the determinants of fertility. They are CPR at a regional level, and their husband's employment status, the perceived 'ideal' number of children, and intervals between births at the individual level. There is an interaction between the perceived ideal number of children, and intervals between births, with unmet needs being a confounder.

An increase of 1% of the CPR at a regional level will cause a decrease in fertility rates of less than 0.6 times at an individual level. Women with a husband that is employed are 1.2 times more likely to reduce their fertility rates when compared to women that have an unemployed husband.

Additionally, women that have birth intervals of 36 months or more are 1.3 times more likely to decrease their fertility rates than women who have birth intervals of less than 36 months. Women with two or less children are also 1.3 times more likely to reduce their fertility rates when compared with women that have two or more children.

The results of our analysis also show an interaction between the perceived ideal number of children and intervals between births. As such women with two or less children who have birth intervals of 36 months or more will be 1.3 times more likely to reduce their fertility rates.

Table 6 outlines the four determinants of fertility experienced by Indonesian women in 2012. They were the level of education of women, the level of empowerment of women, the age of the woman at the birth of her first child, and previous experience of child mortality. Furthermore, the two-confounder variables are CPR and family planning information obtained from the mass media.

Table 4. Correlation Between Regional Factors and Total Fertility Rate Trends from 2002 to 2012

Decrease of total fertility rate			Increase of total fertility rate			Variable
SD	Mean	Number	SD	Mean	Number	
6.03	85.02	2	2.26	92.96	3	Available family planning services
1.50	3.53	2	0.99	4.50	3	Ratio of Family Planning Field Workers (PLKB) per village
3.11	9.90	2	0.04	8.11	3	Available oral contraceptives
2.31	3.80	2	2.71	7.08	3	Available intramuscular contraceptives
0.05	0.04	2	0.01	0.07	3	Available intrauterine devices
0.08	0.17	2	1.68	1.64	3	Available condoms
0.04	0.08	2	0.05	0.20	3	Available contraceptive implants
1.68	8.67	9	2.26	6.82	6	Unmet needs
4.77	62.64	9	2.29	63.17	6	Use of modern contraceptives

Source: IDHS 2002, 2007, 2012

Table 5. Final Model of Determinants of Fertility 2002-2012

95% CI	p	Coefficients	OR	Variable
Regional Level				
0.3-1.0	0.041	-0.51	0.6	Contraceptive Prevalence Ratio (CPR)
0.9-58.6	0.067	1.97	7.2	Unmet needs
Individual Level				
1.1-1.5	0.041	0.18	1.2	Husband's employment status
1.2-1.3	<0.001	0.26	1.3	Interval between births of ≥36 months
1.2-1.3	<0.001	0.26	1.3	Perceived ideal number of children ≤2
0.8-0.9	<0.001	-0.22	0.8	Perceived ideal number of children ≤2 and birth interval of ≥36 months
		0.26	1.3	Perceived ideal number of children ≤2 and birth interval of ≥36 months

Source: IDHS 2002, 2007, 2012

Table 6. Final Model of Determinants of Fertility 2012 Only

95% CI	<i>p</i>	OR	Variable
Provincial Level			
0.1-3.0	0.205	0.1	Contraceptive Prevalence Ratio (CPR)
Individual Level			
0.9-1.0	0.180	0.9	Obtained family planning information from mass media outlets (newspaper, radio, television)
1.2-1.4	0.0001	1.3	Higher educated women
0.8-1.3	0.829	1.0	Average feelings of empowerment
1.0-1.2	0.033	1.1	Higher feelings of empowerment
0.8-1.0	0.069	0.9	Age at birth of first child 18-20 years
0.8-1.0	0.027	0.9	Age at fi birth of first child 21+ years
1.1-1.2	0.0001	1.2	Previous experience of child mortality

Source: IDHS 2012

Women with a higher level of education were 1.3 times more likely to reduce their level of fertility when compared with less educated women. Women with a low or middle score of empowerment were just as likely to reduce their fertility levels. Women with a high score of empowerment were 1.1 times more likely to reduce their fertility levels.

A woman's age at the birth of her first child did not appear to affect her fertility rates. Women who have experienced child mortality are 1.2 times more likely to reduce their fertility rates when compared with women that had never experienced child mortality.

Discussion

Results reveal that provinces with decreased fertility rates appear to have specific characteristics, such as husbands that are employed, women who have attained a higher degree of education, have birth intervals of 3 years or more, have 2 or less children, and have experienced child mortality. The multivariable analysis shows that education status was a large influencing factor of fertility rates in Indonesia in 2012. Studies show that women with higher levels of education have less children, it is thought that more time spent outside of the home, increased work activities, and more access to health services can affect this decision.¹⁴ Similarly, women with higher levels of education typically have a larger role in their household's decision-making processes, including discussions that involve reproductive matters.¹⁵

It has been proven that when all members of a society, including women, are better educated the entire community benefits. A country with better levels of education will have a healthier population, as they are motivated to learn about and take responsibility for their own health. As a result they lead longer lives, their children are

healthier, and for women specifically fertility rates decline as their socio-economic status increases.¹⁶⁻¹⁸

Research that was conducted using demographic health surveys from 26 countries found a correlation between women's education levels and fertility rates. The study found that women with higher education have fewer children. It also influences the CPR, their standard of living, and the perceived ideal number of children. It also found that with increased contraceptive use there was a reduction in unwanted pregnancies.^{19,20} It is thought that higher educated individuals have better access to health facilities and information about family planning and contraceptive methods.²¹

The working status of fathers has a strong correlation with the household economic status and it is generally accepted that a husband with job security will have a better socio-economic status when compared with the unemployed. A household with a higher socio-economic status may have a different perceived ideal number of children than lower socio-economic households. Studies show that parents with a higher socio-economic status may enroll their children in expensive private schools and extra curricular lessons which can be costly and subsequently they may have fewer children.^{16,18} Additionally, parents usually want the best for their children and will pay to ensure good nutrition is maintained and provide a higher levels of healthcare which also comes at a cost.¹⁵

Studies have also found that if the income of a lower socio-economic household increases, so does the parent's desire for more children. As such, interventions to reduce fertility rates should be focused at WCBA with lower education levels and lower socio-economic households with unemployed husbands. Programs should be oriented to change mindsets about the perceived ideal number of children.

A more modern approach to parenting in the developed world is also becoming more apparent. Previously, children may have been taken out of school at a younger age and put to work to help support the family unit. Additionally, couples may have even had more children to increase the number of working individuals within a household. It is less common these days that parents rely on their children to earn an income and children are expected to attend school for longer and may have extracurricular activities. This places a greater stress on the parents to have stable employment and income to provide for their family and in turn can reduce fertility rates.²²

Results from this study found that the perceived ideal number of children can affect fertility rates. Subjects in the low fertility group had a perceived ideal number of 2 or fewer children, whilst those in the high fertility group had a perceived ideal of 2 or more children. These results show that Indonesia's two-child recommendation needs to be targeted more towards the high fertility groups. Fertility rates also have a strong correlation with the children's future economic status, job security and their own reproductive health. A woman's perceived ideal number of children is influenced by many factors, such as certain women may have an innate desire to have multiple children and previously there was a strong culture within Indonesia to have large families.²²

Women with fewer children will result in longer intervals between births than someone who has multiple children. A study in Manipur, India found that factors that can influence birth intervals are a previous experience of child mortality, length of time breastfeeding, contraceptive use, age at time of marriage, and the genders of previous children. Furthermore, research conducted in Iran found that a woman's age, education level, previous experience of child mortality, and the woman's age when she delivered her first child are factors that can postpone their second child.^{23,24}

Research has shown that a birth interval of less than 36 months is associated with higher pain levels and child mortality; a risk that greatly increases with birth intervals of less than 24 months. Longer birth intervals are not only advantageous for the child but can also increase maternal health status. A birth interval of 2 years or more will give the mother time to recover physically and mentally before her next pregnancy.³

Results from this research project show that WCBA who use a contraceptive are actually more likely to have increased fertility rates when compared with WCBA who do not use contraceptives. Due to the cross-sectional design of this study it is not possible to define the exact causality of this. We are not able to definitively know that a previously high fertility rate led to contraceptive use to reduce the likelihood of pregnancy, or if contraceptive

use led to an increased birth rate. However, due to the effectiveness of most modern contraceptives, it is likely that WCBA with a high fertility rate use contraceptives to reduce unwanted pregnancies.

Contraceptives may also cause a negative effect to fertility rates due to drop out cases and the various types of contraceptives. An acknowledged weakness of this research is that we were unable to determine the sustainability of contraceptive use. This is an important aspect as drop out rates and changes to the type of contraceptive can affect fertility rates drastically. A study carried out by Basic Health Research showed that WCBA frequently chose the contraceptive pill or injection. Long-term contraceptive use is still under 6%; this rate needs to increase in order to reduce unwanted pregnancies.

Results from this study show that highly fertile women aged 20 to 29 years with 1 to 2 children are more likely to use modern contraceptives when compared with WCBA with low fertility rates. These results indicate that provinces with high fertility levels can reduce these rates with intervention. Furthermore, provinces with low fertility levels can increase these rates by limiting contraceptive use.

A weakness of this research project is there are too many independent variables that may have altered the conceptual framework because as we had to rely on secondary data. Certain data was only available for the year 2012 and as such we had to split the analysis. Furthermore, there was a change to the definition of 'unmet need' in the 2012 IDHS. The 2012 definition included married WCBA aged 15 to 49 years old that did not use any contraceptive methods and did not want to fall pregnant minimum in the next 2 years. Previous definitions before 2012 did not include the objection to having children minimum in the next 2 years.

Conclusions

Fertility rates have a strong correlation with the number of live births in each family. Factors that affect fertility rates can be broadly characterised into regional factors and individual factors. Individual factors include the employment status of the subject's spouse, the perceived ideal number of children, intervals between births, education level of subjects, and previous experience of child mortality, whilst regional factors include CPR. Provinces with reduced fertility rates appear to have WCBA with higher levels of education, employed husbands, a perceived ideal number of children of no more than 2, birth intervals of more than 3 years, and those who have experienced the death of a child. Strategic interventions that encourage education and employment to increase socio economic status needs to be implemented by both the central and local governments of provinces with

high fertility rates. Furthermore, the BKKBN needs to employ strategies that reduce fertility rates by engaging WCBA in family planning education programs. WCBA with unemployed husbands and low levels of education should be targeted to change their mindset about the ideal number of children to fewer than 2 and to ensure they maintain longer intervals between births (over 36 months). Additionally, the BKKBN in areas with both low and high fertility rates need to ensure ample supply of contraceptives, especially long-term contraceptive methods and ensure that they emphasise the importance of modern contraceptives.

Conflict of Interest Statement

The Authors declare no conflict interest in this research project.

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