

## FACTORS ASSOCIATED WITH ADHERENCE TO IRON SUPPLEMENTS IN PREGNANT WOMEN ATTENDED AT A HEALTH CENTER IN CAÑETE, PERU

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**Objective:** To determine the factors that are associated with adherence to iron supplements in pregnant women.

**Material and methods:** Prospective, cross-sectional study in 30 pregnant women attended at the Malvinas Health Post, a first-level facility in the province of Cañete, Peru between July, and August 2017. Instruments that measured general data, level of adherence ( $\geq 75\%$  of consumption) were applied of iron supplements) and its associated factors: receiving demonstration sessions, waiting for the next consultation or going to the pharmacy to obtain supplements, not having received unpleasant advice about the supplement, health personnel are overworked. Chi-square, Odds Ratio (OR) with 95%CI was applied.

**Results:** 73.3% of pregnant women were between 18 to 34 years old. 11 of 19 pregnant women were adherent (57.9%). An association was found with adherence to iron supplementation in pregnant women receiving demonstration sessions (OR: 10.3; 95%CI: 1.0-108.8), waiting for the next consultation, or going to the pharmacy to obtain supplements (OR: 9.0; 95%CI: 1.0-84.9), not having received unpleasant advice about the supplement (OR: 3.4; 95%CI: 1.9-6.0). When health personnel are overworked, they reduce the probability of adherence (OR: 0.2; 95%CI: 0.03-0.8).

**Conclusion:** There are factors related to the provision of health services that increase adherence to iron treatment.

**Key words:** adhesion, iron, pregnant, Peru

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## INTRODUCTION

Anemia during pregnancy is a public health problem. According to the World Health Organization (WHO), it is widespread throughout the world with prevalence between 20 and 39.9% (1). In Peru, according to the National Demographic and Family Health Survey (ENDES, for its initials in Spanish) for 2018, it reached 30.5% (2).

One of the strategies to reduce it is supplementation with iron, although with problems in its adherence. This being a fundamental component for the success of therapeutic management and obtaining favourable results for health. According to WHO (3), in developed countries 55.4% adhere to the recommendations and the results are lower in developing countries, in India 23.8 to 36.9% (4,5). In

Ethiopia it reached 37.2% in urban areas and 28.9% in rural areas (6), reaching 39.2% (7), in Malawi it reached 37.2% (8) and in Peru it ranged from 28.4% to 30% (9,10). Its treatment in most nations when it refers to pregnant women is free, in Peru supplementation is also free, and it is distributed to all health establishments of the Ministry of Health (MINSA, for its initials in Spanish), programs based on supplementation to combat This nutritional deficiency has not been successful, thus generating a problem for health professionals and for society.

In Peru, the strategies for the reduction of anemia are in a period of stagnation, despite the strategies used, the elements studied have not allowed increasing the range of adherent pregnant women, leading to a repetitive process and a prevalence almost constant, that is why, it is required to test new

factors that present us with a more comprehensive explanation of this complex problem.

Among the factors associated with poor adherence to iron supplements were primary maternal educational level, presence of nausea in pregnancy, prolonged treatment time (11), having 3 or more symptoms during pregnancy, loss of motivation to continue with the supplementation, failure to deliver the supplement by the health facility and inadequate counseling<sup>9</sup>. Our objective was to determine the factors associated with adherence to iron supplementation in Peruvian pregnant women.

## MATERIAL AND METHODS

### STUDY TYPE AND DESIGN

Quantitative, prospective, cross-sectional study.

### POPULATION

It corresponded to pregnant women attended at the Malvinas Health Post, a category I-2 health facility, located in the province of Cañete, in the Lima region, Peru, an establishment belonging to the Ministry of Health (MINSA), and cares for patients affiliated with the health insurance (SIS, for its initials in Spanish), a free insurance managed by the State. The data was collected between July and August 2017. The population initially corresponded to 50 pregnant women, of which those who fulfilled 3 or more prenatal controls and who agreed to participate were identified, leaving 36 pregnant women who had a home visit up to three times, leaving 30 participants at the end.

### VARIABLES

Age, marital status, educational level (pregnant and married), type of health insurance affiliation, employment status and monthly income were measured. The factors associated with adherence to iron supplementation were: receiving demonstration sessions, defined as an educational activity where participants learn to combine local foods in an appropriate way, according to the nutritional needs of the child, the pregnant woman and the woman who breastfeeds, through active participation and group work (12), place of obtaining supplements: health establishment or pharmacy or nowhere. Unpleasant advice from the supplement, understood as the opinion professed by health personnel expressing disagreement or disgust. Health personnel

overworked, understood as the pregnant woman's perception of the increase in tasks or activities entrusted to health personnel.

For the determination of adherence to iron supplementation, which is offered free of charge by MINSA through elemental iron tablets of ferrous sulphate 60 mg, calculated using the pill count method=number of iron supplement tablets consumed in the month / number of iron supplement tablets received in the same period per 100, the result is categorized into  $\geq 75$  adherent pregnant and  $< 75$  non-adherent pregnant (13).

### TECHNIQUES AND PROCEDURES

The observation was applied for the counting of the pills and the structured interview for the determination of general data and associated factors. To determine the factors, initially a search was made of the information published in this regard, then two interviews were conducted with pregnant women who were not adherent and also with two adherents in order to explore other factors not published in the literature, product of these previous elements. To collect the data, we contacted the head of the obstetrics service, after the meeting we were provided with the follow-up book for pregnant women to identify participants, and to outline the route, the location of each home was identified on the map. Home visits were made to all pregnant women assigned to the jurisdiction and who met the inclusion criteria (pregnant woman who agrees to participate in the study, meets 3 or more prenatal care and supplemented with ferrous sulphate), once the home has been identified The study was explained to the pregnant woman, informed consent was applied to those who agreed, and before starting the interview, the iron tablets they had received in the previous consultation and the perinatal card were requested. These being necessary to count the pills. Once the interview was over, a talk was held on the benefits and correct taking of the supplements.

### ETHICAL ISSUES

The study was approved by the Ethics Committee of the Faculty of Medicine of the Universidad Nacional Mayor de San Marcos (Act 1816).

### ANALYSIS OF DATA

A database was created in SPSS v 24. In the qualitative variables, frequency distribution and percentages were applied. To estimate the associated factors, the variables were dichotomized and contingency tables were applied, the Pearson's Chi-square test when the cells were greater than 5 units and Fisher's Exact in less than five, both with a level of statistical significance  $p < 0.05$ . To estimate the strength of the relationship, the cross-product ratio (odds ratio or OR) with its 95% Confidence Interval (95% CI) was applied.

## RESULTS

73.3% of pregnant women were between 18 to 34 years of age; 66.7% had the civil status of married and stable union. The educational level of the pregnant it was between primary and secondary it was 66.7%; while that of his partner reached 80%. Being insured in the SIS reached 86.7%. 76.7% were not working

and 73.3% indicated a monthly income of less than 1,000 soles. 36.7% of pregnant women presented adherence to the iron supplement. (**Table 1**)

Receiving demonstration sessions was associated with adherence to the supplement, it was found in 36.4% of pregnant adherents compared to 5.3% of non-adherents ( $p=0.047$ ), with a 10.3 times greater probability of continuing being adherent (OR: 10.3; 95%CI: 1.0-108.8) when these sessions were carried out. Going to the health facility or going to the pharmacy to obtain supplements was associated with adherence to supplementation, found in 90.9% of adherent pregnant women, compared to 52.6% of non-adherents, with 9.0 times greater probability of adherence (OR: 9.0; 95%CI: 1.0-84.9). Not having received unpleasant comments about ferrous sulphate was found in 27.3% of adherents and in 0% of non-adherents ( $p= 0.041$ ), increasing the probability of adherence when said factor was not present by 3.4% (OR: 3.4; 95%CI: 19-6.0).

Table 1. Percentage distribution of general data of the participants, Cañete 2017

	n	%	Tablets of consumed iron supplement			%	Adherence	p
			P <sub>25</sub>	P <sub>50</sub>	P <sub>75</sub>		CI95%	
<b>Age (years)</b>								
16 a 19	6	20,0	15	24	28	66,7	(28,9:100,0)	0,056
20 a 35	17	56,7	20	22	25	35,3	(12,6:58,0)	
36 a 40	7	23,3	12,5	20	25,5	14,3	(0,0:40,2)	
<b>Marital status</b>								
Single	10	33,3	20	24	34	50,0	(19,0:81,0)	0,284
Married and stable union	20	66,7	14	21	25	30,0	(9,9:50,1)	
<b>Degree of instruction</b>								
Primary school and high school	20	66,7	14	21	25,5	45,0	(23,2:66,8)	0,246
Non-university superior and University Superior	10	33,3	20	22,5	28	20,0	(0,0:44,8)	
<b>Degree of Instruction of the couple</b>								
Primary school and high school	24	80,0	15	20	25,5	37,5	(18,1:56,9)	1,000
Non-university superior and University Superior	6	20,0	20	25	28	33,3	(0,0:71,1)	
<b>Health insurance</b>								
SIS (public)	26	86,7	15	20	26	38,5	(19,8:57,2)	0,732
EsSalud (workers' insurance)	1	3,3	-	-	-	0,0	(0,0:0,0)	
Uninsured	3	10,0	16	25	26,5	33,3	(0,0:86,7)	
<b>Employment situation</b>								
Doesn't work	23	76,7	17,5	22	27	28,6	(0,0:62,0)	1,000
Works	7	23,3	13,5	20	25	39,1	(19,2:59,1)	
<b>Monthly Income (S/.)</b>								
< 1 000	22	73,3	13	20	25	40,9	(20,4:61,5)	0,672
≥ 1 000	8	26,7	22,5	25	31	25,0	(0,0:55,0)	
<b>Total</b>	<b>30</b>	<b>100,0</b>	<b>15</b>	<b>21</b>	<b>26</b>	<b>36,7</b>	<b>(19,4:53,9)</b>	

Likewise, perceiving that health personnel are not overworked, reduces the probability of adherence, was found in 36.4% of adherents and 78.9% of non-adherents, finding that if this factor were deleted, adherence would increase by 99.8% (OR: 0.02; 95%CI: 0.03-0.8) (Table 2).

## DISCUSSION

The complex problem of achieving adherence to pregnant woman supplementation has led us to present new elements, which are found in health establishments, as a result of their organization and management, as factors that may or may not improve this event, and which after evaluations they have been presented as significant.

In the present study, adherence was found in 36.7%, similar results were found in different countries (4-10), it should be noted that despite the multiple strategies to consume iron supplementation in pregnant women, they have not been successful, for this We need the involvement of all health professionals who are in constant communication and care relationship with the pregnant woman, therefore, it is recommended to manage and apply the moments of counselling (14) (5 moments), carry out reinforcing counselling (15), in each care Prenatal check adherence by applying monthly counting techniques in addition to home visits and when there are technological capacities, use of Information and Communication Technologies (ICT) to provide better

follow-up to the pregnant woman (Telemonitoring), preparation of the pregnant woman to instil self-care in health and continuous professional development (tele education).

Another point to note is having received or being present at a demonstration session on healthy eating. It is proposed to include a program to generate self-knowledge of healthy eating through the delivery in consultation of a brochure of foods selected according to the region, so that they can be recognized by pregnant women and they can identify those that predominate in each city or region where they live, to finally carry out the demonstration session and a second brochure about food preparation is delivered.

This program should be applied in each of the prenatal consultations, from the start of the pregnancy controls. We recommend in the first prenatal check-up: motivational message, explanation about healthy eating, anemia, and iron supplementation. In the second control: motivational message, delivery of a booklet with the list of foods of animal, vegetable and cereal origin that contain iron or contribute to its adequate absorption and reinforcement of the benefits of iron supplementation. In the third control: motivational message, information on hand washing, identification of foods you use constantly at home, about iron supplementation and instruction for always carry supplements at each check.

Table 2. Factors associated with adherence to iron supplementation in pregnant women, Cañete 2017

	Adherence to the Supplement				p	OR	(CI95%)
	Yes		No				
	n	%	n	%			
<b>I received demonstration sessions</b>							
Yes	4	36,4	1	5,3	0,047	10,3	(1,0:108,8)
No	7	63,6	18	94,7			
<b>Where do I go to get supplements</b>							
Pharmacy or health facility	10	90,9	10	52,6	0,049	9,0	(1,0:84,9)
Nowhere	1	9,1	9	47,4			
<b>Nasty Supplement Tips</b>							
They haven't told me	3	27,3	0	0,0	0,041	3,4	(1,9:6,0)
Health personnel and family	8	72,7	19	100,0			
<b>Health personnel overworked</b>							
No	4	36,4	15	78,9	0,047	0,2	(0,03:0,8)
Yes	7	63,6	4	21,1			
<b>Total</b>	<b>11</b>	<b>100,0</b>	<b>19</b>	<b>100,0</b>			

For the fourth prenatal check-up: motivational message, explanation of the 5 rules of nutritious feeding, delivery of a primer with recipes for food preparation and evaluation of adherence with the method of counting pills. For the fifth control, the motivational message, the delivery of the food preparation recipe booklet and the evaluation of adherence under the pill count method are recommended. Finally, in the sixth prenatal check-up, the motivational message, the reinforcement of lessons learned, and the evaluation of adherence will be given.

The role of health professionals must be based not only on providing supplementation to each pregnant woman, but also on the adherence of the pregnant woman, it has also been reported by Gebre et al (6) and we could take advantage of measuring adherence when the pregnant woman goes to the office, to be able to detect inadequate adherence early and be able to handle it in time.

Given the lack of specialized professionals in the nation, the health promotion precept, where the person must generate self-care through the use of health education and communication sciences, this could be improved with the use of "Demonstration sessions" (12) virtual ones applying ICT that facilitate mothers' self-learning. Our general proposal is to create an application with food preparation information, with words according to the assigned population. Applying the 4 pillars of education, in learning to know by providing materials to deepen knowledge about changes and requirements of a pregnancy, such as achieving a healthy and safe motherhood; in learning how to prepare him to develop skills for health care and food preparation combined with programs to be installed on mobile devices (App), to encourage his diet and use of supplementation; learning to live together, we will enhance the role of the family in the influence of pregnancy and its care, developing positive attitudes towards pregnancy and finally in learning to be, we will combine everything learned to know, skills, role of the family in achieve self-care in the gestation process.

Another element to develop is to go to the health facility or go to the pharmacy to obtain supplements. There are pregnant women who are empowered in the consumption of supplements to have beneficial effects during their pregnancy, so they worry about obtaining

other supplements either by going to the health facility or going to the pharmacy, in order to continue with the supplementation, but there are pregnant women They may not be informed or have misconceptions that do not contribute to understanding the risks for her and her future child, therefore the help they seek is less or non-existent.

The search to obtain supplements is related to the knowledge that the pregnant woman has or that she has acquired during pregnancy, this is reflected in other studies carried out in Ethiopia, where adherence is significantly associated with knowledge of iron supplementation. (ORa: 2.82, 95%CI: 1.52-5.23) (16) and that receiving information about the importance of supplements increases the chances of adherence (aOR: 3.72; 95%CI: 1.80-1 ,71) (17) compared to low adherence in pregnant women who did not receive information about ferrous sulphate supplementation (aOR: 0.43; 95%CI: 0.25-0.74) (18).

Adequate counselling messages need to be established regarding the benefits of iron supplementation; In the first counselling, the iron tablet is disclosed and how to consume it correctly, you are instructed to take your supplementation tablet to each control so that the health professional can measure the adherence of each pregnant woman and act at first. According to the findings found and to be able to perform individualized management, studies have shown benefits to the pregnant woman in improving adherence (19) and that the quality of counselling in prenatal controls is an important determinant for compliance (20), if it is oriented about related risks in pregnancy and the family, especially the couple, is involved, thus improving adherence (21) and also the appropriate guidance to raise awareness of the need to obtain supplements (22). The Technical Guide for Nutritional Counselling (14) specifies the steps of the five moments of counselling; but it would be appropriate for the health professional to keep these processes in mind for personalized counselling and with the help of ICT.

Another element to study is not having received unpleasant comments about ferrous sulphate. The information provided by health personnel influences either negatively or positively according to the strategies of conducting counselling. A study conducted in Mali concluded that there is insufficient

patient-provider communication and inconsistent prescription practices (23).

Once again it is necessary to improve our communication strategy with pregnant women, give clear instructions (7) and adequate advice (24), we go from communication to just transmitting and persuading communication as a cordial relationship, where content and the relationship between people is important, the tone the greeting, the gesture, where both parties comply with interacting and agreeing on the necessary measures for proper care; Hence we could say that users must be active partners and that we must consider that achieving interactive communication between health personnel and pregnant women will contribute to improving levels of adherence.

Perceiving that health personnel are not overloaded with work improves adherence. 78.9% of non-adherent pregnant women do not perceive that the health personnel are overworked compared to 63.6% of adherent pregnant women, this could be due to the perception of the pregnant women about the meticulous activities carried out by the staff health during the time of your prenatal care, when you feel that it is something you do every month (routine), and in another instance your care is thorough, novel and comprehensive. When the routine in the doctor-patient relationship is not complete, that causes errors, and is solved with protocols and care guidelines.

The use of ICT is the main indicator of innovation in all branches of health and in obstetrics this should not be the exception. Professionals can be within reach of all health innovations, internalizing new management to improve adherence in pregnant women, through continuous and timely follow-up. Having an application where the obstetrician and the pregnant women are connected, we could use it to have real information on the consumption of the daily supplement, if there were discomforts, abandonment of consumption or any doubt; If there is no response, we will schedule it for your home visit (Telemonitoring).

It is essential for all health professionals who are in constant contact and communication with pregnant women to approach new strategies in managing adherence to supplementation, through an approach based on preparing healthy foods, adequate

counselling, and improving communication. with pregnant women, teach them to empower themselves through the knowledge and timely, personalized management of each pregnant woman, by measuring adherence by counting the pills in each prenatal control. Studies affirm that this method is the most accurate to estimate adherence to supplementation (19).

Later, it would be to integrate the use of ICT to achieve telemonitoring so that they can assume an important role in managing their health. Tele education as an instrument for the continuous education of the pregnant woman, will allow to develop the capacity to think critically, act with autonomy and a sense of responsibility in the face of her mother's situation.

As limitations, we present that this study would be the preliminary one with the factors studied, so there is no more comparative evidence, and we also note that the sample size indicates that these factors could be different with larger samples, likewise Peru, a Multicultural and multilingual country allows us to point out evidence of a sector of the population, but it would not be representative for other ethnic and cultural groups, so new studies could improve the factors found.

It is concluded that there are factors related to the provision of health services that increase adherence to iron treatment, as well as that 36.7% of pregnant women presented adherence to iron supplementation, receiving demonstration sessions, acquiring the supplement in the establishment of health or pharmacy, not receiving unpleasant advice of the supplement by health personnel and not perceiving health personnel overworked were associated with adherence to iron supplementation in pregnant women.

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