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The Impact of Three Months of Use of KB Injections on Spotting Incidents in KB Participants

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ABSTRACT The utilization of injectable contraceptives, particularly the three-month formulation, is widely adopted due to its convenience and effectiveness. However, a significant number of users experience menstrual irregularities, notably spotting, which can lead to discontinuation of contraceptive use. This study aims to examine the relationship between the duration of three-month injectable contraceptive use and the incidence of spotting among family planning participants. Employing a retrospective analytical survey design, secondary data were collected from the family planning register at the Ngebel Health Center covering January to December 2022. The sample consisted of 246 women who met inclusion criteria, utilizing systematic simple random sampling. Data analysis involved descriptive statistics and inferential testing using Fisher's Exact Test to determine the association between the duration of contraceptive use and spotting occurrence, with significance set at $p<0.05$. The findings reveal that most participants experienced spotting within the first two years of usage, particularly those using the contraceptive for less than one year. The statistical analysis confirms a significant correlation ($p=0.000$), indicating that the incidence of spotting is notably higher during early withdrawal periods and tends to decrease as the duration of use extends beyond two years. These results align with existing literature suggesting that hormonal imbalances caused by the contraceptive contribute to menstrual irregularities initially, which diminish over time. The study concludes that healthcare providers should offer tailored counseling to clients regarding potential side effects and strategies to manage early spotting, thereby enhancing adherence and reducing discontinuation rates. Future research should explore additional factors influencing menstrual disturbances to further optimize contraceptive counseling and support.

INDEX TERMS Injectable contraceptives, menstrual disturbances, spotting, duration of use, reproductive health

I. INTRODUCTION

Family planning is a critical aspect of reproductive health, directly influencing women's autonomy, fertility control, and socioeconomic development [1], [2]. Among various contraceptive methods, injectable hormonal contraceptives particularly the three-month formulation have gained widespread acceptance due to their efficacy, convenience, and high compliance rates [3], [4]. Nonetheless, despite the advantages, these contraceptives are associated with several menstrual irregularities, notably spotting and amenorrhea, which can adversely affect user satisfaction and continuation rates [5], [6].

The problem of menstrual disturbances, especially spotting, remains a significant barrier to consistent contraceptive use. Spotting, characterized by irregular bleeding outside the normal menstrual cycle, can cause discomfort, emotional distress, and concerns about health risks, leading to discontinuation of contraception [7], [8]. Recent studies indicate that the incidence of spotting is particularly high during the initial periods of injectable contraceptive use, with a decline over time as hormonal equilibrium stabilizes [9], [10]. Despite such findings, there remains a lack of comprehensive understanding of how the duration of contraceptive use influences bleeding patterns, which can inform better counseling and management strategies.

Current methodologies predominantly utilize cross-sectional surveys and secondary data analyses to assess menstrual side effects among injectable contraceptive users [11], [12]. These studies typically focus on immediate side effects without thoroughly exploring the longitudinal relationship between the length of contraceptive use and menstrual irregularities [13]. While some recent research explores the hormonal mechanisms behind these side effects, there is a conspicuous gap concerning detailed temporal analysis specifically, how the incidence of spotting evolves within the first few years of usage, and how this can guide healthcare providers in enhancing user adherence [14], [15].

Furthermore, international guidelines and various reproductive health policies advocate for improved counseling on potential side effects, emphasizing the importance of individualized management plans [16], [17].

Yet, most of these strategies are based on generalized data, lacking insights into local or population-specific patterns of menstrual disturbances linked to duration of contraceptive use. Addressing this gap requires targeted studies that investigate the temporal dynamics of side effects in different demographic settings, especially where data collection is challenging and resource-constrained [18]. Such contextual research can transform global guidelines into more tailored, effective interventions.

The present study aims to investigate the relationship between the duration of three-month injectable contraceptive use and the incidence of spotting among women attending Ngebel Health Center. Building upon previous research, this study seeks to offer granular insights into how side effects develop over time, and how healthcare providers can optimize counseling practices. Its specific objectives include determining the incidence and progression of spotting, analyzing the statistical association with duration of use, and providing evidence-based recommendations for clinical management.

This research makes several notable contributions. First, it offers a detailed temporal perspective on menstrual irregularities related to injectable contraceptive use within a local Indonesian context, contributing valuable region-specific data. Second, it employs rigorous statistical testing to clarify the strength and significance of the association between use duration and spotting, filling a notable gap in existing literature. Third, it supports the development of targeted counseling strategies aimed at mitigating discontinuation due to side effects, which can ultimately improve contraceptive adherence and reproductive health outcomes.

The structure of this article is outlined as follows: the subsequent section reviews related literature, focusing on recent findings concerning hormonal mechanisms and side effect management; the methods section details the retrospective data collection and analysis procedures; the results section presents the key findings; the discussion interprets these findings in the context of existing knowledge and local practices; and the conclusion summarizes the implications and proposes future research directions.

II. METHOD

This research employed a retrospective analytical survey design to evaluate the impact of the duration of three-month injectable contraceptive use on the incidence of spotting among family planning (FP) participants. The methodological approach was structured to facilitate systematic data collection, analysis, and interpretation, ensuring reproducibility and validity of findings. The study was conducted within the working area of the Ngebel Health Center in Ponorogo Regency, Indonesia, over a period spanning from January 2022 to December 2022.

A. POPULATION AND SAMPLE SELECTION

The target population comprised all women who utilized the three-month injectable contraceptive (KB) at the Ngebel Health Center during the specified period. The total population was recorded at 502 individuals, with a subset of 246 participants forming the study sample. The inclusion criteria specified that participants must have complete, accurate data entries in the family planning register book, explicitly documenting variables such as age, parity, occupation, duration of contraceptive use, and occurrence of spotting episodes. Participants with incomplete or inconsistent records were excluded from the analysis to maintain data integrity.

B. SAMPLING METHODOLOGY

A systematic simple random sampling technique was employed to select participants from the eligible population. This method ensures each individual has an equal probability of inclusion, thereby minimizing selection bias [22]. The sampling interval was determined based on the ratio of the population size to the desired sample size, ensuring an unbiased and representative sample.

C. MATERIALS AND DATA COLLECTION PROCEDURES

Data collection was conducted through secondary data extraction from the family planning register book maintained at the Ngebel Health Center. The data variables extracted included participant demographics (age, education, occupation, parity), duration of injectable contraceptive use, and occurrence of spotting. The data collection process involved meticulous editing and verification to eliminate errors and inconsistencies. To protect confidentiality, all identifiable information was anonymized during data processing.

D. OPERATIONAL DEFINITIONS AND VARIABLES

The primary independent variable was the duration of use of the three-month injectable contraceptive, categorized into two groups: ≤ 2 years and > 2 years. The dependent variable was the occurrence of spotting, classified as either 'yes' or 'no.' Additional variables included demographic characteristics, which served as potential confounders and were accounted for during analysis.

E. DATA ANALYSIS

Descriptive statistics were used to characterize the study population, utilizing frequency distributions, percentages, means, and standard deviations as appropriate. The association between the duration of contraceptive use and the incidence of spotting was analyzed using inferential statistical tests suitable for categorical data. Specifically, Fisher's Exact Test was employed due to the presence of cells with expected frequencies less than five in the contingency table [23]. A significance level (α) of 0.05 was established for all statistical tests, in accordance with standard epidemiological research protocols [24].

F. STATISTICAL VALIDITY AND ETHICAL CONSIDERATIONS

Data analysis was performed utilizing the latest version of SPSS (Statistical Package for the Social Sciences) to ensure computational accuracy [25]. The study protocol received ethical clearance from the Surabaya Poltekkes Ethics Committee, with Certificate Number EA/1616/KEPK-Poltekkes_Sby/V/2023. Confidentiality and data privacy

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were maintained throughout the research process, aligning with ethical research standards [26].

G. LIMITATIONS AND ASSUMPTIONS

The retrospective nature of the study inherently limited the control over data collection, relying on existing records which might have contained incomplete entries. To mitigate this, only records with comprehensive information were included. The assumption was made that the recorded data accurately reflected participants' contraceptive use and side effects. Additionally, the potential influence of confounding variables such as the use of other hormonal methods or underlying health conditions was acknowledged but not controlled within the scope of this analysis.

III. RESULTS

A. CHARACTERISTIC FREQUENCY DISTRIBUTION

Based on TABLE 1, the results of the data obtained, the characteristics of the 3-month injection family planning participants in this research are as follows:

TABLE 1
Characteristic Frequency Distribution Participants

Characteristics		frequency	%
Aged	< 20 years	7	2.8
	21-35 years	136	55.3
	> 35 years	103	41.9
	Total	246	100.0
Job	Doesn't work	114	46.3
	Work	132	53.7
	Total	246	100.0
Education	SD	82	33.3
	SMP	76	30.9
	SMA	88	35.8
	Total	246	100.0
Parity	0-1 Parity	78	31.7
	2-5 Parity	85	34.6
	> 5 Parity	83	33.7
	Total	246	100.0

Based on TABLE 2, the age of the 3-month injection KB participants are mostly 21-35 years as many as 136 people (55.3%), most of the 3-month injection KB participants work as many as 132 people (53.7%), the education of some 3-injection KB participants months is SMA as many as 88 people (35.8%) and parity mostly have 2-5 children as many as 85 people (34.6%)

TABLE 2
Frequency Distribution of 3-Month Injectable Contraception Use

Variable		frequency	%
The duration of use of injectable birth control is 3 months	≤ 2 years	147	59.8
	> 2 years	99	40.2
Total		246	100.0

B. FREQUENCY DISTRIBUTION OF TIME OF USE

Based on the results of the data obtained, the distribution of the old frequency of using 3-month injections in this study. Based on the TABLE 2, the duration of use of 3-month injectable birth control is mostly ≤ 2 years of use by 147 people (59.8%).

C. FREQUENCY DISTRIBUTION OF SPOTTING EVENTS

Based on TABLE 3, results of the data obtained, the frequency distribution of spotting events in this research is as follows:

TABLE 3
Frequency Distribution of Spotting Events in 3-month injecting family planning participants

Variabel	frequency	%
Spotting	134	54.5
No Spotting	112	45.5
Total	246	100.0

Based on the table above, the majority experienced spotting as many as 134 people (54.4%)

D. ANALYSIS OF THE EFFECT OF OLD 3-MONTH INJECTABLE CONTRACEPTION USE ON SPOTTING

Based on TABLE 4 the results of the data obtained, the test for the effect of the duration of using 3 months of injection contraception on the incidence of spotting in this study is as follows:

Based on the table above, the number of 3-month injectable family planning participants with a duration of 3-month injection ≤ 2 years with complaints of spotting was 134 people (54.5%) while 3-month injecting KB participants who did not have spotting complaints were 13 people (5.3 %). 3-month injectable family planning participants with a duration of 3-month injection KB > 2 years with no spotting

TABLE 4
The Influence of 3-Month Injectable Family Planning Use on Spotting Events of KB Participants

Variable		*Spotting*		No Spotting		Total		*Chi-square*
		Freq	%	Freq	%	Freq	%	*P-value*
The duration of use	≤ 2 years	134	91.2	13	8.8	147	100.0	0.000
	> 2 years	0	0.0	99	100.0	99	100.0	
Total		134		112		246		

complaints (0.0%), while 99 people (40.2%) did not have spotting complaints.

This study uses a 2x2 table with a factual frequency (fo) that has zero (0) in the cell, so the Fisher's Exact Test is used[14]. The results of the Fisher's Exact Test analysis on the effect of the duration of 3 months of injection contraception on the incidence of spotting obtained a p-value of 0.000 (p-value <0.05) so that it can be concluded that there is a significant effect between the duration of 3 months of injecting birth control and the incidence of spotting in family planning participants at the Ngebel Health Center, Ponorogo Regency in 2022

IV. DISCUSSION

A. INTERPRETATION OF THE STUDY RESULTS

The primary objective of this study was to elucidate the relationship between the duration of use of 3-month injectable contraceptives and the occurrence of spotting among participants. The findings underscore a significant association where a shorter duration of usage specifically, less than or equal to two years correlates with a higher incidence of spotting, whereas longer-term users (over two years) demonstrated a markedly reduced likelihood of experiencing this side effect. This pattern indicates that hormonal stabilization may occur after prolonged use, leading to a decrease in menstrual irregularities, particularly spotting.

The statistical analysis revealed a p-value of 0.000, confirming the significance of this relationship. This aligns with established pharmacological understanding that the hormonal fluctuations induced by Depo Medroxy Progesterone Acetate (DMPA) the active component of the 3-month injectables initially cause irregular bleeding patterns, including spotting and amenorrhea [28][29]. Over time, the endocrine system adapts to the exogenous hormones, resulting in more normalized bleeding patterns or the cessation of menses. This process accounts for the decrease in spotting observed in longer-term users [30].

Further, the study confirms that hormone-related side effects are predominant in the initial phase of contraceptive use, consistent with previous research that reports a high prevalence of irregular bleeding within the first six to twelve months of initiation [31]. The gradual decline in spotting incidence with increased duration suggests an inherent adaptation mechanism where the hypothalamic-pituitary-ovarian axis recalibrates in response to exogenous progestins. Such insights can be pivotal in pre-provision counseling, helping users anticipate and manage expectations regarding side effects over time.

B. COMPARATIVE ANALYSIS WITH RECENT STUDIES

When juxtaposed with contemporary literature, our findings show both consensus and divergence. Similar studies within recent years have emphasized the temporal decline in bleeding irregularities among injectable contraceptive users. For example, a study conducted by Zhang et al. [32] found that approximately 50% of women experienced spotting or irregular bleeding within the first six months, but this decreased to less than 10% after 24 months of continuous use. This trend mirrors our observation where the incidence of spotting diminishes significantly after more than two years, asserting that the body's endocrine response stabilizes over time.

Contrasting these findings, some studies suggest that the incidence of spotting may persist in a subset of users irrespective of treatment duration, influenced by individual variability and comorbidities. For instance, Lee et al. [33] indicated that factors such as age, parity, and underlying gynecological conditions could modulate bleeding patterns, which was not extensively explored in our research. This highlights a potential limitation in our study's scope—mainly focusing on duration—without considering other confounding variables.

Furthermore, the consistency of our results with recent systematic reviews reinforces the concept that the initial period following the initiation of injectable contraceptives presents the highest likelihood of bleeding irregularities [34]. The clinical relevance of this pattern is significant; awareness of the declining nature of spotting over time can improve compliance and continuation rates. Conversely, the persistence of bleeding in some individuals underscores the necessity for personalized counseling and possibly adjunctive therapies.

C. LIMITATIONS AND IMPLICATIONS OF THE FINDINGS

Despite the robust associations identified, this study is not devoid of limitations. Chief among them is the retrospective design, relying on secondary data from health center registers, which may be susceptible to incomplete or inaccurate records. As noted, some data fields such as the precise initial injection date, parity, and occupation were sometimes inadequately recorded, potentially affecting the comprehensiveness of analysis [35].

Moreover, the study's scope was restricted to participants attending the Ngebel Health Center within a specified period, limiting generalizability. External factors such as socioeconomic status, cultural beliefs, and access to healthcare services elements that influence contraceptive continuation and side effect management were not thoroughly examined [36]. Hence, the findings might not be wholly representative of broader populations or different settings.

Additionally, while the Fisher's Exact Test validated the statistical significance of the association between duration and spotting, the study did not evaluate other potential confounders such as concomitant illnesses, medication use, or nutritional status. Future research incorporating a prospective cohort design, larger sample sizes, and multi-center settings could provide deeper insight into these complex factors.

Despite these limitations, the implications of these findings are notable for reproductive health programs. Firstly, emphasizing the natural decline of spotting with prolonged injectable use can enhance user counseling, thereby reducing discontinuation due to side effects. Secondly, health practitioners can prepare users during the initial phase, offering management strategies such as reassurance or temporary interventions to alleviate bleeding irregularities. Moreover, policy strategies could incorporate education campaigns emphasizing the expected pattern of side effects and their temporal trajectories to promote sustained usage.

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From a broader perspective, understanding the temporal dynamics of adverse effects like spotting can contribute to improved contraceptive adherence, which is crucial for reducing unintended pregnancies and improving reproductive health outcomes [37]. Public health interventions could also benefit from integrating this knowledge into training modules for healthcare providers, ensuring they deliver accurate, evidence-based information to users.

In conclusion, this study reinforces that the occurrence of spotting among users of 3-month injectable contraceptives diminishes as duration increases, aligning with existing literature. The findings underscore the importance of pre-implementation education, ongoing counseling, and tailored management to support continued contraceptive uptake and satisfaction. Future research should aim to address the identified limitations, exploring additional variables and employing prospective designs to affirm and extend these insights.

V. CONCLUSION

This study aimed to investigate the impact of the duration of three-month injectable contraceptive use on the occurrence of spotting among family planning participants at the Ngebel Health Center. The findings revealed a significant relationship between the length of use and spotting events, with 54.5% of respondents experiencing spotting during the study period. Specifically, participants who used the contraceptive for less than or equal to two years exhibited a higher incidence of spotting (54.5%), whereas those with usage exceeding two years demonstrated a markedly lower occurrence, reaching 0%. Statistical analysis confirmed this association, with a p-value of 0.000, indicating a highly significant effect of duration on spotting incidence. The data further illustrate that early in the use of the injectable, hormonal imbalances trigger irregular menstruation and spotting, but these side effects tend to diminish over time, with many users experiencing amenorrhea after prolonged use beyond one year. These insights align with existing literature, such as Wahyuni et al. and Wahyu, which also report a decrease in spotting and increase in amenorrhea with increased duration of contraceptive use. Despite the robust findings, the study was limited by retrospective data collection, incomplete records, and a focus solely on participants from a single health center, which may restrict the generalizability of the results. Future research should consider prospective designs, larger diverse populations, and explore additional variables influencing menstrual disturbances, such as age, parity, and hormonal profiles. This will enrich understanding and support more personalized family planning counseling. Overall, the findings underscore the importance of informing users about the temporal nature of hormonal side effects like spotting, thereby improving adherence and satisfaction with contraceptive methods. Healthcare providers should emphasize and discuss potential side effects, especially during the initial years of application, and monitor clients closely to optimize contraceptive experiences and outcomes. Such knowledge serves as a vital resource for reproductive health practitioners and contributes to enhancing family planning programs, ultimately supporting women's reproductive autonomy and well-being.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Authors made substantial contributions to the conception and design of the study, data acquisition, analysis, and interpretation. Fresha Galuh Mahendra led the data collection process and drafted the initial manuscript. Nurlailis Saadah supervised the study design, performed critical revisions, and acted as the corresponding author for all communications. Nana Usnawati contributed to the statistical analysis, interpretation of results, and editing of the final draft. Nani Surtinah provided expertise in midwifery, contributed to data validation, and reviewed the manuscript for important intellectual content. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

DECLARATIONS

ETHICAL APPROVAL

The authors declare that there are no conflicts of interest related to this study. Ethical clearance was obtained from the Surabaya Poltekkes Ethics Commission under Certificate Number EA/1616/KEPK-Poltekkes_Sby/V/2023. Informed consent was waived due to the retrospective nature of the study, which utilized secondary data from existing records. The research adhered to all applicable ethical standards and guidelines for conducting studies involving human data, ensuring confidentiality and data privacy throughout the process.

CONSENT FOR PUBLICATION PARTICIPANTS

Consent for publication was given by all participants.

CONSENT FOR INTERESTING

The authors declare that there are no conflicts of interest or competing interests related to this study.

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