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Fertility Estimation Using the Own Children Method in South Sulawesi Province in 2021

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Abstract

The unavailability of data regarding current fertility conditions complicates the photograph population conditions, especially after the Covid-19 pandemic in South Sulawesi Province. This study aims to produce an estimate of the fertility rate at the district/city level in South Sulawesi Province. Based on the available supporting data, an estimation of the fertility rate in the form of the Total Fertility Rate (TFR) was made using the indirect method, namely the own children method. The calculation is based on the number of women of childbearing age who have ever married and the number of children under five owned by the woman to get the birth rate. Based on these calculations, the results show that all districts/cities in South Sulawesi Province have TFR above the national level. When viewed by region, on the average, districts/cities in the northern part have a higher TFR than districts/cities in the southern part of South Sulawesi Province. With the fertility rate obtained and its distribution, a guideline for the government to formulate appropriate plans and policies is expected as the outcome.

Keywords: fertility; TFR; women of childbearing age; South Sulawesi, Own Children Method

Preliminary

Fertility is the actual reproductive consequence of a woman, while in the demographic meaning, fertility is the number of babies born alive (Arialdi Rendi, 2016; Jumliadi, 2020; Mahendra, 2017; Sinaga & Hardiani, 2017). One of the indicators used is the level of fertility which is measured through the Total Fertility Rate (TFR) showing in the average number of children born to the end of a woman's reproductive period, which is 15-49 years (Bappenas, 2020). Indonesian women's TFR is still at 2.45 children per woman and has stagnated at 2.6 children per woman for more than 10 years (BKKBN, 2021b). The change in Indonesia's TFR rate from 5.6 children per woman to 4.7 children per woman takes a relatively short time compared to the decline in fertility from 4.7 children per woman to 3.6 children per woman (Engraving, 1992). This shows that there is a slowdown in the decline in fertility from time to time.

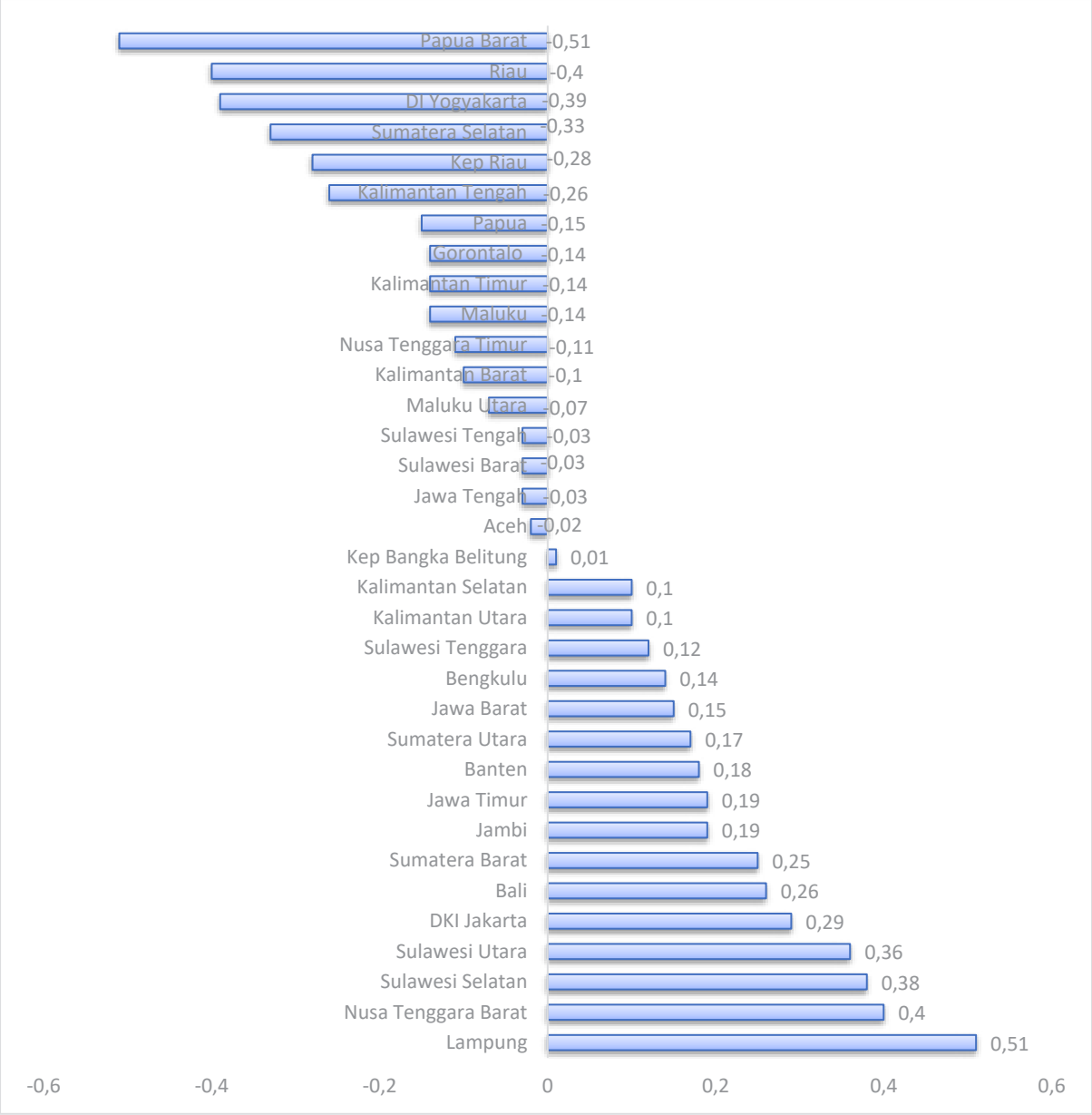
Programs and policies adopted by the government play an essential role in

community decisions regarding fertility (Trisnaningsih, 2016). The population policy taken by the government during the Old Order period of 1945-1968 was trying to increase births or pro-fertility. This policy is allegedly related to the conditions at that time when the population was reduced in number due to the war, especially the male population of productive age. Therefore, many births need to replace the people who died on the battlefield (Trisnaningsih, 2016). Based on the results of the Population Census (*Sensus Penduduk*) in 1990, it is known that Indonesia's population of 60.7 million increased to 97.0 million in 1961 with a growth rate between 1930-1961 of 1.5 percent per year (BKKBN, 1982).

In the New Order era, during 1968-1998, population conditions were highly concerned when the economy only grew by 1.6 percent, while the population grew by 2.8 percent per year. The development paradigm adopted by the New Order government was that a large population was considered as a heavy burden. At this time, the institutions which dealt with family planning programs were in the hierarchical from the central government to local governments so the Family Planning Program has succeeded in reaching its peak of glory (Trisnaningsih, 2016). The population growth rate decreased from 2.3 percent in 1980 to 1.44 percent in 2000. Likewise, the birth rate (TFR) decreased from 5.6 in 1971 to 2.6 in 2002 (BPS, 2013).

During the reformation period, birth control only reached the representative areas/provinces. During this time, many BKKBN employees who were originally *widya iswara* and Family Planning Field Officers (PLKB) moved to other agencies in the province or the district/city areas. PLKB no longer worked for the Provincial BKKBN since they were responsible for the district/city government. The provincial government does not have the power to pressure district/city governments into the birth control program (Trisnaningsih, 2016).

Due to the policies in the reformation era, fertility conditions have stagnated and its development is highly diverse, both at the provincial and district/city levels. This can be seen from the change in TFR between 2017 and 2020 in which 17 provinces experienced an increase, while 17 other provinces experienced a decrease. As for the provinces with the highest increase in TFR are Lampung Province, West Nusa Tenggara, and South Sulawesi . This phenomenon can be seen in Figure 1.



Source: BPS and BKKBN

Figure 1. Changes in TFR between 2017 and 2020 by Province

An interesting phenomenon occurred in South Sulawesi Province. The results of the comparison between the 2017 and 2020 TFR figures shows that South Sulawesi Province was ranked the third highest TFR which the figure increased by 0.38 points (BKKBN, 2021b; BPS et al 2018). At the same time, this province has the fifth-largest population in Indonesia and the first largest one in Eastern Indonesia (BPS, 2021a).

Meanwhile the fertility rate achievement target is described in the South Sulawesi Provincial Regulation No. 1/2019 concerning the Regional Long-Term Development Plan (RPJMD). This regional regulation targets the South Sulawesi's TFR to reach 2.1 children by 2024 (South Sulawesi Provincial Government, 2019). This target is considered quite realistic because the TFR of South Sulawesi Province has been below

the national figure since 2012. However, in 2020 the TFR of South Sulawesi Province experienced a sharp increase to reach 2.78 children per woman (BKKBN, 2021a).

To see the difference in the TFR figures at the district/city level both nationally and within the scope of South Sulawesi Province, the latest figures are not yet available other than the results of the 2017 IDHS. This is because the spike in Covid-19 cases in September 2021 which resulted in the postponement of the implementation of the 2020 Population Census long-form data collection aiming to produce data on fertility rates.

The importance of data related to fertility rates is urgently needed by Indonesia, especially for the formulation of planning and policy-making. In the developed countries, fertility rates are most often measured by using regular registration of births. However, in Indonesia, this data is not available due to a lack of reporting by the public. Fertility estimates can be carried out directly by questioning the mothers or an indirect procedure by estimating the reported age distribution of the population census, using the total number of pregnancies or births prevalence approaches recorded (TH Hull, 1980).

The captured of the fertility phenomenon using the results of the IDHS is considered not up-to-date, especially with the Covid-19 pandemic which has completely changed the social and economic life of the community. Thus, other alternatives are needed which can be in the form of district/city-level estimation figures to capture the current fertility conditions. The TFR figure can be estimated using data from the National Socio-Economic Survey (*Susenas*) conducted by BPS twice a year. Based on the comparison made by Terence H, Hull (2016), there was no significant difference in fertility rates between the IDHS and *Susenas* surveys.

Calculation of fertility estimates can be done using various methods, one of which is the Own Children Method (OCM) that has been used in various countries, including in research by Timæus & Timæus (2021) in England, Reid et al., (2019) in England, AS Goldstein & Goldstein (2016) in Thailand, Indrawati, Lely & Dwi Hapsari (2016) in Indonesia, Krapf & Kreyenfeld (2015) in Germany, Shavazi (2013) in Iran, Opiyo & Levin (2013) in Kenya, and Avery et al. (2013) in the United States.

Research conducted by Avery et al. (2013) using data from the Demographic and Health Survey in 56 countries states that the use of the Own Children Method is better to describe fertility in general than the Full Birth History (FBH) method. This is because the method of calculating the FBH tends to be inconsistent with age coding. In addition, there is a bias in the selection which causes the estimation results of the FBH method to tend to be overestimated.

Furthermore, research conducted by Indrawati & Hapsari (2016) uses the OCM method to estimate fertility from the data from the Basic Health Research (*Riskesdas*) survey conducted by the Ministry of Health in 2013. The results of the study stated that the advantages of the OCM method, namely the Age Specific Fertility Rate (ASFR) can be divided according to age and do not require much information/data. The main information needed is the number of children living with their mothers according to the mothers' age group. The estimated calculation is done by estimating the fertility rate before the survey is conducted based on tabulation of children living with their mothers at the time of enumeration or data collection. The population in this study are all women and children who live with their parents in Indonesia so that similar research at the provincial level has never been done.

One of the advantages of TFR estimation using the OCM method is that this method has taken into account both maternal and child mortality. This method uses a life table in its calculations so the assumption that there are maternal and child deaths

has been included as a correction factor. Meanwhile TFR estimation calculation using the OCM method in research Indrawati & Hapsari (2016) have not used the latest life table that has been developed by BPS using the loglinear model with the weighted growth average combined with the West model Coale and Demeny life table. Thus, this research is expected to be a refinement of the research.

Method

This research is a quantitative research with women of childbearing age who have been married as the main subject of research. Quantitative research is a research method aimed at testing existing theories or research by examining the relationship between variables, where this variable consists of numbers which are then analyzed by applying statistical procedures (Cresswell, 2014).

This research was preceeded by estimating fertility at the district/city level in South Sulawesi Province. The estimation is carried out using indirect estimation of the own children method from the results of the National Socio-Economic Survey (*Susenas*) which would be carried out in March 2021.

The National Socio-Economic Survey (*Susenas*) conducted by BPS is one source of information to obtain an overview of the socio-economic conditions of the community. The March 2021 *Susenas* was carried out in all provinces in Indonesia (34 provinces) with a sample size of 345,000 households spread across 514 districts/cities in Indonesia. As for the March 2021 *Susenas*, sample for South Sulawesi Province was 15,300 households spread over 24 districts/cities. The resulting data is representative enough to produce estimates up to the district/city level (BPS South Sulawesi, 2021).

The population unit in this study was all women aged 15-65 years old in South Sulawesi Province. Furthermore, the unit of analysis in this study was all women aged 15-65 years old who were in the selected sample households of the March 2021 *Susenas* in South Sulawesi Province who were 20,685 people.

To calculate the fertility of survey data, the indirect estimation method was used. This estimation is mostly done in various countries in which the population registration has not been going well. One type of indirect estimation that is often used is the Own Children's Method (OCM) which is a technique can be used to estimate fertility measures when vital registration data are incomplete, or when relevant questions have not been asked in the census (Shavazi, 2013). This method uses a reverse-survival technique to estimate age-specific fertility rates. i.e. a procedure for estimating the specific age and total fertility in the period before the survey from the age distribution of the population (Timæus & Timæus, 2021). Several adjustments were made to reduce errors due to mis-enumeration, such as through counting and misreporting of age, as well as unmatched, such as the presence of non-own children.

In addition, the OCM method uses a life table in its calculations to include the assumption of maternal and child mortality. A life table is a hypothetical table which combines various mortality rates at different ages into a single statistical model. Indonesia does not yet have its life table, even though the World Health Organization (WHO) requires each country to build one. With the help of funds from the United Nations Fund for Population Activities (UNFPA), BPS tried to build a life table using mortality data from the 2010 Population Census administration (national, provincial, and district/city). In addition, BPS developed a model to determine life expectancy (e0) in an area well so that it can be an additional indicator in calculating TFR to be more accurate. The method is using the development linear model with growth weighted average. The calculation

basis model uses data from *Susenas* March 2021 so that it is expected to produce more relevant and up-to-date data.

The calculation will take the form of the number of babies and biological mothers in the form of annual data. However, they were aggregated into five-year groups to reduce misreporting of age. The advantages of using this method are that it is suitable for use in countries which do not yet have a good vital statistical record, can be used to estimate fertility rates according to parity and socioeconomic status, does not require special surveys so it is not expensive to apply, can use large data sizes such as censuses. and surveys, and can provide information on fertility rates by age up to 15 years before the census/survey. For the acquisition of fertility rates up to 15 years before, the survey used in this article, the age range of female respondents was 15-65 years.

Furthermore, the EASWEPOP Fertility Estimate Program application which was developed used figures by the East-West Center Program on Population contains the Coale-Demeny model's life table West for the final calculation step. It is to obtain the number of births and the number of female population per age group.

Calculations using the OCM method can produce the Age Specific Fertility Rate (ASFR) needed to calculate TFR. The ASFR calculation formula is as follows.

$$\mathrm{ASFRi} = \frac{\mathrm{B_i}}{\mathrm{P_i^f}} \mathrm{x}1000$$

ASFRi = Age Specific Fertility Rate for age group i
$\mathrm{B_i}$ = Number of births to women in group i
IP_i^f = Number of women of childbearing age in age group i
i = age group 15-19, …, 45-49

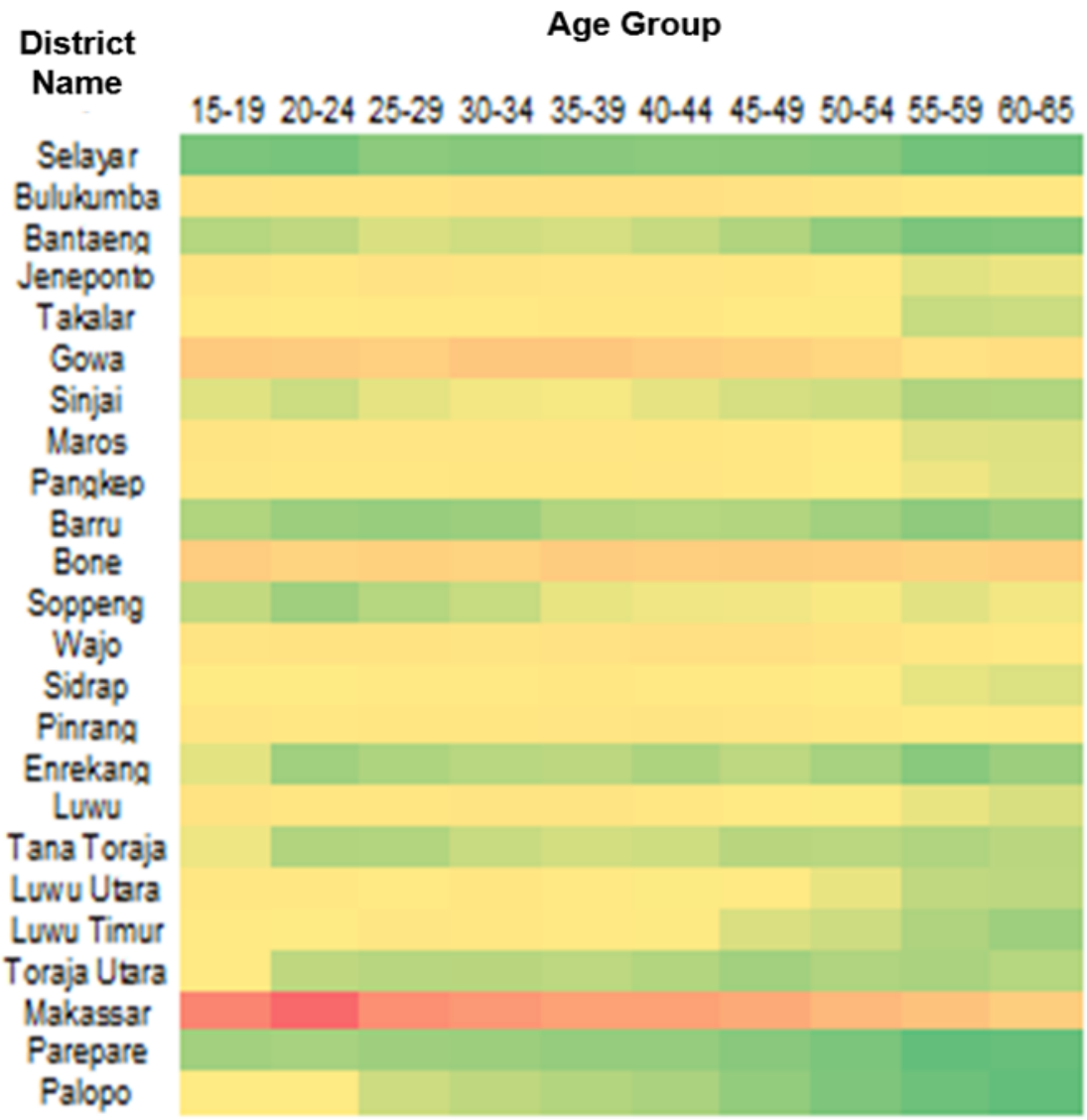
Therefore, after obtaining the ASFR, the TFR can be calculated. The formula for calculating TFR is as follows.

$$\mathrm{IFR} = 5 \sum_{\mathrm{i=15-19}}^{45-49} \mathrm{ASFRi}$$

TFR = Total Fertility Rate
ASFRi = Age Specific Fertility Rate for age group i
i = age group 15-19, …, 45-49

Discussion

Before calculating the TFR, at first, the number of children and women of childbearing age in South Sulawesi is calculated. The calculation of the number of children is by counting the number of toddlers, both own children and non-own children who are in the household. In this study, a heatmap is used to provide a visualization of the number of children under five owned by women of childbearing age, in which the redder indicates the number of children in certain women of childbearing age is decreasing. Based on the heatmap which has been made, the information that most women of childbearing age give birth to children in the age range of 25-39 years in all districts/cities of South Sulawesi Province is obtained.



Source: *Susenas* 2021, processed

Figure 2. Heatmap Number of Toddlers Owned by Women of Childbearing Age in South Sulawesi Province in 2021

Furthermore, from the heatmap above, information can be obtained that the number of children born to women in the age range of 15-19 years for regencies/cities in South Sulawesi Province is marked with yellow and green colors. This shows that the prevalence of child birth in very young mothers has tended to be low in the province of South Sulawesi.

However, there is one district which has a slightly different color that is close to red and that is Makassar City, Gowa Regency, and Bone Regency. It is shown that the number of children of women aged 15-19 years in the three districts/cities is quite high. Even for Makassar City, the number of births to women aged 15-19 years reaches 75,243 children in 2021.

One of the efforts which can be done to reduce the birth rate for young women is to increase education evenly. The level of education is a factor to affects the level

of fertility. If a woman takes a long time to complete her education, a marriage to be delayed and it opens up the choice for when to either working or raising children. Women with higher levels of education generally have a high age at first marriage and in the end, it will affect the number of children born which will be less (Sinaga & Hardiani, 2017).

People with higher levels of education tend to have fewer children than people with lower education. This is because people who have a high level of education will more easily accept new things, such as the norm of small happy and prosperous families, the need for the use of contraceptives, and the new point of view that children are not a tool in the family production, but as an investment by parents for the future of their childhood (Wicaksono & Mahendra, 2016).

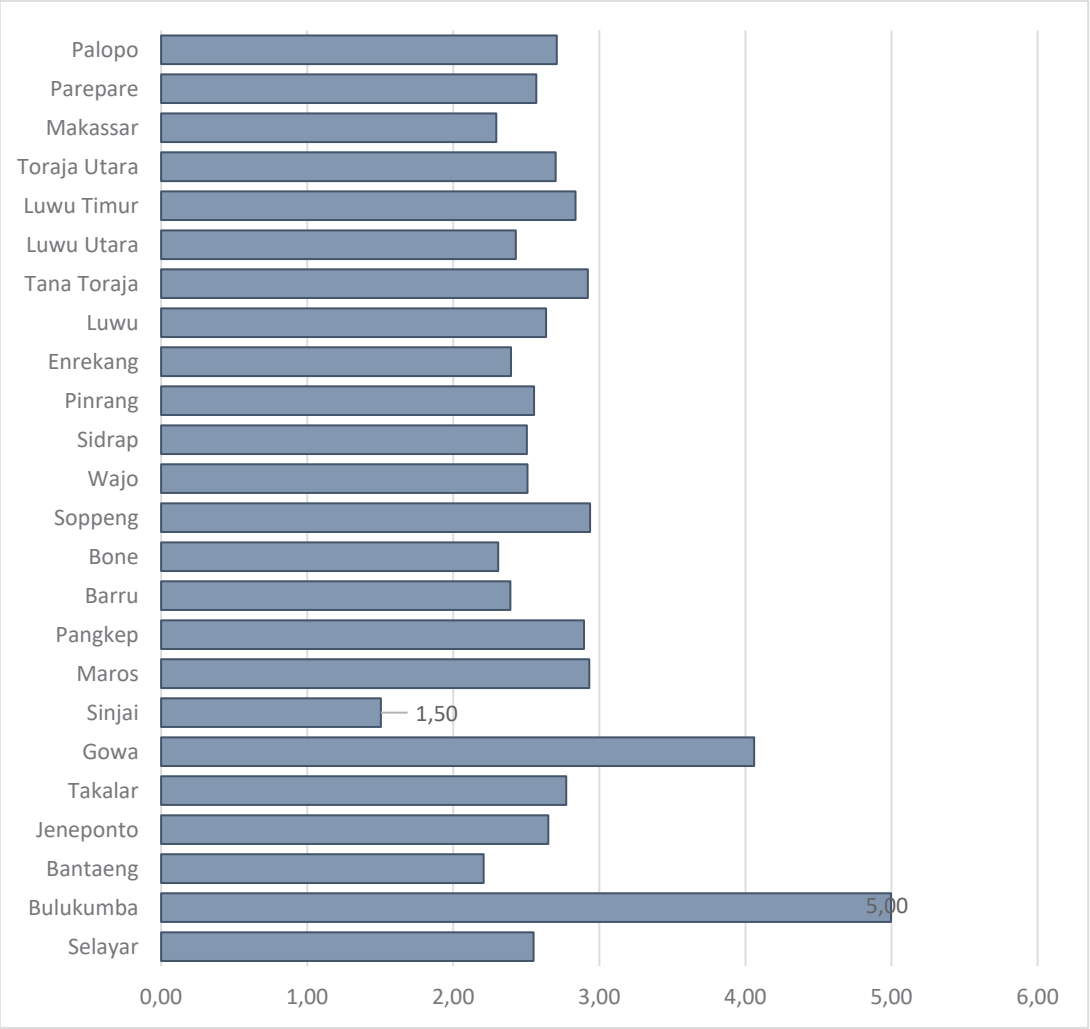
In the future, more women with higher education levels will enter the labor market. The better the education level of women, the more they have the potential to make a greater contribution to family income so that the time they specifically devote to raising children will be limited, which at the end it will affect the number of children desired (Yuniarti et al., 2013).

After obtaining the number of children 0-14 years old both own children and non own children, it will be multiplied by the survival rate to obtain the number of births. Survival Rate is obtained from the BPS development life table using the method of linier model with weighted growth average combined with the West model Coale-Demeny life table. This method is used as an attempt to build a life table and life expectancy which is in accordance with the conditions of mortality in Indonesia which have been adjusted to the condition of the quality of the result data *Susenas* March 2021.

Then, the number of women of childbearing age is obtained from the number of women age 15-65 years in the household. After obtaining the number of women of childbearing age in the household, it will be multiplied by the survival rate to obtain the number of births and the number of mid-year female population.

After obtaining the number of births and the number of female population per age group, the ASFR can be calculated. After calculating the ASFR, the TFR can also be obtained.

Based on the results of calculating the TFR of women of childbearing age using the Own Children method, it is found that all districts/cities in South Sulawesi Province have TFR above the national figure 2.71 child per woman. The highest TFR is in Bulukumba Regency by 5.00 children per woman, while the lowest is in Sinjai Regency with TFR of 1.5 child per woman. This shows that the government requires special attention regarding the handling of this population problem.



Source: *Susenas* 2021, processed

Figure 3. TFR Estimation Results for Women of Childbearing Age in South Sulawesi Province in 2021

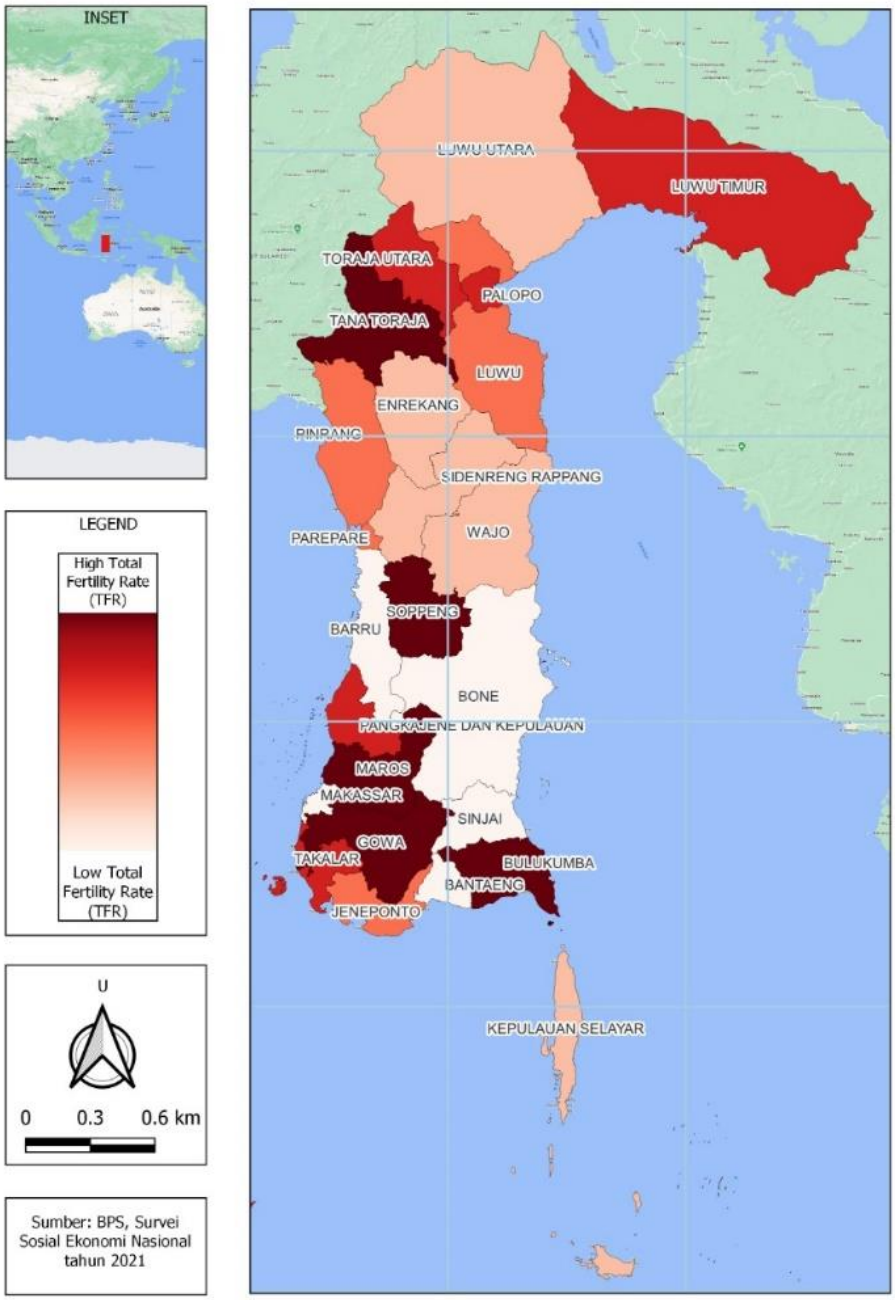
Furthermore, the authors make a thematic map to provide a visualization of the distribution of TFR figures by region. The darker the color on the map, the higher the TFR in a district/city. If seen based on the map of South Sulawesi Province, the distribution of district/city TFR figures in the southern region is higher than in just the north.

For regencies/cities in the southern region, some regencies requires special attention related to fertility decline, namely Bulukumba Regency which has a TFR of 5.00 child per woman. There is only one district in South Sulawesi which the TFR was able to achieve the RPJMD target, namely Sinjai Regency with a TFR of 1.5 children per woman.

This phenomenon is due to the fact that in terms of demographic composition, the number of productive age population in Bulukumba Regency reaches 70.13 percent (BPS Bulukumba, 2021). Meanwhile, in Sinjai Regency, the productive age population is only 68.98 percent (BPS Sinjai, 2021).

In terms of health, in Sinjai Regency there is an innovation made by the government, namely the *Rumah Tunggu Kelahiran* (RTK) which is effective in reducing the birth rate

in Sinjai. At the RTK, in addition to health checks for pregnant and childbirth women, women were also given socialization about the importance of using contraception and the benefits of having small, but high-quality children (Asriadi et al., 2019). Unlike the case in Bulukumba Regency, in a study conducted by Noor & Eni (2020), it showed that the health services for pregnant women and childbirth in Bulukumba were not even optimal. The Bulukumba Regency Government needs to be innovative, especially related to suppressing the number of births so that in the future, the fertility rate can reach the RPJMD target even below it like the achievement of Sinjai Regency.



Source: *Susenas* 2021, processed

Figure 4. Thematic Map of TFR Estimation Results for Women of Childbearing Age in South Sulawesi Province in 2021

To reduce the fertility rate, the government, especially in this case the BKKBN, needs to put more emphasis on the use of a contraceptive method in the community. The use of contraception is one of the variables which affect fertility because it is believed to be effective in preventing pregnancy. By becoming a family planning acceptors, couples of childbearing age can space out pregnancies and limit the number of children they want (Sabina, 2020).

However, most couples of childbearing age use contraceptives after reaching the desired number of children. Based on the results of the National Economic Survey (*Susenas*) held by BPS, there has been a decrease in the use of a contraceptive method in fertile women from 52.65 percent in 2020 to 51.91 percent in 2021. In addition, there has been an increase in the number of women of childbearing age who do not use a contraceptive method from 33.44 percent in 2020 to 34.69 percent in 2021 (BPS, 2021b).

The family planning program is expected to focus on targeting low-parity young couples, namely couples who have only had one child and are not yet 30 years old. This is because if the use of a method of family planning is carried out by couples of childbearing age (EFA) after having more than two children, reduceing the birth rate by more than two will be difficult to achieve.

Conclusion

Based on the results of research conducted by the authors, the district/city TFR figures in South Sulawesi Province are still very high and are above the national average. Efforts to reduce fertility, such as the use of a contraceptive method, should be focused on fertile couples under the age of 30, especially in districts/cities located in the northern part of the province of South Sulawesi. The government needs to focus on socializing the benefits of using contraceptives for the sake of health reproductive and as an effort to suppress the birth rate. The socialization can be done in health services, especially those dealing with pregnant women and childbirth so that they can be effective targets couples of childbearing age. Furthermore, socialization is also can be done by displaying banners and banners at the KUA office, civil registry, and child care centers to target couples who are newly married or have just had children under five and focus on the benefits at maintaining the quality of the children they have, not only considering the quantity. In addition, efforts are needed to increase the school participation rate so that women can delay marriage so that their reproductive age will be shorter.

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