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(REVIEW ARTICLE)

Effect of knowledge and counseling on adherence to iron supplementation in pregnant women: A systematic literature review

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Abstract

Adherence is a determining factor for the success of iron supplementation programs in pregnant women. There are several factors that influence adherence, the most significant of which are knowledge of pregnant women and counseling by health workers. This systematic review of the literature aims to identify the effect of knowledge and counseling on pregnant women's adherence to taking iron supplementation. Literature searches were conducted through four main electronic databases, namely PubMed, Scopus, ScienceDirect, and Web of Science. Fourteen studies met the inclusion criteria and were eligible for review. The PRISMA approach is used in critically evaluating articles. Literature quality assessment was carried out using the quality assessment tool for quantitative studies from the EPHPP (Effective Public Health Practice Project). Findings are collected and summarized systematically. The results are categorized into two major themes. Consistent with previous research, this review explains that knowledge and counseling have a significant effect on adherence. Good knowledge increases adherence by two to five times, and counseling by health professionals increases adherence by two to four times.

Keywords: Adherence; Knowledge; Counseling; Iron Supplementation; Pregnancy

1. Introduction

The worldwide prevalence of anemia in pregnant women is estimated at 38%, with iron deficiency anemia as the main cause [1]. This happens because of the increased need for iron during pregnancy, but the availability of iron in the body is not sufficient, so additional iron supplementation is needed to meet the needs [2]. The World Health Organization (WHO) recommends taking at least 90 tablets of iron supplementation during pregnancy, with each tablet containing 30-60 mg of elemental iron and 0.4 g folic acid [3]. This iron tablet supplementation program has been carried out by countries all over the world for a long time, but the prevalence of anemia in pregnant women is still high. Adherence is the main key to the success of iron supplementation programs. Adherence is influenced by various factors, the most significant of which are the knowledge of pregnant women and the counseling provided by health workers in providing the information needed by pregnant women [4,5].

Knowledge among pregnant women about anemia and iron supplementation can increase mothers' awareness of the importance of behaving according to the advice given by health workers [6]. Health workers have an important role in conveying nutrition-related information to pregnant women to maintain maternal health and optimal fetal growth [7]. This literature study aims to discuss the effect of knowledge and counseling by health workers on adherence. Optimal counseling needs to be done to increase the knowledge of pregnant women so that they can change their perceptions and better comply with recommendations from health workers [6,7].

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Purpose

This review aims to determine the effect of pregnant women's knowledge and counseling by health workers on the adherence of mothers taking iron supplementation. So, the research question is: Does what pregnant women know and what health workers tell them to have any effect on how often mothers take iron supplements?

2. Material and methods

2.1. Design

This is secondary research with a systematic review. This review uses selected reporting items for a systematic review based on the PRISMA [8] guidelines

2.2. Searching the Literature

Literature research involved searching the main electronic databases: PubMed, Scopus, ScienceDirect, and Web of Science using relevant keywords.

2.2.1. Inclusion Criteria

- Research published in the last five years (2018-2022)
- Literature in English;
- Full text, open-access literature and original research can all be accessed.
- The literature describes the effect of knowledge and counseling on pregnant women's adherence to iron tablet supplementation.

2.2.2. Exclusion criteria

- Non-research studies (conference papers, book chapters, and reports) provide the literature.
- Studies are in the form of interventional, qualitative, systematic review, and case report studies.
- Mothers who have chronic diseases during pregnancy

2.3. Assessment of Quality

Research quality was measured using the Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project (EPHPP). This tool consists of 6 general assessment components: selection bias (participants taken), study design (research design), confounders (other variables related to outcomes that must be controlled), blinding (literature assessor), data collection method (evidence of validity and reliability), withdrawals and dropouts (the number of participants who joined or left during the study). Each component is assigned one of three ratings (1 = strong, 2 = moderate, and 3 = weak). After evaluating each component, it can be concluded that in general, a rating for literature is strong if no rating is weak, moderate if there is one weak rating, and weak if there are two or more weak ratings. For each study, we extracted the following information: author, title, literature database, journal, year, edition, volume, number, setting, research method, study design, participants, variables, instruments, statistical analysis, analysis of results, and summary of research results.

2.4. Data Extraction

To make it simpler for researchers to identify the literature, the data preparation process involves transferring significant information from the chosen literature into specific forms or tables.

3. Results

3.1. Search Results

Literature research involved searching the main electronic databases: PubMed, Scopus, ScienceDirect, and Web of Science using relevant keywords. Initially, this database was searched separately to find literature related to iron supplementation adherence using the Boolean operators "adherence" OR "compliance" AND "knowledge" OR "counseling" AND "iron supplementation" OR "iron-folic acid supplementation" AND "pregnancy."

The initial search found 2,693 articles in the electronic database. Then screening was carried out according to the inclusion and exclusion criteria so that a total of 14 articles were obtained for conducting literature studies in this study. The PRISMA flow chart in Figure 1 below shows the search and article selection process.

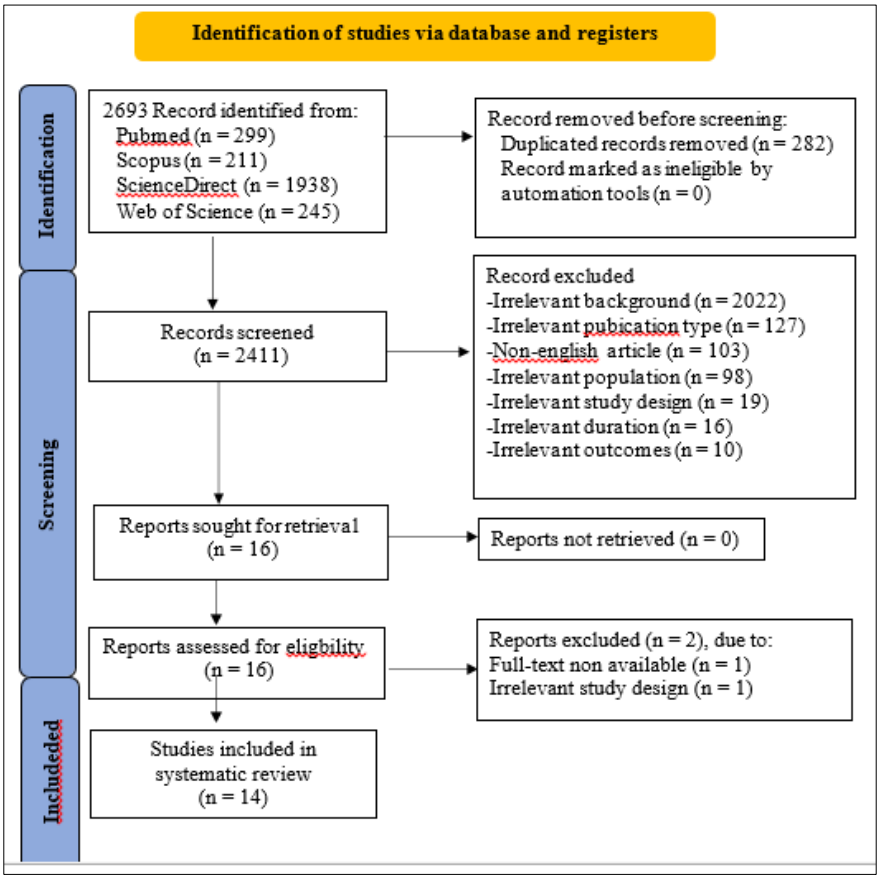

Figure 1 PRISMA flow diagram of study selection process

3.2. Characteristics of the Study

Characteristics of the literature are done by extracting data from each literature review. Of the 14 studies, a total of 4,996 participants were obtained with a cross-sectional study design, twelve studies were conducted in Ethiopia and two studies were conducted in India. The characteristics of the literature can be seen in table 1 below.

Table 1 Data on the characteristics of the literature reviewed

No	Author	Details
1.	[9] Assefa et al	Article title: Magnitude and factors associated with adherence to Iron and folic acid supplementation among pregnant women in Aykel town, Northwest Ethiopia
		Place: Aykel town, Northwest Ethiopia
		Study design: Cross-sectional
		Time: February-May 2018
		Number of participants: 412 participants
		The results of the study: Showed that the level of compliance with iron supplementation in pregnant women was 47.6%. Possibility of adherence is high among pregnant women who have knowledge about the benefits of iron supplementation [AOR = 3.56, 95% CI = (1.77, 7.14)] and have knowledge about anemia during pregnancy [AOR = 2.30, 95% CI = (1.15–4.59)]. Knowledge about

		anemia and iron supplementation were found to be significantly associated with adherence to iron tablet supplementation.
2.	[10] Debi et al	Article title: Compliance to iron-folic-acid supplementation and associated factors among pregnant women: A cross-sectional survey in a district of West Bengal, India
		Place: West Bengal, India
		Study design: Cross-sectional
		Time: March-June 2019
		Number of participants: 208 participants
		Research results: The compliance rate is 81.74%. The most common cause of disobedience was forgetfulness (73.7%). In multivariate regression analysis, age, history of deworming, and education were significant predictors of nonadherence to iron supplementation. No significant association was found between knowledge and compliance.
3.	[11] Demis et al	Article title: Iron and folic acid supplementation adherence among pregnant women attending antenatal care in North Wollo Zone northern Ethiopia: institution based cross-sectional study
		Location: North Wollo Zone, Ethiopia
		Study design: Cross-sectional
		Time: January 29 -March 16, 2018
		Number of participants: 422 participants
		The results of the study: The compliance status of pregnant women who came to the antenatal clinic as a whole was 43.1%. Receive counseling about iron and folic acid supplementation (AOR=2.93, 95% CI 1.43–6.03), good knowledge of anemia (AOR=2.25, 95% CI 1.32–3.82) and good knowledge of iron supplementation (AOR =2.47, 95% CI 1.47–4.16) statistically and positively related to adherence of pregnant women to iron supplementation
4.	[12] Gebremichael et al	Article title: Time to start and adherence to iron-folate supplement for pregnant women in antenatal care follow up; Northern Ethiopia
		Place: Mekelle, Northern part of Ethiopia
		Study design: Cross-sectional
		Time: February-April 2018
		Number of participants: 182 participants
		Result: Health education and counseling about iron supplementation (AOR =4.55, 95% CI =[1.534, 13.512]) are significantly associated with adherence to iron supplementation
5.	[13] Gebremichael & Welesamuel	Article title: Adherence to iron-folic acid supplement and associated factors among antenatal care attending pregnant mothers in governmental health institutions of Adwa town, Tigray, Ethiopia: Cross-sectional study
		Place: Adwa town, Tigray, Ethiopia
		Study design: Cross-sectional
		Time: 1 May-6 July 2018
		Number of participants: 623 participants
		Research results: Only 40.9% of the participants complied. Women who received nutritional counseling [AOR: 4.12(2.12–8.03)] and women who had satisfactory

		knowledge of iron supplementation (AOR: 2.16(1.37–3.40)) had a higher chance of adherence
6.	[14] Mamo et al	Article title: Adherence to prenatal iron folic acid supplementation and associated factors among pregnant women attending antenatal care services in Dilla town, South Ethiopia
		Place: Dilla town, South Ethiopia
		Study design: Cross-sectional
		Time: March 26-May 13 2018
		Number of participants: 396 participants
		Results: 172 (43.4%) pregnant women comply with iron supplementation. Knowledge of iron supplementation (AOR=2.28; 95% CI: (1.36–3.82); p=0.002), and anemia (AOR=2.30; 95% CI: (1.40–3.77); p=0.001) was a significant predictor of adherence to ironsupplementation
7.	[15] Mekonen & Alemu	Article title: Adherence to Iron with Folic Acid Supplementation Among Pregnant Women Attending Antenatal Care in Public Health Centers in Simada District, Northwest Ethiopia: Using Health Belief Model Perspective
		Location: South Gondar Zone, Northwest Ethiopia
		Study design: Cross-sectional
		Time: 24 February-23 March 2020
		Number of participants: 414 participants
		The results of the study: The level of adherence to iron supplementation among pregnant women was 67.6%. Counseling for iron supplementation (AOR=2.28; 95% CI: 1.15–4.53) is a significant factor related to adherence to iron supplementation
8.	[16] Molla et al	Article title: Factors associated with adherence to iron folate supplementation among pregnant women in West Dembia district, northwest Ethiopia: a cross-sectional study
		Place: West Dembia district, northwestern Ethiopia
		Study design: Cross-sectional
		Time: 2018
		Number of participants: 348 participants
		Results: Compliance with iron supplementation in this study was 52.9%. Women who had good knowledge about anemia (AOR: 2.63, 95% CI 1.51, 4.59), and iron supplementation (AOR: 2, 82, 95% CI 1.52-5.23) significantly related to adherence to iron supplementation.
9.	[17] Nasir et al	Article title: Adherence to iron and folic acid supplementation and prevalence of anemia among pregnant women attending the antenatal care clinic at Tikur Anbessa Specialized Hospital, Ethiopia
		Place: Addis Ababa, Ethiopia
		Study design: Cross-sectional
		Time: April 5-June 5 2019
		Number of participants: 250 participants
		Results: The level of adherence to iron supplementation was 63.6%. From multivariable binary logistic regression analysis, only gestational age at the first

		ANC visit and education level showed a statistically significant relationship with adherence to iron supplementation.
10.	[5] Obsa et al	Article title: Factors among Pregnant Women Attending Antenatal Clinic in Shalla District, Southwest Ethiopia: A Cross-Sectional Study
		Venue: Shalla district West Arsi Zone, Ethiopia
		Study design: Cross-sectional
		Time: February-April 2019
		Number of participants: 402 participants
		Results: The level of adherence to taking iron tablets was found (154) 38.3%, counseling about iron-folate supplements [(AOR= 11.39, 95% CI: 5.09–27.03)] was significantly related to adherence to iron supplements.
11.	[7] Palivela et al	Article title: Effect of direct monitoring by family members and counseling by health professionals on iron -folic acid supplementation: A cross-sectional study among pregnant women in Puducherry, India
		Place: Puducherry, India
		Study design: Cross-sectional
		Time: July-August 2019
		Number of participants: 250 participants
		Results: About 34.4% of respondents reported non-adherence to iron supplementation. Counseling by health professionals (AOR =2.97; P = 0.002) is associated with better adherence.
12.	[18] Ridwan & Shafi	Article title: Adherence to iron folate supplementation and associated factors among pregnant women attending antenatal care at public hospitals in Jigjiga Town, Somali Region, Ethiopia 2020
		Place: Jigjiga Town, Eastern Ethiopia
		Study design: Cross-sectional
		Time: March 1-30, 2020
		Number of participants: 264 participants
		Research results: Nearly 54.9% adhered to iron supplementation. Mothers who are knowledgeable about iron supplementation are twice as obedient as mothers who are less informed (AOR: 2.090; 95% CI: 1.134-3.852; P=0.018). Knowledge of iron supplementation is a significant determinant of adherence
13.	[6] Solomon et al	Article title: Adherence and associated factors to iron and folic acid supplementation among pregnant women attending antenatal care in public hospitals of Dire Dawa, Eastern Ethiopia
		Place: Dawa City, Eastern Ethiopia
		Study design: Cross-sectional
		Time: January 1-June 30, 2019
		Number of participants: 401 participants
		Research results: This study revealed that 71.8% of pregnant women had adhered to iron supplementation. Good knowledge about iron supplementation (AOR=3.56; 95% CI: 1.42–8.54) and anemia (AOR=5.22; 95% CI: 2.06–8.33) is significantly associated with supplementation adherence iron

14.	[19] Tegodan et al	Article title: Adherence to Iron and Folic Acid Supplements and Associated Factors Among Pregnant Mothers Attending ANC at Gulele Sub-City Government Health Centers in Addis Ababa, Ethiopia
		Place: Addis Ababa, Ethiopia
		Study design: Cross-sectional
		Time: May-June 2019
		Number of participants: 398 participants
		Results: The proportion of maternal adherence to iron supplementation was 62.3%. A total of 198 (49.7%) respondents had good knowledge about anemia. Knowledge about anemia is a significant factor associated with adherence to consuming iron tablets

4. Discussions

4.1. Sociodemographic Characteristics

Of the fourteen articles reviewed, most came from Ethiopia and India. Based on HDI (Human Development Index), India is included in the category of developing countries and Ethiopia is included in the category of poor countries. This classification is measured based on three dimensions: (1) long and healthy life, (2) knowledge, and (3) a decent standard of living. No literature was found originating from developed countries, for example from the European continent, so this research cannot describe compliance globally. According to research [20] found that the iron status of women of childbearing age in Europe varied by region and worsened in pregnancies without iron supplementation. These results can serve as a guide for future studies on iron supplementation adherence in European.

Based on the level of participant literature in the fourteen articles reviewed, many of them fall into the illiterate category and most only had a primer education. This can affect the mother's level of knowledge because the more education a mother has, the more information sources she can use, and the more she understands how important iron supplementation [17].

4.2. The Effect of Knowledge on Adherence

An analysis of the effect of anemia knowledge and iron tablet supplementation on pregnant women's adherence to consuming iron tablets was obtained from the ten articles reviewed. Eight articles stated that knowledge about anemia and iron tablet supplementation was one of the significant factors related to adherence [6,9,12,14,16–19], while the other two articles did not find a significant association between knowledge and the adherence of pregnant women to consuming iron tablets [10,17].

Knowledge about anemia was measured using a questionnaire containing questions relevant to the level of knowledge about anemia. Anemia knowledge questionnaire items include signs and symptoms of anemia, risk factors, causes, consequences of anemia on the mother and fetus, and knowing how to prevent and treat anemia. After carrying out a binary multivariate logistic test, it was found that mothers who had good knowledge about anemia were 2-5 times more likely to comply than mothers who had poor knowledge [6,9,11,14,16,19]. Knowledge of iron tablet supplementation increases the chances of adherence 2-3 times. Items used to measure knowledge about iron supplementation include knowing the benefits of iron supplementation, which can prevent and treat anemia, knowing the consequences if you miss it, and knowing how to treat the side effects of iron supplementation [6,11,13,14,16,18,19]. Knowledge can raise awereness of the importance of iron supplementation for maternal and fetal health, encouraging mothers to take iron supplementation during pregnancy [6,11,16].

The results of the other two literatures found no significant effect between knowledge on maternal adherence. The results of the two studies found other factors that significantly influenced adherence including age, deworming, education [10] and the gestational age of the mother when she first performed ANC [17].

4.3. The Effect of Counseling on Adherence

Adherence of pregnant women to taking iron supplementation is influenced by several factors, including forgetfulness, side effects, and fear of iron supplementation which causes large babies [17]. In this case the health worker is very

responsible for the information provided when counseling pregnant women. Information that needs to be conveyed during counseling includes the dangers of anemia in pregnancy, the importance of iron supplementation, and how to manage the side effects of iron supplementation [7]. Counseling provided by health workers increases maternal adherence 2-4 times [12,15]. This counseling service can increase the level of knowledge, awareness, attitude, and psychologically pregnant women can tolerate side effects well [11,13,15].

5. Conclusion

Knowledge among pregnant women about anemia and iron supplementation, as well as counseling from health workers, has a significant effect on maternal adherence. Given the importance of knowledge to increase awareness of the importance of iron supplementation, efforts are needed to increase this knowledge, including by providing optimal counseling. Optimal counseling services in which important matters related to the impact of anemia and the importance of iron supplementation are conveyed are expected to be able to increase good perceptions and awareness dan encourage patients to be more obedient in taking iron supplementation in accordance with the directions of health workers.

Compliance with ethical standards

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Disclosure of conflict of interest

The corresponding author declares that there are no competing interests on behalf of the other writers.

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