

Analysis of determining factors of fertility rate in Karangasem District

Ni Putu Wulandary^a and A.A.I.N. Marhaeni^a

^aFakultas Ekonomi dan Bisnis, Universitas Udayana, Bali, Indonesia

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ABSTRACT

The purpose of this research is to analyze the simultaneous and partial effects of the ideal number of children, women's employment status, family perceptions of purusa children, age at first marriage, and women's education level on fertility rates in Karangasem District. Additionally, this study examines the role of women's education level in moderating the effect of age at first marriage on fertility rates in Karangasem District. This research employs a quantitative method with an associative approach, utilizing Snowball Sampling and Accidental Sampling techniques. Data collection was conducted through observation, structured interviews, and in-depth interviews with a sample size of 99 Couples of Reproductive Age (CRA). The data analysis technique used is moderation regression analysis. The results of this study indicate that: 1) The ideal number of children, women's employment status, family perceptions of purusa children, age at first marriage, and women's education level have a simultaneous and significant effect on fertility rates; 2) Age at first marriage and women's education level have a negative and significant effect on fertility rates; 3) The ideal number of children and family perceptions of purusa children have a positive and significant effect on fertility rates; 4) Women working in the formal sector have lower fertility rates than those working in the informal sector; 5) Women's education level moderates and strengthens the effect of age at first marriage on fertility rates.

KEYWORDS

Ideal Number of Children; Women's Employment Status; Family Perceptions of Purusa Children; Age at First Marriage; Women's Education Level; Fertility

1. Introduction

Population growth serves as one of the indicators for the government in formulating policies related to the economic development of a country. Low population growth reflects the success of government programs in controlling the rate of population growth. Indonesia, as the fourth most populous country in the world after China, India, and the United States, has experienced an increase in population projected to reach 278.70 million people in 2023 (Badan Pusat Statistik, 2021). The high population growth rate leads to disparities in welfare and low population quality. According to the global agreement in the 2015 UN session on the 2030 Agenda to achieve 17 Sustainable Development Goals (SDGs), the high population growth rate must be controlled, and one way to achieve this is by reducing fertility rates.

CONTACT A.A.I.N. Marhaeni. Email: marhaeni_agung@unud.ac.id



Fertility is the actual reproductive outcome of a woman or a group of women (Mantra, 2003:167). A high birth rate will result in a large proportion of young population, which in turn increases the burden on the productive age population as they need to support and serve both the young and elderly populations (Marhaeni, 2018). The 2020 Population Census recorded the population of Bali Province at 4,317,404 people with an increasing growth rate (Badan Pusat Statistik, 2020). Karangasem Regency is one of the regencies in Bali Province experiencing a significant increase in population, accompanied by a rising total birth rate. Figure 1 shows the results of the 2020 Bali Province Long Form Population Census, where the highest Total Fertility Rate (TFR) is in Karangasem Regency at 2.31, surpassing the Bali Province TFR of 2.04.

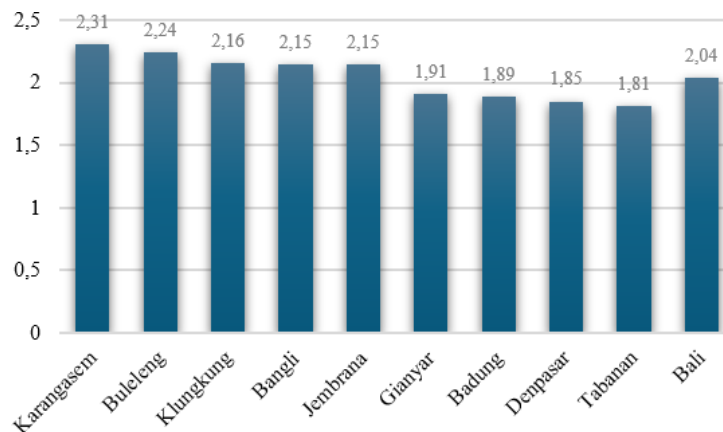


Figure 1. TFR Values by Regency/City in Bali Province, 2020

Source: Bali Province Long Form Population Census Results, 2020

A TFR value of 2.31 indicates that, on average, each woman in Karangasem Regency gives birth to 2-3 children during her reproductive period. Concerning fertility rates in Karangasem Regency, Figure 2 shows the Crude Birth Rate (CBR) by sub-district in Karangasem Regency. The Crude Birth Rate is the number of births per 1,000 population in a given period, usually one year (Suwito, 2020:64).

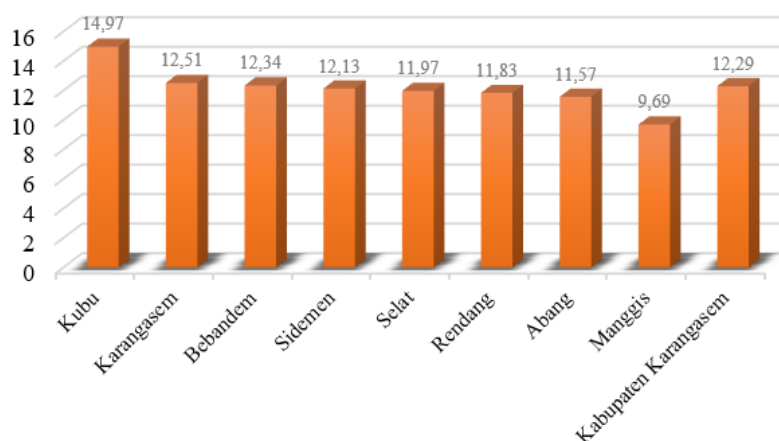


Figure 2. Crude Birth Rate by Sub-district in Karangasem Regency, 2022

Source: Karangasem Regency Health Office, 2023

Data indicates that the highest Crude Birth Rates (CBR) are in Kubu, Karangasem, and Bebandem sub-districts. The Karangasem sub-district is the research target area. Data shows that the CBR in Karangasem sub-district exceeds that of Karangasem Regency, at 12.29. Additionally, the strategic position of Karangasem sub-district as the administrative center of Karangasem Regency results in higher population growth compared to other sub-districts in the regency annually (Badan Pusat Statistik, 2023). If the majority of the population is concentrated in Karangasem sub-district, the consequence will be population imbalance, thus Karangasem sub-district is chosen to control population through fertility regulation.

Fertility levels are influenced by two factors: demographic and non-demographic factors (Mantra, 2003:167). Generally, families that have not reached their ideal number of children are likely to continue having more children until their desired number is achieved. Couples who already have two children tend to want more than they currently have (Arsyad, Nugroho, Nugraha, & Sakti, 2021). Couples of reproductive age need to jointly plan, manage, and determine their ideal number of children. Women's employment status can influence fertility rates. Becker's (1965) Theory of Time Allocation states that working women have a higher opportunity cost of time compared to non-working women (Sukim and Rudi Salam, 2018). Differences in fertility can be observed based on women's employment status in the formal and informal sectors. Tri Saraswati and Urmila Dewi's (2019) research indicates that women working in the formal sector have fewer children, while those in the informal sector have more children.

Freedman (1979) stated that fertility-influencing variables include societal norms. The majority of Balinese people adhere to a patrilineal system where family membership is determined by the male (father's) lineage, making male offspring (purusa) more significant (Putri & Sukaarsana, 2011). This patrilineal culture, which values male children more, leads to a preference for having children of a particular sex, known as sex preference. Fertility preferences can impact the use of contraceptives by couples of reproductive age (Arsyad et al., 2021). Sex preference has a positive influence on fertility (Manuaba & Marhaeni, 2022). Parents who prefer male children will continue to have children until they achieve the desired number of male offspring (Raza, 2023).

Age is a significant demographic characteristic that can influence demographic behavior, particularly population growth and fertility. One factor used as a basis for policymaking to reduce fertility rates is the age at first marriage. Davis and Blake (1956) stated that the age of entry into sexual relations is an intermediate variable that establishes a marriage relationship and impacts birth rates. Agus P Prayogi and Sudibia (2022) stated that the age at first marriage negatively affects fertility. The younger the age at first marriage, the higher the number of births due to a longer reproductive period, and vice versa. The National Population and Family Planning Board (BKKBN) states that the ideal age for marriage for adolescents is 21 to 25 years. Childbearing at a young age becomes a fundamental factor determining women's quality of life and roles in society. If women marry at a young age, the impact includes maternal and infant health issues, socio-economic problems such as lower education and job opportunities, and increased population growth (Malinda, 2012).

Women's education plays a crucial role in reducing birth rates. Becker's (1965) Theory of Time Allocation explains that the value of time for women can influence their decisions in several matters, such as determining the age of marriage as women choose to pursue education. Y Yunifah and Sugiharti (2022) and Putri Wahyuni, Nailufar, Mardiaton, and Zulfan (2022) stated that women's education negatively affects fertility. The higher the education level of women, the lower the fertility rate, and vice versa.

Women who marry at a younger age tend to have lower education and socio-economic status, while those who marry after achieving better education and socio-economic status have fewer children due to older marriage age (Hanum & Andiny, 2018). Education is a component of the Family Planning program aimed at reducing fertility rates without necessarily using contraceptives, thereby increasing the age at first marriage and influencing the number of children born.

Based on the theories and previous research results outlined above, the objectives of this study can be described as follows: 1) To analyze the simultaneous influence of the ideal number of children, women's employment status, family perceptions of purusa children, age at first marriage, and women's education level on fertility rates in Karangasem District; 2) To analyze the partial influence of the ideal number of children, women's employment status, family perceptions of purusa children, age at first marriage, and women's education level on fertility rates in Karangasem District; 3) To analyze the role of women's education level in moderating the influence of age at first marriage on fertility rates in Karangasem District.

2. Research Methodology

The research was conducted in Karangasem District using a quantitative approach with an associative design to analyze the influence of independent variables on the dependent variable. The independent variables in this study are the ideal number of children (X1), women's employment status (X2), family perceptions of purusa children (X3), age at first marriage (X4), and women's education level (M) as a moderating variable, while the dependent variable is the fertility rate (Y). The population in this study consists of Couples of Reproductive Age (CRA) in Karangasem District, aged 15-49 years, totaling 15,309 individuals. The sample size for this study is 99 respondents, calculated using the Slovin formula and distributed based on villages/sub-districts. The sampling technique used is a combination of accidental sampling and snowball sampling. Accidental sampling is a method where the researcher selects respondents who are closest to them, while snowball sampling is a method where the initial sample or respondent serves as a starting point for subsequent sample selection (Marhaeni and Yuliarmi, 2019:212). The research data sources include primary data obtained through observation, structured interviews, and in-depth interviews with informants using interview guidelines, and secondary data collected from the Bali Provincial Statistics Agency, Karangasem District Health Office, National Population and Family Planning Board (BKKBN), and the World Bank. Data analysis techniques employed include descriptive statistical analysis and moderation regression analysis (MRA) using SPSS software.

3. Results and Discussion

3.1. Description of Research Variables Data

To plan a prosperous and happy family, one of the key considerations is the number of children to have. Figure 3 shows that the majority of couples of reproductive age desire more than two children, with 53 percent of respondents expressing this preference. The significant number of respondents desiring more than two children indicates the uneven implementation of the National Population and Family Planning Board's program,

which states that an ideal number of children is ≤ 2 , and ≥ 2 children is considered not ideal.

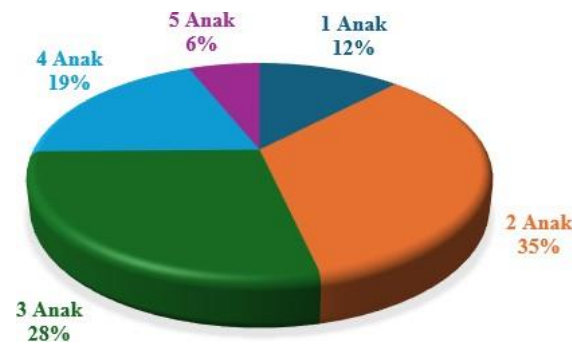


Figure 3. Distribution of Respondents Based on Ideal Number of Children

Source: Processed Primary Data, 2024

Data in Table 1 shows that the majority of respondents work in the informal sector. Women are considered to be working in the informal sector if they are individually responsible for their work, self-financed, tend not to be time-bound, and are not covered by labor legislation. This is in contrast to formal employment, which is subject to labor laws. Most respondents working in the informal sector reported jobs such as traders, laborers, and other service businesses like laundry, salons, and tailoring. Those working in the formal sector primarily reported jobs as private employees, teachers, and civil servants.

Table 1. Distribution of Respondents Based on Women's Employment Status

Employment Status	Number of Respondents (People)	Percentage (%)
Informal	53	53.5
Formal	46	46.5
Total	99	100

Source: Processed Primary Data, 2024

Illustrates family perceptions regarding purusa children and indicates the strength of the patrilineal culture within a family. A strong patrilineal culture tends to increase fertility rates as most families desire children of a particular gender.

Table 2. Distribution of Respondents Based on Family Perceptions of Purusa Children

No.	Statement	SS People (%)	S People (%)	CS People (%)	TS People (%)	STS People (%)	Total People (%)
1	I strive hard to have a male child	53 (53.5)	22 (22.2)	15 (15.2)	9 (9.1)	0 (0.0)	99 (100.0)
2	I consider male children as heirs of the father's lineage	53 (53.5)	28 (28.3)	11 (11.1)	7 (7.1)	0 (0.0)	99 (100.0)
3	My investment in male children is greater than in female children	7 (7.1)	38 (38.4)	33 (33.3)	18 (18.2)	3 (3.0)	99 (100.0)
4	I felt or experienced the purusa concept as a child	8 (8.1)	36 (36.4)	28 (28.3)	22 (22.2)	5 (5.0)	99 (100.0)

The data indicates that most respondents strive hard to have a male child. Respondents view male children as heirs of the father's lineage and make greater investments

in male children than in female children. Most respondents stated that they felt or experienced the purusa concept as children. The strong family perception of purusa children demonstrates that the implementation of the Bali Main Pakraman Village Council (MUDP) Decree on equal inheritance rights for female children in Bali has not been optimal, as only male children are considered heirs of the father's lineage.

Figure 4 shows the data on respondents' age at first marriage. A lower age at first marriage increases the risk of higher birth rates due to a longer reproductive period compared to women who marry at an older age.

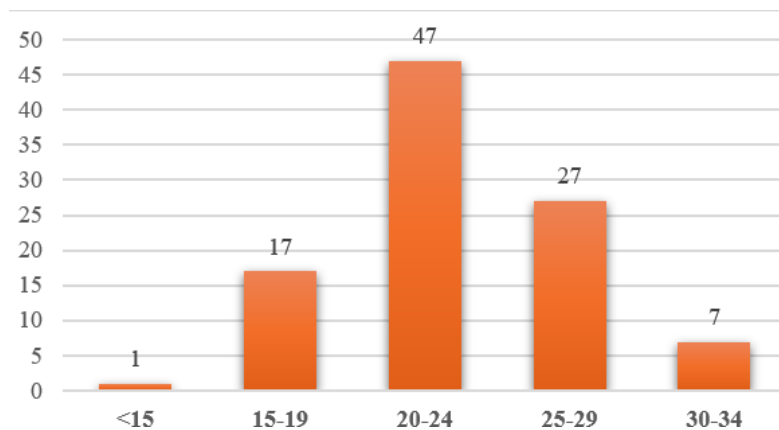


Figure 4. Age at First Marriage of Respondents

Source: Processed Primary Data, 2024

The data shows that the majority of respondents' age at first marriage is 20 years and above. This indicates that couples of reproductive age have adopted the National Population and Family Planning Board's program of Delaying Age at Marriage (PUP), where the minimum age for marriage is 20 years for women and 25 years for men (Hadiyanto, 2020). However, there are still respondents who married below the age of 20, amounting to 18.2 percent, suggesting that the PUP program has not been fully realized among couples of reproductive age.

Data in Figure 5 shows that 46.6 percent of respondents have an education level below high school/vocational school, indicating that nearly 50 percent of women have not met the Ministry of Education and Culture's 12-year compulsory education program.

3.2. Validity and Reliability Test

In the SPSS output, a variable is considered valid if the Pearson Correlation value is ≥ 0.3 (Sudarmanto, 2005). This means that the data in Table 3 shows that the family perception of the purusa child variable has passed the validity test.

Data in Table 4 shows a Cronbach's Alpha value of 0.831, which is greater than 0.6, indicating that the family perception of purusa children variable is reliable.



Figure 5. Distribution of Respondents Based on Women's Education Level

Table 3. Validity Test Results

No.	Variable	Pearson Correlation	Conclusion
1	Family Perception of Purusa Children	0.829	Valid
2	I strive hard to have a male child	0.816	Valid
3	I consider male children as heirs of the father's lineage	0.820	Valid
3	My investment in male children is greater than in female children		
4	I felt or experienced the purusa concept as a child	0.796	Valid

Table 4. Reliability Test Results

No.	Variable	Cronbach's Alpha	Conclusion
1	Family Perception of Purusa Children	0.831	Reliable

3.3. Classical Assumption Test

The normality test aims to determine whether both independent and dependent variables in residual regression are normally distributed (Suyana Utama, 2016:99). The normality test in this study uses the Kolmogorov-Smirnov Test. Table 5 shows the normality test results, indicating that the Test Statistic value in the regression model is 0.047 with a significance level of Asymp. Sig. (2-tailed) of $0.200 > 0.05$, concluding that the residual values are normally distributed and the regression model is suitable for further analysis.

Table 5. Normality Test Results

	Unstandardized Residual
Test Statistic	0,047
Asymp. Sig. (2-tailed)	0,200

Source: Processed Primary Data, 2024

A good regression model is one that does not have multicollinearity among the independent variables. The results of the multicollinearity test in this study are shown in Table 6, indicating that all independent variables do not contain multicollinearity.

This is shown by the tolerance values of each variable being greater than 0.1 and the VIF values being less than 10.

Table 6. Multicollinearity Test Results

Variable	Collinearity Statistics
	Tolerance
Ideal Number of Children (X1)	0.945
Women's Employment Status (X2)	0.639
Family Perception of Purusa Children (X3)	0.923
Age at First Marriage (X4)	0.850
Women's Education Level (M)	0.622

Source: *Processed Primary Data, 2024*

Table 6 shows the results of the heteroscedasticity test, indicating that each variable has a significance value greater than the established level of significance, which is 0.05. This means there is no relationship between the independent variables and the absolute residual, concluding that this study does not contain heteroscedasticity.

Table 7. Heteroscedasticity Test Results

Variable	Sig.
Ideal Number of Children (X1)	0.841
Women's Employment Status (X2)	0.815
Family Perception of Purusa Children (X3)	0.907
Age at First Marriage (X4)	0.158
Women's Education Level (M)	0.667

Source: *Processed Primary Data, 2024*

3.4. Moderation Regression Analysis

3.4.1. Simultaneous Effect of Ideal Number of Children (X1), Women's Employment Status (X2), Family Perception of Purusa Children (X3), Age at First Marriage (X4), and Women's Education Level (M) on Fertility Rate (Y) in Karangasem District (F Test)

The F test aims to examine the simultaneous or concurrent linear relationship between the independent variables, the ideal number of children, women's employment status, family perception of purusa children, age at first marriage, and education level—on the fertility rate in Karangasem District. Table 8 shows the F test results using SPSS software.

Table 8. Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.811	6	2.135	452.697	0.000b
Residual	0.434	92	0.005		
Total	13.245	98			

Source: *Processed Primary Data, 2024*

The analysis shows that the calculated F value (452.697) > F table (2.31) with a significance level of $0.000 < 0.05$, thus H_0 is rejected and H_1 is accepted. This means that the ideal number of children (X1), women's employment status (X2), family perception of purusa children (X3), age at first marriage (X4), and women's education level (M) simultaneously have a significant effect on the fertility rate (Y) in Karangasem District.

Table 9. Coefficient of Determination (R^2) Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.983	0.967	0.965	0.069

Table 9 shows a coefficient of determination of 0.965, meaning that the role of the ideal number of children (X_1), women's employment status (X_2), family perception of purusa children (X_3), age at first marriage (X_4), and women's education level (M) in predicting the variation of the dependent variable, fertility rate (Y), is 96.5 percent. The remaining 3.5 percent is influenced by other variables not included in the model.

3.4.2. Partial Effect of Ideal Number of Children (X_1), Women's Employment Status (X_2), Family Perception Purusa Children (X_3), Age at First Marriage (X_4), and Women's Education Level (M) on Fertility Rate (Y) in Karangasem District (t Test)

The t test aims to analyze the partial influence of the ideal number of children (X_1), women's employment status (X_2), family perception of purusa children (X_3), age at first marriage (X_4), and women's education level (M) on the fertility rate (Y) in Karangasem District.

Table 10. Test Results of Moderation Regression Analysis (MRA)

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	2.470	0.101		24.448
(Ideal Number of Children)	0.185	0.007	0.550	28.328
(Women's Employment Status)	-0.261	0.017	-	-
			0.356	15.081
(Family Perception of Purusa Children)	0.120	0.007	0.327	16.654
(Age at First Marriage)	-0.009	0.004	-	-
			0.098	2.073
(Women's Education Level)	-0.022	0.011	-	-
			0.248	2.042
(Age at First Marriage * Women's Education Level)	-0.001	0.000	-	-
			0.283	1.991

For variables using indicators or latent variables, such as the family perception of purusa children variable, factor score analysis is used before being included in the moderation regression analysis to find representative variables for regression analysis. The moderation regression analysis in this study has used factor score values. Based on Table 10, the moderation regression equation can be formulated, and the regression analysis results for each variable are as follows:

$$Y = 2.470 + 0.185X_1 - 0.261X_2 + 0.120X_3 - 0.009X_4 - 0.022M - 0.001X_4M + \mu$$

The variable of the ideal number of children shows a positive and significant influence ($0.000 < 0.050$) on the fertility rate in Karangasem District. The regression coefficient of the ideal number of children on the fertility rate is positive at 0.185, meaning that if the ideal number of children increases by 1, assuming other independent variables are constant, the fertility rate will increase by 0.185. This indicates that the higher the ideal number of children desired by couples of reproductive age, the higher the fertility

rate will be, and vice versa. This result is supported by Arsyad et al. (2021), showing that couples of reproductive age who already have two children still tend to want more children than they currently have.

The variable of women's employment status shows a significant influence ($0.000 < 0.050$) on the fertility rate in Karangasem District. The regression coefficient of women's employment status on the fertility rate is negative at -0.261 , indicating a difference between the fertility rate of women working in the informal sector and those in the formal sector. Women working in the formal sector ($D=1$) have a lower fertility rate compared to those in the informal sector ($D=0$). This result is supported by studies conducted by Tri Saraswati and Urmila Dewi (2019); Arya P Pranata and Sudibia (2020); J Jayakusuma and Sudibia (2022), which found a significant difference in fertility rates between women working in the informal sector and those in the formal sector. Women working in the informal sector have higher fertility rates compared to those in the formal sector.

The variable of family perception of purusa children shows a positive and significant influence ($0.000 < 0.050$) on the fertility rate in Karangasem District. The regression coefficient of family perception of purusa children is positive at 0.120 , indicating that the stronger the family perception of purusa children, the greater the desire to have male children, thus increasing fertility rates. Conversely, the weaker the family perception of purusa children, the lesser the desire to have male children, thus lowering fertility rates. This result is supported by studies conducted by Bayu Rahardja, Catur-saptani, and Rahmadewi (2021); Dewi M Manuaba and Marhaeni (2022), showing that gender preference positively and significantly influences fertility. This means that the desire to have children of a specific gender can increase birth rates.

The variable of age at first marriage shows a negative and significant influence ($0.041 < 0.050$) on the fertility rate in Karangasem District. The regression coefficient of age at first marriage is negative at -0.009 , indicating that if the age at first marriage increases by 1 year, assuming other independent variables are constant, the fertility rate will decrease by 0.009 . This means that the lower the age at first marriage, the higher the fertility rate, and vice versa. This result is supported by studies conducted by J Jayakusuma and Sudibia (2022); Agus P Prayogi and Sudibia (2022); Nugraheni and Sugiharti (2022), which found that the age at first marriage negatively and significantly influences the fertility of women of reproductive age. The higher the age at first marriage, the lower the fertility rate, and vice versa.

The variable of women's education level shows a negative and significant influence ($0.044 < 0.050$) on the fertility rate in Karangasem District. The regression coefficient of women's education level is negative at -0.022 , indicating that if the education level of women increases by 1 year, assuming other independent variables are constant, the fertility rate will decrease by 0.022 . This means that the lower the education level of women, the higher the fertility rate, and vice versa. This result is supported by studies conducted by Agus P Prayogi and Sudibia (2022); Y Yunifah and Sugiharti (2022); Jiwei Chen and Jiangying Guo (2022), which found a negative and significant relationship between women's education level and fertility rate. The lower the education level, the higher the fertility rate, and vice versa.

3.4.3. The Role of Women's Education Level (M) in Moderating the Influence of Age at First Marriage (X4) on Fertility Rate (Y) in Karangasem District

The variable of women's education level has been proven to moderate the influence of age at first marriage on fertility rate in Karangasem District. This can be seen from the

significance value of $0.049 < 0.05$. This variable is a type of pseudo moderation because both the moderating variable (women's education level) and the moderated variable (age at first marriage) significantly influence the dependent variable. The women's education level strengthens the influence of age at first marriage on fertility rate, as seen from the negative regression coefficient of age at first marriage (-0.009) and the negative interaction coefficient between age at first marriage and women's education level (-0.001). Women's education level can enhance the effect of age at first marriage on fertility rates, meaning that women's education can increase the age at first marriage due to better knowledge related to fertility, reproductive organs, and family planning. Women with higher education levels tend to enter the labor market and delay marriage, thereby reducing fertility rates.

4. Conclusion and Recommendations

Based on the research results, the conclusions are as follows: 1) The variables of the ideal number of children, women's employment status, family perception of purusa children, age at first marriage, and women's education level simultaneously and significantly influence the fertility rate in Karangasem District; 2) Age at first marriage and women's education level negatively and significantly influence the fertility rate in Karangasem District; 3) The ideal number of children and family perception of purusa children positively and significantly influence the fertility rate in Karangasem District; 4) Women working in the formal sector tend to have lower fertility rates compared to those working in the informal sector; 5) Women's education level plays a role in moderating and strengthening the influence of age at first marriage on fertility rate in Karangasem District.

Based on the research, the following recommendations are provided: 1) Programs to improve educational equality by offering more scholarships to women than men are needed, as the study results show that women's education negatively impacts birth rates; 2) Enhancement of the Delaying Age at Marriage (PUP) program through extending women's schooling, providing family guidance, and youth coaching to achieve population-oriented development and create small, happy, and prosperous families, thus controlling high fertility rates; 3) Improvement of education and planning programs for every couple of reproductive age to create quality children through the 4T education (too young, too old, too close, too frequent) so that every couple can consider the ideal number of children for their family.

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