

# Prevalence of anemia and related factors among pregnant women in Ouezzane

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## Abstract

This study investigates the prevalence of anemia among pregnant women in the rural province of Ouezzane, Morocco, and explores associated complications. Anemia, defined by the World Health Organization as a hemoglobin level less than 11 g/dl, affects a significant percentage of pregnant women globally, with iron deficiency being a major underlying cause. Conducted between April 1st, 2015, and May 31st, 2015, the study involves five health centers in the Ouezzane province. A total of 120 pregnant women with complete blood counts attending prenatal care or delivery were included. Socio-demographic analysis results indicate a higher prevalence of anemia among younger women (18-25), with a clear association between education and anemia, emphasizing the potential positive impact of education on health. Lower socio-economic status is linked to a higher prevalence of anemia. The study also explores anemia rates based on parity and intergenital interval, revealing a varied distribution across different groups. Nulliparous women, despite having a lower prevalence, still constitute a notable portion of anemic cases, while multiparous women exhibit a higher prevalence. Intergenital intervals show no clear association with anemia prevalence. The findings underscore the complexity of factors influencing anemia prevalence, emphasizing the need for targeted interventions. The study contributes valuable insights that can inform public health strategies to address anemia among pregnant women in specific contexts. Overall, the research highlights the importance of understanding the socio-demographic and reproductive factors associated with anemia to develop effective intervention strategies.

**Keywords:** Anemia, Pregnancy, Prevalence, Iron deficiency, rural area, Socio-demographic.

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## 1. Introduction

Anemia, a prevalent obstetric issue, is observed in both developed and developing nations, impacting 31.8% of pregnant women and 30.2% of women in their reproductive years [1]. Defined by the World Health Organization (WHO) as a hemoglobin level less than 11 g/dl, anemia often stems from iron deficiency, which underlies over 50% of cases and represents the final manifestation of the condition [2]. The presence of anemia significantly elevates the risk of preterm birth, perinatal mortality, and in utero growth retardation, *El Aski et al., 2024*

along with various maternal and fetal morbidities [3]. Beyond its immediate health implications, anemia exerts substantial effects on economic and social development [4].

The multifaceted impact on an individual's health translates into decreased physical capacity in adulthood and reduced productivity [5-6]. Despite its global significance, anemia remains a notable health concern, particularly for women, as indicated by national and regional studies conducted in Morocco. Iron deficiency anemia was found to

be prevalent in 32.6% of women of procreation age and 37.2% of pregnant women [7]. The study's primary objective was to assess the prevalence of anemia among pregnant women in the rural province of Ouazzane, considering associated complications. Given that anemia is a condition easily correctable and preventable, understanding its frequency and impact is crucial for effective intervention strategies.

## 2. Materials and methods

Between April 1st, 2015, and May 31st, 2015, a cross-sectional study was conducted across five health centers situated in five communes (Terwal, Sidi Redouan, Zoumi, Ain Dorrij, and Masmouda) within the rural region of the Ouezzane province in Morocco. The selection of these centers was based on their significant involvement in over two-thirds of the program's activities related to pregnancy and childbirth surveillance. Data collection involved an organized in-person survey, with the survey tool pretested and adjusted before completion. The researcher personally conducted each interview. Participants included pregnant women with a complete blood count (CBC) attending one of the five study centers for prenatal care or delivery, provided they had given written informed consent. Exclusions comprised individuals lacking a blood count and those with mental health issues. The sample size, determined using Morocco's prevalence of 32.7% anemic pregnant women, was calculated with a margin of error of  $\pm 10\%$  and a confidence interval of 95%, resulting in a minimum sample size of  $n=88$  using Schwartz's formula [8-9]. A total of 120 women meeting the inclusion criteria were recruited for the study. The statistical analysis covered various variables, including socio-demographic, socioeconomic, clinical, gynecological, and obstetrical history (such as age, gestational age, number of deliveries, number of abortions), along with dietary habits. Data analysis was conducted using Epi-info and Excel software.

## 3. Results

### 3.1. Socio-demographic characteristics

The results present the percentages of non-anemic and anemic women across different age groups. Among non-anemic women, there is a prevalence of 55% for those aged 18 to 25, 65% for those aged 25 to 35, and 80% for those aged 35 and above. Conversely, among anemic women, the corresponding percentages are 45%, 35%, and 20% for the same age groups, respectively. The comparative analysis reveals a slight predominance of non-anemic women among those aged 18 to 25, a majority of non-anemic women among those aged 25 to 35, and a clear predominance of non-anemic women among those aged 35 and above (Figure 1). The Figure 2 shows a clear association between educational attainment and anemia prevalence among women. Among non-anemic women, there is a noticeable trend of decreasing illiteracy rates with higher education levels, starting from 58% for illiterate women to 100% for those with secondary and college education. This suggests that higher education is associated with a lower likelihood of anemia among women, showcasing the potential positive impact of education on health. In contrast, anemic women display a different pattern, with anemia prevalence decreasing as educational levels rise. Illiterate women have an anemia rate of 42%, while anemia is notably absent (0%) among those with primary, secondary, and college education. This inverse relationship between

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anemia prevalence and education underscores the potential role of education in mitigating anemia risk among women. All enrolled participants were married and belonged to a lower socioeconomic class. However, due to the limited number of patients with average socioeconomic status (25 cases), statistical significance in the comparison with women of average socioeconomic status could not be established. Nonetheless, it is noteworthy that women from lower socioeconomic backgrounds exhibited a higher prevalence of anemia compared to their counterparts from average socioeconomic backgrounds (Figure 3). The provided data presents the distribution of anemic and non-anemic women based on two variables (Table 1): parity (number of live births a woman has experienced) and intergenital interval (the time between two consecutive live births).

### 3.2. Parity

#### 3.2.1. Nulliparous

Among anemic women, 21% fall into this category, while 79% are non-anemic. In comparison, non-anemic nulliparous women make up 35% of the total nulliparous population.

#### 3.2.2. Primiparous

Anemic women account for 31% in this group, while 69% are non-anemic. Among all primiparous women, non-anemic individuals constitute 23%.

#### 3.2.3. Pauciparous

Anemic women represent 13%, and non-anemic women account for 57% in this category. Non-anemic pauciparous women make up 4% of the total pauciparous population.

#### 3.2.4. Multiparous

Anemic women comprise 46%, and non-anemic women make up 54% in this group. Non-anemic multiparous women constitute 7% of the total multiparous population.

#### 3.2.5. Total

Overall, among anemic women, 32% are nulliparous, 31% are primiparous, 4% are pauciparous, and 46% are multiparous. Among non-anemic women, 35% are nulliparous, 23% are primiparous, 57% are pauciparous, and 54% are multiparous.

### 3.3. Intergenital Interval

#### 3.3.1. 1 to 2 years

Anemic women account for 52.6%, while non-anemic women make up 55% in this interval category.

#### 3.3.2. 2 to 4 years

Anemic women constitute 26.3%, and non-anemic women make up 26% in this interval category.

#### 3.3.3. Over 4 years

Anemic women represent 21.1%, while non-anemic women make up the majority at 19% in this interval category.

#### 3.3.4. Total

Overall, among anemic women, 31.7% have an intergenital interval of 1 to 2 years, 15.8% have an interval of

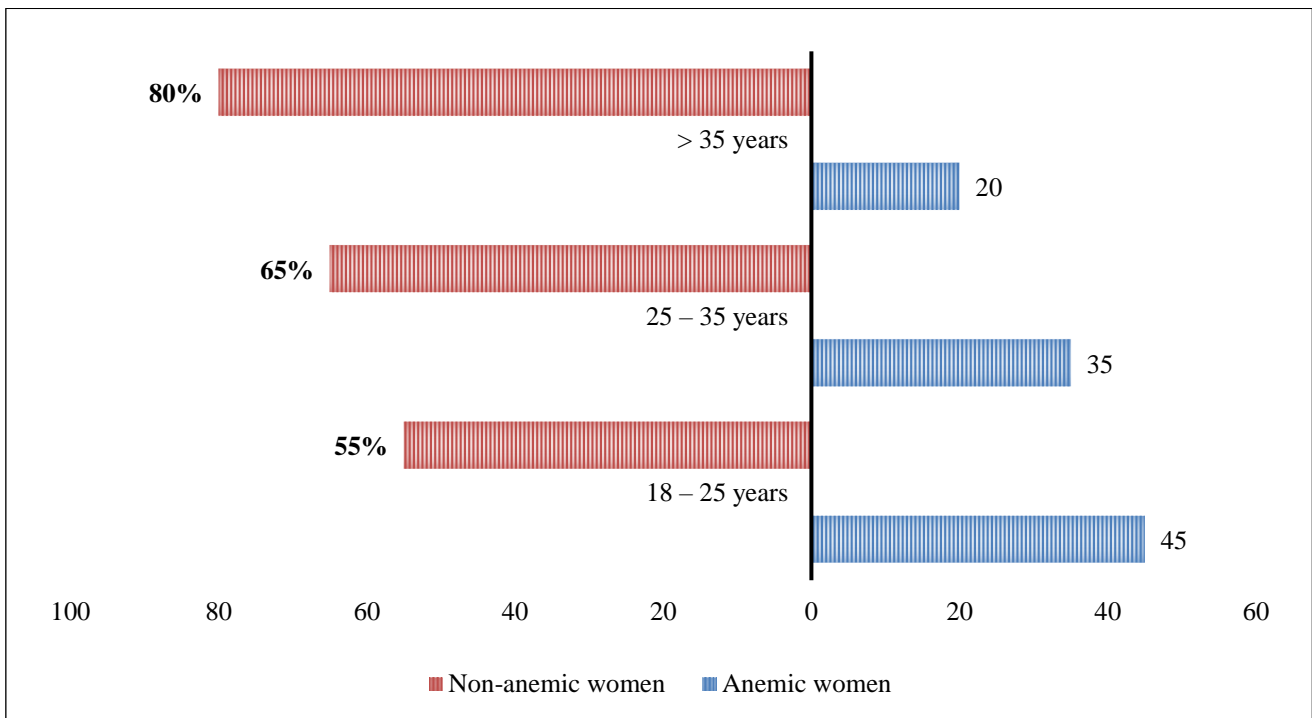
2 to 4 years, and 21.1% have an interval over 4 years. Among non-anemic women, 68.3% have an interval of 1 to 2 years, 34% have an interval of 2 to 4 years, and 19% have an interval over 4 years.

**4. Discussion**

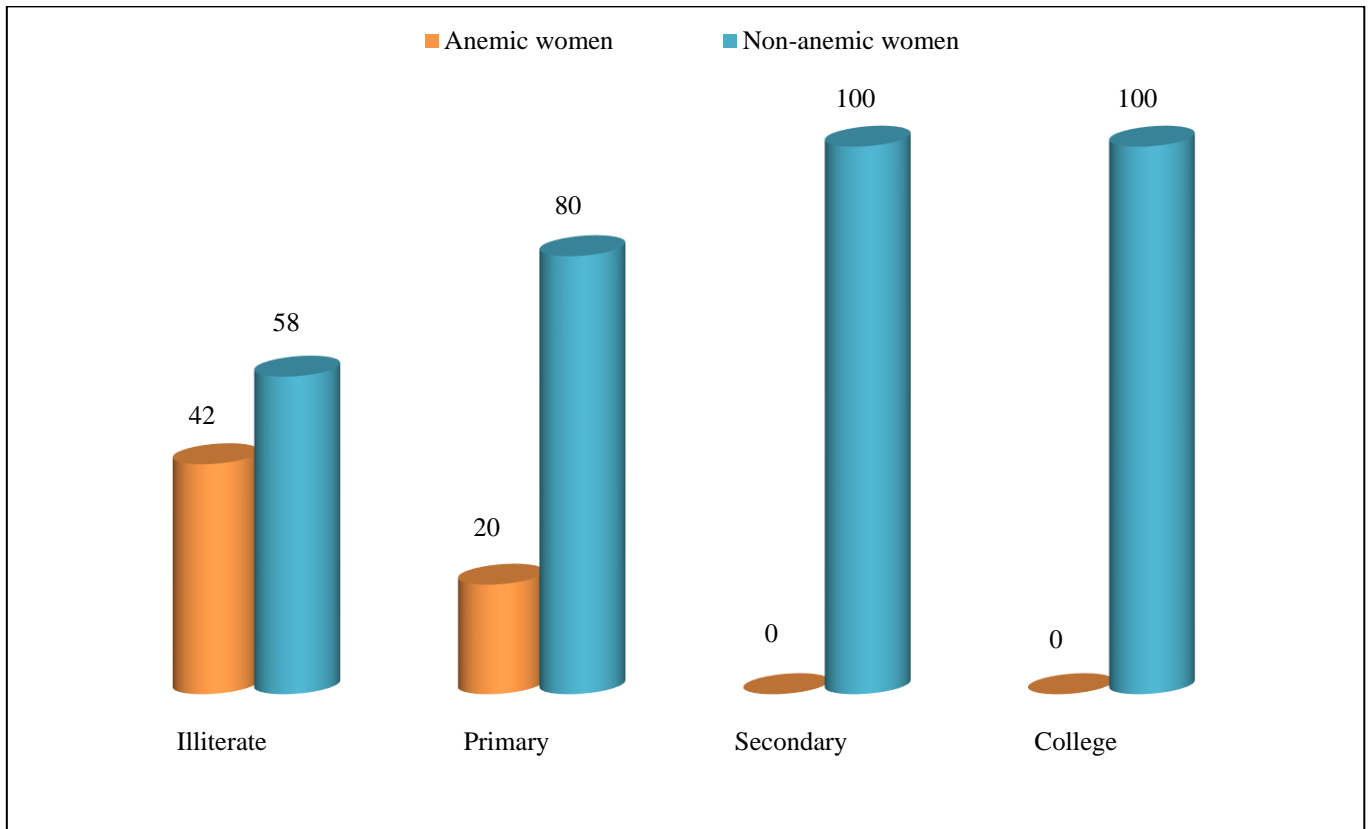
The data suggests varied distributions of anemia across different parity and intergenerational interval groups.

Despite a lower prevalence of anemia, nulliparous women still constitute a significant proportion of anemic cases. In contrast, multiparous women exhibit a higher prevalence of anemia compared to other parity groups [10]. Moreover, the distribution of anemia among different intergenerational intervals appears to be fairly balanced. These results highlight the complexity of factors influencing the prevalence of anemia [11]. The study also reveals several noteworthy findings regarding the prevalence of anemia among pregnant women in the rural province of Ouazzane, Morocco. The analysis of socio-demographic characteristics, particularly age, highlights a higher prevalence of anemia among younger women (18-25 years), with a gradual decrease in prevalence in the subsequent age groups. This age-based distribution underscores the vulnerability of younger pregnant women to anemia, indicating the need for targeted interventions and increased awareness for this demographic group [12-13]. The association between education levels and the prevalence of anemia is a crucial observation. The data suggests that higher education levels, especially beyond primary education, are associated with a lower likelihood of anemia [14]. This inverse relationship

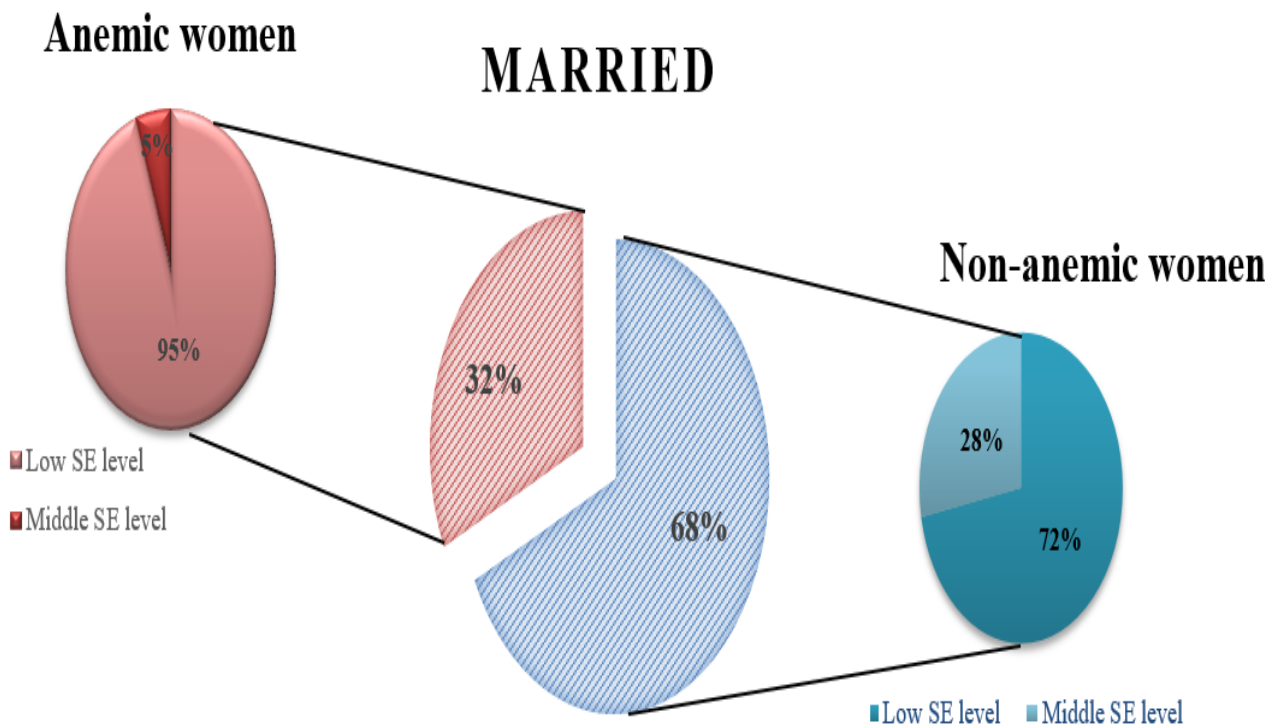
emphasizes the potential positive impact of education on women's health, indicating that educational initiatives can play a role in reducing anemia [15]. This finding aligns with broader discussions on the interconnectedness of education and health outcomes. The socio-economic aspect adds an additional layer to the analysis, revealing a higher prevalence of anemia among women from disadvantaged socio-economic backgrounds [16]. The trend indicates a potential correlation between socio-economic factors and anemia [17]. Considering the economic determinants of health is essential in developing comprehensive strategies to combat anemia, especially within vulnerable populations. The study of parity and intergenerational intervals provides nuanced information. Despite a lower prevalence, nulliparous women still constitute a significant proportion of anemic cases. In contrast, multiparous women exhibit a higher prevalence, suggesting that previous pregnancies may contribute to the risk of anemia [18]. The distribution of anemia among different intergenerational intervals seems balanced; indicating that the time elapsed between two consecutive live births may not be a major determinant of anemia prevalence in this context [19]. These results reveal significant trends in the prevalence of anemia among pregnant women, with implications for targeted intervention strategies. Understanding the diverse factors influencing anemia prevalence, including age, education, socio-economic status, parity, and intergenerational intervals, is crucial for developing effective public health initiatives. These findings contribute valuable insights to the broader discourse on maternal health and emphasize the need for context-specific approaches in public health initiatives.



**Figure 1:** Prevalence of anemia categorized by socio-demographic characteristics, specifically age



**Figure 2:** The rates of anemia based on socio-demographic characteristics, specifically focusing on the level of education.



**Figure 3:** Anemia rates according to marital status and socio-economic level.

**Table 1:** Anemia rates by parity and intergenital interval.

Variable	Anemic women Number %		Non-anemic women Number %	
<b>Parity</b>				
Nulliparous	9	21	35	79
Primiparous	10	31	23	69
Pauciparous	13	4	17	57
Multiparous	6	46	7	54
Total	38	32	82	68
<b>Intergenital interval</b>				
1 to 2 years	20	52,6	45	55
2 to 4 years	10	26,3	21	26
over 4 years	8	21,1	16	19
Total	38	31,7	82	68,3

## 5. Conclusion

Pregnancy, marked by increased metabolic demands stemming from physiological changes and fetal development, underscores the pivotal role of micronutrients, including vitamins, minerals, and trace elements, in influencing the well-being of both the pregnant woman and the developing fetus. The heightened risk of maternal mortality due to bleeding during childbirth associated with iron deficiency-induced anemia further accentuates the importance of addressing nutritional needs during pregnancy. While conventional supplementation, particularly with iron and folic acid, remains a fundamental approach to improving nutritional status in pregnancy, alternative strategies such as food fortification and dietary diversification deserve closer examination. These alternative approaches are likely to yield long-term benefits compared to relying solely on supplements. Additionally, recognizing the impact of enhanced socioeconomic status on household diets is crucial and should not be underestimated. In response to these considerations, the Ministry of Health has launched a national nutritional program with the goal of addressing micronutrient deficiencies. This program entails supplementing pregnant women with iron and folic acid and fortifying flour with iron and B vitamins (thiamine, riboflavin, niacin, and folic acid). The presented data underscores the importance of implementing a comprehensive intervention strategy to mitigate anemia-related complications, placing particular emphasis on postpartum monitoring to rectify deficiencies before subsequent pregnancies. These findings contribute valuable insights to the broader discourse on maternal health,

highlighting the imperative for tailored and context-specific approaches in public health initiatives.

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