SUSTAINABILITY OF IUD UTILIZATION FROM LAW AND INSTITUTIONAL DIMENSIONS: A MULTI-DIMENSIONAL SCALING APPROACH IN PEKANBARU CITY

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Abstract

Sustainable contraceptive practices are essential for controlling population growth and reducing environmental pressure. Despite its advantages, the utilization of non-hormonal Intrauterine Devices (IUDs) in Indonesia remains low. This study analyzed the sustainability of IUD utilization from legal and institutional perspectives in Pekanbaru City, Riau Province, Indonesia. A quantitative approach was employed through interviews with 99 family planning acceptors and 4 informants, supported by observations and document reviews. The sustainability assessment used the Multi-Dimensional Scaling (MDS) method with RAPSGreenC analysis, adapted from RAPFISH, to evaluate eleven attributes across the legal–institutional dimensions. The sustainability index of IUD utilization was 67.6, indicating a moderately sustainable status. Six main leverage factors were identified: funding support, availability of field officers, availability of health personnel, collaboration with related sectors, the role of non-formal institutions, and monitoring and evaluation mechanisms. These factors significantly influence institutional capacity and service continuity. Strengthening cross-sector collaboration and adaptive monitoring systems is recommended to enhance policy implementation and ensure the long-term sustainability of family planning programs.

Keywords: Sustainability, Intrauterine device, Law and institutional dimensions.

INTRODUCTION

Uncontrolled population growth can lead to a decline in the quality of clean water and air, as well as land conversion for housing development [1]. It also increases the potential for waste generation and environmental pollution [2], which in turn may result in food and nutritional insecurity, leading to deteriorating public health [3]. Furthermore, population growth often exacerbates economic hardship and becomes a burden on national development [4].

Population growth must be maintained in balance with environmental sustainability. Therefore, efforts are needed to achieve a Total Fertility Rate (TFR) of 2.1 and to reduce the population growth rate to below 1%. Indonesia, with a population of around 275 million, has shown a downward trend in TFR, from 2.41 in the 2010 Population Census to 2.18 in 2020. However, the population growth rate remains relatively high at 1.17%. In Riau Province, which has a population of 6.6 million, the TFR stands at 2.28 [5]. Meanwhile, Pekanbaru City reports a lower TFR of 1.90 but a population growth rate exceeding the national target at 3.23%, with a total population of 1,167,599, the largest in the province [6].

Population control requires serious attention because it plays a strategic role in managing growth while mitigating environmental impacts through the use of contraception. The use of

contraceptives is a major determinant in reducing fertility and population growth rates [7]. A wide range of contraceptive methods are available, including condoms, pills, injections, implants, Intrauterine Devices (IUDs), both non-hormonal (Copper IUDs) and hormonal (Levonorgestrel IUDs/LNG IUDs), as well as female sterilization, male sterilization, lactational amenorrhea method, fertility awareness-based methods, and withdrawal [8].

Although no contraceptive method is entirely ideal, the non-hormonal IUD offers notable advantages over other methods. It contains no synthetic hormones, can be used for up to ten years, is economically efficient, and produces minimal waste. From a health perspective, it is suitable for women across reproductive age groups and parity levels, can be inserted and removed as needed, allows for rapid return to fertility, and does not require daily attention. These characteristics make the non-hormonal IUD an effective, safe, and economical contraceptive option [9] [10] [11].

Despite these advantages, the use of non-hormonal IUDs remains relatively low compared with other methods. Data from Pekanbaru City show that IUD users represent only 8.85% of all contraceptive users, far below those using injections (44.45%) and pills (19%) [6].

As a contraceptive method, the non-hormonal IUD not only supports population control but also contributes to achieving environmental sustainability targets. Policies on contraceptive provision, the planning of contraceptive needs, monitoring and evaluation of contraceptive supply, availability of health personnel, availabilty family planning field officers, funding support, collaboration with related sectors, the role of non-formal institutions, support from community leaders, community participation, promotion, communication, information, and education (CIE) methods, represent legal and institutional factors that can strengthen the adoption and sustainable use of contraceptives[12] [13] [14] [15] [16] [17] [18].

Analyze the sustainability of IUD use from law and institutional dimensions provides an opportunity to identify pathways for increasing non-hormonal IUD utilization. To date, there has been no study that specifically examines the sustainability of IUD use through these dimensions as an approach to enhancing sustainable contraceptive practices. Therefore, this study aims to analize the sustainability status of non-hormonal IUD use among family planning acceptors in Pekanbaru City, Riau Province, Indonesia, from law and institutional perspectives. The findings are expected to provide innovative solutions and policy insights for improving the adoption and sustainability of non-hormonal IUD use among family planning acceptors in Pekanbaru City, Riau Province, Indonesia.

METHODS

This study employed a quantitative research design, using interviews with family planning acceptors, key informant interviews, observation, and document review to collect data on each attribute related to the dimensions and utilization of IUD contraceptives. The study population consisted of family planning acceptors, with a total sample of 99 respondents, 90 from Tuah Madani District and 9 from Sail District, selected proportionally for interview. In addition to the acceptors, indepth interviews were conducted with purposively selected informants who were knowledgeable about contraceptive use programs within relevant institutions. These included two key informants from the Pekanbaru City Office of Population and Family Planning Control, and two informants from community health centers in the working areas of Tuah Madani and Sail Districts responsible for family planning programs. [19]

The sustainability analysis of IUD use was conducted using the Multi-Dimensional Scaling (MDS) method, employing the RAPSGreenC analysis, an adaptation of RAPFISH developed by the Fisheries Center, University of British Columbia.

RESULTS

1.Utilization of IUD Contraception

Based on the data analysis, the distribution of IUD use among the 99 respondents is presented in Table 1. The majority of respondents (74.8%) have never used an IUD, while only 13.1% are current users. This finding aligns with national data indicating that IUD use remains below 15% and tends to be lower compared to other contraceptive methods. Similarly, [20] reported that active IUD use in urban areas of Indonesia ranges between 10–14%, which is consistent with the 13.1% observed in this study. These results suggest that the IUD has not yet become the primary contraceptive choice among most respondents in the study area, and its use remains limited to a relatively small segment of women of reproductive age.

Table 1.Frequency Distribution of Respondents by IUD utilization

No	IUD Use Category	Frequency	Percentage (%)
1	Never used	74	74.8
2	Previously used	12	12.1
3	Currently using	13	13.1
	Total	99	100

2. Law and Institutional Dimensions and Attributes of Sustainable IUD utilization among Family Planning Acceptors in Pekanbaru City

The law and institutional sustainability is influenced by eleven main attributes: Policies on contraceptive provision, the planning of contraceptive needs, monitoring and evaluation of contraceptive supply, availability of health personnel, availabilty family planning field officers, funding support, collaboration with related sectors, the role of non-formal institutions, support from community leaders, community participation and then promotion, communication, information, and education (CIE) methods.

Based on Figure 1, the RAPSGreenC analysis results show that the multidimensional scaling (MDS) sustainability index for the law and institutional dimensions is 67.6. This value indicates that dimensions are in the moderately sustainable category, as they are above the 50% threshold. This indicates that the law and institutional support in Pekanbaru City are generally good for supporting the sustainable use of IUDs.

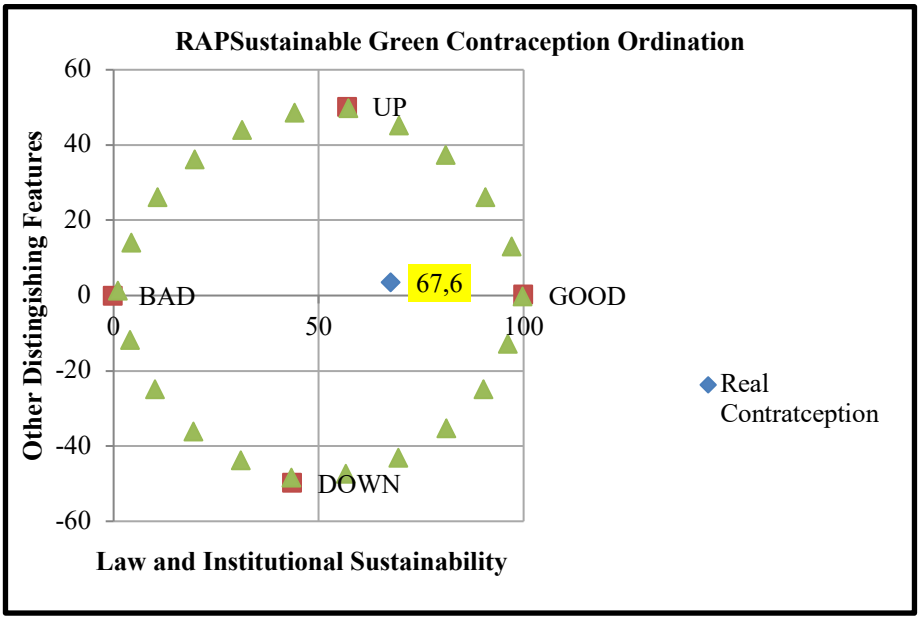

Figure 1. Law and Institutional Dimension Sustainability Index

The determining factors (leverage) of the law and institutional dimension in Figure 2 include funding support (Root Mean Square / RMS = 4.1), availability of field officers (RMS = 4.0), collaboration with related sectors (RMS = 3.7), availability of health personel (RMS = 3.4), the role of non-formal institutions (RMS = 3.4), monitoring and evaluation of contraceptive supply (RMS = 3.1), support from community leaders (RMS = 3.0), planning for the contraceptive provision(RMS = 2.5), and community participation (RMS = 2.5).

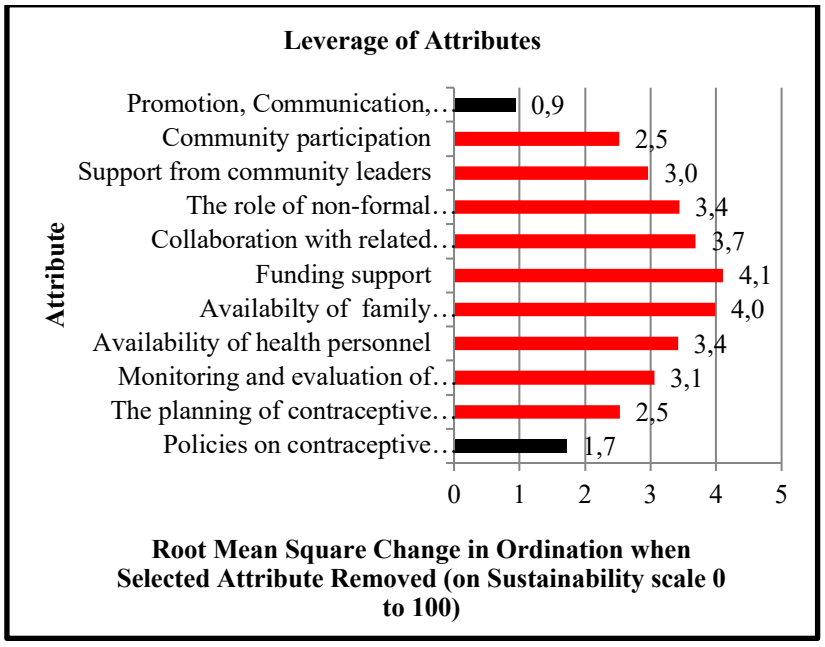

Figure 2. Leverage Atribut Law and Institutional Dimension

Further analysis revealed a Monte Carlo (MC) value of 66.0, very close to the MDS value (the MDS-MC difference was only 1.6). This closeness indicates that the data used in the model is stable and has minimal bias, thus making the analysis results reliable. A stress level of 0.14 (still below the threshold of 0.25 or 0.2) indicates good model fit, meaning the model adequately represents the relationships between attributes. Furthermore, an R2 value of 0.95 (close to 1) indicates that the RAPSGreenC model is able to explain data variation with a very high degree of confidence.

3. Determining factors for the sustainability of IUD contraception in Pekanbaru City

To determine the main leverage (determinant) factors, the RMS value of each attribute was analyzed using the Pareto Optimum Law approach. The results of the Pareto analysis on the attributes of the law and institutional dimension show that the attributes Funding support, Availability of family planning field officers, Availability of health personnel, Collaboration with related sectors, Role of non-formal institutions, and Monitoring and evaluation of contraceptive supply have cumulative percentage values of less than 80%, indicating that these are the main leverage factors. Therefore, to ensure the continued use of IUD contraception among family planning acceptors, 6 factors from the law and institutional dimensions must be taken into account.

DISCUSSION

Overall, these indicators confirm that the law and institutional dimensions are positive aspects and contribute significantly to the sustainability of IUD use in Pekanbaru City, with solid data and a reliable model. Further analysis of each of these attributes demonstrates their contribution to sustainability.

a.Funding Support

The funding support attribute had the highest RMS value (4.1), indicating that sustained and adequate funding is the most critical determinant of family planning program sustainability, particularly for IUD use. This finding aligns with[21], who emphasized the effectiveness of co-financing between local governments and donors in sustaining reproductive health programs. For instance, The Challenge Initiative (TCI) in Nigeria demonstrated that strong co-funding mechanisms foster local government ownership and significantly promote modern contraceptive use. Similarly, [22] reported that programs supported by local budgets maintained modern contraceptive use even after donor support declined, while highlighted the necessity of multi-year financial commitments to ensure long-term service quality.

In Indonesia, potential funding sources include local government budgets , national funds, corporate social responsibility contributions, and profits from community-based economic groups[23]. The high sensitivity of this attribute underscores that maintaining stable and diversified funding sources is essential for ensuring continuous service provision and long-term sustainability of IUD programs.

b.Availability of Family Planning Field Officers

The availability of family planning field officers attribute recorded an RMS value of 4.0, identifying it as the second most sensitive determinant influencing IUD program sustainability. The good score indicates that the number and performance of field officers in Pekanbaru are currently optimal. Field officers serve as frontline agents of family planning services at the

community level, responsible for information dissemination, education, and behavioral change related to contraceptive use, including IUDs.

Several studies support this finding. [24] found that the motivation, education, and competence of field officers significantly influence new acceptor recruitment. Similarly, [25] observed that training quality and motivation are statistically correlated with field officers performance in Cilacap. In West Sumatra, [26] reported that trained field officers demonstrated high motivation and competence, thereby improving the quality of family planning services and counseling.

National regulations, including Ministry of Administrative and Bureaucratic Reform No. 53/2022 and National Population and Family Planning Agency Regulation No. 9/2023, comprehensively define family planning field officers responsibilities, ranging from data collection and community outreach (individual, group, and mass communication) to facilitation of contraceptive services. Effective communication by field officers enhances community understanding and participation in family planning programs [14]. The high sensitivity of this attribute underscores the necessity of maintaining both adequate staffing levels and continuous capacity development of field officers to ensure the sustainability of IUD programs.

c. Collaboration with Related Sectors

The collaboration with related sectors attribute had an RMS value of 3.7, indicating high sensitivity. The good score shows that intersectoral collaboration in Pekanbaru functions effectively. Population growth issues cannot be addressed by a single institution; therefore, coordinated efforts across government and non-government sectors are essential.

[17] emphasized that coordinated collaboration among agencies creates synergy to achieve family planning targets, while poor coordination can hinder implementation. [27] demonstrated that joint programs between Population Services International (PSI) and governments in Guatemala, Laos, Mali, and Uganda significantly expanded IUD service delivery in the public sector, uncovering previously unmet demand.

In Indonesia, the legal framework on contraception promotes integration among National Population and Family Planning Agency, the Ministry of Health, and other agencies to ensure comprehensive education, accessibility, and distribution. In Pekanbaru, such collaboration is reflected in partnerships between National Population and Family Planning Agency, the Health Office, and community organizations like Family Welfare Empowerment Organisation. The high sensitivity of this attribute underscores that strong and sustained intersectoral collaboration is fundamental to the success and sustainability of IUD programs.

d.Role of Non-Formal Institutions

The role of non-formal institutions attribute had an RMS value of 3.4, with a good score indicating that their contribution in Pekanbaru is optimal. Non-formal institutions, such as community-based organizations, faith-based groups, and Non Governmental Organization (NGO), play strategic roles in extending outreach and bridging gaps between communities and healthcare providers, particularly in underserved areas.

In Zambia, [28] emphasized that community health committees sustain IUD use by strengthening education and accessibility. Similarly, community dialogues facilitated by local groups help reduce stigma and improve understanding of IUD benefits [29]. In Pakistan, [30] found that NGO led voucher programs significantly increased IUD uptake and continuation. In Indonesia, the Indonesian Planned Parenthood Association has long been a leading advocate, providing education, counseling, and reproductive health services nationwide. In Pekanbaru,

collaborations between Indonesian Planned Parenthood Association and local women's organizations have enhanced counseling and outreach for long-acting contraceptives.
The high sensitivity of this attribute underscores that the active involvement of non-formal institutions is not merely supportive but indispensable to the sustainability and equity of IUD programs.

e. Availability of Health Personnel

The availability of health personnel attribute had an RMS value of 3.4, with a Fair score, suggesting moderate but insufficient availability. Health professionals, there are midwives, doctors, and field educators, are critical frontliners in delivering contraceptive services and counseling. Because IUD insertion requires skilled providers, workforce shortages can significantly restrict service coverage.
To address such gaps, [31] World Health Organisation recommends task sharing, delegating IUD insertion to midwives or community health officers, while emphasizing that clinical competence must be paired with empathetic communication for effective counseling. The WHO Family Planning and Abortion Care Toolkit highlights this integrated approach. In Haiti, joint training programs for doctors and midwives, supported by mobile clinics, successfully expanded access to IUD services in underserved communities.

In Indonesia, Regulation of the Minister of Health of the Republic of Indonesia No. 2/2025 authorizes contraceptive services by trained health personnel and field counselors[32]. [33] emphasized that adequate doctor to population and midwife to population ratios are essential for comprehensive reproductive health services. In Pekanbaru, uneven distribution of midwives and limited training opportunities at community health centers have constrained IUD service coverage. Although the score is fair, the high RMS value underscores that strengthening both the availability and competence of health workers is vital to sustaining IUD programs.

f. Monitoring and Evaluation of Contraceptive Supply

Monitoring and Evaluation (M&E) attribute had an RMS value of 3.1, with a good score reflecting effective monitoring. M&E is crucial to ensuring the continuous availability of long-term contraceptives such as IUDs.
Previous studies have consistently highlighted the strategic role of M&E in ensuring contraceptive reliability. [34] found that local availability of contraceptives directly increases usage rates by reducing access barriers. Regular evaluations motivate providers and improve stock management [35] Moreover, service quality closely monitored through M&E correlates with higher contraceptive continuation rates [36].
According to National Population and Family Planning Agency Regulation No. 9/2019, M&E is conducted at the provincial, district, and health facility levels, covering all stages, election, planning, procurement, and distribution, to inform evidence-based policy. In Indonesia, however, the consistency of M&E feedback loops remains a challenge, particularly in translating monitoring data into timely program adjustments at the community level. The high sensitivity of this attribute underscores that robust M&E systems are indispensable for maintaining supply continuity, ensuring service quality, and ultimately sustaining IUD use.

CONCLUSION

The sustainability of IUD utilization in Pekanbaru City is classified as moderately sustainable, with a sustainability index of 67.6 under the law and institutional dimensions. The

analysis identified six key leverage factors that significantly influence program sustainability: funding support, availability of family planning field officers, availability of health personnel, collaboration with related sectors, the role of non-formal institutions, and monitoring and evaluation of contraceptive supply. These attributes collectively strengthen the institutional capacity to maintain continuous service provision and foster community trust in long-term contraceptive methods.

The findings highlight that adequate and diversified funding sources, well-trained and motivated field officers, intersectoral collaboration, and active participation of non-formal institutions are pivotal in promoting the sustainability of IUD programs. The study emphasizes that a robust legal framework supported by institutional synergy and consistent monitoring systems is essential for ensuring equitable and sustained access to contraceptive services.

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