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Prevalence of anemia in pregnant women seen at basic health units in Caruaru, Pernambuco, Brazil

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Abstract

Objective: To assess the prevalence of anemia in pregnant women seen at basic health units in Caruaru, Pernambuco state, Brazil. *Methods:* A cross-sectional, quantitative study conducted from secondary data drawn from the research information bank entitled "Nutritional status of pregnant women: methodological aspects and epidemiological implications for prenatal screening care." Information in that municipal district was extracted and samples consisted of 141 pregnant women. The data extracted was guided by an instrument containing the variables of interest in the study, involving sociodemographic aspects, obstetric history and data from the current pregnancy. The outcome was considered as anemia Hb <11 mg/dl according to criteria adopted by the World Health Organization. We used Epi-info software 7 to make descriptive and bivariate analyses. *Results:* Prevalence of anemia was only 5%. Higher frequencies of anemia were observed in pregnant adolescents, with low education, belonging to lower economic classes, who performed just 1-2 antenatal medical consultation visits, starting this monitoring in the 2nd and 3rd quarters and without an antianemic treatment during pregnancy. The bivariate analysis showed no association between the outcome of anemia and evaluated explanatory variables. *Conclusion*: Research results showed low prevalence of anemia by hemoglobin levels in Caruaru, suggesting the need for further research on factors involving this nutritional deficiency.

Keywords: Anemia. Pregnancy. Hemoglobins. Deficiency Diseases.

Introduction

Anemia is an important public health problem with worldwide distribution, being more prevalent in less developed countries. This aggravation is the result of a wide variety of causes, but the greatest one is iron deficiency, which contributes to the fact that they often be treated as synonyms.[1]

In 2008, the World Health Organization (WHO) published a global estimate of anemia, which involved compiling data from 93 countries from 1993 to 2005, showing that 1.6 billion people (24.8% of the world population) are affected. And the prevalence of this nutritional deficiency in pregnant women is estimated as around 41.8%. According to the same publication, anemia in pregnant women in Brazil was a public health problem of moderate intensity, often 29.1%.[2]

In the Brazilian state of Pernambuco, a survey that evaluated public health services guidelines regarding anemia in pregnancy has found that of the 440 pregnant women who had hemoglobin (Hb) on the prenatal screening card, 23% presented values < 11 g/dl.[3] In the state capital, a survey carried out at a prenatal screening outpatient clinic at Instituto de Medicina Integral Prof. Fernando Figueira (IMIP; Institute of Integral Medicine Professor Fernando Figueira) revealed a 56.6% anemia frequency in pregnant women attended at that service.[4]

Anemia is one of the main complications of pregnancy.[5] It is estimated that, out of every ten pregnant women who have a prenatal screening, three are anemic.[6] In the gestational cycle, iron-deficiency anemia may be associated with increased maternal, fetal, and perinatal mortalities, prematurity, low birth weight, and infant morbidity.[7]

The aforementioned impairment during pregnancy stands out not only for the frequency with which it manifests, but also for the harmful effects on pregnant women's health and the conceptus.[8] Among the main causes of anemia in pregnant women are: low socioeconomic level, higher number of births, low educational level, inadequate reserves of iron, lack of iron supplementation and iron-deficient diets.[9]

From this brief presentation, and considering that there are no recent data published on the prevalence of anemia in pregnant women in the Brazilian state of Pernambuco and, therefore, in the city of Caruaru, the development of this research became relevant considering the magnitude of said nutritional deficiency and its deleterious effects on the health of pregnant women and the conceptus. Thus, the survey has aimed to verify the prevalence of anemia in pregnant women monitored at basic health units of the municipality of Caruaru, PE.

Methods

A cross-sectional study, of a quantitative nature, based on secondary data extracted from the research information database entitled "Nutritional status of pregnant women: epidemiological methodological aspects and implications in prenatal care," a population-based prevalence study conducted in the year 2012, through a joint initiative from the Department of Nutrition of Universidade Federal de Pernambuco (UFPE; Federal University of Pernambuco) and Instituto de Medicina Integral Prof. Fernando Figueira (IMIP), with a support from CNPq [*Conselho Nacional de Desenvolvimento Científico e Tecnológico* (National Counsel of Technological and Scientific Development)], whose objective was to describe the nutritional status of pregnant women attended at health centers in Pernambuco. The following Brazilian municipalities participated in the survey: Recife, Vitória de Santo Antão, Caruaru and Petrolina. The general sample consisted of 1,600 pregnant women, including those aged between 18 and 35 years and gestational age between eight and 32 weeks.

Exclusion criteria were: pregnant women with very evident dysmorphic conditions (severe lordosis and scoliosis), with a history of recent abortion (less than 8 weeks) and gestational bleeding involving hospital treatment of at least 24 hours, pregnant women with decondensed heart disease and kidney disease (serum urea of 50 mg/dl, creatinine above 1.6 mg/dl). Sampling was non-probabilistic, for convenience. While awaiting for a prenatal screening consultation, pregnant women would be approached and invited to participate in the study and then sign an Informed Consent Form (ICF). Hemoglobin values were taken from tests results, obtained by automatic hemoglobin reading methods.

The current research is a cut of the data referring to the Brazilian municipality of Caruaru, PE, in which 164 pregnant women participated. However, the current sample had 141 pregnant women, since only these had blood count results. Withdrawing information in the database was carried out in May 2014 by means of an instrument containing the variables of interest. These involved sociodemographic aspects, obstetric antecedents and current pregnancy data. In the original study, the variable "hemoglobin" was verified in its continuous form. However, in this research it was transformed into a dichotomous variable (Yes – Hb < 11 mg/dl; No – Hb > 11 mg/dl), according to WHO criteria.[1]

For the present study, an statistical analysis was performed using software Epi-info 7 and it was developed in two stages: initially the researched population's sample characteristics were described. For the continuous variables, central tendency measures were presented. And for the categorical variables, their relative and absolute frequencies were presented. Later, a bivariate analysis was

performed aiming to identify the explanatory variables that could present a statistically significant association with the response variable ($p < 0.05$). The survey was approved by the Research Ethics Committee (REC) of ASCES College (Legal Opinion no. 659161 on 5/23/14).

Results

In this study, information from 141 pregnant women with hemoglobin value record was analyzed, which made up the database of the original study. The prevalence of anemia found was only 5% (Chart 1).

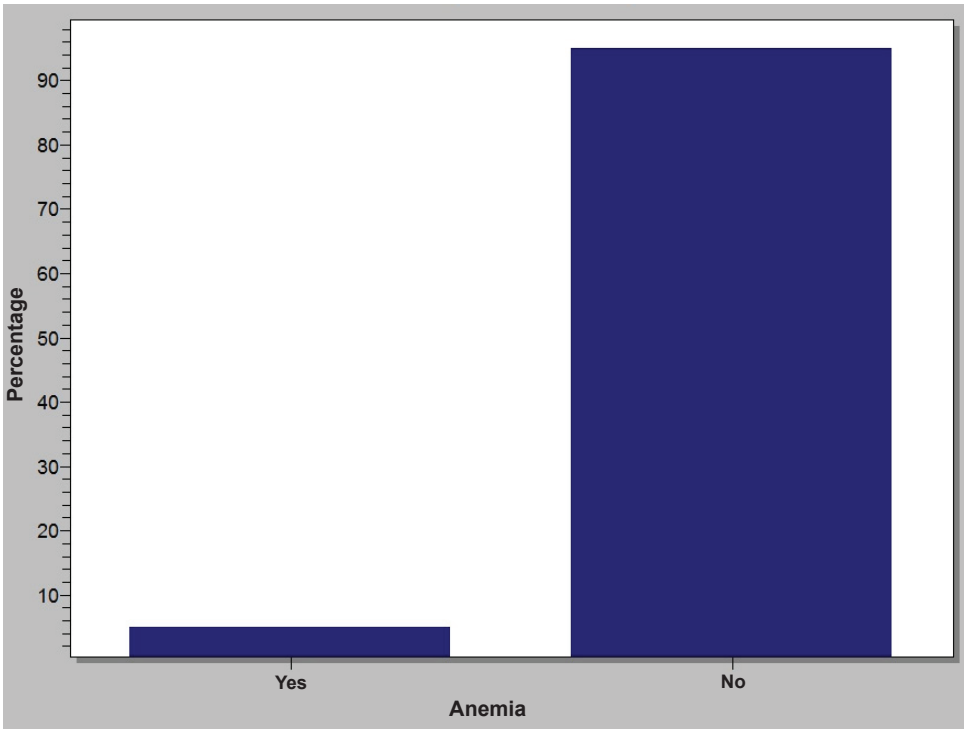

Chart 1. Prevalence of anemia in pregnant women assisted in Brazilian Basic Health Units. Caruaru, PE, 2012.

Information on pregnant women's demographic, socioeconomic and health characteristics is summarized in Table 1.

Table 1. Prevalence of anemia in pregnant women assisted by the Brazilian Basic Health Units, according to demographic, socioeconomic and health characteristics. Caruaru, PE, 2012.

Variables	N	Anemia				*p*
		Yes		No		
		N	%	n	%	
Age						0.3156
< 20 years	16	2	12.5	14	87.5	
20 to 29 years	90	4	4.4	86	95.6	
≥ 30 years	35	1	2.9	34	97.1	
Color						0.5154
White	63	2	3.2	61	96.8	
Dark-skinned	47	2	4.3	45	95.7	
Black	14	1	7.1	13	92.9	
Other	17	2	11.8	15	88.2	
Income†						0.5843
< 0.5 MW	13	1	7.7	12	92.3	
0.5 ≤ 1 MW	47	2	4.3	45	95.7	
1 ≤ 2 MW	38	3	7.9	35	92.1	
≥ 2 MW	20	–	–	20	100	
Social class						0.0657
B (middle class)	21	–	–	21	100	
C (working class)	72	2	2.8	70	97.2	
D (lower class)	28	4	14.3	24	85.7	
E (below lower class)	2	–	–	2	100	

to be continued

Variables	N	Anemia				*p*
		Yes		No		
		N	%	n	%	
Education (years of study)						0.1808
None	1	–	–	1	100	
1 – 9	52	5	9.6	47	90.4	
10 – 12	68	1	1.5	67	98.5	
≥ 13	8	–	–	8	100	
Number of people in the household						0.6558#
1 – 3	81	4	4.9	77	95.1	
4 – 8	43	2	4.7	41	95.3	
Number of children < 5 years						0.5706#
None	94	5	5.3	89	94.7	
≥ 1	47	2	4.3	45	95.7	
Number of pregnancies						0.5904#
1 – 2	104	5	4.8	99	95.2	
≥ 3	37	2	5.4	35	94.6	
Last gestation (in years)						0.6244#
Up to 2 years	22	1	4.5	21	95.5	
> 2 years	58	2	3.4	56	96.6	
Number of prenatal screening consultations (current pregnancy)						0.2767#
1 – 2	75	5	6.7	70	93.3	
≥ 3	66	2	3.0	64	97.0	

to be continued

Variables	N	Anemia				*p*
		Yes		No		
		N	%	n	%	
Prenatal screening beginning (per trimester)						0.2345#
1st trimester	114	4	3.5	110	96.5	
2nd – 3rd trimesters	21	2	9.5	19	90.5	
Anti-anemic treatment (current gestation)						0.0822
Yes	108	3	2.8	105	97.2	
No	32	4	12.5	28	87.5	
Does not know	1	–	–	1	100	
Vitamin supplement (current gestation)						0.7845
Yes	27	2	7.4	25	92.6	
No	106	5	4.7	101	95.3	
Does not know	3	–	–	3	100	

†The family income variable was taken in its continuous form, being later categorized considering the minimum wage value of BRL 724.00. # The p-value of the Fisher's exact test was considered.

The studied pregnant women's mean age was 25.6 years, with the age group under 20 being the one with the highest frequency of anemic pregnant women (12.5%). Results showed a higher prevalence of anemia in women who reported being black (7.1%). Women in the lower economic class presented higher prevalences of anemia (14.3%). Approximately 8% (n = 3) of the sample had family income between one and two Brazilian minimum wages.

In relation to schooling, there were higher prevalences of anemia among pregnant women who had less than nine years of schooling, making up 9.6% (n = 5) of the sample.

In relation to the number of persons per household, there was no significant difference ($p > 0.05$) in the prevalence of anemia in pregnant women (1-3 people: 4.9%; ≥ 4 people: 4.7%). A higher iron deficiency was observed among pregnant women who had no children younger than five years (5.3%), as well as in pregnant women who reported three or more pregnancies (5.4%).

It was verified that the prevalence of anemia decreased according to the interval between deliveries. Among pregnant women who had had an interval of up to two years, 4.5% (n = 1) were anemic, a number which decreased when the interval between deliveries was greater than two years (3.4%). Regarding the number of pregnancies, 5.4% of anemic women were multiparous with three or more pregnancies. Regarding the number of consultations, it is noteworthy that of the pregnant women who had had one to two consultations, 6.7% (n = 5) had anemia.

On average, the 141 women sampled were pregnant for slightly more than 19 weeks (19.4 weeks) and approximately 31% of these women were for up to 12 weeks at the time of the interviewer's approach. Of the pregnant women who started prenatal screening care in the second and third trimesters, 9.5% (n = 2) had a hemoglobin value lower than 11 mg/dl.

Regarding the antianemic treatment, the research identified that of the 108 who used iron supplementation, only 2.8% (n = 3) were considered anemic, a number that reaches higher proportions when considering women who did not receive treatment 12.5% (n = 4).

When the bivariate analysis was carried out, it was verified that there was no statistically significant association between the explanatory variables evaluated and the "anemia" outcome, since no variable had a p-value < 0.05.

Discussion

The prevalence found in this study was lower than the index considered of alarming importance by WHO. It is possible to classify the prevalence of anemia as normal or acceptable (below 5%), mild (from 5 to 19.9%), moderate (from 20 to 39.9%), and severe (greater than or equal to 40%).[2] Thus, the frequency observed for this aggravation (5%) qualifies it as a mild public health problem in the study population, as shown in Chart 1. This value is similar to that found in a study carried out by Camargo et al.,[10] where 4.8% of pregnant women were anemic, considering the cutoff point Hb < 11 g/dl.

Hemoglobin is the only parameter routinely used in prenatal screening at public services, suggesting that the majority of pregnant women with iron deficiency are not identified.[10] The concentration of hemoglobin reflects an already established situation of nutritional deficiency.[5] Hemoglobin levels should be carefully analyzed, since physiological changes in blood composition during pregnancy, such as hemodilution, make it difficult to recognize the pathological condition.[5]

When analyzing the cases of anemia by age group, a greater occurrence was observed in pregnant women younger than 20 years. This result was similar to that found by Tapia et al.[11] in a study carried out in the Brazilian municipality of Belo Horizonte, MG, in which higher rates

of anemia were found in pregnant adolescents younger than 18 years (14.02%), which may be explained by the greater need of iron to meet the growth demands of age.

The results showed that anemia was more prevalent in black women. This result converges with that observed by Fabian et al.,[12] in which the risk of anemia in black women remained three times higher than in white women. The ethnic difference in the prevalence of anemia was also shown in the Brazilian government Pesquisa Nacional de Demografia e Saúde (PNDS; National Demography and Health Survey).[13]

In the present study, it was observed that the majority of anemic pregnant women belonged to the economic lower class and had income lower than two Brazilian minimum wages. Some authors emphasize that the risks for the establishment of nutritional deficiencies occur mainly in the lower social classes, whose consumption of food is, in most cases, inadequate.[11, 14]

An investigation carried out by Ferreira et al.[15] with pregnant women in the semi-arid region of Brazilian state of Alagoas has found that the low socioeconomic status was related to a higher frequency of anemia. Low income entails a lower purchasing power for foods considered as a source of high iron bioavailability (meats, poultry, fish and giblets) and this fact would contribute to the increase of anemia cases.

Regarding schooling, the majority of anemic pregnant women had less than nine years of schooling. According to Santos and Cerqueira,[8] the greater occurrence of anemia and other nutritional deficiencies stems from individuals' educational and cultural levels. There is evidence that pregnant women with lower educational level have higher prevalences of anemia.[9, 16, 17]

The fact that there were no significant differences in the prevalence of iron deficiency among pregnant women according to the number of people living in the household is similar to other authors' findings.[8, 17] In turn, the prevalence of anemia was higher among pregnant women who had no children under the age of five, disagreeing with other studies carried out in cities in northeastern Brazil that demonstrated a higher prevalence of anemia in pregnant women having up to two children.[14, 17] Hypothetically, pregnant women participating in the present study may have been exposed to other factors that determine anemia, such as abortion and insufficient intake of iron-rich foods, but because these variables have not been verified, they can not be stated.

The frequency of anemia increased according to the higher number of pregnancies, but there was no statistically significant association between these variables, corroborating the results observed in the Alagoas semiarid[15] and in pregnant women in a municipality in Brazilian state Rio Grande do Sul.[9] It is known that gestation and blood loss due to delivery make women need higher amounts of iron to compensate for the lower levels of hemoglobin imposed by these events.

The association between the shorter interval between deliveries and the presence of low levels of hemoglobin in pregnant women was demonstrated in this study. This result is in opposition to the findings by Santos et al.,[14] who report a similar frequency of anemia, both for pregnant women whose delivery interval was less than 24 months and for those whose interval between deliveries was greater. It is advisable that the interval between pregnancies be at least two years.[18]

A study carried out by Miglioli et al.[17] in the state of Pernambuco, which analyzed the occurrence of anemia in children under five and women in the reproductive period, has found that this nutritional deficiency was more prevalent in the group of pregnant women with three or fewer medical consultations during pregnancy, corroborating the present study findings. The Brazilian Ministry of Health recommends that the total number of prenatal consultations be at least six.[18]

This research has pointed to an increase in the prevalence of anemia according to the evolution of gestation, an information that is convergent with those found in a study carried out by Totti et al.,[19] in which anemia was observed in the first trimester in 2.8% of pregnant women, being less frequent than in the second (7.14%) and third trimesters (9.6%) of gestation. A similar fact was seen in a survey carried out by Rocha et al.[16] in the Brazilian municipality of Viçosa, MG, where the prevalence of nutritional deficiency evolved as the gestational age progressed. Iron needs vary markedly with each gestational trimester. In the first trimester, the requirements do not change.[20] However, from the second one these requirements begin to rise due to the increase in oxygen needs for the mother and the fetus, lasting until the end of gestation.[21]

Most of the pregnant women evaluated in this research were taking antianemic medicines. This result is similar to that performed in the Brazilian municipality of Feira de Santana, BA, by Santos and Cerqueira,[8] according to which 78.5% of pregnant women were taking antianemic medication. In the present study, it was verified that 12.5% of the pregnant women affected by this nutritional deficiency reported not using such supplement. Iron supplementation is universally recommended during pregnancy[9] even in the absence of anemia, aiming to satisfy the increase of the needs for this mineral during the last two gestational trimesters. [20, 21]

Despite the present study methodological limitations, the small sample size and the low prevalence of perceived anemia may have contributed to the fact that there were no statistically significant associations between anemia and variables known to be competitors for the occurrence of this outcome. In addition, because a multivariate analysis was not performed, these findings may have been influenced by some unidentified confounding factor in the bivariate analysis. It is also known that working with databases restricts research to the available variables, making it impossible to verify other factors contributing to the event.

Conclusion

The findings of this research have shown a low prevalence of anemia due to hemoglobin levels in the Brazilian municipality of Caruaru, PE, and statistically significant factors associated with this outcome were not found.

In a research, one does not reach all the answers that would be desirable, but it was possible to carry out an initial dimensioning of the anemia scope in a geographic stratum characterized by environmental and social contrasts. Thus, the need for further research on the factors involved in determining this nutritional deficiency is suggested.

References

1. World Health Organization. Iron deficiency anaemia: assessment, prevention and control: a guide for programme managers. Geneva: WHO; 2001. 114 p.
2. World Health Organization. Worldwide prevalence of anaemia 1993 2005: WHO global database on anaemia. Geneva: WHO; 2008. 40 p.
3. Santos ICRV, Batista Filho M. Anemia no atendimento pré-natal em Pernambuco: avaliação de condutas preventivas e curativas em serviços públicos de saúde. Recife: IMIP: 2001. (Publicações Científicas do Instituto Materno Infantil de Pernambuco, IMIP, n. 5).
4. Bresani CC, Souza BAI, Batista Filho M, Figueiroa JN. Anemia e ferropenia em gestantes: dissensos de resultados de um estudo transversal. Bras. Saúde Mater. 2007; (Suppl. 1): s15-s21.
5. Costa CM, Brum IR, Lima ES. Anemia e marcadores séricos da deficiência de ferro em grávidas atendidas na rede pública municipal de Manaus, Amazonas, Brasil. Acta Amaz. 2009; 39(4):901-905.
6. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Política nacional de alimentação e nutrição. 2. ed. Brasília: Ministério da Saúde; 2003.
7. Batista Filho M, Souza AI, Bresani CC. Anemia como problema de saúde pública: uma realidade atual. Ciênc. Saúde Coletiva 2008; 13(6):1917-1922.
8. Santos PNP, Cerqueira EMM. Prevalência de anemia nas gestantes atendidas em unidades de Saúde em Feira de Santana, Bahia, entre out. 2005 e mar. 2006. Rev. Brasileira de Análises Clínicas 2008; 40(3):219-223.
9. Vitolo MR, Boscaini C, Bortolini GA. Baixa escolaridade como fator limitante para o combate à anemia entre gestantes. Rev. Bras. Ginecol. Obstet. 2006; 28(6):331-339.
10. Camargo RMS, Espinosa MM, Pereira SF, Schirmer. Prevalência de anemia e deficiência de ferro: relação com índice de massa corporal em gestantes do Centro-Oeste do Brasil. Medicina (Ribeirão Preto) 2013; 46(2):118-127.

11. Tapia MEL, Ro MLSF, Gontijo MLBZ, Martins CS, Viana KA, Dusse LMS, et al. Prevalência de anemia nas gestantes atendidas no Sistema Único de Saúde – Secretaria Municipal de Saúde – Prefeitura de Belo Horizonte. Rev. Bras. Anal. Clin. 2010; 42(4):277-281.

12. Fabian C, Olinto MTA, Dias-da-Costa JS, Bairros F, Nácul LC. Prevalência de anemia e fatores associados em mulheres adultas residentes em São Leopoldo, Rio Grande do Sul, Brasil. Cad. Saúde Pública 2007; 23(5):1199-1205.

13. Centro Brasileiro de Análise e Planejamento. Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher – PNDS 2006: dimensões do processo reprodutivo e da saúde da criança. Brasília: Cebrap; 2009. Série G. Estatística e Informação em Saúde.

14. Santos FF, Conceição SIO, Monteiro SG. Anemia em gestantes atendidas em maternidades, em São Luís (MA). Cad. Pesq. 2012; 19(2):54-61.

15. Ferreira HDS, Moura FA, Cabral Junior CR. Prevalência e fatores associados à anemia em gestantes da região semi-árida do Estado de Alagoas. Rev. Bras. Ginecol. Obstet. 2008; 30(9):445-451.

16. Rocha DS, Pereira Netto M, Priore SE, Lima NMM, Rosado LEFPL, Franceschini SCC. Estado nutricional e anemia ferropriva em gestantes: relação com o peso da criança ao nascer. Rev. Nutr. 2005; 18(4):481-489.

17. Miglioli TC, Brito AM, Lira PIC, Figueroa JN, Batista Filho M. Anemia no binômio mãe-filho no Estado de Pernambuco, Brasil. Cad. Saúde Pública 2010; 26(9):1807-1820.

18. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Atenção ao pré-natal de baixo risco. Brasília: Ministério da Saúde; 2012. 318 p. Cadernos de Atenção Básica, n° 32.

19. Totti HKSB, Zimmermmann JB, Pena DMF, Pereira MP, Bittencourt C, Coutinho T. Frequência de anemia e valores de normalidade para a hemoglobina em gestantes. HU Rev. 2009; 35(4):282-286.

20. Silva LSV, Thiapó AP, Souza GG, Saunders C, Ramalho A. Micronutrientes na gestação e lactação. Rev. Bras. Saúde Mater. Infant. 2007; 7(3):237-244.

21. Américo SCM, Ferraz, FN. Prevalência de anemias em gestantes do município de Campo Mourão – PR entre os períodos de 2005 a 2008. Semina Cienc. Biol. Saúde 2011; 32(1):59-68.

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