

## REVIEW ARTICLE

# Anemia Among Women and Children in Saudi Arabia: Is it a Public Health Burden?

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### SUMMARY

**Background:** Anemia is a global health burden affecting developing and developed countries alike, estimated to affect one-third of the world's population. The most prevalent type of anemia globally is iron deficiency anemia. The groups most vulnerable to developing anemia include children, women (particularly pregnant women), and the elderly, primarily in developing nations. Anemia is also widespread in Gulf countries, including Saudi Arabia, where estimates suggest the disease affects up to 70% of women and children. The aim of the current review was to report the incidence of anemia among women and children in Saudi Arabia and the impact of anemia on pregnancy.

**Methods:** The main electronic databases were searched for publications on anemia among women and children in Saudi Arabia.

**Results:** In Saudi Arabia, the incidence of anemia among children and women ranges from 12.5% to 70%, varying by province. Younger pregnant women exhibit a higher prevalence of anemia than older pregnant women. The primary risk factors for developing anemia among children and women in Saudi Arabia include lifestyle choices, low dietary intake, the number of pregnancies, and sociodemographic factors. Consequently, anemia is a major health burden in Saudi Arabia, necessitating serious planning and intervention to reduce anemia-related complications among women and children.

**Conclusions:** Despite substantial development and improvements in socio-economic factors, anemia remains a major health issue for children and women in Saudi Arabia. Therefore, the underlying factors, including nutritional and other risk factors, warrant further investigation.

(Clin. Lab. 2025;71:xx-xx. DOI: 10.7754/Clin.Lab.2025.250102)

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#### KEYWORDS

anemia, children, women, pregnant women, Saudi Arabia

#### INTRODUCTION

Anemia is a global health burden impacting all societies in developed as well as developing countries, albeit to varying degrees [1,2], affecting approximately one-third of the global population [2]. The countries most burdened by anemia are the low- and lower-middle-income countries [1]. Moreover, the groups most vulnerable to developing anemia include children, women of child-bearing age, pregnant women, and the elderly [1]. The World Health Organization (WHO) estimates that the

prevalence of anemia lies between 40% and 60.2% among children aged 6 - 59 months, is around 30% among women aged 15 - 59 years, and is approximately 37% among pregnant women [1,3].

In the Middle East, particularly in Gulf countries (including Saudi Arabia, Kuwait, Bahrain, United Arab Emirates, Qatar, and Oman), anemia poses a significant health burden [4]. The prevalence of anemia among women of childbearing age in the Middle East is estimated to be moderate (between 20 - 40%) in some areas and severe (> 40%) in others [3], whereas in Gulf countries, it is estimated to reach 54% [5]. Iron deficiency anemia (IDA) is highly prevalent in Gulf countries, affecting around 40.5% of young females (aged 16 - 18 years), while among children (preschool- and school-aged), the prevalence ranges from 12.6% to 67% [5]. The most common type of anemia among women in Gulf countries is IDA [5,6]. The high prevalence of anemia among women, pregnant women, children, and infants is a significant concern that warrants attention [5, 6]. The global nutrition target aims to reduce the incidence of anemia among women of reproductive age by 2025 due to its substantial impact on women's health, quality of life, mortality, and morbidity [7]. Furthermore, El-Hazmi and Warsy (1999) reported that the incidence of anemia among children in various areas of Saudi Arabia, particularly in the eastern and southwestern provinces, reached levels comparable to those in developing countries [8]. Therefore, this review aimed to report the prevalence of anemia among females and children across the 13 provinces - namely, Riyadh, Eastern, Qassim, Makkah, Madinah, Asir, Jazan, Al-Baha, Najran, Hail, Tabuk, Al-Jouf, and Northern Border - of Saudi Arabia and the associated risk factors contributing to the increased the incidence of anemia.

## MATERIALS AND METHODS

The primary electronic databases, including Web of Science, Scopus, Google Scholar, PubMed, Directory of Open Access Journals, and the Cumulative Index to Nursing & Allied Health Literature, were searched for publications on anemia, IDA, nutritional anemia, microcytic, normochromic, and macrocytic anemia in Saudi Arabia. Publications focusing on healthy individuals, women, children, infants, and pregnant women were selected. Only publications addressing the search terms in English with full access or available abstracts online were included in this study. Publications focusing solely on adult male populations, anemia associated with chronic disorders, reports from premarital screening program and genetic counselling, and hemoglobinopathies were excluded from the review.

## Prevalence of anemia in Saudi Arabia

### Nationwide

As per the reports, the prevalence of anemia in Saudi Arabia was estimated to be high, reaching up to 70% [9]. The overall estimation of anemia among young adult women, pregnant women, and children varies across regions and cities in Saudi Arabia [8-10]. In 2020, the official World Health Survey in Saudi Arabia, published by the Ministry of Health, indicated that anemia affected 50.2% of 7,427 residents aged over 15 years, with the prevalence at 51.9% among 3,898 males and at 48.3% among 3,529 females [10]. In the same year, Owaidah et al. (2020) reported that the incidence of anemia among 981 university students (507 women and 474 men; aged over 17 years) from four main cities in four different provinces for iron deficiency without anemia (ID) was 28.6%, and IDA was 10.7% in both men and women [11]. Among women, the IDA was around 94.1% [11], with the highest incidence of anemia (ID, IDA, and hemoglobinopathies) observed in the Dammam city at 59.2%, followed by Makkah city at 22.4%, Riyadh city at 12.2%, and Madinah at 6.1% [11]. Furthermore, a systematic review, in 2023, estimated the prevalence of anemia to range from 12.5% to 70% among young adult women and 18% to 58% among pregnant women [9]. A summary of the reported percentage of anemia among non- and pregnant females in Saudi Arabia is illustrated in Supplemental Table S1.

Regarding children, a nationwide study conducted in 1999 involving 5,381 children (< 14 years old) reported an overall prevalence of anemia at 24.8%. The highest prevalence was observed in the Eastern province, followed by Jazan province [8]. Most cases of these anemia cases were microcytic hypochromic and normochromic hypochromic, with macrocytic anemia representing a small percentage (0.45%) [8]. The prevalence of anemia reported among 2,997 children (< 14 years old) from Abha, Jazan, Najran, Qunfuda, Albaha, Bisha, Majarda, Yanbu, and Safra cities was 25.3% (n = 757), with the highest incidence reported in Jazan [8]. Additionally, the prevalence of anemia in two provinces (Riyadh and Qassim) was reported as 16.5% (212/1,281) among children aged < 14 years old [8]. A summary of the reported percentage of anemia among children in Saudi Arabia is illustrated in Table 1.

### Riyadh province

#### Incidence among adult females

Out of all studies on anemic females in Saudi Arabia, Riyadh city has the most studies reported [12-17]. In 2007, Alssaf reported that 21% of 102 non-pregnant women and 2.3% of 132 men (aged > 18 years) had IDA [12]. In 2013, the prevalence of anemia among 969 women (aged 15 - 49 years) was reported at 40% (n = 390) [13]. In 2018, the prevalence of anemia, primarily IDA, was reported at 41.6% among 683 healthy females (18 - 40 years) [14], while in 2019, it was reported at 12.0% among 173 men and women aged 18 - 29 years

**Table 1. Reported percentage of anemia among children and adolescents in Saudi Arabia.**

Province	City	Year	% of anemia	Sample size	Population	Age	Reference
Nationwide	Nationwide	1999	24.8%		children	< 14 years	[8]
Riyadh	Riyadh	1999	55.4%	1,210	school girls	7 - 14 years	[21]
		2013	22.3%	753	children	5 - 12 years	[22]
		2015	27.1%	495	teenagers	13 - 18 years	[23]
		2015	34.2%	292	teenagers (female)	13 - 18 years	[23]
		2023	24%	338	children	school age	[24]
	Kulias area	2022	39.1%	417	7 - 18 year-olds	children - teenager	[25]
Eastern	Al-Khobar	1989	26.4%	285	schoolgirls	6 - 12 years	[30]
	Al-Hafouf and Al-Qateef	1999	41.3%	664	children	< 14 years	[8]
Makkah	Makkah	2019	25.3%	99	infants	< 1 year	[38]
	Jeddah	1989	25%	138	infants	9 months	[44]
		2002	20.5%	800	school students	< 12 years	[45]
		2008	23%	123	children	6 - 12 years	[46]
	Taif	2018	56%	200	children	5 - 12 years	[48]
		2023	7.5%	200	children	2 - 6 years	[49]
Madinah	Madinah	1989	6%	330	infants	0 - 15 months	[52]
		2015	49%	500	infants	6 - 24 months	[53]
Asir	Abha/ Khamis Mushait	2019	26.4%	2,415	children	6 - 59 months	[58]
Tabuk	Tabuk	1996	56%	4,751	infants	9 months	[69]
		2021	15.6%	4,158	children	6 - 12 years	[70]
Najran	Najran	2019	22.5%	240	teenagers	13 - 19 years	[73]
Al-Baha	Baha	2020	15.2%	384	children	0 - 69 months	[74]

at King Saud University and Alfaisal University. Out of the 12% of anemic individuals, 75% were women [15]. In 2020, the prevalence of anemia was 54.6% among 1,893 residents of Riyadh [10]. In 2021, AlFaris et al. reported anemia of 28.4%, primarily IDA, among 250 non-pregnant females (20 - 65 years) [16]. A recent study reported a 46% incidence of anemia, mainly IDA among 240 obese patients at King Fahad Medical Center (n = 128) [17].

In 2016, the prevalence of anemia among 372 pregnant women visiting Prince Sultan Medical Military City in Riyadh was 20.4% [18]. IDA was the most prevalent type of anemia (70%) among 84 anemic pregnant women [19]. A recent multicenter study reported a 30.75% prevalence of anemia among 10,600 pregnant women in Riyadh city [20].

#### **Incidence among infants and children**

In 1999, anemia among 1,210 schoolgirls (aged 7 - 14 years) was reported as 55.4% in Riyadh city [21]. In 2013, 22.3% incidence of anemia was reported among 753 children aged 5 - 12 years, with comparable incidence in male and female children [22]. Two years later, the same author reported 27.1% anemic teenagers among 495 teenagers (203 men and 292 women) aged 13 - 18 years in Riyadh city. In the male population, 16.7% (n = 34) were anemic, while in the female population, 34.2% (n = 100) were anemic [23]. In 2022, Shetah et al. reported a 24% prevalence of anemia among 338 children of school age [24]. The prevalence of anemia in female children was higher than in male children [24].

In Khulais, a rural area outside Riyadh city, the overall prevalence of anemia among 417 children (147 children

aged 7 - 11 years old, and 123 female and 147 male adolescents aged 12 - 18 years old) was 39.1% [25]. The prevalence of anemia was 27.2% (n = 40) among 147 children, 46.3% (n = 57) among 123 female adolescents, and 44.9% (n = 66) among 147 male adolescents [25]. The type of anemia among the children and adolescents was primarily microcytic hypochromic [25].

### **Eastern province**

The prevalence of anemia among pregnant and non-pregnant women in the Eastern province has been documented since 1983. In 2008, Rasheed et al. conducted a study on 464 pregnant women in three primary health-care centers in Al-Khobar, which served 50% of the Al-Khobar residents [4]. Anemia was reported at 41.3% (192 out of 464 pregnant women) [4]. Anemia was more prevalent in Saudi women (n = 153) compared to non-Saudi women (n = 39). Sickle cell trait and sickle cell disease accounted for 6.7% of the cases, while the remaining cases were suspected to be IDA [4]. In 2010, anemia among 787 pregnant women was reported at 45.2% in Al-Hasa (n = 356) [26]. In 2014, the prevalence of anemia among 31 women (pregnant, non-pregnant, and adolescent female; aged 12 - 44 years) in Al-Hasa, Eastern province, was reported at 54.8% (n = 17) [27]. Additionally, anemia was more prevalent among pregnant women than among non-pregnant women [27]. In 2018, AlSheikh reported 38.38% incidence of IDA among young adult female students (n = 120) in Dammam city [28]. In 2019, the incidence of IDA among young adult female students (n = 201) was reported at 35.3% in Dhahran city [29]. Finally, in 2020, the Ministry of Health estimated anemia at 35.5% among 887 adult male and female residents of the Eastern province [10]. In children, the prevalence of anemia among 285 schoolgirls (aged 6 - 12 years) in Al-Khobar was 26.4% [30], while in Al-Hafouf and Al-Qateef, it was 41.3% among 664 children in 1999 [8].

### **Qassim province**

In 2020, the Ministry of Health estimated anemia at 26.2% among 284 residents of Qasim province [10]. The prevalence of anemia in Qassim was also reported at 29.3% among 233 pregnant women (aged 18 - 42 years) at the Maternity and Children Hospital in Buraidah city in 2020 [31]. Anemia was more prevalent in younger pregnant women aged 25 - 30 years [31]. In 2022, a single study from Alghat city reported 51% prevalence of anemia among 1,663 patients aged > 15 years, with women comprising 849 out of the 1,663 [32]. Among these, 21% of the 849 female patients were anemic, with the incidence of anemia being more prominent in young women aged < 40 years than in older women > 40 years old [32]. A recent study in 2023 reported 28.1% prevalence of anemia among 520 obese patients after bariatric surgery (> 16 years) in Buraydah city [33].

### **Makkah province**

The Ministry of Health estimated anemia at 56.4% among 2,069 male and female residents of the Makkah province [10].

### **Makkah city**

In 2012, the prevalence of anemia among 100 pregnant women was reported at 39% [34]. The incidence of anemia was higher in women aged between 25 and 35 years old [34]. In 2022, the prevalence of anemia among 310 pregnant women (aged > 18 years) was 41.9%, mostly among younger women aged 25 - 35 years [35], while another study reported 47.3% incidence of anemia among 12,020 adult non-pregnant women (n = 5,689) [36]. Furthermore, a recent study reported a 13% incidence of IDA among 100 adult female students (aged 19 - 23 years) in Makkah city [37]. In children in 2019, Alhazmi reported 25.3% prevalence of anemia among 99 infants (< 1 year) attending well-baby clinic in Makkah [38].

### **Jeddah city**

In 2010, the prevalence of anemia was reported at 43.1% among 8,981 pregnant women attending their first prenatal visit (n = 3,869) [39]. The incidence of mild and moderate anemia was high, while severe anemia was very low (0.3%; n = 24) [39]. In 2011, IDA was reported at 23.6% among 310 female university students (aged 18 - 23 years) [40]. In 2019, a retrospective study of five-year records at King Abdulaziz University in Jeddah indicated a 66.8% incidence of anemia among 1,037 obese pregnant women [41]. In 2020, a study of 5,120 pregnant women at King Abdulaziz University Hospital in Jeddah reported that 55.6% (2,845) had anemia, with the majority of the cases being Saudi women [42]. ALQurashi et al. (2022) reported a 28.6% incidence of anemia among 336 pregnant women, with the majority of these cases occurring in the second and third trimester [43]. All cases of anemia in the study were attributed to IDA [43].

In children, a study conducted in 1989 reported 25% of 138 infants was anemic, primarily due to thalassemia and IDA [44]. In 2002, anemia among school students (< 12 years) was reported at 20.5% [45], while in 2008, the prevalence of anemia was 23% among 123 female children (aged 6 - 12 years) [46]. In 2021, anemia was reported at 9.8% among 286 children (aged 2 - 5 years).

### **Taif city**

In 2014, the incidence of anemia among 316 pregnant women in Taif was reported at 25.3% [47]. In 2018, IDA was reported at 56% among 200 children (aged 5 - 12 years) [48], while a recent study in 2023 reported a 7.5% prevalence of anemia among 200 children (aged 2 - 6 years) [49]. Anemia is more prevalent in older children than younger children in Saudi Arabia, mainly because the younger children are fed by their mothers [45].

### **Madinah province**

In 2015, the prevalence of anemia among 268 young females (aged 18 - 35 years) was reported at 64% [50]. In 2020, the Ministry of Health estimated anemia at 47.9% among 627 residents of Madinah province [10], while in 2023, the prevalence of anemia among 300 pregnant women (aged 16 - 45 years) was 44% in Al-Madinah city [51].

In children, in 1989, anemia was reported at 6% among 330 infants (aged newborn to 15 months) [52]. IDA was more prevalent among infants aged 9 - 15 months than among younger infants and newborns [52]. In 2015, the reported prevalence of anemia, primarily IDA, among 500 infants aged 6 - 24 months visiting primary health care centers in Madinah was 49% (n = 246), with 126 out of the 246 (51%) having IDA [53].

### **Asir province**

In 1994, anemia was reported at 31.9% (n = 2088) among 6,539 pregnant women (aged > 18 years) [54], while in 1995, it was reported at 21.6% among 1,938 pregnant women (aged > 18 years) [55] in Asir province. In 2020, the Ministry of Health estimated anemia at 55.2% among 566 residents of Asir province [10], while Alkhaldy et al. (2020) estimated anemia, particularly IDA among 200 women (aged 19 to 27 years) at 63% [56]. In 2022, the prevalence of IDA was reported at 58.2% (n = 398) among 683 patients at the hematology unit of King Abdullah Hospital in Bisha. IDA was prevalent among 228 women and 138 children [57]. The incidence of anemia, primarily microcytic hypochromic, among 2,415 children aged 6 - 59 months in Abha and Khamis Mushait was 26.4% (n = 638), with the majority of cases being Saudi [58]. Microcytic hypochromic anemia was the most common type, and women exhibited a higher incidence of anemia than men [58].

### **Jazan province**

The rate of anemia among pregnant women aged 19 to 48 years was estimated at 58.9% [59]. The Ministry of Health estimated anemia at 34.4% among 325 residents of the Jazan province [10]. Hamali et al. (2020) reported a higher incidence of anemia among 49 female young adult university students [60]. Furthermore, incidences of IDA were reported at 51.1% and 51.6% among female adult university students (aged 18 - 24 years) in the Jazan Region by Hakami et al. (2024) and Essawi et al. (2024), respectively [61,62]. In Farasan island, which is located 40 kilometers away from Jazan city, the prevalence of anemia among university students was 51.6% [63], which is similar to the reports by Hakami et al. (2024) and Essawi et al. (2024), respectively [61,62].

### **Hail province**

The Ministry of Health estimated anemia at 17.7% among 121 residents of Hail province [10]. In 2015, anemia, mainly IDA, was reported at 58% among pregnant women aged 20 - 40 years in Hail city [64]. In 2020, the reported incidence of anemia among 390

pregnant women was 34.1% (n = 133) [65]. A recent study by Eltayeb et al. (2023) reported a 29.9% (n = 100) prevalence of anemia among 334 pregnant women ( $\geq 18$  years) who visited the hail maternity hospital [66].

### **Tabuk province**

The Ministry of Health estimated anemia at 49.7% among 208 residents of the Tabuk province [10]. In 2017, the prevalence of anemia was reported at 12.5% among 200 university female students (aged 18 - 25 years) [67].

In 2023, the prevalence of anemia was reported at 48.73% among 2,805 men and women [68], with the prevalence of anemia among women accounting for 51.82% of that [68].

In children, in 1996, the incidence of anemia among 4,751 infants aged 9 months who attended routine vaccine appointments at well baby clinical was 56% (n = 2,668), with most cases being IDA [69], while in 2021, the incidence of anemia among 4,158 children (comprising 1,814 males and 2,344 females) attending primary school was 15.6% (n = 651) [70]. The prevalence of anemia among 2,344 female children was 12.2% (n = 285) and 20.2% (n = 366) among male children [70].

### **Northern border province**

The Ministry of Health estimated anemia at 13.3% among five residents of the northern border province [10]. The prevalence of anemia among 150 men and women aged 24 - 76 years was reported at 43.33% (n = 65) [71]. Out of the 65 anemic individuals, 66.2% (n = 43) had IDA [71]. The prevalence of anemia was reported at 34.8% among 299 pregnant women who visited the Maternity and Children Hospital in Arar for routine antenatal visits. Severe anemia was reported at less than 1% [72].

### **Najran province**

The Ministry of Health estimated anemia at 79.4% among 175 residents of Najran province [10]. The incidence of IDA was reported at 22.5% among teenagers in Najran (aged 13 - 19 years old) [73].

### **Al-Baha province**

The Ministry of Health estimated anemia at 81.5% among 133 residents of the Al-Baha province [10]. The prevalence of anemia among 384 children (0 - 69 months) was reported at 15.2% [74].

### **AL-Jouf province**

The Ministry of Health estimated anemia at 27.4% among 134 residents of the Al-Jouf province [10]. The prevalence of anemia among 198 university students (aged 18 - 24 years) was reported at 32% [75].

### **Causes and risk factors for developing anemia**

The causes of anemia are multifactorial, encompassing both physiological and pathological factors [76]. Iron plays a crucial role in developing red blood cells

(RBCs), particularly hemoglobin, and in developing other organs, including the central nervous system. Iron is efficiently recycled within the body for protein synthesis; however, small amounts can be lost during menstruation and bleeding. Other factors contributing to iron deficiency include infections [76]. Additionally, the demand for iron increases during pregnancy and the development of children and infants. Therefore, anemia, particularly IDA, affects various bodily functions and the development of pregnancy, children, and infants. In Saudi Arabia, several risk factors have been identified that increase the incidence of anemia, particularly IDA, among adult females and pregnant women. However, the most common risk factors include inadequate diet consumption, lifestyle choices, and the number and timing of pregnancies [25]. Other risk factors encompass socio-demographic, economic, and cultural factors, dietary habits such as low consumption of red meat, a history of anemia, menorrhagia and menstrual disorders, juice intake of vitamin-rich juices, overweight and obesity, lack of fresh juice consumption, heavy use of non-steroidal anti-inflammatory drugs and antacids, and failure to take iron supplementation during pregnancy [6,9,13,14,20,23,27,34,47,51,59,70,77,78]. Additionally, a history of anemia, previous blood transfusions, and intrauterine fetal death has been associated with an increased risk factor for developing anemia [42].

Among pregnant women, anemia has been associated with age, gestational age, consumption of tea after meals, gravidity, occupational status, and the intake of green vegetables [35]. Furthermore, Mahofuz et al. (1994) reported that high multiparity, educational levels, short intervals between each pregnancy, and being a pregnant woman under the age of 20 are significant risk factors [54]. The number of pregnancies and first trimester was associated with the risk of developing anemia among females [51]. Severe anemia cases are often observed in younger pregnant women and primigravida [39]. Finally, the number of pregnancies and the intervals between them are associated with the risk of developing anemia [18,31,59].

These risk factors have been exacerbated by a lack of awareness among pregnant women. Almurshed et al. (2007) reported that 114 pregnant women in Riyadh, aged 17 - 42 years, had a low daily intake of several nutrients compared to the recommended dietary allowance [79]. The development of IDA has been attributed to irregular intake, despite the availability of iron supplementation [4]. ALQurashi et al. (2024) reported a 50% gap in adherence to the Ministry of Health's recommendations for measuring hemoglobin during pregnancy, which may explain the increased incidence of IDA among pregnant women in Saudi Arabia [43].

#### **Impact and consequences of anemia on pregnancy**

Anemia has a significant impact on health, particularly for pregnant women and children, affecting the mother during pregnancy and being associated with complica-

tions such as placenta previa and placental abruption [78]. Anemia, especially IDA, has been linked to an increased risk of maternal death [80]. Maternal anemia is a serious complication that raises the risk of mortality and morbidity for the mother. Additionally, anemia affects pregnancy outcomes, including preterm birth, low birth weight, and perinatal and neonatal mortality [81]. The diagnosis of IDA is particularly important, as ID without anemia may lead to long-term complications that could be irreversible [82,83]. Such complications can manifest as neurodevelopmental and behavioral disorders [82,83]. Anemia, particularly IDA, has been demonstrated to affect not only growth but also cognitive and psychomotor skills; deficiencies in early life can impair motor and mental functions. The effect of anemia in pregnant women can be detrimental if left untreated, increasing the risk of maternal mortality, perinatal mortality, low birth weight, and other complications [82,83].

Data from Saudi Arabia indicate that pregnant women with moderate anemia are more likely to be admitted to intensive care units, deliver low-birth-weight newborns, and experience preterm birth as compared to non-pregnant women [20]. Anemia is a serious medical condition with severe consequences, including increased morbidity and mortality risks for both the fetus and the mother. Thus understanding the incidence and causes of anemia establishes a foundational basis for policymakers to develop intervention strategies. These initiatives aim to reduce anemia rate in Saudi Arabia, ultimately enhancing the quality of life.

Most of the cases of anemia among women and children in Saudi Arabia have been attributed to IDA; however, the incidence of hemoglobinopathies and glucose-6-phosphate deficiency should not be ignored especially in the Eastern province and the Jazan province [84-86].

#### **Lesson from the study**

The implementation and continuous evaluation of national health policies for the surveillance of antenatal care investigations - including anemia screening - are crucial interventions to consider in modern Saudi Arabia. Such initiatives, coupled with universal iron supplementation as recommended by the WHO, will enhance maternal and infant health and well-being in the Kingdom. Health education targeting pregnant women and those of reproductive age regarding the importance of micronutrients and iron supplementation is vital to empower mothers and their families to achieve healthy pregnancies.

## **CONCLUSION**

Anemia is highly prevalent among women and children in Saudi Arabia, reaching up to 70% and 56%, respectively. It remains a major health burden for children and women in Saudi Arabia, despite the significant development and improvements in the socio-economic factors.

The underlying factors, including nutritional factors and other risk factors, require further elucidation, and effective measures are needed to reduce the incidence of anemia among women and children in Saudi Arabia.

#### Source of Funds:

The author extends his appreciation to the Deputyship for Research & Innovation, Ministry of Education in Saudi Arabia, for funding the research work through project number ISP22-1.

#### Declaration of Interest:

The author declares that he has no conflicts of interest.

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