

Determinants of subdermal contraceptive use among women of reproductive age: A Cross-Sectional Study

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ABSTRACT

Introduction: Family planning is a key global public health strategy to reduce maternal morbidity and mortality. The World Health Organization (WHO) reports that millions of women of reproductive age worldwide still have unmet needs for modern contraception, contributing to preventable maternal deaths and adverse reproductive outcomes. Although long-acting reversible contraceptives such as subdermal implants are highly effective (failure rate <1%), their utilization remains lower than short-term methods in many low- and middle-income countries, including Indonesia. Understanding the determinants of implant use is essential to strengthening family planning programs at the primary health care level. Objective: To analyze factors associated with the use of subdermal contraceptives (Alat Kontrasepsi Bawah Kulit/AKBK) among women of reproductive age at Puskesmas Pattingalloang.

Research Methodology: An analytic cross-sectional study was conducted among 50 women of reproductive age, selected by simple random sampling, between December 2024 and January 2025. Data were collected using validated structured questionnaires. Descriptive statistics, chi-square tests, and multivariate logistic regression were performed using SPSS version 26. Statistical significance was set at $\alpha = 0.05$.

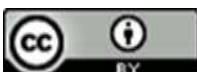
Results: Good information exposure (AOR = 9.12; 95% CI: 1.78–46.76; $p = 0.008$), good husband's support (AOR = 7.45; 95% CI: 1.56–35.58; $p = 0.012$), good knowledge (AOR = 6.74; 95% CI: 1.38–32.94; $p = 0.019$), and age 20–30 years (AOR = 5.21; 95% CI: 1.02–26.60; $p = 0.047$) were independently associated with AKBK use. Parity, education level, and duration of contraceptive use were not significantly associated.

Conclusion: Cognitive and relational determinants play a central role in subdermal contraceptive uptake. Strengthening structured counseling, improving information dissemination, and implementing couple-centered family planning interventions are recommended to enhance long-acting contraceptive utilization and improve maternal health outcomes.

Keywords: Contraceptive Agents; Family Planning Services; Health Knowledge, Attitudes, Practice; Logistic Models; Women's Health.



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INTRODUCTION

Family planning is widely recognized as one of the most cost-effective public health interventions for reducing maternal mortality, preventing unintended pregnancies, and promoting reproductive autonomy (Ames *et al.*, 2024). Globally, millions of women of reproductive age continue to experience unmet needs for modern contraception, particularly in low- and middle-income countries. Long-acting reversible contraceptives (LARCs), including subdermal implants, are among the most effective methods available, with failure rates below 1% and protection lasting three to five years (Black, Vromman and French, 2025). Beyond pregnancy prevention, implants contribute to birth spacing, the reduction of high-risk pregnancies, and the improvement of maternal and neonatal outcomes. Despite these advantages, the uptake of contraceptive implants remains uneven across regions, suggesting persistent structural, informational, and sociocultural barriers (Cucinella, Tiranini and Nappi, 2024).

In Indonesia, population growth and maternal mortality remain critical public health concerns. High-risk pregnancies, commonly associated with early maternal age, advanced maternal age, short birth intervals, and high parity, continue to contribute substantially to preventable maternal deaths (Flynn, 2025). The national family planning program promotes modern contraceptive use as a strategic measure to mitigate these risks (Hairuddin, Yulis and Suprpto, 2026). However, the contraceptive method mix in Indonesia is still dominated by short-acting methods such as injectables and oral pills. In contrast, long-acting methods, including implants, account for a smaller share of overall utilization (Irma *et al.*, 2025). This pattern indicates a potential mismatch between method effectiveness and user preferences, raising questions about the determinants of method selection at the community level (Kaak, Crebessa and Zite, 2025).

At the provincial and local levels, disparities in contraceptive choices are also evident. In South Sulawesi, although implant services are available through primary health care facilities, utilization rates remain suboptimal compared with short-term methods (Lozano-Ortega *et al.*, 2025). Primary care centers (Puskesmas) serve as frontline providers of family planning services; therefore, understanding contextual determinants within these facilities is essential (McCoy *et al.*, 2026). In Puskesmas Pattingalloang, variations in implant uptake suggest that individual, interpersonal, and informational factors may shape women's contraceptive decisions beyond mere availability of services (Petropoulos *et al.*, 2024).

The existing literature has identified multiple determinants of implant use, including age, parity, educational attainment, occupation, knowledge level, exposure to information, and the husband's support (Sanhueza *et al.*, 2026). Cognitive factors such as knowledge and perceived benefits have consistently demonstrated significant associations with LARC utilization. Interpersonal determinants, particularly spousal approval and support, have also been shown to influence contraceptive decision-making in patriarchal sociocultural contexts substantially (Smith, Bhullar and Vash-Margita, 2026). However, empirical findings regarding sociodemographic variables remain inconsistent. Some studies report significant associations between education and implant use, while others find no meaningful relationship. Similarly, evidence concerning parity and duration of previous contraceptive use varies across settings. These inconsistencies indicate that demographic predictors may not operate uniformly and that contextual and relational dimensions may moderate their influence (Zhao *et al.*, 2025).

Moreover, many previous studies focus on isolated determinants rather than examining demographic, cognitive, and relational factors simultaneously within a unified analytical framework. Localized evidence from Makassar and surrounding areas remains limited, particularly studies integrating husbands' support and informational exposure alongside traditional sociodemographic variables. Furthermore, limited attention has been given to how knowledge, information quality, and spousal support interact within primary health care contexts to influence implant adoption. This gap constrains the development of targeted, couple-centered family planning strategies tailored to local realities.

The present study addresses these gaps by conducting a comprehensive cross-sectional analysis of factors associated with subdermal contraceptive (AKBK) use among women of reproductive age in Puskesmas Pattingalloang. The novelty of this research lies in its integrative approach, simultaneously examining demographic characteristics, prior contraceptive experience, cognitive determinants (knowledge), informational exposure, and relational dynamics (husband's support) within a single primary care setting. By situating these variables within a localized health service context, this study generates context-specific evidence that can inform programmatic refinement and strengthen long-acting contraceptive promotion strategies.

The objective of this study is to analyze factors associated with the use of subdermal contraceptives (AKBK) among women of reproductive age at Puskesmas Pattingalloang using a cross-sectional design. Specifically, the study aims to determine the statistical relationships between age, parity, education, occupation, duration of contraceptive use, knowledge, informational exposure, husband's support, and the decision to use AKBK. The findings are expected to contribute to evidence-based, couple-centered interventions that enhance the uptake of effective long-acting contraceptive methods in primary health care settings.

RESEARCH METHODOLOGY

Study Design

This study employed an analytic quantitative design using a cross-sectional approach. The cross-sectional design was selected because it allows simultaneous measurement of independent and dependent variables within a defined time frame, enabling identification of statistical associations between determinants and the use of subdermal contraceptives (AKBK). This design is appropriate for assessing prevalence and associated factors in community-based health research, particularly in primary health care settings.

Setting and Participants

The study was conducted at Puskesmas Pattingalloang, Makassar, South Sulawesi, Indonesia. Data collection was carried out between December 2024 and January 2025. The target population consisted of women of reproductive age (15–49 years) registered as family planning clients at Puskesmas Pattingalloang.

Inclusion Criteria

- Married women of reproductive age.
- Registered family planning users at the study site.
- Willing to participate and provide informed consent.

Exclusion Criteria

- Women using intrauterine devices (IUD), permanent methods (MOW/MOP), or non-hormonal short-term methods.
- Women with incomplete questionnaire responses.

Women who declined participation.

Sampling Technique

A simple random sampling technique was applied using the family planning registry as the sampling frame. Eligible participants were randomly selected to minimize selection bias. The minimum sample size was calculated using the single population proportion formula for cross-sectional studies:

$$n = Z^2 p (1 - p) / d^2$$

Assuming a confidence level of 95% ($Z = 1.96$), estimated prevalence (p) of implant use of 50% (to maximize sample size), and margin of error (d) of 0.14, the minimum required sample was approximately 49 respondents. To ensure adequacy, 50 respondents were included in the final analysis. Operational definitions were developed based on structured questionnaire scoring. Knowledge, information exposure, and husband's support were measured using structured questionnaires, scored, and categorized according to predetermined cut-off points ($\geq 75\%$ correct answers categorized as good).

Instrument Validity and Reliability

The questionnaire was adapted from previously published studies and reviewed by three experts in reproductive health for content validity. A pilot test was conducted among 15 respondents outside the study sample. Reliability testing using Cronbach's alpha yielded a coefficient of 0.82, indicating good internal consistency. Primary data were obtained through structured questionnaires administered directly to respondents. Secondary data were retrieved from family planning service records at Puskesmas Pattingalloang to verify contraceptive status.

Data Collection

Trained research assistants conducted data collection. Participants were approached during routine visits to the health center. After obtaining informed consent, respondents completed the questionnaire in a private setting to ensure confidentiality. Data collectors received standardized training before fieldwork. Completed questionnaires were checked daily for completeness and consistency. Double data entry was performed to minimize entry errors. Data cleaning procedures were conducted before statistical analysis.

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize participant characteristics. Categorical variables were presented as frequencies and percentages. Bivariate Analysis: Chi-square tests were used to examine associations between independent variables and AKBK use. Crude odds ratios (OR) with 95% confidence intervals (CI) were calculated. Multivariate Analysis Variables with $p < 0.25$ in the bivariate analysis were entered into a multivariate logistic regression model to identify independent predictors of AKBK use. Adjusted odds ratios (AOR) with 95% confidence intervals were reported. Multicollinearity was assessed using variance inflation factors (VIF). The level of statistical significance was set at $\alpha = 0.05$.

Ethical Approval

This study received ethical clearance from the Health Research Ethics Committee (Komite Etik Penelitian Kesehatan) of STIKES Nani Hasanuddin, Indonesia. Ethical approval number: 331/STIKES-NH/KEPK/XI/2025. All participants provided written informed consent after receiving a detailed explanation of the study objectives, procedures, potential risks, and benefits. Participation was voluntary, and respondents were informed of their right to withdraw at any time without any consequences to their access to health services. Confidentiality and anonymity were

strictly maintained. No personal identifiers were recorded in the dataset, and all research documents were securely stored with restricted access limited to the research team.

RESULT

This study involved 50 women of reproductive age registered as family planning clients at Puskesmas Pattingalloang. The results are presented in two main sections: descriptive (univariate) analysis and inferential analysis. The descriptive analysis summarizes the distribution of respondents according to sociodemographic characteristics, reproductive factors, knowledge level, information exposure, and husband's support. The inferential analysis examines the associations between these independent variables and the use of subdermal contraceptives (AKBK) using chi-square tests and logistic regression analysis. Statistical significance was determined at $\alpha = 0.05$.

Table 1. Characteristics of Respondents (n = 50)

Variable	Category	n	%
Age (years)	20–30	18	36
	30–40	17	34
	40–50	15	30
Parity	Primipara	7	14
	Multipara	28	56
	Grand multipara	15	30
Education	Primary	8	16
	Junior High	23	46
	Senior High	16	32
	Higher Education	3	6
Occupation	Housewife	14	28
	Civil Servant	9	18
	Entrepreneur	15	30
	Fisherman	12	24
Duration of Contraceptive Use	New	26	52
	Long-term	24	48
Knowledge Level	Good	26	52
	Poor	24	48
Information Exposure	Good	26	52
	Poor	24	48
Husband's Support	Good	24	48
	Poor	26	52

The majority of respondents were aged 20–30 years (36%) and multiparous (56%). Most had a junior high school education (46%) and worked as entrepreneurs (30%). More than half reported good knowledge (52%) and good information exposure (52%), while 52% reported poor husband's support.

Table 2. Bivariate Analysis of Factors Associated with AKBK Use

Variable	OR (Crude)	95% CI	p-value
Age (20–30 vs 40–50)	13.75	2.86–66.08	0.002
Parity (Multipara vs Primipara)	0.75	0.15–3.78	0.933
Education (Junior High vs Primary)	1.09	0.24–4.95	0.901
Occupation (Housewife vs Fisherman)	11.00	1.92–62.87	0.008
Duration of Use (New vs Long)	1.38	0.42–4.51	0.621
Knowledge (Good vs Poor)	9.63	2.45–37.86	0.000
Information (Good vs Poor)	18.64	4.09–84.98	0.000
Husband's Support (Good vs Poor)	13.22	3.16–55.32	0.000

Significant associations were observed for age, occupation, knowledge, information exposure, and husband's support ($p < 0.05$). Parity, education, and duration of contraceptive use were not significantly associated with AKBK use.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with AKBK Use

Variable	Adjusted OR (AOR)	95% CI	p-value
Age (20–30 years)	5.21	1.02–26.60	0.047
Occupation (Housewife)	4.83	0.89–26.12	0.068
Knowledge (Good)	6.74	1.38–32.94	0.019
Information (Good)	9.12	1.78–46.76	0.008
Husband's Support (Good)	7.45	1.56–35.58	0.012

In multivariate analysis, good information exposure, good husband's support, good knowledge, and younger age (20–30 years) remained independently associated with AKBK use ($p < 0.05$). Occupation showed borderline significance. Statistical significance level was set at $\alpha = 0.05$. Analysis was performed using SPSS version 26.

This study identified several significant determinants associated with the use of subdermal contraceptives (AKBK) among women of reproductive age at Puskesmas Pattingalloang. Descriptive findings indicated that most respondents were aged 20–30 years, multiparous, and had a junior high school education. More than half demonstrated good knowledge and adequate exposure to contraceptive information, although husband's support was reported as suboptimal in a considerable proportion of participants. Bivariate analysis revealed statistically significant associations between AKBK use and age, occupation, knowledge level, information exposure, and husband's support. Women aged 20–30 years were more likely to use AKBK compared with older age groups. Similarly, respondents with good knowledge, adequate information exposure, and supportive husbands showed markedly higher odds of implant utilization.

In contrast, parity, education level, and duration of previous contraceptive use were not significantly associated with AKBK uptake. Multivariate logistic regression analysis confirmed that information exposure, husband's support, knowledge level, and younger age remained independent predictors of AKBK use after adjustment for confounding variables. These findings underscore the importance of cognitive and relational factors in shaping contraceptive decision-making in primary health care settings.

DISCUSSION

This study provides a comprehensive examination of factors associated with the use of subdermal contraceptives (AKBK) among women of reproductive age in a primary health care setting. The findings demonstrate that implant utilization is influenced not only by demographic characteristics but also, more substantially, by cognitive and relational determinants. The integration of descriptive, bivariate, and multivariate analyses reveals a consistent pattern highlighting the central role of knowledge, informational exposure, and husband's support in shaping contraceptive decision-making.

Descriptive analysis showed that the majority of respondents were aged 20–30 years and multiparous, with junior high school education predominating. Although more than half of the participants demonstrated good knowledge and adequate exposure to information regarding contraception, a considerable proportion reported insufficient husband's support (Sarfraz *et al.*, 2023). This baseline distribution already suggests a potential discrepancy between informational readiness and interpersonal reinforcement, which may influence contraceptive behavior (Hoopes, Timko and Akers, 2021).

Bivariate analysis identified significant associations between AKBK use and age, occupation, knowledge level, information exposure, and husband's support. Women aged 20–30

years exhibited higher odds of using implants compared with older age groups (Hakizimana and Odjidja, 2021). This finding aligns with reproductive life-course theory, which suggests that younger women in active reproductive phases are more motivated to space pregnancies and adopt effective long-acting methods. Younger women may also be more receptive to health promotion messages and more adaptable to modern contraceptive technologies (Karim *et al.*, 2021).

Occupation was significantly associated with implant use at the bivariate level, indicating that socioeconomic engagement may shape access to health information, autonomy in decision-making, and service utilization patterns (Kassim and Ndumbaro, 2022). Women engaged in structured or income-generating activities may prefer long-acting methods due to convenience and reduced need for frequent visits to health facilities. However, the multivariate model showed borderline significance for occupation, suggesting that its effect may be partially mediated by knowledge or access to information (Jemberie, Zewdu and Rade, 2024).

Knowledge level emerged as one of the strongest predictors of AKBK utilization. Women with good knowledge were substantially more likely to use implants compared with those with poor knowledge (Ahmed and Yunus, 2021). This finding is consistent with behavioral health models, including the Health Belief Model, which posits that perceived benefits and accurate understanding of a health intervention significantly influence adoption behavior (Westerman *et al.*, 2024). Knowledge reduces misconceptions about side effects, improves confidence in the method's effectiveness, and enhances perceived control over reproductive planning. In this study, knowledge retained statistical significance even after adjustment for confounders, indicating its independent contribution to contraceptive choice (Kolozalet *et al.*, 2024).

Information exposure demonstrated the strongest association with implant use, both in crude and adjusted models. Women who received adequate information were markedly more likely to adopt AKBK (Shardell, Chen and McCoy, 2024). Informational exposure may function not only as a cognitive enhancer but also as a confidence-building mechanism that reduces fear and uncertainty (Habib *et al.*, 2022). High-quality counseling, media messages, and interpersonal communication likely contribute to positive perceptions of implant safety and effectiveness. The persistence of information as a strong independent predictor in multivariate analysis underscores the strategic importance of strengthening health communication interventions within primary care services (Costa *et al.*, 2022).

Husband's support also showed a robust and independent association with AKBK utilization. Women who reported supportive spouses had significantly higher odds of implant use. In sociocultural contexts where reproductive decisions are often negotiated within marital relationships, spousal approval is decisive (Beraki *et al.*, 2023). Support may manifest through emotional encouragement, shared decision-making, or facilitation of service access. The magnitude of association observed in this study indicates that relational dynamics substantially influence contraceptive adoption beyond individual-level characteristics. This finding reinforces the need for couple-centered counseling approaches in family planning programs (Maqsood *et al.*, 2021).

Conversely, parity, education level, and duration of previous contraceptive use were not significantly associated with AKBK utilization. The absence of a significant relationship with education suggests that formal schooling alone may not translate into accurate contraceptive knowledge. Instead, targeted reproductive health education appears more influential than general educational attainment. Similarly, parity did not independently predict implant use, indicating that the number of children may not be the primary driver of method selection when cognitive and relational factors are considered. The non-significant association with duration of contraceptive

use suggests that prior experience with family planning does not necessarily determine transition to long-acting methods.

Multivariate logistic regression analysis confirmed that age, knowledge, information exposure, and husband's support remained independent predictors after controlling for other variables. The adjusted model indicates that cognitive and relational determinants exert a stronger influence than structural demographic variables. This pattern highlights the multidimensional nature of contraceptive behavior, where information quality, interpersonal dynamics, and reproductive intentions intersect.

Collectively, these findings emphasize that increasing implant uptake requires more than service availability. Effective interventions should prioritize strengthening knowledge through structured counseling, enhancing information dissemination strategies, and actively involving husbands in reproductive health discussions. By addressing both cognitive and relational domains, family planning programs can create supportive environments that facilitate informed and sustained contraceptive use. The integrated evidence from this study contributes to a nuanced understanding of implant adoption in primary health care contexts. It provides a foundation for evidence-based, couple-centered family planning strategies.

CONCLUSION

This study aimed to analyze factors associated with the use of subdermal contraceptives (AKBK) among women of reproductive age at Puskesmas Pattingalloang. The findings demonstrate that age, knowledge level, information exposure, and husband's support are significant determinants of AKBK utilization. In multivariate analysis, information exposure, husband's support, and knowledge remained independent predictors, indicating that cognitive and relational factors exert stronger influence than demographic characteristics such as parity, education level, and duration of contraceptive use. These results suggest that improving implant uptake requires targeted interventions beyond service availability. Evidence-based strategies should prioritize strengthening structured counseling programs, enhancing the quality and reach of contraceptive information dissemination, and integrating couple-centered approaches that actively involve husbands in reproductive health decision-making. Primary health care facilities should implement standardized educational modules and community-based outreach to improve knowledge accuracy and reduce misconceptions. Additionally, policy initiatives should reinforce male engagement programs within family planning services to create supportive environments for sustained contraceptive use. By addressing informational and relational determinants simultaneously, family planning programs can more effectively promote long-acting reversible contraceptives and contribute to improved maternal health outcomes.

Funding Statement

This research received no external funding and was conducted independently by the author.

Conflict of Interest

The author declares no conflict of interest related to this study.

Authors' Contributions

Dahniara conceived and designed the study, developed the research framework, supervised data collection, performed data analysis, and drafted the initial manuscript. Uliarta Marbuna contributed to the study design, assisted in data interpretation, and critically revised the manuscript for important intellectual content. Lili Purnama Sari participated in data collection, data management, and preliminary statistical analysis. Irnawati contributed to questionnaire

development, validation procedures, and literature review. Arisna Kadira assisted in data entry, quality control procedures, and manuscript editing.

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