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From Decline to Rebound: Analyzing the Dynamics of Fertility Trends in Sleman Regency Amid Global Shocks, 2018-2022

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Abstract

This quantitative study aims to examine the trends of live birth rates in Sleman Regency over a five-year period (2018-2022). The study utilizes birth data obtained from the Ministry of Home Affairs (Kemendagri). The analysis focuses exclusively on live birth data without considering socio-economic indicators or environmental factors. The findings indicate that Sleman Regency experienced significant fluctuations in fertility trends amidst global challenges, including the Covid-19 pandemic. Initially, the fertility environment was stable, with a slight increase in live births from 13,102 in 2018 to 13,354 in 2019. However, a notable decline to 11,702 live births was observed in 2021, followed by a robust rebound to 14,908 live births in 2022. The study highlights the resilience of Sleman Regency's demographic dynamics in the face of global disruptions. These findings underscore the importance of continuous monitoring and analysis of demographic data to anticipate and manage future demographic shifts. This research contributes to the demographic field by providing insights into the fluctuating fertility patterns in a specific region during a period marked by global disruptions.

Keywords: fertility trends; Sleman Regency; Covid-19 pandemic

Introduction

Fertility rates are influenced by global shocks, such as changes in national income, contraceptive availability and cost, and climatic shocks. Studies have shown that national per capita income has a negative effect on fertility, with higher income leading to lower fertility rates (Hailemariam, 2024). However, the effect of monetary costs on contraceptive use is not significant, indicating that keeping contraceptive prices low may not be a major determinant of fertility behavior (Frankenberg, et.al., 2004). In agrarian communities dependent on rainfed agriculture, droughts can lower the opportunity cost of having children and increase fertility rates (Dessy, et.al., 2019). Additionally, a decrease in child mortality due to positive weather shocks leads to a decrease in fertility, particularly among larger households (Jones & Schoonbroodt, 2016). These findings suggest that global shocks can have varying effects on fertility rates, depending on factors such as income, contraceptive availability, and child mortality rates.

The most recent global shock which occurred was the Covid-19 pandemic. The Covid-19 pandemic has had varying effects

on fertility rates and reproductive health globally. The severity and duration of the epidemic, as well as socio-economic factors and policy responses, have influenced the impact on fertility rates. Some countries have experienced a decline in births during the pandemic, while others may see a short-term increase in fertility due to unintended pregnancies resulting from disruptions in access to family planning services (United Nations, 2023). The pandemic has also led to a decrease in sexual and reproductive health care services due to global lockdowns and closures of non-essential health sectors (Falana, et.al., 2023). In terms of reproductive behavior, individuals in Czechia considered the most restrictive period of the pandemic to be unfavorable for childbirth, leading to a reduction in the planned number of children (Slabá, 2023). However, overall, there is no evidence for long-term effects of the pandemic on fertility, suggesting that pre-pandemic fertility forecasts still apply (Vanella, et.al., 2023).

The global landscape has changed greatly with the emergence of the Covid-19 pandemic, which has impacted various aspects of human life, including demographic trends (Van Dalen & Henkens, 2021; Liu & McKibbin, 2022). Before this pandemic, global fertility rates were already showing signs of fluctuation due to various factors ranging from economic conditions to advances in health services. The emergence of Covid-19 introduced additional complexities, affecting birth rates through both direct and indirect pathways. Sleman Regency, a region in Indonesia, provides a unique case study in this regard. Known for its stable demographic patterns, the regency is facing unprecedented challenges during this pandemic. This study aims to determine shifts in fertility trends in Sleman Regency from 2018 to 2022, a period marked by significant global disruption. This period, characterized by a global pandemic, offers a unique opportunity to study the impact of unprecedented global events on fertility trends (Wang, et.al, 2022; Sobotka, et.al., 2023). Understanding these patterns is critical to addressing long-term socio-economic challenges associated with demographic shifts (Tasneem, et.al., 2023; Ahmed, et.al., 2024). By focusing on live birth rates as the main indicator, this research excludes socio-economic and environmental variables usually associated with fertility studies, allowing for a concentrated analysis of birth rate dynamics amidst the pandemic.

The primary concern of this research is to elucidate the dynamics of fertility trends in Sleman Regency during the span of 2018 to 2022, a period characterized by the global Covid-19 pandemic. The abrupt onset and pervasive impact of the pandemic have raised questions regarding its effects on demographic trends, particularly fertility rates. Meanwhile previous studies have explored the relationship between pandemics and fertility, the specific impacts of Covid-19 on local demographics remain less understood. General approaches to addressing this research problem involve the quantitative analysis of birth data, offering insights into how global crises influence regional fertility patterns. This study adopts a focused methodology, analyzing live birth data from the Ministry of Home Affairs (Kementerian Dalam Negeri/Kemendagri) to trace the fluctuations in birth rates, thereby providing a microcosmic view of broader demographic shifts during this tumultuous period.

Research on fertility trends amidst global shocks typically integrates a multi-faceted approach, encompassing socio-economic, health, and environmental factors (Anser, et.al., 2020; Pezzulo, et.al., 2021; Țarcă, et.al., 2022; Nkalu, 2023; Ahmed, et.al., 2024). However, this study narrows its scope, concentrating solely on live birth data to analyze fertility trends. This decision is grounded in a methodological preference which seeks to isolate the pandemic's direct impact on birth rates from other variables. The literature reveals that focusing on live

birth rates can offer a clear, albeit partial, picture of fertility dynamics. This approach is informed by studies such as Salvati, et.al. (2020), which employed similar methodologies to dissect fertility trends during health crises. Other studies also use similar things such as Sobotka, et. al. (2022), Marteleto, et.al. (2020) and John & Adjiwanou (2022). By emulating this focused approach, the study aims to contribute to a nuanced understanding of how specific global events, like the Covid-19 pandemic, directly affect regional fertility rates, independent of broader socio-economic trends.

A comprehensive review of existing literature indicates that while there is a significant body of research on the impact of pandemics on fertility/birth rates (Kirchengast & Hartmann, 2021; Aassve, et.al., 2021; Karasek, et.al., 2021; Pasternak, et.al., 2021; Molina, et.al., 2022), few studies have specifically focused on the direct relationship between global health crises and live birth rates in the Indonesian context. Most existing research incorporates a wide array of variables to explain fertility trends, including economic conditions, healthcare access, and environmental factors (Alfana, et.al., 2021; Siregar & Siregar, 2021; Akbar, et.al., 2022; Tjahyadi, et.al., 2022). This broad analytical scope, while valuable, often dilutes the direct impact of pandemics on fertility rates. The literature review underscores a research gap in studies which exclusively analyze live birth data to understand fertility trends during the Covid-19 pandemic in regions like Sleman Regency. This gap highlights the need for focused research that can provide clear insights into the pandemic's direct impact on birth rates, offering valuable data for policymakers and demographers.

The objective of this study is to analyze the dynamics of fertility trends in Sleman Regency from 2018 to 2022, a period notably affected by the Covid-19 pandemic. This research is novel in its focused examination of live birth rates as a solitary measure of fertility trends, excluding socio-economic and environmental factors from its analysis. This narrowed approach provides a distinct perspective on the direct impact of the pandemic on fertility rates, filling a notable gap in the literature. The justification for this hypothesis lies in the preliminary data indicating significant fluctuations in live birth rates during the study period, suggesting a direct correlation with the global health crisis. The scope of this study is deliberately limited to analyzing birth data from the Ministry of Home Affairs, avoiding the conflation with broader demographic factors. This focused examination aims to contribute targeted insights to the discourse on fertility trends amid global disruptions, specifically within the Indonesian context.

Materials and Methods

The main material used in this research consists of birth data collected in Sleman Regency. This study employs secondary data sourced from the Ministry of Home Affairs, focusing on live birth records. The data encompasses live birth occurrences within Sleman Regency during the period from 2018 to 2022. This comprehensive dataset provides a solid foundation for analyzing fertility trends and calculating the Total Fertility Rate (TFR) amidst global shocks.

The preparation of the dataset involved the aggregation and cleaning of birth records from Sleman Regency. This process included verifying the accuracy of the data, removing duplicates, and ensuring completeness for the period under study.

The main parameter measured in this research is the Total Fertility Rate (TFR) which is obtained from birth data (live birth). TFR is an important demographic indicator which reflects the average number of children a woman has throughout her reproductive life, given the current birth rate. These parameters are analyzed in the context of

population dynamics in Sleman Regency, allowing for an in-depth understanding of fertility trends and their implications.

Statistical analysis was conducted to interpret the calculated TFR values and assess their significance within the broader demographic trends observed in Sleman District. This analysis involved the use of descriptive statistics to summarize the TFR.

Total Fertility Rate (TFR) will be calculated using the following meticulously designed steps.

1. **Calculating Live Births by Specific Age Groups in Sleman**: This entails tallying the number of live births from mothers aged between 10 and 64 years. These age groups are further broken down into five-year intervals, offering a detailed perspective on fertility patterns across different stages of reproductive age.
2. **Enumerating Women by Age Group**: Similar to the first step, this involves counting the number of women within the same age range of 10 to 64 years, also categorized into five-year age groups. This segmentation provides a foundational dataset for further fertility rate calculations.
3. **Calculating the Age-Specific Fertility Rate (ASFR**): Employing the formula **ASFR X = (Number of Births at Age X / Number of Women at Age X) × 1000**
   This step precisely measures the fertility rate for each age group, offering insights into age-specific fertility behaviors.
4. **Summing Up All ASFR Values**: By aggregating the ASFR values, we gain a composite view of the fertility landscape, laying the groundwork for the next calculation.
5. **Determining the Total Fertility Rate (TFR):** The TFR is calculated using the formula **TFR = 5 * ∑ASFR**, encapsulating the overall fertility rate across all age groups into a single figure.
6. **Analyzing TFR Fertility Trends**: This final step involves a thorough analysis of the TFR, discerning patterns, and interpreting the fertility trends over time.

Results and Discussion

Live Birth Trends in Sleman Regency from 2018 to 2022

This part of the discussion delves into the changes in the number of live births in Sleman Regency from 2018 to 2022, a period marked by unprecedented global shocks. This analysis investigates the resilience and dynamics of fertility patterns, shedding light on how local demographics have not only navigated through challenges but also shown signs of a remarkable rebound. This exploration offers a unique lens through which to understand the evolving demographic landscape, providing pivotal insights for policymakers, researchers, and communities alike.

Analyzing the trend of live births in Sleman Regency over a five-year period uncovers a narrative of demographic shifts possibly influenced by socio-economic and environmental factors. Beginning in 2018, with a live birth count of 13,102, a slight increase was observed in 2019, reaching 13,354, suggesting a stable fertility environment initially (Figure 1). This stable trend was maintained in 2020, with a small decline to 13,275 live births. A notable decrease occurred in 2021, descending to 11,702, which could potentially be correlated with global phenomena impacting fertility decisions. However, the subsequent escalation to 14,908 live births in 2022 warrants an in-depth analysis of the contributing factors that led to such a robust recovery.

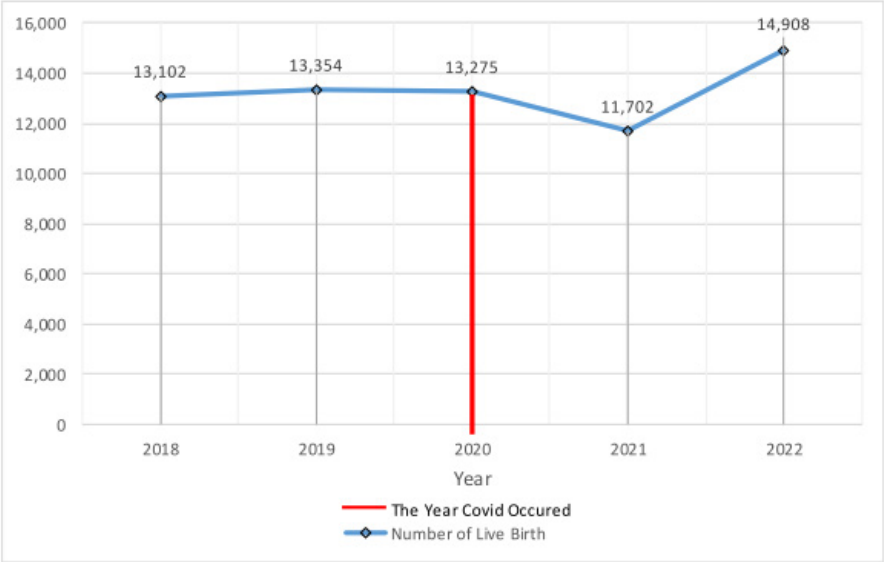

Figure 1. Live Birth Trends in Sleman Regency from 2018 to 2022

The dramatic decrease in live births in Sleman Regency during 2021 raises questions about the specific factors which contributed to this decline. A thorough understanding of the drivers of fertility rates is critical for informed policy-making. In Sleman Regency, as in many regions, various factors contribute to fertility rates, including mortality rates, access to contraceptives, socio-economic status, and urbanization trends, which have been identified as significant factors in fertility decline (Herzer, et.al., 2012; Götmark & Andersson, 2022; Jiang, et.al., 2019; Alazbih, et.al., 2017). Additionally, the impact of environmental factors on fertility cannot be underestimated. Pollution has been tied to decreased male fertility (Li & Li, 2017), and for females, the quality of oocytes and ovarian aging are critical (Takahashi, et.al., 2011). The global shift towards urbanized living also plays a role, as evidenced by the significant fertility decline associated with rapid urbanization (Zhao, et.al., 2017).

Moreover, the broader implications of fertility decline on societies and economies are considerable. A Total Fertility Rate (TFR) falling below 2.1, a critical demographic threshold, signals potential demographic and economic challenges ahead, as lower fertility rates can eventually lead to aging populations and labor shortages, impacting the economy's dynamism (Herzer, et.al., 2012; Jiang, et.al., 2019).

The inter-annual variations in live birth rates in Sleman Regency prompt a comparative evaluation against wider literature and the potential implications of such demographic shifts. The decrease observed in 2021 could align with global influences, such as the Covid-19 pandemic, which has been shown to affect fertility intentions and behaviors adversely (Aassve, et.al., 2021; Chen, et.al., 2022). The pandemic's impact has been different across demographics, with larger declines in fertility predicted for women with lower educational attainment and those from minority groups (Wilde, et. al., 2020). The economic fallout from the pandemic, including recession and income shocks, likely contributed to reduced fertility intentions, further exacerbating the decline in live births during this period (Emery & Koops, 2022).

On the contrary, the rebound in live births in 2022 could be attributed to a post-pandemic recovery phase, which may have included catch-up fertility, a concept where delayed childbearing during a crisis occurs

once conditions stabilize. This concept is supported by historical precedents and the observed rapid recovery post-2021. The trend in Sleman Regency may reflect a localized manifestation of these broader demographic and economic patterns. Understanding these dynamics is pivotal for policymakers to prepare for future demographic shifts and to implement strategies which address the socio-economic implications of fluctuating fertility rates.

The 2021 decline and the 2022 recovery in live births underscore the complexity of fertility dynamics and the interplay of global and local factors, including economic conditions, healthcare access, educational attainment, urbanization, and environmental issues. These findings reiterate the importance of continuous monitoring of fertility trends and the necessity of responsive policies which can adapt to changing demographic realities.

Fertility Trends in Sleman Regency 2018-2022

The analysis of fertility patterns in Sleman Regency during a span from 2018 through 2022 unveils a nuanced picture of demographic changes influenced by a combination of socio-economic factors and significant global events, most notably the Covid-19 pandemic. The initial period saw a relatively stable fertility environment, as indicated by slight variations in live birth counts and fertility rates. This equilibrium in birth trends was disrupted as the pandemic unfolded, leading to a discernible contraction in fertility rates, which can be attributed to the pandemic's far-reaching effects on health, mobility, and economic conditions. This can be seen from the decline in the number of births, which has an impact on the decline in TFR in Selman Regency in 2021 (Table 1). This is in accordance with several other studies that the pandemic predicted and actually caused a decrease in birth rates. (Ullah, et. al., 2020; Alfana, et.al., 2021; Shah, et.al., 2021; Sobotka, et.al., 2023; Kearney & Levine, 2023).

The most striking aspect of the trend was observed in the aftermath of the pandemic, where a robust recovery in fertility rates was noted, with a surge which surpassed previous years, suggesting a post-crisis rebound. This upswing reflects the resilience of the population and possibly the resumption of postponed family planning decisions. The dip and subsequent resurgence underscore the region's adaptive responses to external shocks, offering insights into the reproductive choices made in the face of uncertainty in Sleman Regency.

Table 1. Total Fertility Rate in Sleman Regency, 2018-2022

Years	Number of Women Aged 10-64 Years	Number of Live Birth	ASFR (Per1000)	TFR=5 x ASR/1000
2018	273,678	13,102	345.00	1.73
2019	385,581	13,354	349.00	1.75
2020	419,880	13,275	344.25	1.72
2021	422,903	11,702	301.11	1.51
2022	426,164	14,908	381.26	1.91

Source: Data Processed, 2024

The data on birth differences in Sleman reflects a significant demographic shift between 2020 and 2021, with a noticeable decline in births across all maternal age groups, most profoundly within the 20-29 and 30-39 age brackets (Table 2). This trend denotes a widespread impact on fertility decisions and outcomes during 2021, aligning with the challenging circumstances brought on by the global pandemic. The decrement across such a broad range of reproductive ages suggests that the factors contributing to this decline were pervasive and influential, likely linked to the socio-economic and healthcare strains experienced during the height of Covid-19.

Table 2. Difference in Births Between Years, 2018-2022 Period

	Birth Difference				
Age Group	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**
10-14	0	0	1	4	-3
15-19	79	-10	-21	-42	52
20-24	357	1	151	-354	277
25-29	462	100	180	-482	1217
30-34	42	36	-177	-401	1013
35-39	44	99	-195	-280	445
40-44	-72	22	-15	-10	167
45-49	-24	1	-4	-6	19
50-54	0	2	0	-1	4
55-59	0	1	1	-2	0
60-64	0	0	0	1	-1

Source: Data Processed, 2024

In stark contrast, the year 2022 marked a period of demographic rebound with an increase in births across all age groups, signaling a recovery phase. This rebound was especially pronounced in the 25-29 and 30-34 age groups, which experienced the most substantial increases. The resurgence in these age groups could be indicative of a delayed response to family planning decisions put on hold during the pandemic, as well as improved socio-economic conditions and possibly a return to normalcy post-pandemic.

These shifts underscore the sensitivity of fertility patterns to external shocks and the capacity for rapid change in response to evolving conditions. The substantial recovery in 2022 suggests a degree of optimism and adaptability among the population, as families may have been moving forward with plans that were previously postponed. This analysis highlights the need for a flexible and responsive approach to demographic planning and healthcare provision, to better accommodate the fluctuations in fertility which can result from such global events.

The trend of age-specific fertility rates (ASFR) and total fertility rate (TFR) in Sleman Regency from 2018 to 2022, as depicted in Table 1, provides a demographic snapshot of the region's fertility patterns. Over these years, the ASFR and TFR have experienced notable fluctuations. The TFR, particularly, has hovered around the replacement level of 2.1, dipping below it in certain years. This indicates a pattern where, on average, women are bearing fewer children than the

number required to maintain the population size independently of migration, raising questions about the long-term demographic and socioeconomic implications for Sleman Regency. This condition was made worse by the global shock in the form of Covid-19, which was able to reduce fertility in Sleman Regency. Fortunately, this condition quickly rebounded, even though in fact the TFR remained below 2.1.

The TFR in Sleman Regency reflects a broader demographic transition pattern observed globally. When the TFR falls below the critical threshold of 2.1, it reflects a decline to below-replacement fertility, meaning the population may not be self-sustaining in the long run without immigration (Rabbi & Kabir, 2015; Sobotka, 2004; Saadati, et.al., 2017). This phenomenon has been documented in various regions worldwide, including a significant decrease in TFR in countries such as China, which witnessed a rapid decline from higher levels to below replacement levels (Morgan, et. al., 2009; Jiang, et.al., 2019). The reasons behind these shifts are multifaceted, including socio-economic factors such as increased education, women's participation in the workforce, urbanization, access to family planning, and broader economic trends.

Low Fertility Rates in Sleman Regency

The persistent sub-replacement fertility rates pose significant challenges for societal sustainability, as seen in various European and Asian contexts where lowest-low fertility levels have been sustained over the decades (Kohler, et.al., 2002; Myrskylä, et.al., 2009; Sobotka, 2017). This declining trend necessitates an analysis of the potential socio-economic impact, such as an aging population, a shrinking labor force, and the pressure on social welfare systems. It also requires an examination of policy measures which can be implemented to mitigate these effects and to bolster fertility rates to sustainable levels, which is essential for the long-term demographic and economic health of Sleman Regency (Guo, et.al., 2021; Hu & Chiang, 2020).

By examining these trends and their implications, policymakers can devise strategies that address the multifaceted drivers of fertility decline, aligning demographic goals with broader societal well-being.

Our findings on the fluctuation of Total Fertility Rate (TFR) in Sleman Regency from 2018 to 2022 can be interpreted through the lens of several key theories in demographic and socio-economic research. Each theory offers a unique perspective on the factors influencing fertility trends observed in our study.

1. Demographic Transition Theory (Notestein, 1945): This theory suggests that as a society progresses economically and socially, its fertility and mortality rates decline from high to low levels. The shifts in TFR in Sleman Regency can be partially understood within this framework, reflecting the region's ongoing economic development and modernization processes.
2. Human Capital Theory in Fertility (Becker, 1960): Becker's theory posits that higher investments in education and health, which constitute human capital, are associated with lower fertility rates. This is because individuals, especially women, with higher education levels often prioritize quality over quantity of children. The decline in TFR during periods of economic uncertainty in Sleman Regency may reflect such decision-making processes influenced by educational attainment.
3. Household Economic Theory (Becker, 1981): According to this theory, family decisions about the

number of children to have are influenced by the costs and benefits associated with child-rearing. The economic pressures brought about by the Covid-19 pandemic likely impacted these cost-benefit analyses, contributing to the temporary decline in birth rates observed in 2021.

4. Social Choice Theory (Sen, 1970): Sen's theory underscores the impact of social norms and cultural values on fertility decisions. Changes in societal views on family size, employment, and gender roles might have influenced fertility trends in Sleman Regency, reflecting broader shifts in social preferences and values.
5. Resilience Theory (Holling, 1973): Originally applied in ecology and psychology, the concept of resilience can also explain how populations adapt to sudden external shocks, such as a pandemic. The quick recovery of fertility rates in 2022, following the decline in 2021, demonstrates the resilience of the population in adapting to and recovering from crises.
6. Fertility Delay Theory (Lesthaeghe, 1995): This theory explains that individuals or couples may choose to delay childbearing due to economic, educational, or career reasons. The post-pandemic recovery phase might have seen a "catch-up fertility" effect, where delayed childbearing during the crisis is compensated for once conditions improve, as evidenced by the rebound in TFR in Sleman Regency.

Integrating these theoretical perspectives provides a comprehensive understanding of the dynamic and multifaceted nature of fertility trends in Sleman Regency. The decline and subsequent recovery in TFR can be seen as the result of complex interactions among economic conditions, educational levels, social norms, and individual resilience in the face of global and local challenges. These theories not only help to explain the observed patterns but also highlight the importance of considering a broad range of factors in fertility research and policy-making.

Low Fertility and Policy

Addressing the issue of low fertility in Sleman requires a multifaceted approach that not only identifies the underlying causes but also proposes comprehensive policy solutions. This discussion explores the phenomenon of low fertility rates, their implications, and suitable political policies, focusing on Sleman's context.

Low fertility rates have become a significant demographic concern globally, with profound implications for societal structure, economic development, and the welfare state. In Sleman, like in many parts of the world, this demographic shift poses challenges to traditional growth models and social security systems. The Total Fertility Rate (TFR) in Sleman, reflecting the average number of children a woman would have over her lifetime, has seen a marked decline, mirroring trends in developed and some developing countries.

Factors Contributing to Low Fertility

Several factors contribute to low fertility rates, including but not limited to:

1. Economic Conditions: Economic uncertainty and the high cost of living, including the expenses associated with child-rearing and education, deter families from having more children (Kim, Oh & Ahn, 2022; Wang & Zhong, 2022; Wang, Gozgor & Lau, 2022).

2. Workforce Participation: Increased female participation in the workforce, coupled with insufficient maternity leave and childcare support, challenges work-life balance and family planning (Enache, 2013; Kato & Kato; 2021).
3. Societal and Cultural Shifts: Changes in societal norms and individual priorities, with a greater focus on personal development and career aspirations, influence decisions regarding family size (Kearney, Levine & Pardue, 2022; Doepke, et. al., 2023).
4. Access to Education and Contraception: Higher levels of education, especially among women, and widespread access to contraceptive methods, allow individuals to plan their families and delay childbearing (Götmark, F., & Andersson, 2020; Liu & Raftery, 2020; Ross, 2021).

The decline in fertility rates has several implications for Sleman, including an aging population, potential labor shortages, and increased pressure on social security systems. Moreover, it affects the dependency ratio, increasing the burden on the working-age population to support the elderly.

Addressing low fertility requires comprehensive policy interventions that tackle the root causes and provide supportive measures for families. Key policy recommendations include:

1. Economic and Financial Support: Implementing financial incentives, such as tax breaks, child allowances, and subsidies for childcare and education, can alleviate the economic burden on families. Policies aimed at housing affordability and job security can also create a more conducive environment for family expansion.
2. Work-Life Balance Initiatives: Promoting flexible working hours, remote work options, and adequate parental leave for both mothers and fathers can help parents balance their careers and family life. Employers should be encouraged, through policy incentives, to create family-friendly workplaces.
3. Education and Awareness Programs: Public campaigns which promote the value of family and address misconceptions about fertility can help shift societal attitudes. Education programs focused on family planning and parenting skills are also crucial.
4. Childcare Support and Services: Expanding access to affordable, high-quality childcare services eases the burden on working parents and supports early childhood development. This includes investing in early childhood education facilities and programs.
5. Gender Equality Measures: Policies which promote gender equality in the workplace and combat discrimination against working mothers are vital. Ensuring equal pay, career advancement opportunities, and protection from workplace discrimination can empower women to make choices about childbearing without fear of economic or professional setbacks.
6. Healthcare and Fertility Services: Improving access to healthcare, including reproductive health services and fertility treatments, can support couples wishing to have children. Comprehensive healthcare policies should address the physical and mental health aspects of fertility and child-rearing.
7. Urban Planning and Housing Policies: Creating family-friendly

communities with access to parks, schools, and healthcare facilities can make urban areas more attractive to young families. Housing policies which consider the needs of families can also encourage higher fertility rates.

Conclusion

This study has systematically analyzed the trends in live births and Total Fertility Rate (TFR) in Sleman Regency from 2018 to 2022, highlighting significant demographic shifts. The findings reveal a notable decline in TFR in 2021, followed by a rebound in 2022, underscoring the resilience of fertility behaviors amidst socio-economic and environmental challenges, including the Covid-19 pandemic. These fluctuations are indicative of a complex interplay between various factors, such as economic uncertainty, healthcare access, urbanization, and environmental quality, affecting fertility decisions. This research also reveals that Sleman's fertility is at a low level. This is revealed from the TFR which is less than 2.1. The existence of a global shock has proven to have an impact on the decline in the TFR value. For this reason, it is very important to continue to study the fertility issue in Sleman Regency.

One of the key limitations of this research is its reliance on secondary data from the Indonesian Ministry of Home Affairs, which may not capture all nuances of individual fertility decisions. Additionally, the study focuses primarily on quantitative analysis, potentially overlooking the qualitative aspects of why families make specific fertility choices.

For future research, it is recommended to incorporate qualitative methods, such as interviews or focus groups, to gain deeper insights into the motivations behind fertility decisions. Further studies could also explore the impact of specific government policies on fertility trends, offering a more comprehensive understanding of how policy interventions can effectively support demographic sustainability.

This research contributes to the broader discourse on demographic trends, providing valuable insights for policymakers and scholars interested in fertility dynamics. It highlights the importance of adaptive and multifaceted policy approaches to address the challenges of fluctuating fertility rates, ensuring societal and economic well-being in the face of global and local disruptions.

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