The Effect of Education of Women of Childbearing Age and Household Income on Fertility with Age at First Marriage as an Intervening Variable

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Abstract

This research examines the influence of education of women of childbearing age, household income and age at first marriage as intervening variables on fertility in South Kalimantan Province. This research uses data from the 2022 National Socio-Economic Survey. The unit of analysis for this research is ever-married women aged 15 to 49 years. The analysis technique used is path analysis. The research results show that education of women of childbearing age and household income have a significant effect on fertility directly and indirectly through the variable age at first marriage. Improving the quality of women's education and increasing income welfare will have an impact on increasing the age at first marriage, and ultimately will reduce fertility.

Keywords: *Education, Income, Age At First Marriage, Fertility.*

A. INTRODUCTION

The population is the key in the development movement. Population circumstances and conditions greatly influence the national development framework. Population is the subject as well as the object of development (Kwon & Sohn, 2023)(Forty, 2023). As the subject of development, the population must be fostered and advanced in their thinking so that they can become the driving force of development. In addition, residents are also objects of development, namely the results of development in an area must also be enjoyed by residents (Dehesh et al., 2022)(Kim, 2023).

South Kalimantan is one of the provinces on the island of Borneo. South Kalimantan Province consists of 11 regencies and 2 municipalities. Based on the results of the 2020 Longform Population Census, the population of South Kalimantan in 2022 will be 4.18 million people. Ten years ago, namely in 2010, the population of South Kalimantan was 4.07 million. Population growth in South Kalimantan has grown by 1.51 percent for ten years (Central Bureau of Statistics, 2023).

Population growth is composed of three components, namely fertility, mortality and migration. Fertility is defined as the real reproductive result of a woman or a group of women or in other words fertility is a woman's ability to produce live births (Demography FE UI, 2010). Age between 15-49 years is the fertile age for a woman, because at that age women have a greater chance of giving birth to live-born children.

Fertility is measured through the total fertility rate (TFR). Based on the results of the 2020 LongForm Population Census, the total fertility rate (TFR) for South Kalimantan is 2.31. This figure means that the average number of children a woman has until the end of her reproductive period (15-49 years) in South Kalimantan Province is 2.31 children or in other words 2 to 3 children. However, when compared with the total national fertility rate, Indonesia's TFR figure is 2.18. South Kalimantan's TFR figure is above the national figure. Based on Presidential Regulation Number 18 of 2020 concerning the National Medium-Term Development Plan (RPJMN) a TFR target of 2.10 children per woman is set in 2024. For this reason, efforts have been made to reduce the TFR figure by looking at what variables can affect and can reduce fertility rate.

This research will examine the influence of educational variables for women of childbearing age and household income on fertility. Plus, we also want to see the influence of the age at first marriage variable as an intervening variable. The role of age at first marriage as an intervening variable is expected to act as a catalyst in accelerating the decline in fertility rates.

In the educational aspect, the length of a person's education is closely related to the attitudes and outlook on life of a community group. Education can be a person's reason for living their life. The level of education attended and the length of time a woman has been in education will influence the age at which she marries for the first time (Negash & Asmamaw, 2022; Chen et al., 2022). The higher a woman's education means the longer she will spend studying. Women with a higher level of education are generally older at the age of their first marriage, which in turn will influence the number of children born to be fewer (Yulzain, 2017; Jiang & Yang, 2022). Because women have an infertile period (menopause).

Hanum (2018) explains that women with a higher level of education generally have a higher age at first marriage and this will affect the number of children born, namely being fewer. Meanwhile, the view of Apriwana (2019) explains that socio-economic conditions, especially education, have a negative influence on fertility. The higher a person's level of education, the more knowledge and skills will increase, which will encourage increased productivity. If productivity increases automatically income will also increase, as a result someone will prefer to have a career and will postpone marriage Sahara et al (2018). And Mahendra (2017) explains that research on the relationship between women's education and fertility in several developing and undeveloped countries, explains that there is a close relationship between education level and fertility level. The higher the education, the lower the fertility rate.

B. METHOD

The type of research used is quantitative research. The data used in this research is secondary data. The data source comes from the 2022 National Socioeconomic Survey in South Kalimantan Province. The independent variables in this study were the education of women of childbearing age, household income, and the age at first marriage of women of childbearing age. The dependent variable in this

study is the fertility rate. The data analysis model used in this study is Path Analysis with the following equation:

$X_3 = \gamma_0 + \gamma_{31}X_1 + \gamma_{32}X_2 + \varepsilon_1$ ..... (1)

$Y_2 = ß_0 + ß_{11}X_1 + ß_{12}X_2 + ß_{13}X_3 + \varepsilon_2$ ..... (2)

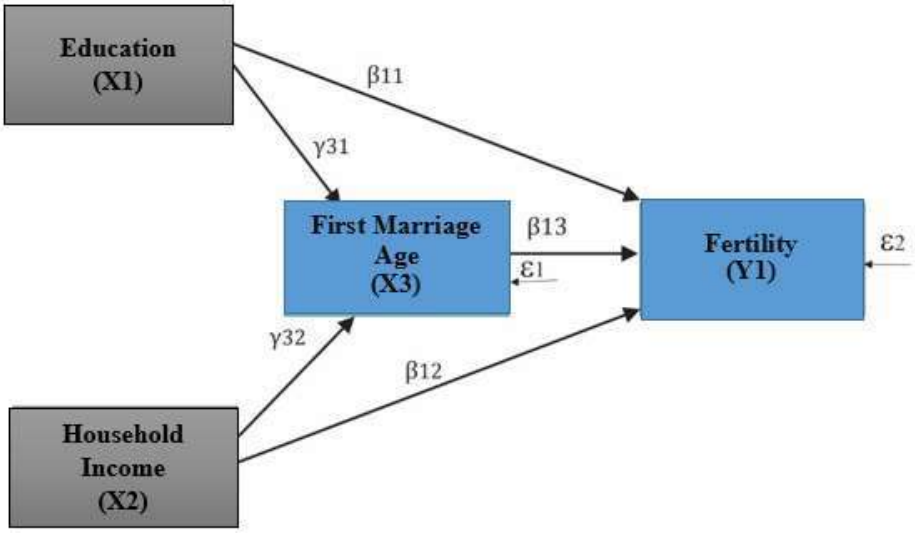


Figure 1. The Data Analysis Model

H1: Education of women of childbearing age has a positive effect on age at first marriage

H2: Household income has a positive effect on age at first marriage

H3: Education of women of childbearing age has a negative effect on fertility

H4: Household income has a negative effect on fertility

H5: Age at first marriage has a negative effect on fertility.

C. RESULT AND DISCUSSION

Before carrying out the significance test of the regression variables, this research first carried out a regression assumption test consisting of a Normality Test, A Multicollinearity Test and a Heteroscedasticity Test.

First Structural Equation Model

The influence of the educational influence of women of childbearing age, household income and its effect on the age of first marriage.

$X_3 = \gamma_0 + \gamma_{31}X_1 + \gamma_{32}X_2 + \varepsilon_1$ ..... (1)

Normality Test

The structural equation normality test uses the Kolmogorov-Smirnov test. The model meets the assumption of normality when the Kolmogorov-Smirnov test results have a significance value of more than 0.05.

Table 1. Normality test results

Significance Value	Normal Distribution Criteria	Conclusion
(1)	(2)	(3)
0.274	Significance >0.05	Unstandardized residuals are normally distributed

Source: Secondary data processed

From the results of the Kolmogorov-Smirnov test, it is known that the significance value is 0.274, so it can be concluded that the data used for the structural equation model of the influence of education and income on age at first marriage is normally distributed.

Multicollinearity Test

The multicollinearity test is used to test whether in the regression model performed there is a correlation between the independent (independent) variables. Multicollinearity can be seen by analyzing the correlation matrix of independent variables. A Variance Inflation Factor (VIF) value that does not exceed 10 and a Tolerance value that is close to 0 indicates that collinearity does not occur.

Table 2. First Structural Equation Multicollinearity Test

Variabel Bebas	Tolerance	VIF	Conclusion
(1)	(2)	(3)	(4)
Education	0.932	1.073	Multicollinearity did not occur
Household Income	0.913	1.016	Multicollinearity did not occur

Source: Secondary data processed

The results of the multicollinearity test produce a Variance Inflation Factor (VIF) number that does not exceed 10 and a Tolerance value that is close to 0 for all the variables tested. So it can be concluded that there is no collinearity.

Heteroscedasticity Test

The heteroscedasticity test is to test whether the regression model has unequal variances from the residuals or observations to the next observation. Detecting heteroscedasticity in this study uses the Glejser test. If the significance value is above 0.05 then the regression model does not experience heteroscedasticity.

Table 3. Heteroscedasticity Test

Variable	Significance Value	Criteria	Conclusion
(1)	(2)	(3)	(4)
Education	0.134	Significance > 0.05	There is no Heteroscedasticity
Household Income	0.247	Significance > 0.05	There is no Heteroscedasticity

Source: Susenas data processed

The results of the heteroscedasticity test show that the significance value of each variable is greater than 0.05. This shows that heteroscedasticity does not occur.

Simultaneous Model Accuracy Testing (Test F)

The F significance test shows whether the independent variables simultaneously affect the dependent variable. In this study the method used was to compare the values of Fcount and Ftable or a significance value of less than 0.05. When Fcount is greater than Ftable, the independent variables simultaneously affect the dependent variable.

Table 4. F statistical test results

F_{count}	Significance	Conclusion
(1)	(2)	(3)
72460.189	0.000	Simultaneous effect

Source: Susenas data processed

Based on the table of results of the F significance test, it can be seen that the significance value is less than 0.05. Thus, it can be said that the variables of education and household income have a significant effect on the age at first marriage of women of childbearing age in South Kalimantan Province.

Partial Model Accuracy Testing (T-Test)

The t statistical test shows whether the independent variable partially influences the dependent variable. When the t_{count} value is greater than t_{table} or the significance value is less than 0.05, the independent variable has an effect on the dependent variable.

Table 5. Statistical T-Test results

Variable	T_{count}	Significance	Conclusion
(1)	(2)	(3)	(4)
Education	355.074	0.000	Positive influence
Household Income	40.048	0.000	Positive influence

Source: Susenas data processed

The results of the t test show that the variables of education and household income have a positive effect on the age of first marriage. The two independent variables have a positive effect, which means that the higher the level of education and the increase in household income, the age at first marriage for women of childbearing age will also continue to age in South Kalimantan Province, and vice versa.

Structural Equation Model

Based on the results of the classic linear regression assumption test, the structural equation model formed is as follows: $X_3 = \gamma_0 + \gamma_{31}X_1 + \gamma_{32}X_2 + \varepsilon_1$

First Marriage Age (X_3) = 16.967 + 0.327 Education (X_1) + 0.0000000374 Household Income (X_2) + ε_1

The equation model can be explained as follows:

1. The constant value (γ_0) of 16.967 indicates that when the Education and Household Income variables are 0, the age at first marriage in South Kalimantan Province is 16.967. However, in reality there is no education for women of childbearing age and their household income is 0.
2. The coefficient value of the education variable (γ_{31}) is 0.327 with a positive value. This means that for every 1 year increase in the length of education of women of childbearing age, the age at first marriage will increase by 0.327.
3. The coefficient value of the household income variable (γ_{32}) is 0.0000000374 with a positive value. It can be said that every 1 rupiah increase in household income will increase the age at first marriage by 0.0000000374

Coefficient of Determination (R^2)

The coefficient of determination or R^2 is used to measure the ability of the independent variable to explain the dependent variable. The closer the R2 value is to 1, the greater the ability of the independent variable to explain the dependent variable so that the model formed is better.

Table 6. Koefisien Determinasi Persamaan Struktural Pertama

Model	R	R-Square
(1)	(2)	(3)
1	0.878	0.771

Source: Susenas data processed

From the results of the table above the value of R^2 is 0.771. This value means that the variable Education of Women of Reproductive Age and Household Income, is able to explain its effect on the Age of First Marriage in South Kalimantan Province by 77.1 percent.

Second Structural Equation Model

Effect of Education, Household Income, and Age of First Marriage, on Fertility

Normality test

The normality test uses the Kolmogorov-Smirnov test. The model meets the assumption of normality when the Kolmogorov-Smirnov test results have a significance value of more than 0.05.

Table 7. Normality test results

Significance Value	Normal Distribution Criteria	Conclusion
(1)	(2)	(3)
0.127	Significance > 0.05	Unstandardized Residual terdistribusi normal

Source: Secondary data processed

From the results of the Kolmogorov-Smirnov test it is known that the significance value is 0.127, so it can be concluded that the data used to model the structural equation of the effect of education, household income and age at first marriage on fertility is normally distributed

Multicollinearity Test

The multicollinearity test was used to test whether the regression model found a correlation between the independent (independent) variables. Multicollinearity can be seen by analyzing the correlation matrix of independent variables. A Variance Inflation Factor (VIF) value that does not exceed 10 and a Tolerance value that is close to 0 indicates that collinearity does not occur.

Table 8. Multicollinearity Test

Independent Variable	Tolerance	VIF	Conclusion
Education	0.814	1.228	Multicollinearity did not occur
Household Income	0.930	1.075	Multicollinearity did not occur
First Marriage Age	0.857	1.167	Multicollinearity did not occur

Source: Secondary data processed

The results of the multicollinearity test produce a Variance Inflation Factor (VIF) number that does not exceed 10 and a Tolerance value that is close to 0 for all the variables tested. So it can be concluded that there is no collinearity.

Heteroscedasticity Test

The heteroscedasticity test is to test whether the regression model has unequal variance from the residual or observation to the next observation. To detect the presence of heteroscedasticity in this study using the Glejser Test. If the significance value is above 0.05, the regression model does not experience heteroscedasticity.

Table 9. Heteroscedasticity Test Result

Variable	Significance Value	Criteria	Conclusion
(1)	(2)	(3)	(4)
Education	0.142	Significance > 0.05	There is no Heteroscedasticity
Household Income	0.138	Significance > 0.05	There is no Heteroscedasticity

First Marriage Age	0.107	Significance > 0.05	There is no Heteroscedasticity

Source: Susenas data processed

The results of the heteroscedasticity test show that the significance value of each variable is greater than 0.05. This shows that there is no heteroscedasticity.

Simultaneous Model Accuracy Testing (F Test)

The F significance test shows whether the independent variables together have an effect on the dependent variable. In this research, the method used is to compare the F^{count} and F^{table} values or the significance value is less than 0.05. When Fcount is greater than F^{table} then the independent variable simultaneously influences the dependent variable.

Table 10. F Statistical Test Results

F_{count}	Significance	Conclusion
(1)	(2)	(3)
4,814.427	0.000	Simultaneous effect

Based on the table of Significance F test results, it can be seen that the significance value is less than 0.05. Thus, it can be said that the variables Education, Household Income, and Age at First Marriage have a significant effect on the fertility of women of childbearing age in South Kalimantan.

Partial Model Accuracy Testing (T Test)

The t statistical test shows whether partially the independent variable has an effect on the dependent variable. When the tcount value is greater than t_{table} or the significance value is less than 0.05, the independent variable affects the dependent variable.

Table 11. Results of the t statistical test

Variable	t_{count}	Significance	Conclusion
(1)	(2)	(3)	(4)
Education	-84.124	0.000	Negative influence
Household Income	-13.681	0.000	Negative influence
First Marriage Age	-48.615	0.000	Negative influence

Source: Susenas data processed

The results of the t test show that the variables education, household income and age at first marriage have a negative effect on fertility. In other words, the higher the education of women of childbearing age, the higher the household income and the higher the age at marriage. Firstly, the fertility rate of women of childbearing age in South Kalimantan Province will decrease.

Structural Equation Model

Based on the results of the classic linear regression assumption test, the structural equation model formed is as follows: $Y_2 = ß_0 + ß_{11}X_1 + ß_{12}X_2 + ß_{13}X_3 + ε_2$

Fertility (Y2) = 2.378 – 0.003 Education (X1) -0.000000000469 Household Income (X2) - 0.002 Age of first marriage (X_3)+ $ε_2$

This equation model can be explained as follows:

1. A constant value ($ß_0$) of 2.378 indicates that when the variables of Education, Household Income, and Age of First Marriage are 0, then the Fertility of women of childbearing age in the province of Kalimantan is 2.378.
2. The coefficient value of the Education variable ($ß_{11}$) is -0.003 with a negative value. This means that for every 1 year increase in the length of education of women of childbearing age, fertility will decrease by 0.003.
3. The coefficient value of the Household Income variable ($ß_{12}$) is -0.000000000469 with a negative value. It can be said that every increase in household income of 1 rupiah will decrease the fertility of women of childbearing age by 0.000000000469.
4. The coefficient value of the variable Age of First Marriage ($ß_{13}$) is -0.002 with a negative value, which means that for every 1 year increase in age at first marriage, the fertility of women of childbearing age will decrease by 0.002.

Coefficient of Determination (R^2)

The coefficient of determination or R2 is used to measure the ability of the independent variable to explain the dependent variable. The closer the R2 value is to 1, the greater the ability of the independent variable to explain the dependent variable so that the model formed is better.

Table 12. Table of the Coefficient of Determination of the Second Structural Equation

Model	R	R square
(1)	(2)	(3)
2	0.898	0.806

Source: Susenas data processed

From the results of the table above the value of R2 is 0.806. This value means that the variables of Education of Women of Reproductive Age, Household Income and Age of First Marriage are able to explain the effect on fertility in South Kalimantan Province by 80.6 percent.

To determine the direct and indirect influence between variables, standardized regression coefficients are used.

Table 13. Table of Direct and Indirect Effects of Education Variables, Household Income, and Age of First Marriage as Intervening Variables on Fertility

Variables Affecting Fertility	Direct Influence	Indirect Influence		Total Influence
		Through	Value	
(1)	(2)	(3)	(4)	(5)
Education	-0.592	First Marriage Age	-0.205	**-0.797**
Household Income	-0.156	First Marriage Age	-0.023	**-0.179**
First Marriage Age	-0.564			**-0.564**

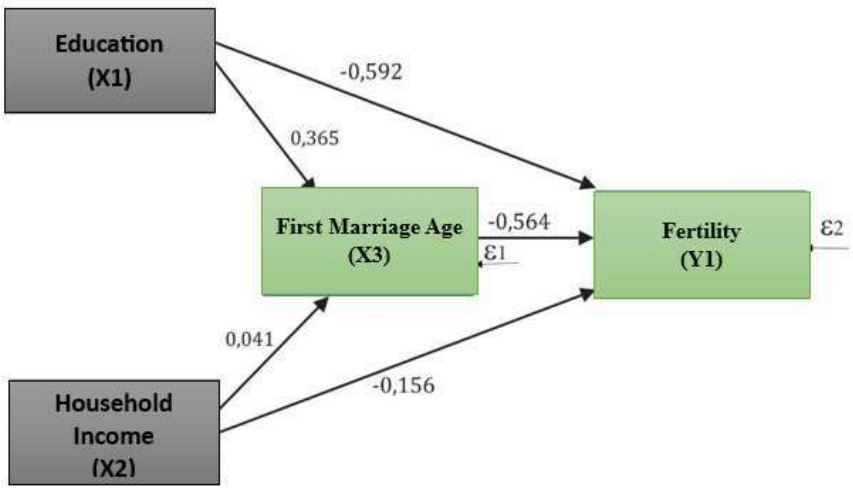


Figure 2. Effect of education of women of childbearing age, household income on fertility with the age of first marriage as an intervening variable

The variable education of women of childbearing age, the variable household income and the variable age at first marriage have a significant effect on fertility. Among these three variables, the Education variable has the greatest direct influence among the other three variables, namely -0.592. When the first marriage age variable is seen as an intervening variable. The education variable is able to provide a significant indirect effect through the age of first marriage on fertility. The value of the indirect effect of education on fertility is -0.205. Thus the total effect of education on fertility becomes -0.797.

Income also has a significant effect on fertility. The direct effect of income is -0.156. Income also influences fertility indirectly through the age of first marriage, which is -0.023. The value of the indirect influence of income through age at first marriage is smaller when compared to education. Then the total effect of income on fertility is -0.179. The total influence of income is the smallest when compared to the education variable.

So that from the results of this study education makes the biggest contribution to its influence in efforts to reduce fertility. According to Josef Brüderl and Andreas Diekmann (1997), women who have higher education show a lack of interest in getting married. By providing equal education between men and women, government programs to reduce fertility control will become more effective. Education is a human

right. The obligation to get an education is stated in the 1945 Constitution article 27 paragraph 1 which states that every citizen has the right to receive education. The level of education is closely related to one's attitude and outlook on life. Education can be the background for someone to gain broader knowledge. The level of education will affect the age at first marriage, which will affect Hanum's fertility (2018). Women with a higher level of education generally have a higher age at first marriage and this will ultimately influence the number of children born to be fewer.

Although in this study the effect of total income on fertility was the smallest. The role of the income variable is also very important in influencing efforts to reduce fertility. According to Sajogyo and Pujawati (2002) in Raka (2012) the socio-economic status of a family can be measured through the level of education, improved employment, and family income level. Social status indicators are caste, age, education, marital status, educational aspirations, social participation, development organization relations, land ownership, ownership of agricultural equipment, and previous income. In addition, Melly G. Tan in Raka (2012) a person's socioeconomic status is measured through work, education and income.

John Stuart Mill argued that a person's particular situation can influence his demographic behavior. If human productivity is high then he will tend to have a small family (Peng et al., 2023)(Mahmoudiani, 2023). So, the standard of living is a determinant of fertility and the level of fertility is determined by the humans themselves. In this regard, Mill suggests that by improving the quality of education, the level of the less fortunate will increase so that the high and low birth rates can be more stable (Mantra, 2000)(Boateng et al., 2023). An increase in income through increased welfare in South Kalimantan Province means that efforts to reduce fertility in South Kalimantan province will also run better. With convergent local government policies in efforts to reduce fertility, it is hoped that the rate of population growth will be controlled.

D. CONCLUSION

Education of women of childbearing age and household income have a direct and significant effect on fertility. When adding the variable age at first marriage as an intervening variable, it was found that education of women of childbearing age and income also had an indirect influence on fertility through age at first marriage. With these results, the total effect of education and income becomes greater when the indirect effect is added through the variable age at first marriage. This suggests that efforts to reduce fertility can be made by improving the quality of education and improving women's living standards, which increases income, thereby making women tend to postpone marriage. This is a policy action in an effort to reduce fertility.

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