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Research Article

The Relationship Between the Length of Use of Implantable Contraceptives with Changes in Acceptor Weight

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Abstract: Weight gain in contraceptive implant acceptors can have various negative health impacts, including degenerative diseases such as heart disease, hypertension, and a reduced ability to carry out daily activities. This study aimed to examine the relationship between the duration of contraceptive implant use and weight gain among women of reproductive age. A quantitative design with a cross-sectional approach was applied. The study population consisted of all contraceptive implant acceptors registered at the health facility, totaling 74 respondents. The sampling technique used was random sampling to ensure representativeness. The independent variable in this research was the duration of contraceptive implant use, while the dependent variable was weight change. Data were collected using a structured questionnaire, and statistical analysis was performed using the chi-square test. The results revealed a statistically significant relationship between the duration of contraceptive implant use and weight gain among respondents. Specifically, the longer the duration of implant use, the higher the likelihood of experiencing weight gain. This finding supports existing evidence that hormonal contraceptive implants may cause side effects, including increased body weight. If not properly managed, such weight gain can lead to overweight or obesity, conditions that substantially raise the risk of developing metabolic disorders such as diabetes mellitus, as well as cardiovascular diseases including hypertension and coronary heart disease. Based on these results, it is recommended that contraceptive implant users undergo regular weight monitoring to identify changes early. Additionally, health education programs emphasizing balanced nutrition and adequate physical activity should be implemented for women using hormonal contraceptives. Health care providers are encouraged to deliver comprehensive counseling prior to implant insertion, ensuring that potential side effects and preventive measures are clearly explained. Such proactive steps will help women make informed decisions and maintain optimal health while using contraceptive implants.

Keywords: Body weight; Contraceptive implant; Duration; Obesity; Risk

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1. Introduction

According to the World Health Organization (WHO), contraceptive use has increased in many parts of the world, especially in Asia and Latin America, and is lowest in Sub-Saharan Africa. Globally, users of modern contraceptives such as birth control pills, birth control injections, implants/Norplant/implants, IUDs/spirals, vasectomy, and tubectomy have increased slightly from 54% in 1990 to 57.4% in 2019. In Africa, it increased from 23.6% to 28.5%; in Asia, it increased slightly from 60.9% to 61.8%; and in Latin America and the Caribbean, it remained stable at 66.7%. According to the World Health Organization (WHO), more than 100 million women worldwide use effective contraceptives, with more than 75% using hormonal contraceptives and 25% using non-hormonal contraceptives (Akhid Suraiya, 2022). Meanwhile, data from the Panca Karsa 2 Health Center obtained a report on the target coverage of Family Planning (KB) in 1 year consisting of 8,671 Fertile Age Couples (PUS) and a report on the target coverage of active Family Planning (KB) of 7,151 (82.5%) participants, including Intra Uterine Device (IUD) 73 (5.9%), Implants 162 (10.2%), Injections 4,856 (329.8%), Condoms 312 (55.2%) and Pills 862 (53.1%).

Family Planning (FP) is one of women's most basic and primary preventive health services. Although not consistently recognized as such, improving and expanding family planning services is one of the efforts to reduce the high maternal morbidity and mortality rates due to pregnancy experienced by women. Many women have to make difficult contraceptive choices, not only because of the limited number of methods available but also because specific methods may not be acceptable to national FP policies, women's health and sexuality, or the cost of obtaining contraception (Akhid Suraliyal, 2022). One of the long-term contraceptives (MKJP) is the implant. The implant is a contraceptive method that only contains progestin with a long working period, low dose, and revised;e for women. The implant is a type of contraception in the form of an implant made of a type of silastic rubber containing hormones installed in the upper arm. The implant can be used for a long term of 5 years and is reversible. The advantage of highly effective contraception is that the implant failure rate is 1 per 100 women per year in the first 5 years, and there is low usage failure; once installed, there is no need to remember anything. The implant contains levonorgestrel, which is a progesterone hormone.

The advantages of birth control implants are very effective in preventing pregnancy. The success rate is relatively high; out of 100 users of birth control implants, only one person still gets pregnant. The disadvantages of the Implant birth control method are that it triggers an increase or decrease in body weight when releasing synthetic progestin implanted under the skin, or a contraceptive for women that is installed (injected) under the skin with the upper part consisting of 6 capsules measuring approximately 3 cm so that it can cause scars.

The impact of using implant contraception is that continuous weight gain can cause obesity. Excess weight or obesity increases the relative risk of a woman suffering from diabetes mellitus and the relative risk of developing cardiovascular disease such as high blood pressure, which can then increase the risk of coronary heart disease.

The side effects of implant contraception include menstrual cycle disorders (8.8%) and weight gain (3.3%), increased blood pressure (2.25), headaches (5.5%), and bleeding/menstrual cycle disorders (1.6%). Weight gain in KB acceptors occurs due to increased body fat and not due to fluid retention.

Weight gain measures the amount of protein, fat, fluid, and minerals in the bone tissue. Weight gain changes occur if the weight gain exceeds the previous weight. The amount of fat influences this weight gain from consuming fat, which is converted into fat and then stored in the skin tissue

The hormone progesterone also stimulates the hypothalamus's appetite control center, which in turn causes the acceptor to be more active than usual (Halrtalnto, 2019). The use of implantable contraceptives in the womb is also straightforward to cause baldness. Increased baldness in the acceptor of implantable contraceptives in the womb has several adverse effects, such as degenerative diseases such as heart disease and high blood pressure, and also affects daily activities. Side effects of contraceptive implants occur in pregnant women who use contraceptive implants, which are the most frequently complained about by women who accept contraceptive implants. Increased weight gain or obesity increases the relative risk of a pregnant woman suffering from diabetes mellitus, the relative risk of developing cardiovascular disease, for example, high blood pressure, and it can increase the risk factors for coronary heart disease (Yulialwalti, 2019). Adequate diets for weight loss include avoiding high-calorie foods and foods that contain high sugar and fat, exercising regularly, avoiding consumption of soda and alcohol, and avoiding stress (Suraltun, 2019). Based on these factors, researchers are interested in discovering more about the relationship between the use of Implant KB and weight loss changes.

2. Research methods

Study Design

This research employed a cross-sectional design, suitable for the study's objective of analyzing factors influencing pregnant women's adherence to iron tablet consumption at a specific point in time. The cross-sectional approach enabled the researchers to collect data simultaneously from participants and to examine the associations between independent variables and the dependent variable. The study was conducted at Modayag Health Center, Kotamobagu. This location was selected because it serves as a primary healthcare facility providing antenatal care services to pregnant women in the region. The research took place over a three-month period, from June to August 2024.

Population and Sample

The target population included all pregnant women registered for antenatal care at Modayag Health Center. The sample was selected using purposive sampling, with inclusion criteria specifying pregnant women in their second or third trimester who received iron tablets and consented to participate. Exclusion criteria included pregnant women with pregnancy complications requiring specialized care. The sample size, calculated using Slovin's formula with a 5% margin of error, resulted in 110 eligible participants.

Variables

The independent variables were maternal knowledge about iron tablets, maternal attitude towards iron supplementation, family support, the role of healthcare providers, side effects experienced, accessibility of iron tablets, and sociodemographic characteristics (age, education level, employment status, and parity). The dependent variable was adherence to iron tablet consumption, defined by the proportion of tablets consumed relative to the recommended number prescribed by healthcare providers.

Research Instrument

Data were collected using a structured questionnaire containing both closed and open-ended questions. The instrument was developed based on an extensive review of relevant literature and consultations with experts in maternal and child health. The questionnaire included items assessing sociodemographic characteristics, knowledge, attitudes, family support, healthcare provider roles, side effects, accessibility, and adherence. Prior to data collection, the questionnaire was tested for validity and reliability.

Data Collection Procedures

Ethical approval was obtained from the Ethics Committee of the Institute of Science and Health Technology RS dr. Soepraoen. Upon approval, researchers coordinated with the Modayag Health Center to explain the study's aims and procedures. Eligible pregnant women were identified and informed about the study. Those willing to participate signed informed consent forms. Data were collected through face-to-face interviews using the validated structured questionnaire. Collected data were checked for completeness before being entered into statistical software for analysis.

Data Analysis

Data analysis was conducted in three stages:

a. Univariate analysis was used to describe the characteristics of respondents and distribution of research variables through frequency and percentage tables.
b. Bivariate analysis applied the chi-square test to examine associations between independent variables and adherence to iron supplementation.

c. Multivariate analysis used multiple logistic regression to identify the most influential factors on adherence after adjusting for potential confounders.

Ethical Considerations

This study received ethical clearance from the Research Ethics Committee of the Institute of Science and Health Technology RS dr. Soepraoen. Participation was voluntary, with informed consent obtained from each participant. Confidentiality and anonymity of respondents were strictly maintained throughout the study.

3. Result and Discussion

Respondent Characteristics

The study involved 110 pregnant women who met the inclusion criteria. The demographic characteristics assessed included age, education level, employment status, and parity. The distribution is summarized in the following table:

Table 1. Characteristics of Respondents (n=110)

Characteristics	Frequency (n)	Percentage (%)
Age		
< 20 years	10	9.1
20–35 years	85	77.3
> 35 years	15	13.6
Education Level		
Elementary School	20	18.2
Junior High School	30	27.3
Senior High School	45	40.9
University	15	13.6
Employment Status		
Employed	40	36.4
Unemployed	70	63.6
Parity		
Primiparous	60	54.5
Multiparous	50	45.5

The majority of participants were aged between 20 and 35 years (77.3%), while a smaller proportion were younger than 20 years (9.1%) or older than 35 years (13.6%). Most respondents had completed senior high school (40.9%), followed by junior high school (27.3%), elementary school (18.2%), and university education (13.6%). In terms of employment, 63.6% of participants were unemployed (primarily housewives), and 36.4% were employed. Regarding parity, more than half (54.5%) were primiparous, while 45.5% had experienced multiple pregnancies. This demographic diversity provides a broad perspective on the factors influencing compliance.

Univariate Analysis

Univariate analysis was conducted to describe the distribution of independent and dependent variables among the respondents. The results are presented below:

Table 2. Distribution of Independent and Dependent Variables (n=110)

Variables	Frequency (n)	Percentage (%)
Knowledge		
Good	70	63.6
Poor	40	36.4
Attitude		
Positive	80	72.7
Negative	30	27.3
Family Support		
Supportive	75	68.2
Not Supportive	35	31.8
Role of Health Workers		
Good	85	77.3
Poor	25	22.7
Side Effects		
None	90	81.8
Present	20	18.2
Accessibility		
Easy	95	86.4
Difficult	15	13.6
Compliance		
Compliant	80	72.7
Non-compliant	30	27.3

The majority of participants demonstrated good knowledge (63.6%), had a positive attitude towards iron tablet consumption (72.7%), received family support (68.2%), and evaluated the role of health workers as good (77.3%). Additionally, most respondents did not experience side effects (81.8%) and found iron tablets easily accessible (86.4%). Regarding adherence, 72.7% of the women were compliant, indicating a relatively high but still improvable rate.

Multivariate Analysis

Multivariate analysis using multiple logistic regression was conducted to determine the strongest predictors of compliance. The analysis included variables that had p-values less than 0.25 in bivariate testing.

Table 3. Multivariate Logistic Regression Analysis Results

Variables	B	SE	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)
Knowledge	1.528	0.512	8.902	1	0.003	4.608	1.689–12.573
Attitude	1.326	0.498	7.091	1	0.008	3.766	1.418–10.004
Family Support	1.187	0.486	5.973	1	0.015	3.277	1.265–8.488
Role of Health Workers	1.092	0.517	4.465	1	0.035	2.981	1.082–8.212
Constant	-6.093	1.328	21.049	1	0.000	0.002	

The analysis revealed that knowledge (p=0.003), attitude (p=0.008), family support (p=0.015), and the role of healthcare providers (p=0.035) significantly influenced compliance with iron tablet consumption. Knowledge emerged as the most influential factor, with pregnant women possessing good knowledge being 4.6 times more likely to comply compared to those with poor knowledge. Similarly, positive attitudes, family support, and good healthcare provider roles substantially increased the likelihood of compliance.

The findings of this study highlight that knowledge, attitude, family support, and the role of healthcare providers are key determinants of pregnant women's adherence to iron tablet consumption. These results are consistent with previous research emphasizing the significance of these factors in promoting compliance with iron supplementation during pregnancy [19], [20]. Knowledge emerged as the strongest predictor of compliance. Pregnant women with a solid understanding of the benefits of iron supplementation for maternal and fetal health were more likely to adhere to the recommended intake. This supports findings by Mbhenyane & Cherane, 2017, who noted that higher levels of knowledge about anemia and iron supplementation are positively correlated with adherence. Adequate knowledge empowers women to appreciate the rationale behind health recommendations and fosters intrinsic motivation to comply [21].

Moreover, a positive attitude was found to significantly influence compliance. Women who held favorable beliefs about the importance of iron tablets were more inclined to consume them regularly [22]. Conversely, negative perceptions, including doubts about effectiveness or fears of side effects, tended to hinder adherence [23]. Therefore, strengthening positive attitudes through targeted education and counseling is vital [24]. Family support, particularly from husbands, also played a critical role in enhancing adherence. Women who received encouragement, reminders, and emotional support from family members showed higher levels of compliance, aligning with findings from Ratno et al. (2020) and Hasani et al. (2021). Active involvement of family members in maternal care can create a nurturing environment that promotes health-seeking behaviors [25].

The role of healthcare providers proved equally crucial. Effective communication, counseling, and education by health workers not only increased awareness but also strengthened pregnant women's trust in medical advice [26]. Regular follow-ups and motivational support further reinforced adherence [27], [28]. Interestingly, although side effects and accessibility issues were assessed, they did not emerge as statistically significant factors in multivariate analysis. Nonetheless, these aspects should not be overlooked. Previous studies have indicated that side effects such as nausea and constipation may deter women from continuing supplementation [29]. Thus, proactive management of side effects and reassurance regarding their temporary nature are essential [12], [30]. Accessibility to iron tablets, particularly in remote areas, remains an important structural consideration. Ensuring a consistent supply and easy availability of supplements can facilitate better compliance, especially among disadvantaged populations [13], [16], [24].

The implications of this study emphasize the need for a holistic approach. Health interventions should prioritize increasing knowledge, fostering positive attitudes, involving family members actively, and enhancing the roles of healthcare workers [3]. Continuous health education campaigns, personalized counseling, family-centered care programs, and the strengthening of healthcare supply chains are recommended strategies [5], [7]. This study has limitations. Its cross-sectional design restricts the ability to establish causality between

independent variables and compliance. Additionally, as the study was conducted in a single health center, generalization to broader populations must be approached with caution. Future longitudinal studies encompassing diverse settings are encouraged to deepen the understanding of adherence dynamics over time. Overall, this study reaffirms that promoting maternal compliance with iron supplementation demands a multifaceted and collaborative effort involving pregnant women, families, healthcare providers, and the health system as a whole.

4. Conclusions

This study concludes that knowledge, attitude, family support, and the role of healthcare providers significantly influence the compliance of pregnant women in consuming iron tablets at Modayag Health Center, Kotamobagu. Among these, knowledge stands out as the most dominant factor, followed by positive attitudes, supportive family involvement, and active engagement of healthcare workers. Although side effects and accessibility were not statistically significant, they remain important considerations in ensuring adherence. A comprehensive strategy integrating educational interventions, attitude reinforcement, family engagement, and healthcare provider support is essential to enhance compliance rates. The findings provide valuable insights for healthcare practitioners and policymakers in designing targeted interventions to improve maternal and fetal health outcomes. Future research with longitudinal designs and broader populations is recommended to further explore the evolving factors affecting compliance with iron supplementation during pregnancy.

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