

Effect of Education of Women of Reproductive Age, Household Income, Age of First Marriage, Length of Marriage and Infant Mortality on Fertility

Edy Wiranto¹, Dwia Aries Tina Pulubuhu², M. Ramli AT³

Abstract

In the last ten years, according to the results of a comparison between the total fertility rate from the 2010 Population Census and the 2022 Long Form Population Census, South Kalimantan Province was ranked second nationally with the lowest decline of 0.04 points. There has been stagnation in the decline in fertility in South Kalimantan. The purpose of this study was to determine the dominant variable that influences fertility in South Kalimantan. The independent variables involved were the education of women of childbearing age, age at first marriage, length of marriage, and infant mortality. The grand theory used comes from the fertility theory put forward by Freedman. The statistical method used is path analysis using data from the 2022 National Socioeconomic Survey (Susenas) in South Kalimantan Province. The results showed that all variables significantly affect fertility with infant mortality having the greatest influence on fertility.

Keywords: *Fertility, Education, Income, Age of First Marriage, Length of Marriage, Infant Mortality.*

Introduction

The population component is the most vital thing in planning development. This is because the population is the subject as well as the object of development. A large population should be accompanied by an even composition and distribution. In addition, if these conditions are accompanied by a good and adequate quality of population, it can be a driving force for the progress of development. If a country has a large population and low-quality human resources, the impact will be a burden on development and the country. This phenomenon will have negative impacts such as increasing poverty, increasing crime, and decreasing environmental quality (Avtar et al., 2019).

Population growth is inseparable from the influence of demographic factors, which consist of birth (fertility) and death (mortality) rates and migration. One effort that needs to get attention at this time is the effort to reduce fertility. This is because fertility is more complex than mortality, where a woman only dies once, but she can give birth to more than one baby. An employed metric involves the fertility metric, quantified by the Total Fertility Rate (TFR). This figure represents the mean count of offspring delivered by a

¹ Universitas Hasanuddin, Makassar, Indonesia. ORCID: 0009-0002-4953-4460. Email: edy.wiranto.ok@gmail.com

² Universitas Hasanuddin, Makassar, Indonesia, ORCID: 0000-0001-6065-2412. Email: dwiatn@yahoo.com

³ Universitas Hasanuddin, Makassar, Indonesia. ORCID: 0000-0002-3520-4789. Email: mramliat@yahoo.com

woman throughout her reproductive years, typically spanning from 15 to 49 years of age (Newsham & Rowe, 2021).

In 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. This means that it is hoped that Indonesian women will be able to give birth to 2 children throughout their reproductive life. This will be implemented well considering that the results of the 2020 Long Form Population Census in 2022 show that the TFR value for Indonesian women is at 2.18 children per woman (Bolarinwa et al., 2022).

If broken down by province, in 2020 there are 26 provinces whose TFR is above the national figure. An interesting phenomenon occurred in the Province of South Kalimantan. In the last ten years, the results of a comparison between the TFR figures from the 2010 Population Census and the 2022 Long Form Population Census, South Kalimantan Province was ranked second nationally in the lowest decline of 0.04 points. There has been stagnation in the decline in fertility in South Kalimantan (Alaimo et al., 2023).

At the national level, the TFR rate has also stagnated at 2.6 children per woman for more than 10 years. The stagnant TFR figures come from the 2002-2003 IDHS survey, 2007 IDHS and 2012 IDHS. In fact, in China, China's TFR has been at 1.6 since 2006, and is still the country with the largest population in the world (Selvaraj et al., 2022).

The target for achieving the fertility level is also spelled out in the Regional Regulation of the Province of South Kalimantan Number 2 of 2022 concerning the Regional Medium and Long-Term Development Plan (RPJMD). In this regional regulation, it is targeted that South Kalimantan's TFR is targeted to reach 2.1 children in 2026 (Nugroho et al., 2022). This target is considered quite realistic because the South Kalimantan Province's TFR is still above the national figure in 2017 and in 2022 the South Kalimantan Province's TFR has only decreased slightly to 2.31 children per woman. Looking at the phenomenon of fertility in South Kalimantan Province, it is necessary to study the variables that affect fertility (Sarmiasih & Pratama, 2019).

Through the brief explanation above, this study then tries to look at the relationship that exists between the effects of education of women of childbearing age, household income, age at first marriage, length of marriage, and infant mortality on fertility.

Literature Review

Fertile Age Women

Women within the reproductive age bracket (15-49 years), regardless of their marital status, encompass women capable of childbearing. The reproductive capability of women aged 20-45 remains optimal. Female fertility span outpaces that of males. The zenith of fertility occurs between 20 and 29 years, affording a 95% probability of conception. During the 30s, the likelihood diminishes to 90% (An et al., 2020). Meanwhile, entering the age of 40, the chance of getting pregnant decreases to 40%. Beyond 40 years of age, women experience a mere 10% peak likelihood of conception. Understanding reproductive fertility challenges holds significant importance. Throughout this fertile phase, women should prioritize the maintenance and hygiene of their reproductive organs, one of which is by carrying out early detection of cervical cancer in women (Kim et al., 2021).

According to the BKKBN, a woman of childbearing age is a wife who is aged 20-35 years or who is less than 15 years old and has experienced menstruation or menstruation or a wife who is more than 50 years old but she is still experiencing menstruation or menstruation. According to the Indonesian Ministry of Health, women of childbearing age are women who are still of reproductive age, namely between the ages of 15-49 years,

with the status of single, married, or widowed. Women of Reproductive Age (WUS) are women whose reproductive organs are functioning properly between the ages of 20-29 years (Clasen et al., 2023).

Women of childbearing age generally have certain characteristics, including the following:

1. Menstrual Cycle

Typically, women with consistent monthly menstrual cycles exhibit fertility. Thus, the menstrual cycle can serve as an initial indicator to determine a woman's fertility status (Cedars, 2022).

2. Fertility recorder

Women releasing eggs. When the egg comes out, there will usually be an increase in temperature of 0.2 degrees Celsius for 10 days. However, if at that time there is no increase in temperature, it means that the woman is infertile (Jonsson & Greenberg, 2022).

3. Blood test

Women whose menstrual cycles are irregular, such as the arrival of menstruation every three months or every six months are usually irregular. In this condition, a blood test needs to be done to find out the cause of the irregular menstrual cycle and this test is also to find out the hormone content that affects a woman's fertility (Li et al., 2021).

4. Physical examination

To find out female fertility, examinations can also be carried out such as the breasts, thyroid gland in the neck, and reproductive organs (Drozd et al., 2020).

5. Track records

Women who have had a miscarriage, whether intentional or not, have a very high chance of contracting germs and these germs will cause blockage of the reproductive tract (Arora & Lakshmi, 2021).

The fertile period is a period in a woman's menstrual cycle where there are eggs that are ready to be fertilized. The emergence of various events, namely as follows: hormonal reactions, biological reactions, psychological reactions and there is a periodic repetition of menstrual events. All of these things just processed in a normal mood (Cornejo Ulloa et al., 2021).

Adult women who are healthy and not pregnant, every month will regularly bleed from their uterine devices, events like this are called menstruation or menstruation. According to Prawirohardjo, the menstrual cycle is divided into 3 periods, namely:

1. Menstrual period, which usually occurs for two to eight days. At that time the endometrium will be released, while the ovarian hormones will be released at a minimum or the lowest (Davis & Baber, 2022).

2. The proliferative period occurs until the fourteenth day. So that at that time the endometrium grows back, and between the 12th and 14th day an ovum is released from the ovary which is called ovulation (Arbeláez-Gómez et al., 2022).

3. The period of secretion occurs on the 14th to the 28th day. The period after ovulation which lasts from the 14th to the 28th day, this period is the period of the corpus rubrum which becomes the corpus luteum which secretes progesterone. This period is the time when the endometrium prepares itself to receive an egg to be fertilized (Zhao et al., 2022).

Household Income

Revenue is all receipts, both cash and non-cash which are the result of sales of goods or services within a certain period. Income is compensation for providing services to others, everyone gets income for helping others. Meanwhile, personal income is all kinds of income, one of which is income earned without doing anything that is received by residents of a country (Shachar, 2021). Personal income includes all community income regardless of whether the income is obtained from providing factors of production or not. According to Kadariyah, the money received by a person is in the form of wages, profits, rent, etc., and is obtained within a certain period (Bilan et al., 2020).

Revenue or another name for revenue is income earned for a certain period. Revenue is all that is received from the sale of goods and services obtained in the business unit. The definition of income is different from the definition of revenue. Revenue (revenue) is income that has not been deducted from costs and expenses, while income is net income that has been deducted from expenses and expenses (Napier & Stadler, 2020).

A person's income can be related to the type of work he does following their respective professions, for example, entrepreneurs, laborers, employees, carpenters, and others. After working, a person earns income that can be used to fulfill daily needs, besides that it can be used for savings and business (Young et al., 2023). Furthermore, individual income or one's income is the wage or salary given to someone after doing a job. Income is money earned by a person or family member who struggles to do work. In general, income is defined as all public or state revenue from all activities carried out or activities that are not carried out (Tunio et al., 2021).

The Central Bureau of Statistics defines income as someone who has worked to get wages or income for a predetermined period either in the form of money or goods. The Central Bureau of Statistics classifies income into three definitions, namely as follows:

1. Income in the form of money, is acceptance in the form of money obtained from remuneration.
2. Revenue in the form of goods, is receipt in the form of goods or services. Goods or services obtained are equated with market prices but are not carried out with money transactions by connoisseurs of these goods or services.
3. Receipts that are not income, namely receipts in the form of sales of used goods, inheritance, gifts, loans of money, and so on (Chowdhury et al., 2023).

According to Andiana and Karimi, income is the total real income of all household members donated to meet collective and individual needs. According to Giang, income is the end of every desire from every work, because from income a person can live his life with his family. The definition of income is different from the definition of household income (Keshavarzi et al., 2023).

While the household income itself is the income of family members from the results obtained from sources of income. Household income is classified as including wages or salaries for family members who work as laborers or employees, income from family members' businesses, and other income earned by household members as household income. According to Intha, household income can be interpreted as the income of all family members originating from sources of income (Leng et al., 2020).

Marriage Bonds

The definition of marriage according to Law No. 1 of 1974 concerning Marriage is stated in Article 1 which reads "Marriage is an inner and outer bond between a man and a woman as husband and wife to form a happy and eternal family (household) based on Belief in the One Supreme God". According to the Compilation of Islamic Law, the definition of marriage is contained in Article 2 which reads "Marriage according to

Islamic law is a marriage, namely a very strong contract or mitsaqan ghalizhan to obey Allah's commands and carrying it out is worship" (Sitompul et al., 2020).

According to Soemiyati, marriage in religious terms is called "marriage" is carrying out an aqad or agreement to bind oneself between a man and a woman to justify sexual relations between the two parties, to realize a happy family life filled with love and peace in ways that please Allah. Meanwhile, according to Mohamad Idris Ramulyo, marriage is a sacred aqad (agreement) to live as a legal husband and wife, to form a happy and eternal family, the elements of which are as follows:

1. The sacred covenant between a man and a woman;
2. Forming a happy and prosperous family (makruf, sakinah, mawaddah, and rahmah) (Aji & Khusaini, 2022)

Masdar Helmy stated that the purpose of marriage apart from meeting the needs of human physical and spiritual life, is also to form a family and maintain and continue offspring in the world, prevent adultery, create calm and peace of mind for those concerned, peace in the family and society (Fraenkel & Cho, 2020).

The purpose of marriage is to fulfill religious instructions to establish a harmonious, prosperous, and happy family according to the objectives of marriage:

1. Get and keep offspring
2. fulfilling human needs to channel lust and shed love
3. fulfill religious calls, protect oneself from evil, and damage
4. foster seriousness to be responsible for accepting rights and obligations and to obtain halal assets
5. build a household to form a peaceful society based on love and compassion (Hasan et al., 2022)

From some of the definitions above, it can be concluded that marriage is an agreement between a man and a woman to become a legal husband and wife to form a happy and prosperous family under the commands of God Almighty.

Infant Death

Demise or mortality stands as one of the trio of factors within the demographic mechanism impacting population composition. The additional constituents of this process include fertility and population mobility. The extent of mortality within a region not only impacts population expansion, but also functions as an indicator of the prevailing public health standards in that locality, whether high or low (Wilson et al., 2022). Demise is an occurrence resulting in the permanent cessation of vital indicators, feasible following any instance of live childbirth. Consequently, the condition of demise invariably follows a state of vitality. The concept of demise remains non-existent in the absence of vitality. Conversely, vitality invariably commences with a live birth (Gonçalves & Carvalho, 2019).

Infant mortality pertains to the premature passing of a newborn within <28 days of birth. It is categorized into two sections: early infant mortality, manifesting within the initial week of life (0-6 days), and late infant mortality, arising between days 7 and 28. This form of mortality is classified by its origins, encompassing endogenous and exogenous factors. Endogenous infant mortality is attributed to factors inherited from parents or developed during pregnancy, while exogenous infant mortality, or post-neonatal death, arises from external environmental factors (Mynarek et al., 2023).

Factors associated with neonatal death consist of four factors, namely:

1. Maternal factors include the mother's age, mother's education, occupation, nutritional status, anemia status, antenatal care visits, type of delivery, the distance between pregnancies, parity, gestational age, and maternal health status (Diana et al., 2020)
2. Infant factors include the condition of the baby at birth and accompanying complications such as gender, jaundice, congenital abnormalities, sepsis, LBW, asphyxia, respiratory disorders, and others (Paul et al., 2022)
3. Factors of health services consisting of birth attendants, delivery places, and referral systems (Ahmed et al., 2019)
4. Geographical or environmental factors include distance to health facilities, both primary health facilities (clinics/public health center/midwife practice/doctor practice) or referral health facilities (hospitals), and access to transportation facilities in reaching health facilities (Ndambo et al., 2022).

Fertility

Fertility is the result of real reproduction of a woman or a group of women, whereas in the field of demography fertility is a term used to describe the number of children born alive. The size of the number of births in a population depends on the time of first marriage, the number of marriages, women's employment status, use of contraceptives, and income or wealth. Fertility is also called natality which has a meaning to include the role of birth in population change and human reproduction (Liu et al., 2020).

Other concepts related to the notion of fertility that are important to know are:

1. Fecunditas is a woman's potential ability to bear children;
2. Sterilization is the inability of a man or woman to produce a birth;
3. Natality is a birth which is a component of change
4. Live birth is a child born alive (showing signs of life) at the time of birth. Regardless of how long it lasts in the womb, even though it finally dies;
5. Abortion is the death of a baby in the womb with a birth age of less than 28 weeks;
6. Stillbirth is the birth of a baby from a womb that is at least 28 weeks old without showing signs of birth, not counted in the birth (Flemming, 2021).

The fertility theory put forward by Freedman states that social, economic, and environmental factors influence fertility through intermediate variables. The theory is a development of the theory of Davis and Blake. Variables included in this study were education of women of childbearing age, age at first marriage, length of marriage, and infant mortality (Laczniak & Shultz, 2021).

Research Methods

This study falls under the category of quantitative research, focusing on married women within the childbearing age group as its primary subjects. Quantitative research is an investigative approach designed to validate established theories or prior research by investigating the connections between variables. These variables are numeric in nature and are subsequently scrutinized through statistical methodologies. The secondary data used is data from the March 2022 National Socio-Economic Survey compiled and obtained from the Central Bureau of Statistics for the Province of South Kalimantan. Secondary data is used for quantitative analysis to determine the dominant variable that influences fertility in South Kalimantan Province. The analysis technique used is path analysis.

Result and Discussion

Structural Equation Model of the Effect of Education of Women of Reproductive Age on Age of First Marriage

The t-statistical test shows how far the influence of one independent variable is partially on 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 affects the dependent variable.

Table 1. T Statistical Test Table of the First Structural Equation

Variable	T_{count}	Significance	Result
Education	378.223	0.000	Positive Influence

The results of the t-test, show that the education variable of women of childbearing age has a positive effect on the age of first marriage. It can be said that the higher the level of education completed, the higher the age of first marriage for women of childbearing age.

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

Table 2. Coefficient of Determination of the First Structural Equation

Model	R	R square
1	0.876	0.767

From the results of the table above the value of R^2 is 0.767. This value means that the variable age of women's education can explain its effect on the variable age of first marriage of women of childbearing age in South Kalimantan Province of 76.7 percent.

Structural Equation Model of Variable Influence of Age of First Marriage on Variable Length of Marriage

The t-statistical test shows how far the influence of one independent variable is partially on 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 affects the dependent variable.

Table 3. T Statistical Test Table of the Second Structural Equation

Variable	t_{count}	Significance	Result
First Marriage Age	-362.631	0.000	Negative Influence

The results of the t-test show that the variable age at first marriage harms the length of marriage. The higher or older the age of first marriage for women of childbearing age in South Kalimantan Province, the lower the length of marriage. Conversely, the lower the age of first marriage for women of childbearing age in South Kalimantan Province, the longer the marriage period.

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

Table 4. Coefficient of Determination of the Second Structural Equation

Model	R	R square
2	0.839	0.703

From the results of the table above the value of R^2 is 0.703. This value means that the variable age at first marriage can explain its effect on the length of marriage of women of childbearing age in South Kalimantan Province by 70.3 percent.

Structural Equation Model of the Influence of Education, Household Income, and Age of First Marriage on Infant Mortality

The t-statistical test shows how far the influence of one independent variable is partially on 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 affects the dependent variable.

Table 5. T Statistical Test Table of the Third Structural Equation

Variable	T_{count}	Significance	Result
Education	-50.999	0.000	Negative Influence
Household Income	-160.349	0.000	Negative Influence
First Marriage Age	-12.804	0.000	Negative Influence

The results of the t-test show that the variables of education, household income, and age at first marriage harm infant mortality. The three independent variables have a negative effect, which means that as women of reproductive age increase in education, increase in household income, and increase in age at first marriage, infant mortality will continue to decrease in South Kalimantan Province, and vice versa.

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

Table 6. Coefficient of Determination of the Third Structural Equation

Model	R	R square
3	0.902	0.813

From the results of the table above the value of R^2 is 0.813. This value means that the variables of Education for Women of Reproductive Age, Household Income, and Age of First Marriage can explain the effect on infant mortality in South Kalimantan Province by 81.3 percent.

Structural Equation Model Effect of Education, Household Income, Age of First Marriage, Length of Marriage, and Infant Mortality on Fertility

The t-statistical test shows how far the influence of one independent variable is partially on 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 affects the dependent variable.

Table 7. T Statistical Test Table of the Fourth Structural Equation

Variable	T_{count}	Significance	Result
Education	-84.748	0.000	Negative Influence
Household Income	-94.890	0.000	Negative Influence
First Marriage Age	-62.913	0.000	Negative Influence
Marriage Age	64.041	0.000	Positive Influence
Infant Death	440,910.	0.000	Positive Influence

The results of the t-test show that the variables of education, household income, and age at first marriage harm fertility. In other words, the higher the education of women of

childbearing age, the higher the household income, and the higher the age at first marriage, the lower the fertility rate of women of childbearing age in South Kalimantan Province. This also applies to vice versa. While the variables of length of marriage and infant mortality have a positive effect on fertility. This means that longer marriages and infant mortality will increase the fertility rate.

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

Table 8. Table of the Coefficient of Determination of the Fourth Structural Equation

Model	R	R square	Adjusted R Square
4	0.948	0.898	0.863

From the results of the table above the value of R^2 is 0.898. This value means that the variables of Education of Women of Reproductive Age, Household Income, Age of First Marriage, Length of Marriage, and Infant Mortality can explain the effect on fertility in South Kalimantan Province by 89.8 percent.

Direct and Indirect Effects of Exogenous and Endogenous Variables on Fertility Variables

The variables of education of women of childbearing age, household income, age at first marriage, length of marriage, and infant mortality have a significant effect on fertility. The variables of education of women of childbearing age, household income, and age at first marriage have a positive effect on fertility. However, the variables of length of marriage and infant mortality harm fertility.

In general, the biggest positive influence that affects fertility comes from infant mortality, which is 0.432. The second biggest influence affecting fertility comes from household income, which is -0.172. The third largest influence with a negative value comes from the education variable of women of childbearing age. The next two variables have the smallest effect, namely the age of first marriage and length of marriage with respective values of -0.099 and 0.069.

The Effect of Education Variables on Fertility on Fertility

Education is very useful to improve one's ability to think. Thinking about deciding concerning fertility is thinking about and deciding the age of the first marriage and the number of children born alive. The higher the education level, the longer it takes to study. So according to Sinaga and Hardiani, the number of children born alive is less. By having a longer education, women's minds will also be more open-minded to new values such as having fewer children will make them happier and more prosperous.

In this study, the education variable has a significant influence with a total value of -0.156. A negative value indicates that the higher the education of women of childbearing age, the lower the number of children born to women of childbearing age, and vice versa. The ideal reproductive period for women aged 15 to 49 years will decrease when women spend more time attending higher education. Thus, when women have higher education, they tend to have fewer children.

The Effect of Household Income Variable on Fertility

Household income affects fertility in total by -0.172. The results of the study revealed that household income harms fertility, which means that the higher the household income, the fewer children will be born alive and vice versa. The smaller the household income, the greater the tendency to have a large number of children.

According to Rahman and Syaukur, the costs of raising children incurred by parents are considered durable consumer goods. The function of children as consumption goods

provide happiness and solace for sadness for parents. Children can also become parents' friends in their old age. In high-income societies where parents tend to pursue careers, having children is considered to be a large expense, so it is considered a burden. So, there is a stigma in society, the higher the household income, the desire to have children will decrease.

The Effect of Variable Age of First Marriage on Fertility

Age at first marriage affects fertility by -0.025 in total. The results of the study explained that the age of first marriage affected fertility with a negative effect value, which means that the higher the age of first marriage for women of childbearing age in South Kalimantan Province, the lower the number of children born alive. The older the woman is of childbearing age when she enters into her first marriage, the smaller the chances of having children or the less the woman has children.

This is in line with the research by Wicaksono and Mahendra which states that the age of first marriage harms fertility. Likewise, Pronk's research states that the higher a person's age in fostering marriage will make a person think more logically with stable emotional control so he prefers a small number of children. With a small number of children, parents can provide the best facilities for their children's education. That is, when a family has few children that form a small family, they can provide better facilities to each child, such as educational facilities.

The Effect of Marriage Length Variable on Fertility

The variable length of marriage influences fertility by 0.069. Length of marriage has a positive effect on fertility. This means the longer the marriage experienced by women of childbearing age, the higher the fertility. The length of time a person is in a marriage bond has a close relationship with the age of his first marriage. The younger the age when a woman gets married for the first time, the longer the woman is in the marriage bond. It will also have a longer reproductive period.

Effect of Infant Mortality Variables on Fertility

The infant mortality variable influences fertility by 0.432. The infant mortality variable has the greatest influence on fertility compared to all the variables included in this study. Infant mortality has a positive effect on fertility, which means that the higher the number of deaths of babies born alive, the higher the number of children born alive. As stated by Singarimbun, in a situation where the mortality rate is high, fear of child mortality can stimulate to have more children.

In 2010, Angeles tried to observe the impact of infant mortality on the number of children born alive, as a result, changes in mortality rates have a large impact on reducing fertility. Then in 2023, Bradshaw et al explained that efforts to increase life expectancy or reduce infant mortality, especially in low and middle-income countries; in turn, will reduce the number of births accompanied by an increase in the health status of children and mothers utilizing ease of access to quality family planning services and without coercion.

Conclusion

This study reveals that several factors have a significant role in influencing the fertility rate of women of childbearing age in South Kalimantan Province. The results of the study show that the education received by women of childbearing age has a strong impact on fertility patterns in the region. In addition, economic factors also have an important link, in which household income plays a role in regulating the birth rate. Another interesting finding is that the age at first marriage also influences birth rates, where a higher age at first marriage tends to be associated with lower fertility rates. Furthermore, the results of this study identify the direction of influence of these factors on the fertility of women of

childbearing age. In particular, education of women of childbearing age, household income, and age at first marriage were found to have a negative effect on birth rates. This means that higher education and income, as well as older age at first marriage, tend to contribute to lower birth rates. On the other hand, factors related to the continuity of marriage, such as length of marriage and infant mortality, have the opposite effect. Longer marriage duration and the presence of infant mortality in the family appear to be associated with higher fertility rates. This research provides deeper insight into the dynamics of fertility in South Kalimantan Province and the factors that contribute to birth patterns in the region. By understanding these factors, policy steps can be taken to manage population growth and better plan for the demographic future of this area.

Conflict in Interest: There is no Conflict in Interest

References

- Ahmed, M., Demissie, M., Worku, A., Abrha, A., & Berhane, Y. (2019). Socio-cultural factors favoring home delivery in Afar pastoral community, northeast Ethiopia: a qualitative study. *Reproductive health*, 16(1), 1-9.
- Alaimo, L. S., Nosova, B., & Salvati, L. (2023). Did COVID-19 enlarge spatial disparities in population dynamics? A comparative, multivariate approach for Italy. *Quality & Quantity*, 1-30.
- Ali, Z. Z., & Khusaini, M. (2022, December). The Transformation of Marriage Guidance Policy in the Office of Mutual-Based Religious Affairs Indonesia. In 1st International Seminar on Sharia, Law and Muslim Society (ISLAMIS 2022) (pp. 272-285). Atlantis Press.
- An, L., Mak, J., Yang, S., Lewison, R., Stow, D. A., Chen, H. L., ... & Tsai, Y. H. (2020). Cascading impacts of payments for ecosystem services in complex human-environment systems. *Journal of Artificial Societies and Social Simulation*, 23(1).
- Arbeláez-Gómez, D., Benavides-López, S., Giraldo-Agudelo, M. P., Guzmán-Álvarez, J. P., Ramírez-Mazo, C., & Gómez-Echavarría, L. M. (2022). A phenomenological-based model of the endometrial growth and shedding during the menstrual cycle. *Journal of Theoretical Biology*, 532, 110922.
- Arora, M., & Lakshmi, R. (2021). Vaccines-safety in pregnancy. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 76, 23-40.
- Avtar, R., Tripathi, S., Aggarwal, A. K., & Kumar, P. (2019). Population–urbanization–energy nexus: a review. *Resources*, 8(3), 136.
- Bilan, Y., Mishchuk, H., Samoliuk, N., & Yurchyk, H. (2020). Impact of income distribution on social and economic well-being of the state. *Sustainability*, 12(1), 429.
- Bolarinwa, O. A., Afaya, A., Ajayi, K. V., Ojo, A., & Alawode, O. A. (2022). Prevalence and factors associated with the use of long-acting reversible and permanent contraceptive methods among women who desire no more children in high fertility countries in sub-saharan Africa. *BMC Public Health*, 22(1), 2141.
- Cedars, M. I. (2022). Evaluation of female fertility—AMH and ovarian reserve testing. *The Journal of Clinical Endocrinology & Metabolism*, 107(6), 1510-1519.
- Chowdhury, E. K., Dhar, B. K., & Gazi, M. A. I. (2023). Impact of remittance on economic progress: evidence from low-income Asian Frontier countries. *Journal of the Knowledge Economy*, 14(1), 382-407.
- Clasen, J. L., Mabunda, R., Heath, A. K., Kaaks, R., Katzke, V., Schulze, M. B., ... & Muller, D. C. (2023). Reproductive and hormonal factors and risk of renal cell carcinoma among women in the European Prospective Investigation into Cancer and Nutrition. *Cancer Medicine*.
- Cornejo Ulloa, P., Krom, B. P., & Van der Veen, M. H. (2021). Sex steroid hormones as a balancing factor in oral host microbiome interactions. *Frontiers in Cellular and Infection Microbiology*, 11, 714229.

- Davis, S. R., & Baber, R. J. (2022). Treating menopause—MHT and beyond. *Nature Reviews Endocrinology*, 18(8), 490-502.
- Diana, S., Wahyuni, C. U., & Prasetyo, B. (2020). Maternal complications and risk factors for mortality. *Journal of public health research*, 9(2), jphr-2020.
- Drozd, V., Schneider, R., Platonova, T., Panasiuk, G., Leonova, T., Oculevich, N., ... & Reiners, C. (2020). Feasibility study shows multicenter, observational case-control study is practicable to determine risk of secondary breast cancer in females with differentiated thyroid carcinoma given radioiodine therapy in their childhood or adolescence; findings also suggest possible fertility impairment in such patients. *Frontiers in Endocrinology*, 11, 567385.
- Flemming, R. (2021). Fertility control in ancient Rome. *Women's history review*, 30(6), 896-914.
- Fraenkel, P., & Cho, W. L. (2020). Reaching up, down, in, and around: Couple and family coping during the coronavirus pandemic. *Family process*, 59(3), 847-864.
- Gonçalves, A., & Carvalho, S. (2019). Death among primates: A critical review of non-human primate interactions towards their dead and dying. *Biological Reviews*, 94(4), 1502-1529.
- Hasan, H., Jahar, A. S., Umar, N., & Abdullah, I. (2022). Polygamy: Uncovering the effect of patriarchal ideology on gender-biased interpretation. *HTS Teologiese Studies/Theological Studies*, 78(4), 7970.
- Jonsson, B., & Greenberg, L. (2022). Egg incubation temperature influences the population-specific outmigration rate of juvenile brown trout *Salmo trutta*. *Journal of Fish Biology*, 100(4), 909-917.
- Keshavarzi, S., Saunders, C., & Karimi, M. (2023). Persistent Anti-Littering Activism in a Non-Western Context: The Case of the Nature Cleaners Movement in Iran. *Society & Natural Resources*, 1-19.
- Kim, Y. N., Choi, D. W., Kim, D. S., Park, E. C., & Kwon, J. Y. (2021). Maternal age and risk of early neonatal mortality: a national cohort study. *Scientific reports*, 11(1), 814.
- Laczniak, G., & Shultz, C. (2021). Toward a doctrine of socially responsible marketing (SRM): A macro and normative-ethical perspective. *Journal of Macromarketing*, 41(2), 201-231.
- Leng, C., Ma, W., Tang, J., & Zhu, Z. (2020). ICT adoption and income diversification among rural households in China. *Applied Economics*, 52(33), 3614-3628.
- Li, K., Chen, G., Hou, H., Liao, Q., Chen, J., Bai, H., ... & Ai, J. (2021). Analysis of sex hormones and menstruation in COVID-19 women of child-bearing age. *Reproductive biomedicine online*, 42(1), 260-267.
- Liu, J., Xing, C., & Zhang, Q. (2020). House price, fertility rates and reproductive intentions. *China Economic Review*, 62, 101496.
- Mynarek, M., Vik, T., Andersen, G. L., Brigtsen, A. K., Hollung, S. J., Larose, T. L., ... & Afset, J. E. (2023). Mortality and neurodevelopmental outcome after invasive group B streptococcal infection in infants. *Developmental Medicine & Child Neurology*.
- Napier, C. J., & Stadler, C. (2020). The real effects of a new accounting standard: the case of IFRS 15 Revenue from Contracts with Customers. *Accounting and Business Research*, 50(5), 474-503.
- Ndambo, M. K., Munyaneza, F., Aron, M. B., Nhlema, B., & Connolly, E. (2022). Qualitative assessment of community health workers' perspective on their motivation in community-based primary health care in rural Malawi. *BMC health services research*, 22(1), 179.
- Newsham, N., & Rowe, F. (2021). Projecting the demographic impact of Syrian migration in a rapidly ageing society, Germany. *Journal of Geographical Systems*, 23, 231-261.
- Nugroho, H. Y. S. H., Indrawati, D. R., Wahyuningrum, N., Adi, R. N., Supangat, A. B., Indrajaya, Y., ... & Hani, A. (2022). Toward Water, Energy, and Food Security in Rural Indonesia: A Review. *Water*, 14(10), 1645.
- Paul, S., Nahar, A., Bhagawati, M., & Kunwar, A. J. (2022). A review on recent advances of cerebral palsy. *Oxidative medicine and cellular longevity*, 2022.

- Sarmiasih, M., & Pratama, P. Y. (2019). The problematics mitigation of forest and land fire district (Kerhutla) in policy perspective (A case study: Kalimantan and Sumatra in period 2015-2019). *Journal of Governance and Public Policy*, 6(3), 270-292.
- Selvaraj, S. K. K. A., Karan, K. A., Srivastava, S., Bhan, N., Mukhopadhyay, I., & World Health Organization. (2022). India: health system review. *Health Systems in Transition*, 11(1).
- Shachar, A. (2021). Unequal access: wealth as barrier and accelerator to citizenship. *Citizenship Studies*, 25(4), 543-563.
- Sitompul, R., Alesyanti, & Ridwan, M. (2020). Domestic violence as initiated by Batak culture in East Medan, Indonesia. *Journal of Human Behavior in the Social Environment*, 30(7), 835-842.
- Tunio, M. N., Jariko, M. A., Børsen, T., Shaikh, S., Mushtaque, T., & Brahmi, M. (2021). How entrepreneurship sustains barriers in the entrepreneurial process—A lesson from a developing nation. *Sustainability*, 13(20), 11419.
- Wilson, T., Temple, J., & Charles-Edwards, E. (2022). Will the COVID-19 pandemic affect population ageing in Australia?. *Journal of Population Research*, 39(4), 479-493.
- Young, D. K., McLeod, A. J., & Carpenter, D. (2023). Examining the influence of occupational characteristics, gender and work-life balance on IT professionals' occupational satisfaction and occupational commitment. *Information Technology & People*, 36(3), 1270-1297.
- Zhao, F., Wei, Q. W., Li, B. J., Weng, Q. N., Jiang, Y., Ning, C. B., ... & Liu, H. L. (2022). Impact of adrenocorticotropin hormone administration on the endocrinology, estrus onset, and ovarian function of weaned sows. *Endocrine Journal*, 69(1), 23-33.