

Effect of PRECEDE–PROCEED Model on the Decision-Making of Implant Contraceptive Method among Women of Reproductive Age

Enny Suramto¹⁾, Setyo Sri Rahardjo^{1,2)}, Revi Gama Hatta Novika^{1,3)},
Ika Sumiyarsi Sukamto^{1,3)}, Erindra Budi Cahyanto^{1,4)}

¹⁾Master's of Public Health Study Program, Faculty of Medicine, Universitas Sebelas Maret

²⁾Department of Pharmacology, Faculty of Medicine, Universitas Sebelas Maret

³⁾Midwifery Study Program, Faculty of Medicine, Universitas Sebelas Maret

⁴⁾Diploma IV Anesthesiology Nursing Study Program, Vocational School, Universitas Sebelas Maret

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ABSTRACT

Background: Implant contraception is a highly effective long-acting contraceptive method, but its use among women of reproductive age remains suboptimal. Decisions to use implant contraception are influenced by demographic characteristics, predisposing factors, enabling factors, and reinforcing factors. This study aimed to analyze the direct and indirect effects of PRECEDE–PROCEED Model indicators on decision-making regarding implant contraceptive use among women of reproductive age in the working area of Miri Public Health Center, Sragen Regency.

Subjects and Method: A cross-sectional study was conducted among 422 women of reproductive age in the working area of Miri Public Health Center, Sragen Regency, Central Java, Indonesia. Respondents were selected using fixed control sampling. The dependent variable was implant contraceptive use. Independent variables included education, age, occupation, income, knowledge, attitude, enabling factors, family support, social support, and community support. Data were collected using a structured questionnaire and analyzed using the Chi-square test and path analysis with Generalized Structural Equation Modeling.

Results: Implant contraceptive use was directly increased by age ($b=2.56$; 95% CI=1.82 to 3.31; $p<0.001$), family support ($b=0.94$; 95% CI=0.22 to 1.65; $p=0.010$), social support ($b=2.75$; 95% CI= 1.78 to 3.72; $p<0.001$), and positive attitude ($b=2.57$; 95% CI=1.82 to 3.33; $p<0.001$). Conversely, education ($b=-1.09$; 95% CI=-1.80 to -0.38; $p=0.003$) and occupation ($b=-1.00$; 95% CI= -1.73 to -0.28; $p=0.006$) reduced implant contraceptive use. Income and enabling factors showed no significant direct effects. Attitude was positively influenced by age ($b= 1.17$; $p<0.001$), knowledge ($b= 0.82$; $p= 0.037$), and family support ($b= 1.38$; $p<0.001$), while social and community support had no significant effects.

Conclusion: Implant contraceptive use was influenced by age, education, occupation, family support, social support, and attitude. Attitude acted as an important mediator linking age, knowledge, and family support to implant contraceptive use.

Keywords: PRECEDE–PROCEED model, implant contraception, family planning, social support.

Correspondence:

Setyo Sri Rahardjo. Department of Pharmacology, Faculty of Medicine, Universitas Sebelas Maret. Jl. Ir Sutami 36A, Surakarta, Central Java 57126, Indonesia. Email: setyosri@staff.uns.ac.id.

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BACKGROUND

The use of implant contraceptive methods among women of reproductive age remains an important issue in reproductive health and family planning programs. Implants are long-acting contraceptive methods that are highly effective, practical, and can prevent pregnancy for several years without requiring daily use. Family planning programs have an important role in regulating birth spacing, preventing unintended pregnancy, reducing maternal morbidity and mortality, and improving family welfare (Rahmi and Hadi, 2020; National Population and Family Planning Agency of the Republic of Indonesia, 2023). However, in Indonesia, the use of long-acting contraceptive methods such as implants is still lower than short-term methods, especially injections and pills. This condition shows that the success of family planning programs is not only influenced by the availability of contraceptive services, but also by women's understanding of the benefits, safety, effectiveness, and suitability of each contraceptive method.

Although implants are effective and suitable for women who need safe and sustainable contraception, many women are still hesitant to use them. This hesitation is often caused by fear of side effects, lack of accurate information, negative experiences shared by others, and limited support from family or the surrounding environment (Senderowicz and Kolenda, 2022; Tang et al., 2022). In the working area of Miri Public Health Center, Sragen Regency, this problem is also evident. The number of women of reproductive age in Miri District reached 8,980, while couples of reproductive age using implant contraception were only 1,228 or 17.19%. This achievement is still lower than several other public health center working areas in Sragen Regency,

such as Kalijambe, Jenar, and Kedawung II Public Health Centers.

The decision to use implant contraception is influenced by various related factors. These factors include internal factors, such as education, knowledge, and attitudes toward implants, as well as external factors, such as access to health services, distance to health facilities, availability of services, and support from family, health workers, cadres, and the community (Rahmi and Hadi, 2020; Baihaqi, 2025; Muzyati et al., 2026). Women with good knowledge and positive attitudes toward implants are more likely to understand the benefits and risks of this method. Conversely, limited information, negative perceptions, and lack of social support can become barriers to decision-making regarding implant use.

The PRECEDE–PROCEED Model is relevant for explaining the factors that influence health behavior, including the decision to use implant contraception. This model explains that health behavior is shaped by three main factors: predisposing factors, enabling factors, and reinforcing factors (Mahmoud et al, 2020; Khademi and Kaveh, 2025). Predisposing factors include education, knowledge, and attitude. Enabling factors include the availability of health facilities, access to services, distance to health facilities, and competent health workers. Reinforcing factors include support from husbands, families, health workers, cadres, and the community. These three factors need to be analyzed together because contraceptive decisions are often influenced not only by individual readiness, but also by service conditions and social support.

Based on this explanation, this study aims to analyze the direct and indirect effects of predisposing factors, enabling factors, and reinforcing factors on decision-

making regarding the use of implant contraceptive methods among women of reproductive age in the working area of Miri Public Health Center, Sragen Regency. This study is important because previous studies have often examined these factors separately, so they have not fully explained how implant-use decisions are formed. By using the PRECEDE–PROCEED Model, this study is expected to provide a more systematic and comprehensive understanding of the determinants of implant contraceptive use.

SUBJECTS AND METHOD

1. Study Design

This study uses an analytical observational design with a cross-sectional approach. The study was conducted at Miri Public Health Center, Sragen, Central Java, Indonesia, from January to February 2026.

2. Population and Sample

The target population was all women of reproductive age. The source population or accessible population consists of women of reproductive age who live in the working area of Miri Public Health Center, and are registered as either active or inactive family planning participants. The study sample consists of women of reproductive age who meet the inclusion and exclusion criteria.

The sample size was calculated using the Slovin formula with a population of 8,980 women of reproductive age and a 5% margin of error, resulting in a minimum sample of 383 respondents. To anticipate the possibility of respondents being unwilling to participate or withdrawing from the study, the sample size was increased by 10%, resulting in a final total sample of 422 respondents. The sampling technique used is a fixed control sampling technique, with respondents selected purposively based on the predetermined inclusion and exclusion criteria.

3. Study Variables

The dependent variable was decision-making regarding the use of implant contraceptive methods. The independent variables consist of three groups of factors based on the PRECEDE–PROCEED Model. First, predisposing factors include education, knowledge, and attitudes toward implant contraception. Second, enabling factors include the availability of health facilities, access to services, and distance to health facilities. Third, reinforcing factors include family support, social support, and community support.

4. Operational Definition of Variables

Education refers to the respondent's highest level of formal education.

Age refers to the respondent's age at the time of data collection.

Occupation refers to the respondent's employment status or main daily activity.

Income refers to the respondent's or household's economic condition that may influence access to contraceptive services.

Attitude refers to the respondent's positive or negative response toward the use of implant contraception.

Knowledge refers to the respondent's understanding of implant contraception, including its benefits, side effects, duration of use, procedure, and suitability as a contraceptive method.

Enabling factors are conditions that make it possible or easier for women of reproductive age to obtain implant contraceptive services.

Family support refers to support provided by husbands or family members in the form of approval, motivation, information, and assistance in the decision-making process related to implant contraception.

Social support refers to support from health workers, cadres, peers, or the surrounding social environment in

providing information, encouragement, and a sense of security regarding the use of implant contraception.

Community support refers to the role of the community, community leaders, religious leaders, health cadres, or local organizations in encouraging, facilitating, and creating a supportive environment for the use of implant contraception.

Decision-making use implant refers to the respondent's process of considering, choosing, and deciding whether or not to use implant contraception.

5. Study Instruments

The research data will be collected using a closed-ended questionnaire developed based on the study variables. The instrument for measuring knowledge of implant contraception uses a questionnaire with true-or-false responses. The instrument for measuring attitudes toward implant contraception uses a Likert scale. Enabling factors, family support, social support, and community support are also measured using Likert-scale questionnaires. Mothers' knowledge of implant contraception is measured using a questionnaire consisting of 29 question items. Mothers' attitudes toward implant contraception are measured using 18 Likert-scale statements. Access to and availability of family planning services are measured using 3 Likert-scale statements. Family support is measured using 9 statements, social support using 6 statements, and community support using 3 statements. Decision-making regarding implant contraceptive use is measured using 1 question with two categories: using and not using implant contraception.

6. Data analysis

Data analysis will be conducted using univariate, bivariate, and multivariate analyses. Univariate analysis is used to

describe respondents' characteristics and the distribution of each research variable. Bivariate analysis is performed using the Chi-square test to determine the relationship between the independent variables and the dependent variable. Multivariate analysis is conducted using path analysis with the assistance of STATA 13 software. Path analysis is used to analyze the direct and indirect effects of predisposing factors, enabling factors, and reinforcing factors on decision-making regarding the use of implant contraceptive methods. The stages of path analysis include model specification, model identification, model fit testing, parameter estimation, and model modification if necessary.

7. Research Ethics

This study observes ethical principles in research involving human respondents. Each respondent will be given an explanation regarding the purpose, benefits, procedures, and rights of respondents before data collection is carried out. The data obtained will only be used for research purposes. Ethical approval for the study will be obtained from the authorized Health Research Ethics Committee. Ethical clearance was obtained with approval number 2.571/XII/HREC/2025, dated December 12, 2025, and issued by Dr. Moewardi General Hospital, Indonesia.

RESULTS

1. Sample Characteristics

This study involved 422 women of reproductive age. The distribution of sample characteristics showed variations in sample characteristics, both in terms of demographic aspects and health behavior factors. These characteristics are important to describe the condition of the study population and to provide a basis for understanding the relationship between predisposing factors, enabling factors, reinforcing factors,

and the decision to use implant contra- ceptive methods.

Table 1. characteristics of Respondents

Variable	n	%
Age		
<35 years	182	43.13
≥35 years	240	56.87
Education		
<Senior High School	209	49.53
≥Senior High School	213	50.47
Occupation		
Not working	244	57.82
Working	178	42.18
Income		
<Regional Minimum Wage IDR 2,300,000	270	63.98
≥Regional Minimum Wage IDR 2,300,000	152	36.02
Knowledge		
Low	48	11.37
High	374	88.63
Attitude		
Negative	206	48.82
Positive	216	51.18
Enabling factors		
Difficult	55	13.03
Easy	367	86.97
Family support		
Low	226	53.55
High	196	46.45
Social support		
Low	149	35.31
High	273	64.69
Community support		
Low	89	21.09
High	333	78.91
Implant contraceptive use		
Not using implant contraception	211	50.00
Using implant contraception	211	50.00

2. Bivariate Analysis

Based on the results of the bivariate analysis, respondents aged ≥35 years had a higher proportion of implant contraceptive use than respondents aged <35 years. Mothers aged ≥35 years had 15.54 times greater odds of using implant contraception compared with mothers aged <35 years (OR=15.54; 95% CI=9.53 to 25.36; $p < 0.001$). This means that age was strongly associated with implant contraceptive use,

and the association was statistically significant.

Education was also associated with implant contraceptive use. Respondents with an education level of ≥Senior High School had lower odds of using implant contraception compared with respondents with an education level of <Senior High School (OR=0.25; 95% CI=0.16 to 0.37; $p < 0.001$). An OR value of less than 1 indicates that an education level of ≥Senior High School reduced the likelihood of

implant contraceptive use in the bivariate analysis. Employment status showed a similar pattern, in which working mothers had lower odds of using implant contraception than non-working mothers (OR= 0.35; 95% CI=0.23 to 0.53; $p<0.001$).

For the income variable, respondents with income $\geq$ Regional Minimum Wage had lower odds of using implant contraception than respondents with income $<$ Regional Minimum Wage (OR=0.24; 95% CI=0.16–0.37; $p<0.001$). High knowledge was associated with increased odds of implant contraceptive use. Mothers with high knowledge had 7.02 times greater odds of using implant contraception compared with mothers with low knowledge (OR= 7.02; 95% CI=3.07 to 16.00; $p<0.001$).

A positive attitude toward implant contraception showed a strong association with implant contraceptive use. Mothers with a positive attitude had 15.77 times greater odds of using implant contraception compared with mothers with a negative attitude (OR=15.77; 95% CI=9.79 to 25.30; $p<0.001$). Enabling factors were also associated with implant contraceptive use. Respondents who perceived access and facility availability as easy had 4.24 times greater odds of using implant contraception compared with respondents who perceived access as difficult (OR=4.24; 95% CI=2.17–8.31; $p<0.001$).

Family support, social support, and community support were also associated with implant contraceptive use. Respondents with high family support had 7.97 times greater odds of using implant contraception compared with respondents with low family support (OR=7.97; 95% CI= 5.15–12.30; $p<0.001$). Social support was the variable with the strongest association, in which respondents with high social support had 20.78 times greater odds of using implant contraception compared with respondents with low social support (OR= 20.78; 95% CI=11.62–37.16; $p<0.001$). Respondents with high community support had 7.76 times greater odds of using implant contraception compared with respondents with low community support (OR= 7.76; 95% CI=4.21–14.30; $p<0.001$).

Overall, the results of the bivariate analysis showed that age, education, employment status, income, knowledge, attitude, enabling factors, family support, social support, and community support were significantly associated with the use of implant contraceptive methods. The variable with the strongest association was social support (OR=20.78), followed by positive attitude (OR=15.77) and age ≥ 35 years (OR=15.54). This indicates that implant contraceptive use is influenced not only by individual factors but also by social support and the respondents' surrounding environment.

Table 2. Bivariate Analysis

Variables	Implant Contraception Use				OR	p
	No		Yes			
	N	%	N	%		
Age						
≥35 years	59	24.58	181	75.42	15.54	<0.001
<35 years	152	83.52	30	16.48		
Education						
≥Senior High School	142	66.67	71	33.33	0.25	<0.001
<Senior High School	69	33.34	140	60.66		
Occupation						

Variables	Implant Contraception Use				OR	p
	No		Yes			
	N	%	N	%		
Working	115	64.61	63	35.39	0.35	<0.001
Not working	96	39.34	148	60.66		
Income						
≥Regional Minimum Wage	109	71.71	43	28.29	0.24	<0.001
IDR 2,300,000						
<Regional Minimum Wage	102	37.78	168	62.22		
IDR 2,300,000						
Knowledge						
High	170	45.45	204	54.55	7.02	<0.001
Low	41	85.42	7	14.58		
Attitude						
Positive	45	20.83	171	79.17	15.77	<0.001
Negative	166	80.58	40	19.42		
Enabling factors						
Easy	168	45.78	199	54.22	4.24	<0.001
Difficult	43	78.18	12	21.82		
Family support						
High	48	24.49	148	75.51	7.97	<0.001
Low	163	72.12	63	27.88		
Social support						
High	78	28.57	195	71.43	20.78	<0.001
Low	133	89.26	16	10.74		
Community support						
High	136	40.96	197	59.04	7.76	<0.001
Low	75	84.27	14	15.73		

3. Multivariate analysis

The results of the path analysis showed that education had a direct negative effect on implant contraceptive use and was statistically significant ($b=-1.09$; 95% CI= -1.80 to -0.38 ; $p=0.003$). This means that the higher the respondent's education category, the lower the tendency to use implant contraception in this model.

Age had a direct positive effect on implant contraceptive use and was statistically significant ($b=2.56$; 95% CI= 1.82 to 3.31 ; $p<0.001$). This result indicates that respondents in the older age group were more likely to use implant contraception.

Occupation had a direct negative effect on implant contraceptive use and was statistically significant ($b=-1.00$; 95% CI= -1.73 to -0.28 ; $p=0.006$). This means that working mothers tended to have a lower

likelihood of using implant contraception compared with the reference group.

Income did not show a significant direct effect on implant contraceptive use ($b=-0.65$; 95% CI= -1.47 to 0.17 ; $p=0.118$). This indicates that, after being analyzed together with other variables, income was not proven to be a direct determining factor of implant contraceptive use.

Enabling factors also did not show a significant direct effect on implant contraceptive use ($b=0.62$; 95% CI= -0.91 to 2.15 ; $p=0.430$). This indicates that the availability of health facilities, access to services, and distance to health facilities were not meaningful direct factors in determining the decision to use implant contraception after being controlled for other variables.

Family support had a direct positive effect on implant contraceptive use and was

statistically significant ($b=0.94$; 95% CI= 0.22 to 1.65; $p=0.010$). This means that the better the family support received by respondents, the greater the likelihood that they would decide to use implant contraception.

Social support showed a strong direct positive effect on implant contraceptive use and was statistically significant ($b=2.75$; 95% CI=1.78 to 3.72; $p < 0.001$). This result indicates that support from health workers, cadres, and the social environment is one of the important factors encouraging implant contraceptive use.

Attitude showed a strong direct positive effect on implant contraceptive use and was statistically significant ($b=2.57$; 95% CI= 1.82 to 3.33; $p < 0.001$). This result indicates that the more positive the mother's attitude toward implant contraception, the greater the likelihood that she would decide to use this method.

Overall, the variables that had significant direct effects on implant contraceptive use were education, age, employment status, family support, social support, and attitude. Meanwhile, income and enabling factors did not show significant direct effects. The variable with the strongest positive direct effect was social support ($b=2.75$; 95% CI= 1.78 to 3.72; $p < 0.001$), followed by attitude ($b=2.57$; 95% CI= 1.82 to 3.33; $p < 0.001$) and age ($b=2.56$; 95% CI= 1.82 to 3.31; $p < 0.001$).

The results of the indirect effect analysis showed that age had an effect on implant contraceptive use through attitude and was statistically significant ($b=1.17$; 95% CI=0.70 to 1.64; $p < 0.001$). This finding indicates that age plays a role in shaping mothers' attitudes toward implant contraception, which may subsequently influence the decision to use this method.

Knowledge had an effect on implant contraceptive use through attitude and was statistically significant ($b=0.82$; 95% CI= 0.04 to 1.59; $p=0.037$). This finding indicates that knowledge does not only function as cognitive information, but also contributes to the formation of a positive attitude, which then encourages the decision to use implant contraception.

Family support also had an indirect effect on implant contraceptive use through attitude and was statistically significant ($b=1.38$; 95% CI=0.91 to 1.85; $p < 0.001$). This means that support from husbands and families can strengthen mothers' acceptance of implant contraception, thereby increasing the likelihood that mothers will decide to use this method.

Social support did not show a statistically significant indirect effect through attitude ($b=0.42$; 95% CI=-0.17 to 1.01; $p=0.166$). This indicates that social support was not proven to influence implant contraceptive use through attitude formation in this analytical model.

Community support also did not show a statistically significant indirect effect through attitude ($b=0.66$; 95% CI=-0.04 to 1.36; $p=0.060$). A p value greater than 0.050 indicates that the effect of community support through attitude was not statistically significant.

Thus, attitude serves as an important mediating variable in the relationship between age, knowledge, and family support with the decision to use implant contraception. In contrast, social support and community support did not show significant indirect effects through attitude. These data refer to Table 3 of the GSEM path analysis results.

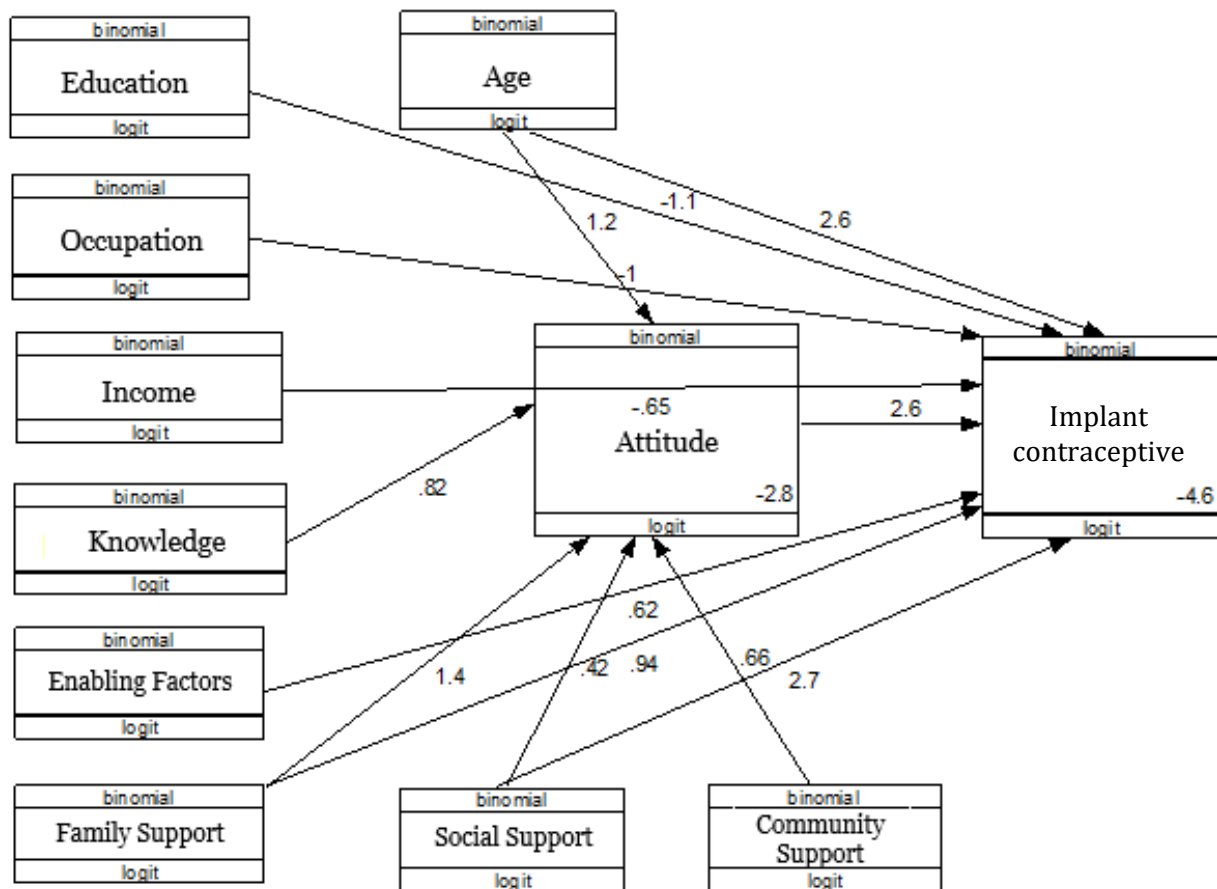


Figure 1. Generalized Structural Equation Modeling (GSEM) of PRECEDE–PROCEED Constructs on Decision-Making of Implant Contraceptive Use

Table 3. Results of the GSEM of PRECEDE–PROCEED Constructs on Decision-Making of Implant Contraceptive Use

Dependent variables	Independent variables	b	95% CI		p
			Lower limit	Upper limit	
Direct Effect					
Decide to use implant contraceptive	← Education	-1.09	-1.80	-0.38	0.003
	← Age	2.56	1.82	3.31	<0.001
	← Occupation	-1.00	-1.73	-0.28	0.006
	← Income	-0.65	-1.47	0.17	0.118
	← Enabling factors	0.62	-0.91	2.15	0.430
	← Family support	0.94	0.22	1.65	0.010
	← Social support	2.75	1.78	3.72	< 0.001
	← Attitude	2.57	1.82	3.33	<0.001
Indirect Effect					
Attitude	← Age	1.17	0.70	1.64	<0.001
	← Knowledge	0.82	0.04	1.59	0.037
	← Family support	1.38	0.91	1.85	<0.00
	← Social support	0.43	-0.17	1.01	0.166
	← Community support	0.66	-0.04	1.36	0.060

DISCUSSION

The Effect of Age on Decision Making Regarding Implant Contraceptive Use

The results of the multivariate analysis showed that age influenced decision making regarding the use of implant contraception among women of reproductive age. Respondents in the older age group were more likely to choose implant contraception than respondents in the younger age group. Statistically, age had a positive effect on implant contraceptive use. This finding indicates that age was a strong and significant predictor of decision making regarding implant contraceptive use.

This result is consistent with previous studies showing that age is associated with contraceptive behavior. Beyene et al., (2023) reported that women aged 35–49 years were more likely to use contraception than younger women. Fekadu *et al.*, (2019) found that reproductive maturity, pregnancy experience, and knowledge were related to the use of long-acting contraceptive methods. Mekonnen, (2022) also emphasized that implant contraceptive use is influenced by reproductive characteristics, decision-making factors, knowledge, and exposure to family planning information. Gobena and Kassie, (2024) reported a different pattern, in which younger women were more likely to use modern contraceptive methods. This difference suggests that the relationship between age and contraceptive use may vary depending on social context, fertility intention, access to services, and the type of contraceptive method being analyzed.

Theoretically, older women may have greater experience with pregnancy, childbirth, and family planning services. They may also have clearer fertility goals, particularly when they want to space or limit births. Therefore, implant contraception

may be perceived as a suitable method because it is long-acting, effective, and does not require daily adherence. In contrast, younger women may still have concerns about side effects, future fertility, partner approval, or limited knowledge about long-acting reversible contraceptive methods.

The Effect of Education on Decision Making Regarding Implant Contraceptive Use

The results of the multivariate analysis showed that education influenced decision making regarding implant contraceptive use among women of reproductive age. Based on the GSEM results, education had a negative effect on implant contraceptive use. This finding indicates that respondents with higher levels of education were not always more likely to use implant contraception. In other words, higher educational attainment did not automatically increase the likelihood of choosing implant contraception as a contraceptive method.

This finding is interesting because it differs from several previous studies which reported that higher education was associated with greater acceptance of long-acting contraceptive methods. Gobena and Kassie, (2024) found that education was related to the use of long-acting reversible contraceptives because women with higher education generally had better access to information and greater ability to understand the benefits of contraception. Oktaviani, et.al, (2025) also reported that women with higher education had a greater likelihood of using implant contraception than those with lower education. Similarly, Jonas *et al.*, (2021) found that completion of secondary education was associated with intention to use contraceptive implants. However, the finding of the present study is more consistent with Rahmi and Hadi, (2020) who suggested that implant use may be more common among women with lower

educational levels because they may be more receptive to recommendations from health workers or their social environment. D'Souza *et al.*, (2022) also found that education was not always significantly associated with implant contraceptive use.

Theoretically, education can improve an individual's ability to receive, understand, and evaluate health information. However, in the context of implant contraceptive use, higher education does not always lead to a stronger decision to use implants. Women with higher education may be more critical, selective, and cautious in choosing a contraceptive method. They may consider side effects, menstrual changes, compatibility with their body condition, experiences of other users, and preference for contraceptive methods that they perceive as easier to control (Pazol *et al.*, 2015). In contrast, women with lower education may rely more on advice from health workers, cadres, husbands, family members, or experiences within their social environment when making contraceptive decisions.

This finding suggests that education should not be understood merely as a factor that directly increases implant contraceptive use. Education may shape how respondents assess the risks, benefits, comfort, and suitability of a contraceptive method. Therefore, the decision to use implants is not determined only by educational level, but also by the quality of information received, previous contraceptive experiences, husband or family support, trust in health workers, and perceptions of side effects.

The Effect of Occupation on Decision Making Regarding Implant Contraceptive Use

The results of the multivariate analysis showed that occupation had a significant effect on decision making regarding

implant contraceptive use among women of reproductive age. The GSEM results indicated that occupation had a negative effect on implant contraceptive use. This result indicates that occupational status was significantly associated with the decision to use implant contraception. Respondents who were working had lower odds of using implant contraception compared with those who were not working.

This finding suggests that being employed does not always increase the likelihood of using implant contraception. In some contexts, working women may have better economic resources, wider access to information, and greater autonomy in health-related decision making. However, the present finding shows the opposite direction, indicating that working respondents may face specific barriers in choosing implant contraception. These barriers may include limited time to visit health facilities, concerns about side effects that could interfere with work activities, fear of pain or discomfort after insertion, difficulty attending follow-up visits, or preference for contraceptive methods perceived as more flexible and easier to discontinue (Shimels *et al.*, 2025).

This result is different from Oktaviani *et al.* (2025), who found that employed respondents were more likely to use contraceptive implants than unemployed respondents. It is also different from Ningrum *et al.* (2016), who reported that working outside the home could be an additional factor supporting the use of long-term contraceptive methods. Bhandari *et al.* (2019) also showed that occupational characteristics, particularly the husband's occupation, could influence the use of long-acting reversible contraception. However, other studies have reported inconsistent findings. Iffa *et al.* (2025) found that occupation did not show a significant association with interest

in using implant contraception, while studies on unmet need for family planning also suggest that employment status does not always determine women's contraceptive intentions. These differences indicate that the influence of occupation may vary depending on local context, type of work, access to services, household decision-making patterns, and the quality of family planning counseling.

Theoretically, occupation may influence contraceptive decision making through several pathways. First, employment can affect time availability. Women who work may have limited opportunities to access family planning services during health facility operating hours. Second, employment may influence perceived risk. Working women may be more concerned about side effects such as irregular bleeding, dizziness, arm discomfort, or menstrual changes because these conditions may interfere with productivity. Third, occupation may shape autonomy and preference. Women with paid work may have stronger preferences for methods they perceive as controllable, temporary, or easier to stop. Therefore, although implant contraception is highly effective and long-acting, it may not always be perceived as the most suitable method by working women.

The Effect of Income on Decision Making Regarding Implant Contraceptive Use

The results of the multivariate analysis showed that income did not have a statistically significant direct effect on decision making regarding implant contraceptive use among women of reproductive age. The GSEM results showed that income had a negative but non-significant effect on implant contraceptive use. This finding indicates that income was not a dominant direct determinant of implant contraceptive

use after being analyzed together with other variables in the model.

This finding suggests that the economic condition of respondents or households did not independently determine the decision to use implant contraception. Although income may influence the ability to access health services, pay transportation costs, or obtain contraceptive-related information, its effect may become weaker when other factors such as knowledge, attitude, family support, social support, availability of health facilities, and access to family planning services are included in the model. In other words, income may influence implant contraceptive use indirectly rather than directly.

This result differs from Bolarinwa et al. (2020), who found that household wealth was associated with the use of long-acting reversible contraceptives among women of reproductive age. Similarly, Kupoluyi et al. (2025) reported that women in certain wealth groups were more likely to use long-acting reversible contraceptive methods, suggesting that socioeconomic position may influence access to information and family planning services. A study conducted in Kulon Progo also found a significant relationship between income and implant contraceptive use. In addition, Harokan et al. (2025) reported that socioeconomic status was significantly associated with implant use. However, the finding of the present study indicates that income may not always function as a direct predictor when analyzed simultaneously with other stronger determinants.

Theoretically, income can affect contraceptive decision making through access to services, transportation, affordability, and exposure to health information. However, in settings where family planning services are subsidized, available through public health facilities, or supported by

community-based programs, income may no longer become the main barrier. Women with lower income may still be able to access implant contraception if services are affordable and health workers actively provide counseling. Conversely, women with higher income may not necessarily choose implants if they have concerns about side effects, prefer other contraceptive methods, or receive inadequate counseling.

The Effect of Knowledge on Attitude Toward Implant Contraception

Knowledge in this study refers to respondents' understanding of implant contraception, including its definition, mechanism of action, effectiveness, duration of protection, side effects, and benefits. The GSEM results showed that knowledge had a significant positive effect on attitude toward implant contraception. This finding indicates that respondents with better knowledge were more likely to have a positive attitude toward implant contraception.

This result is consistent with previous studies showing that knowledge plays an important role in shaping women's perceptions and attitudes toward contraceptive methods. Tegegne et al. (2024) found that knowledge, attitude, and practice were important components related to implant use among married women of reproductive age. Vachhani et al. (2025) also reported that awareness and knowledge of contraceptive implants remained limited, and improvement through information, education, and communication was needed to increase acceptance. Similarly, Almualm (2022) found that women's knowledge and attitude toward implant contraception were important aspects in understanding acceptance of the method. Kasa et al. (2018) emphasized that knowledge and attitude are closely related to family planning

practice among women of reproductive age. From a theoretical perspective, Hall (2011) explained that health beliefs, perceived benefits, perceived barriers, and cues to action can influence contraceptive behavior, suggesting that knowledge can shape how women evaluate the advantages and disadvantages of contraception.

Theoretically, knowledge can influence attitude because information allows respondents to understand the benefits, risks, and suitability of implant contraception. Women who understand that implants are long-acting, effective, reversible, and do not require daily adherence may develop a more favorable attitude toward this method. Good knowledge can also reduce fear, misconceptions, and uncertainty, particularly regarding side effects, insertion procedures, removal procedures, and the return of fertility after discontinuation. In contrast, limited knowledge may lead to negative attitudes due to fear of infertility, excessive bleeding, pain, or misunderstanding about how implants work.

This finding suggests that attitude toward implant contraception is not formed spontaneously, but is influenced by the quality and accuracy of information received by respondents. Respondents with better knowledge are more likely to evaluate implant contraception rationally and positively. Therefore, knowledge serves as an important cognitive foundation for building acceptance and confidence toward implant use.

The Effect of Attitude on Decision Making Regarding Implant Contraceptive Use

Attitude refers to the respondent's positive or negative response toward the use of implant contraception. The results of the multivariate analysis showed that attitude had a strong positive effect on implant contraceptive use. This finding indicates

that women with a positive attitude toward implant contraception were far more likely to use the method than women with a negative attitude.

This result is consistent with previous studies showing that attitude is an important determinant of contraceptive behavior. Tegegne et al. (2024) found that knowledge, attitude, and practice were closely related to implant use among married women of reproductive age. Harokan (2025) also reported that attitude was significantly associated with contraceptive implant use and was one of the strongest determinants in the model. Handayani et al. (2022) showed that ideational factors, including knowledge, attitude, social support, and interpersonal discussion, were associated with long-acting reversible contraceptive behavior. Kasa et al. (2018) also emphasized that women's attitudes toward family planning were related to family planning practice. In addition, Feriani et al. (2024), in a systematic review, highlighted that contraceptive intention and use are shaped by individual-level and social-contextual factors, including perceptions, beliefs, and social norms.

Theoretically, attitude is an important psychological factor that influences health-related decision making. Women who have a positive attitude toward implant contraception may perceive the method as effective, safe, practical, long-acting, and suitable for birth spacing or limiting pregnancy. A positive attitude may also reduce hesitation, fear, and uncertainty in choosing implants. In contrast, women with a negative attitude may be influenced by concerns about side effects, fear of insertion, menstrual changes, myths about infertility, or negative experiences shared by others.

This finding suggests that decision making regarding implant contraceptive

use is not determined only by access to services or sociodemographic characteristics, but also by how women evaluate the method. A positive attitude can strengthen acceptance, confidence, and willingness to use implant contraception. Therefore, attitude can be considered a key determinant in the pathway toward implant contraceptive use.

The Effect of Enabling Factors on Decision Making Regarding Implant Contraceptive Use

Enabling factors in this study refer to conditions that make it possible or easier for women of reproductive age to obtain implant contraceptive services. These factors include the availability of health facilities, access to family planning services, and distance to health facilities. The GSEM results showed that enabling factors did not have a statistically significant direct effect on implant contraceptive use. This finding indicates that although service availability and access are important, they were not sufficient to directly determine implant contraceptive use after other variables were included in the model.

This result suggests that the presence of health facilities, access to family planning services, and shorter distance to health facilities do not automatically lead women to use implant contraception. Enabling factors may create opportunities for service utilization, but the final decision to use implants may still depend on individual and interpersonal factors such as knowledge, attitude, husband's support, family support, trust in health workers, perceived side effects, and previous contraceptive experience. Therefore, enabling factors may function more as supporting conditions rather than as direct determinants of implant contraceptive use.

This finding is partly different from Khan et al. (2022), who found that the

availability and readiness of health facilities were associated with long-acting modern contraceptive use in Bangladesh. Escamilla et al. (2019) also emphasized that women who want to use long-acting reversible contraception may need access to facilities that provide LARC services and have adequate technical capability. However, the present finding is consistent with Babazadeh et al. (2021), who reported that proximity to family planning service delivery points did not necessarily determine modern contraceptive use. Their study suggested that barriers other than physical access, such as cognitive access, economic barriers, sociocultural norms, and bypassing nearby facilities, may play an important role. This shows that access to services is multidimensional and cannot be understood only through distance or facility availability.

Theoretically, enabling factors are important because they provide the structural conditions that allow women to obtain contraceptive services. However, structural availability does not always result in actual use. A woman may live near a health facility and have access to family planning services, but she may still refuse implant contraception if she has fear of side effects, negative attitudes, lack of knowledge, limited husband's approval, or low confidence in the provider. Conversely, a woman who lives farther from a facility may still use implants if she has strong motivation, adequate knowledge, positive attitude, and strong family or social support.

This finding indicates that improving service availability alone may not be sufficient to increase implant contraceptive use. Health facilities must also ensure the quality of counseling, provider competence, privacy, affordability, method availability, and follow-up services. In addition, com-

munity-based education and outreach are needed so that women do not only have physical access to services, but also have cognitive and emotional readiness to use implant contraception.

The Effect of Family Support on Attitude and Decision Making Regarding Implant Contraceptive Use

Family support refers to support provided by husbands or family members in the form of approval, motivation, information, and assistance in the decision-making process related to implant contraception. The results of the multivariate analysis showed that family support had a significant positive effect on implant contraceptive use. Family support also had a significant positive effect on attitude toward implant contraception. These findings indicate that family support influences implant contraceptive use both directly and indirectly through attitude.

This result suggests that women who receive support from husbands or family members are more likely to have a positive attitude toward implant contraception and are also more likely to use the method. Family support may strengthen women's confidence, reduce fear, and provide emotional reassurance during the decision-making process. In addition, approval from husbands or family members may reduce interpersonal barriers, especially in social contexts where reproductive decisions are often discussed and negotiated within the family.

This finding is consistent with previous studies showing that husband or family support plays an important role in contraceptive behavior. Utami et al. (2022) found that husband's support, together with knowledge and attitude, influenced the use of long-acting reversible contraceptive methods in Yogyakarta. Sianturi et al. reported that husband support affected the

use of implant contraception among women of reproductive age in Dairi, North Sumatera, Indonesia. Susanti et al. (2022) also emphasized that husband involvement was important in reducing implant discontinuation, suggesting that partner support is relevant not only for initiation but also for continuation of implant use. Similarly, Balogun et al. (2016) found that women who perceived support from their male partners were more likely to use contraception effectively. These findings support the argument that reproductive decision making is influenced not only by individual factors but also by interpersonal and family-level support.

Theoretically, family support may influence implant contraceptive use through two pathways. First, it may have a direct effect by providing approval, encouragement, transportation, financial support, and assistance in accessing health services. Second, it may have an indirect effect by shaping women's attitudes toward implant contraception. When husbands or family members provide positive information, emotional support, and reassurance, women may develop a more favorable perception of implants as an effective, safe, and acceptable contraceptive method. Conversely, lack of family support may create hesitation, fear, conflict, or refusal, even when health services are available.

This finding indicates that family support is an important determinant in the decision-making process regarding implant contraceptive use. The significant direct effect shows that support from husbands or family members can facilitate actual use of implants. Meanwhile, the significant effect on attitude shows that family support can also shape psychological readiness and acceptance before a woman decides to use the method. Therefore, family support can be understood as both a practical and

psychosocial factor in implant contraceptive decision making.

The Effect of Social Support on Decision Making Regarding Implant Contraceptive Use

Social support refers to support from health workers, family planning cadres, peers, or the surrounding social environment in providing information, encouragement, and a sense of security regarding the use of implant contraception. The results of the multivariate analysis showed that social support had the strongest direct effect on implant contraceptive use. However, social support did not have a statistically significant effect on attitude toward implant contraception. These findings indicate that social support may influence behavior more directly through encouragement, facilitation, and service guidance rather than through attitude formation.

This result suggests that social support is a key external factor in the decision-making process regarding implant contraceptive use. Support from health workers, cadres, peers, and the surrounding social environment may help women obtain accurate information, access services, feel more secure, and overcome practical barriers to using implants. The strong direct effect shows that women who receive social support are far more likely to use implant contraception. However, the non-significant effect on attitude indicates that social support may not necessarily change women's personal evaluation or emotional response toward implants. In other words, social support may encourage actual use even when attitude has not changed substantially.

This finding is consistent with Handayani et al. (2022), who found that ideational factors, including social support and interpersonal discussion, were associated with long-acting reversible contra-

ceptive behavior. Laput et al. (2021) also reported that information from health workers was one of the most influential factors in the use of implant contraception among women of reproductive age. Similarly, Iffa et al. (2025) found that information from healthcare providers was significantly related to women's interest in using implant contraceptives. Feriani et al. (2024), in a systematic review, also emphasized that contraceptive use is shaped by individual and community-level determinants, including peer influence, socio-cultural factors, healthcare access, and male partner participation. These studies support the view that contraceptive behavior is not only determined by individual knowledge or attitude, but also by social interaction, service guidance, and supportive environments.

Theoretically, social support may influence implant contraceptive use through several mechanisms. First, informational support from health workers and cadres can help women understand the benefits, effectiveness, side effects, insertion procedure, removal procedure, and return of fertility after implant use. Second, emotional support from peers or the surrounding environment can reduce fear, hesitation, and uncertainty. Third, practical support may help women access health facilities, obtain referrals, or receive guidance during the service process. Fourth, normative support from the social environment may create a sense that implant contraception is acceptable and commonly used.

The non-significant effect of social support on attitude may occur because attitude is more closely related to internal beliefs, previous experiences, perceived side effects, and personal interpretation of information. Social support may provide encouragement and facilitate access, but it may

not be strong enough to change deeper perceptions or concerns about implant contraception. For example, a woman may receive encouragement from health workers or cadres and eventually use an implant, but she may still have concerns about menstrual changes, pain during insertion, or possible side effects. Therefore, social support may be more effective in moving women toward service utilization than in transforming their personal attitudes.

The implication of this finding is that family planning programs should strengthen the role of health workers, family planning cadres, and peer educators in guiding women toward implant contraceptive services. Counseling should not only provide information but also actively assist women in navigating the service process. Health workers and cadres should provide reminders, referrals, follow-up communication, and reassurance after insertion. Peer-based education may also be useful because women often trust experiences shared by other implant users. However, because social support did not significantly affect attitude, counseling should also directly address fears, myths, misconceptions, and negative beliefs about implants.

The Effect of Community Support on Attitude Toward Implant Contraception

Community support refers to the role of cadres, health workers, or community leaders in providing education and facilitating communication related to the use of implant contraception. In this study, community support was analyzed as a predictor of attitude toward implant contraception. The results of the multivariate analysis showed that community support had a positive but not statistically significant effect on attitude. Although the result was not statistically significant at the 0.05 level, the direction of the effect was posi-

tive. This suggests that stronger community support may contribute to more positive attitudes toward implant contraception, but the evidence in this study was not strong enough to confirm a significant effect.

This finding indicates that community support may have a potential role in shaping women's attitudes toward implant contraception, but its effect was not sufficiently strong in the present model. Cadres, health workers, and community leaders may provide information, encouragement, and communication channels that help women become more familiar with implant contraception. However, attitude is a personal psychological response that may be influenced more strongly by individual knowledge, previous contraceptive experience, perceived side effects, family approval, husband's support, and trust in health workers. Therefore, community support may contribute to attitude formation, but it may not be the main determinant when other factors are considered simultaneously.

This result is partly consistent with Gupta et al. (2020), who showed that community attitudes and gendered influences may shape decision-making pathways around contraceptive implant use. Rahmidini and Hartiningrum (2021) also found that health-worker support was directly related to family planning acceptor participation, indicating that community-based health actors can influence family planning behavior. Mariati et al. (2021) reported that the role of cadres was one of the dominant factors influencing the selection of long-term contraceptive methods. In addition, Potgieter et al. (2018) emphasized that social influences, counseling, communication, and fear of side effects affected women's choices regarding implantable contraception. These studies suggest that community support is relevant in contra-

ceptive decision making, although its effect may vary depending on the quality of communication, community trust, and women's personal beliefs.

Theoretically, community support may influence attitude through several mechanisms. First, cadres and health workers can provide accurate information about the benefits, effectiveness, duration of protection, side effects, insertion procedure, removal procedure, and return of fertility after implant use. Second, community leaders can help reduce stigma and increase social acceptance of family planning. Third, community-based communication can create a supportive environment in which women feel safer to discuss contraception. Fourth, repeated exposure to positive messages from trusted community figures may gradually reduce fear, myths, and misconceptions about implants.

However, the non-significant result in this study suggests that community support alone may not be sufficient to change women's attitudes toward implant contraception. A woman may receive information or encouragement from cadres or community leaders, but she may still have negative perceptions if she fears side effects, lacks personal confidence, receives limited support from her husband or family, or has heard negative experiences from other users. Thus, community support may create an enabling social environment, but attitude formation may require more personal, intensive, and individualized counseling.

The implication of this finding is that family planning programs should strengthen the quality, consistency, and credibility of community-based education. Cadres, health workers, and community leaders should not only promote implant contraception generally, but also address specific concerns about side effects, safety,

procedure, reversibility, and fertility after discontinuation. Community education should be integrated with individual counseling, couple counseling, and follow-up communication. Training for cadres is also important so that the information delivered to women is accurate, clear, and not based on myths or incomplete understanding.

AUTHOR CONTRIBUTION

All authors contributed to the conception and design of the study, data collection, data analysis, interpretation of results, and manuscript preparation. All authors reviewed, revised, and approved the final manuscript for publication.

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CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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