

Reproductive Health Surveillance Policy: Innovative Pre-marital Screening Model for Early Detection of Female Infertility Risks in Indonesia

Sri Subekti¹

¹Department of Public Health, Faculty of Medicine, Semarang State University, Central Java, Indonesia

Corresponding author: mrsbukti81@students.unnes.ac.id

Abstract. Female infertility in Indonesia remains a serious reproductive health challenge, with a prevalence of 10–15% among couples of reproductive ages. The low rate of early detection of ovulation and hormonal disorders means that many new cases are only identified after two years of marriage without pregnancy. A study by Kusuma et al. (2025) shows that 34.6% of married women experience infertility, while 36–40% of the population does not consider it a medical problem. The lack of fertility literacy and the absence of a surveillance system to monitor the risk of infertility exacerbate this condition. The proposed policy is the development of an Integrated Risk-Based Premarital Screening Model, which combines physical assessment, anthropometry, lifestyle assessment, and hormonal biomarker testing (AMH, LH, FSH), as well as evidence-based fertility counseling. This model is integrated into the national surveillance system through cross-sector collaboration between the Ministry of Health, the Ministry of Religious Affairs, and the National Population and Family Planning Agency (BKKBN). This policy directly contributes to the achievement of SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality) through a preventive, educational, and gender-equitable approach to women's reproductive health in Indonesia. **Keywords:** Infertility, Early Detection, Reproductive Health, Screening Model

1 Introduction

Reproductive health concerns, particularly those related to fertility disorders, remain a significant challenge in many countries, including Indonesia. The low rate of early detection of reproductive disorders, especially among women of childbearing age, is one of the main factors contributing to delays in treatment. These conditions often go undetected early on because they do not usually cause obvious symptoms in the early stages, as is the case with ovulation disorders or ovarian dysfunction [1].

According to a report by WHO, approximately 17.5% of couples of childbearing ages worldwide experience fertility problems, or about one in six couples [2]. Of these, about 40% are caused by female factors, including ovulation disorders, ovarian dysfunction, and hormonal abnormalities. The prevalence of these cases is relatively similar between developed countries (17.8%) and developing countries (16.5%). In Indonesia, infertility is estimated to affect 10–15% of couples of reproductive ages, with the highest number of cases found in urban areas and developing regions. According to data by Indonesian Ministry of Health, more than 30% of infertility cases come from the under 35 age group who have not been able to conceive within one to two years of their first marriage [3].

Delays in addressing fertility issues in Indonesia are largely due to low rates of early detection of reproductive disorders, particularly among women of childbearing age. Disorders such as ovarian dysfunction and ovulation are often unidentified because their symptoms are minimal in the early stages [1]. Low awareness of the importance of fertility testing, including the identification of

hormonal biomarkers such as luteinizing hormone (LH), follicle stimulating hormone (FSH), and Anti-Müllerian Hormone (AMH), further exacerbates this condition. In fact, testing for these biomarkers is very important in identifying the risk of infertility early [4]. As a result, many couples only realize they have fertility problems after several years of marriage, which causes considerable emotional, social, and economic burdens [5].

Infertility is also closely related to lifestyle factors and overall health status. A diet high in fat and sugar, lack of physical activity, obesity, and malnutrition can disrupt ovarian function and hormonal balance. Diet and exercise interventions have been shown to improve ovulation function and insulin sensitivity, especially in women at risk for polycystic ovary syndrome (PCOS).

In Indonesia, national epidemiological data on PCOS is still limited, but regional estimates indicate that approximately 2.5–4 million women of reproductive age are potentially affected by PCOS. This condition is the most common cause of anovulation and infertility, with a national infertility prevalence of 10–15% among couples of childbearing ages, where more than 40% of cases are caused by female factors [3]. PCOS is a complex endocrine disorder characterized by anovulation, increased androgen hormones, and disruption of the hypothalamic–pituitary–ovarian axis [6,7]. Hyperandrogenism inhibits follicular maturation and increases AMH levels, which is a potential biomarker in the diagnosis of PCOS [8,9].

PCOS is not only a reproductive disorder, but also a multisystem syndrome that increases the risk of metabolic syndrome (33–47%), type 2 diabetes mellitus (4–7 times), and psychological disorders such as depression and anxiety (28–64%) due to social stigma and negative body image [6]. Globally, PCOS places a significant economic burden on healthcare systems through increased disability-adjusted life years (DALYs) and the cost of treating infertility and metabolic complications [10].

The paradigm for treating PCOS is now shifting from curative to preventive through early detection and lifestyle modification. The window of early intervention is crucial to prevent long-term complications. One strategic group for this intervention is prospective brides and grooms, as the premarital phase is an ideal period for reproductive screening and fertility education. However, awareness of the importance of fertility testing among prospective brides and grooms remains low [10].

In response, the government has developed national strategies such as the National Reproductive Health Strategy [11], the BERANI (Better Sexual and Reproductive Health and Rights for All in Indonesia) program [12], and training health workers in infertility management through collaboration with professional organizations such as PERFITRI [3].

An integrated risk-based premarital screening model for early detection of fertility disorders, this model combines physical assessment (blood pressure, anaemia, menstrual history), anthropometry (LILA and BMI), mental health (SRQ-20), and hormone biomarker testing (AMH, LH, FSH) for participants at risk. This approach is preventive and promotive, emphasizing education and awareness of conception readiness. Given that hormonal therapy takes time and does not produce instant results, premarital screening is a strategic step for early detection, pregnancy planning, and prevention of long-term infertility.

2 Methods

This policy brief is based on a comprehensive review and synthesis of national and international evidence related to infertility in women of productive age in Indonesia. This policy brief draws on a combination of secondary and primary evidence to inform recommendations for integrating biomarker-based premarital fertility screening into reproductive health policies. Secondary sources included national reproductive health surveys, fertility and maternal health reports, and WHO guidelines on reproductive health and infertility management. Primary evidence was derived from case studies and clinical observations highlighting the delayed detection of hormonal and ovulatory disorders, such as ovarian dysfunction and polycystic ovary syndrome (PCOS).

The analysis focused on identifying gaps between current policies and actual practice, particularly the absence of integrated premarital screening models combining hormonal biomarkers, physical assessments, and educational interventions. Evidence was synthesized to develop actionable, cross-sectoral policy recommendations involving the Ministry of Health, primary care

facilities, and reproductive health education programs, aiming to enable early detection, timely intervention, and improved reproductive health outcomes for women.

3 Results And Discussion

3.1 Main Issue

Infertility in women of productive age in Indonesia remains a significant health issue, mainly due to the low rate of early detection of hormonal and ovulation disorders. Most cases of infertility are only identified after couples have failed to conceive within 1–2 years of marriage, which indicates the weakness of the reproductive screening system in the premarital phase. In fact, many disorders such as ovarian dysfunction and polycystic ovary syndrome (PCOS) can be detected earlier through hormonal biomarker tests such as Anti-Müllerian Hormone (AMH), Luteinizing Hormone (LH), and Follicle Stimulating Hormone (FSH).

The lack of public awareness regarding the importance of fertility screening before marriage, coupled with limited access to comprehensive screening facilities in primary care, has resulted in many women losing the opportunity for early intervention. This condition is further worsened by unhealthy lifestyle factors, such as obesity, lack of physical activity, and chronic stress, which also affect hormonal balance and ovulation quality.

On the other hand, government policies related to reproductive health, such as the National Reproductive Health Strategy and the BERANI program, have not specifically included biomarker-based premarital fertility screening as a preventive measure. This creates a gap between policy and field needs.

The absence of an integrated premarital screening model that combines physical, anthropometric, hormonal, and educational indicators means that potential infertility is not comprehensively detected. As a result, the risk of infertility increases over time, impacting women's quality of life, the economic burden on families, and challenges in achieving national reproductive health and sustainable development goals (SDGs 3 and 5). Therefore, there is a need to develop a data-based integrated premarital screening model that can identify the risk of infertility early on, strengthen the reproductive health surveillance system, and support modern evidence-based policymaking.

3.2 Study Case

Fertility Prevalence in Indonesia, with 408 respondents in six provinces in Indonesia [13]

1. Knowledge and Perception Disparity Regarding Infertility

The study was conducted on 408 respondents in six provinces in Indonesia, with 296 women (72.5%) and 112 men (27.5%) [13]. Most respondents were Muslim (68.4%) and had a D4/S1 education level (70.8%), reflecting a relatively highly educated productive population group. Of the total respondents, 156 (38.2%) were married, and among them, 110 respondents already had children, while 46 respondents did not yet have children. Of the married group, 54 people (34.6%) reported experiencing infertility, namely not getting pregnant after more than two years of marriage without using contraception.

These findings confirm that even though the majority of subjects have a high educational background and good access to digital information, the level of understanding of infertility is still low. Between 36% and 40% of respondents did not consider infertility to be a medical condition, and most still believed in the myth that stress is the main cause of infertility. This misconception was more prevalent in rural areas than in urban areas, indicating a gap in fertility literacy between urban and rural areas, despite equal access to digital information. Low awareness of the main risk factors, such as advanced reproductive age, unhealthy lifestyles, and a history of reproductive infections, increases the potential for delayed detection and treatment of infertility at the community level.

2. Inappropriate Health Service Behavior

Differences in health service behavior between urban and rural communities were also an important finding. Outside Java, 19.5% of respondents preferred to consult a midwife rather than a general practitioner, and only 9.1% went to health facilities with medical specialists. This shows that the referral process for infertility in primary care is still not optimal. In addition, around 38–42% of couples are known to delay medical examinations for more than two years after experiencing difficulties conceiving. This delay has an impact on reducing the chances of successful fertility treatment and increases the risk of permanent infertility, especially in women over the age of 35.

3. The shortcomings of the reproductive health surveillance system

The current circumstances show that the national reproductive health surveillance system does not yet fully cover infertility risk indicators. The current focus of surveillance is still limited to pregnancy, childbirth, and contraceptive use, while risk factors for infertility such as ovulation disorders, pelvic inflammatory disease, or advanced reproductive age are not yet systematically monitored. As a result, early detection of female infertility is not yet part of the national reproductive health prevention strategy, even though early intervention can significantly reduce infertility rates.

4. Potential for Innovation Through Premarital Screening

The findings also show opportunities to develop innovative models through premarital screening. This program can be used as an entry point to detect infertility risks early by utilizing premarital counseling services or reproductive health checkups for adolescents. Premarital screening can include examining menstrual history, lifestyle habits, history of infectious diseases, and reproductive age, which are then integrated into the national reproductive health surveillance system. Through this mechanism, the data collected can serve as a basis for policy planning and strengthening promotive-preventive interventions in the fertile age population.

Based on the results of a case study in Indonesia, although access to information about infertility in Indonesia is widespread, public fertility literacy is still low, and health service-seeking behaviour is not yet appropriate. This gap reinforces the urgency of developing a premarital screening model that is integrated with the national reproductive health surveillance system as a strategy for early detection, prevention, and increased awareness of the risk of infertility among women in Indonesia.

3.3 Policy Recommendation

Based on the results above, it shows the main problem is low fertility literacy, delays in medical examinations, and the absence of an integrated infertility surveillance system, a national policy is needed to encourage innovation in premarital screening models as an instrument for early detection of female infertility risks. This policy recommendation focuses on three main pillars strengthening regulations and policies, integrating health care services, and educating public effectively.

1. Strengthening National Regulations and Policies

Every prospective bride and groom must undergo basic reproductive and hormonal examinations, including Luteinizing Hormone (LH), Follicle Stimulating Hormone (FSH), and Anti-Müllerian Hormone (AMH) parameters, as fertility biomarkers. The results of these tests are not only used for clinical purposes, but are also entered into a national reproductive health surveillance database to monitor trends in infertility risks among the reproductive ages population. It is necessary to issue a Minister of Health Regulation governing the implementation of biomarker-based premarital screening, accompanied by the development of standard operating procedures (SOPs) in primary care facilities such as community health centers and primary clinics. The results of this screening will be integrated into the National Reproductive Health Information System (SIK-Repro) as an official data component of national fertility surveillance.

2. Integration of Premarital Screening Services into the Surveillance System

The next strategic step is to integrate the premarital screening model into the national reproductive health surveillance system. The aim of this integration is to ensure that screening is not merely administrative or ceremonial, but becomes part of a sustainable, evidence-based fertility monitoring system. The development of a digital platform for healthy reproductive surveillance is needed to connect data on prospective brides and grooms from community health

centers, laboratories, and the Office of Religious Affairs (KUA), so that information on the risk of infertility can be identified early and used in planning preventive health interventions.

The Indonesian Ministry of Health needs to develop a fertility surveillance module based on female infertility risk and strengthen the capacity of primary health workers such as midwives, general practitioners, and laboratory analysts to be able to conduct fertility screening and counseling with uniform standards. The government also needs to provide subsidized premarital screening service packages in areas with high infertility prevalence and include female fertility indicators as part of the national Key Performance Indicators (KPIs) for reproductive health. Through this integration, the surveillance system will function not only as a data collection tool but also as a mechanism for early detection of reproductive health risks that can be followed up quickly and measurably.

3. Improving Fertility Education and Healthy Reproductive Literacy

A study found that around 36–40% of respondents did not consider infertility to be a medical condition and still believed in myths about its causes, such as stress and non-biological factors [13]. This condition highlights the urgency of improving reproductive literacy and fertility education at the community level. The government needs to develop a science-based fertility education curriculum that can be integrated into the Marriage Guidance (Bimwin) program under the coordination of the Ministry of Religious Affairs. This education should not only emphasize psychological readiness for marriage, but also understanding of fertility physiology, ideal reproductive age, healthy lifestyles, and the importance of early detection of hormonal disorders.

To support its implementation, the Ministry of Health can collaborate with professional organizations such as PERFITRI, POGI, and IDI in developing fertility education modules that meet scientific standards. Additionally, the development of interactive digital media such as the infertility risk assessment application (Ferti-ID) can expand the reach of education to the public, especially young people and prospective brides and grooms in areas with limited access to services. This effort is expected to raise awareness that infertility is a medical problem that can be prevented and treated through early detection and changes in health behavior.

4. Development of an Integrated Risk-Based Premarital Screening Model

The recommended innovative policy is the establishment of an Integrated Risk-Based Premarital Screening Model. This model combines four complementary main components, namely physical and anthropometric assessment (including blood pressure, body mass index, and upper arm circumference), evaluation of menstrual history and lifestyle (such as smoking habits, physical activity, and stress levels), hormonal biomarker testing (AMH, LH, and FSH), and evidence-based fertility counseling that provides an understanding of conception readiness and long-term infertility prevention.

This model can be implemented gradually through pilot projects in provinces with high infertility prevalence, such as DKI Jakarta, East Java, and North Sumatra. The initial implementation results can be used to refine the design of the national fertility surveillance system and strengthen interagency coordination in reproductive health data management. This approach places the premarital phase as a strategic starting point in the reproductive life cycle, where education, early detection, and preventive interventions can be carried out simultaneously.

5. Policy Impact and Implications

The implementation of this integrated premarital screening model is expected to increase early detection of infertility in women of reproductive age by up to 40% and reduce delays in fertility examinations, which currently exceed two years for most couples, as found in a study [13]. In addition, this policy will strengthen the national database on female fertility, which has not been covered in the reproductive health surveillance system. The long-term impacts of this policy include improving women's quality of life, reducing the social and economic burden of infertility, and strengthening the role of families in national health development.

Strategically, this policy contributes directly to the achievement of the Sustainable Development Goals, particularly SDG 3 (Good Health and Well-being) through increased access to reproductive health services, and SDG 5 (Gender Equality) through the empowerment of women in decision-making related to their reproductive health. Thus, the implementation of

the Integrated Pre-marital Screening Model Based on Female Infertility Risk is a strategic and preventive step in strengthening the national reproductive health surveillance system and building the foundation for a healthy, productive, and competitive Indonesian generation.

3.4 Research Setting Analysis

The Integrated Risk-Based Premarital Screening Model development program is directly relevant to the results of a study [13] on low fertility literacy and delayed fertility examinations in six provinces in Indonesia. The results of this study provide empirical basis for the formulation of national policies to strengthen the surveillance and early detection system for female infertility.

1. **Point 1:** Strengthening National Regulations and Policies

The study results show that 34.6% of married women experience infertility after more than two years of not conceiving without contraception. This condition reinforces the urgency of implementing national regulations that require premarital screening based on hormonal biomarkers such as AMH, LH, and FSH in primary health facilities. The implementation of this policy can begin as a pilot project in provinces with high infertility prevalence (DKI Jakarta, East Java, and North Sumatra) to become a national model that integrates premarital examination results into the national reproductive health surveillance system.

2. **Point 2:** Integration of Premarital Screening Services into the Surveillance System

Based on findings that 38–42% of couples delay medical examinations for more than two years, it is necessary to develop a data-based fertility surveillance system that connects community health centers, laboratories, and the Office of Religious Affairs (KUA). Through this digital system, early detection of infertility risks can be carried out more quickly and comprehensively. Primary healthcare workers can continuously monitor risk factors such as hormonal disorders, irregular menstrual history, and unhealthy lifestyles.

3. **Point 3:** Improving Fertility Education and Healthy Reproductive Literacy

A study shows that 36–40% of respondents do not consider infertility to be a medical condition, and happened because of myths are still widely believed. Therefore, it is necessary to strengthen fertility education in the Marriage Guidance (Bimwin) program through collaboration between the Ministry of Religious Affairs, the Ministry of Health, PERFITRI, and POGI. Educational materials should cover awareness of the ideal reproductive age, the risks of hormonal disorders, and the importance of premarital fertility checks. Digital approaches such as the Ferti-ID application can be used for self-assessment of infertility risks and access to credible medical information.

4. **Point 4:** Development of an Integrated Risk-Based Premarital Screening Model

The developed premarital screening model combines four main aspects: physical and anthropometric assessment, evaluation of menstrual history and lifestyle, hormonal biomarker testing (AMH, LH, FSH), and evidence-based fertility counseling. This approach allows prospective brides and grooms to obtain a comprehensive picture of their reproductive readiness. Its application can be integrated into the KUA's premarital service flow and health examinations at community health centers.

5. **Point 5:** Policy Impact and Implications

The implementation of this premarital screening model is expected to increase early detection of infertility by up to 40% and improve reproductive health service-seeking behavior among the community. The screening data will strengthen the National Reproductive Health Information System (SIK-Repro) and form the basis for the formulation of national fertility policies. This policy also supports the achievement of SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality) through increased access to reproductive services that are fair and gender-sensitive.

4 Conclusion

The results of the study (Kusuma et al., 2025) provide a strong basis for the development of an Integrated Risk-Based Premarital Screening Model as a strategic step in strengthening the national reproductive health surveillance system. The research locations in six provinces illustrate the real

conditions of gaps in public knowledge and behavior related to infertility. Through the implementation of this policy, Indonesia can build an effective early detection system, strengthen public fertility literacy, and create a preventive, educational, and sustainable premarital service ecosystem.

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