OPEN ACCESS Freely available online

Journal of Nutrition & Food Sciences

ISSN: 2155-9600

Research Article

Iron Supplementation among Children Aged 6 to 59 months in Afghanistan: A Report of Afghanistan Demographic and Health Survey (AfDHS) 2015

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ABSTRACT

Objective: Iron deficiency (ID) remains a global nutrition problem resulting in a prevalence rate of 30%-60% anemia in young children of low income countries. Low cost iron supplements are efficient for prevention and treatment of iron deficiency anemia (IDA). The present study aimed to evaluate iron supplementation in children under the age of five in Afghanistan.

Methods: This study is a part of the Afghanistan Demographic and Health Survey (AfDHS) implemented by the Central Statistics Organization (CSO) and the Ministry of Public Health. AfDHS followed a stratified two stage sampling design for 34 provinces of Afghanistan. In the first stage, 950 clusters selected, and in the second stage, a fixed number of 27 households per cluster including 25,741 households selected for the study, of which 24,395 successfully interviewed, yielding a response rate of 98%.

Results: About 30% of the children under age of two years old in Afghanistan consumed iron rich foods in the 24 hours before the interview. Non breastfeeding children were more likely to consume foods rich in iron comparing breastfeeding children. Only 6% of children 6-59 months received iron supplements in the seven days prior to the survey. Higher education of mother and better economic status related to more intakes of iron rich foods and iron supplements in children. Iron intake from food or supplements was higher in urban districts comparing rural areas.

Conclusion: Although IDA is very common in developing countries like Afghanistan, the importance of iron supplementation is still neglected. Health policy makers should keep focusing on iron malnutrition and improve parents' knowledge on choosing iron rich foods and iron supplementation.

Keywords: Iron deficiency (ID); Afghanistan Demographic and Health Survey (AfDHS)

INTRODUCTION

Iron is an essential nutrient for the function of the immune and neural system, as well as, regulation of energy metabolism in nearly all microorganisms [1,2]. Although Iron is abundant in the environment, common forms of iron are minimally soluble and therefore poorly accessible to biological organisms [3]. Iron required by infants to produce red blood cells in the first months after birth [4]. Infants commonly use iron stored during the last months of gestation [5]. When infant is 4-6 months of age, the stores can become low or depleted; this exacerbated when there are inadequate iron stores due to low birth weight and prematurity [6].

Iron deficiency anemia (IDA) is an important public health issue worldwide, affecting especially children and young women [7]. Iron deficiency (ID) usually caused by poor iron intake or parasitic infection, whereas vegetarian diet choices, poor iron absorption and chronic blood loss are common causes in high income societies [8]. ID affects up to 2 billion people worldwide of these about 500 million have anemia, particularly infants, young children, adolescents, elderly individuals, those with chronic inflammatory diseases, and women, in whom

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Received date: April 15, 2021; **Accepted date:** April 29, 2021; **Published date:** May 06, 2021

Citation: Barekzai AM, Baraki B (2021) Iron Supplementation among Children Aged 6 to 59 months in Afghanistan: A Report of Afghanistan Demographic and Health Survey (AFDHS) 2015. J Nutr Food Sci. 11:805.

menstruation and pregnancy are additional risks [9]. About 30%-40% of pre-school age children and pregnant women in industrialized countries are suffering from ID [10].

The risks for anemia in children start during gestation [11]. Anemia in the child's mother during pregnancy is associated with an increased risk of low birth weight and maternal, living in poverty from developing countries, diet low in iron or vitamins and child mortality [12]. In infants, antenatal and perinatal factors can influence iron status [13]. Low birth weight and preterm infants are born with lower iron stores and are at increased risk of IDA [14]. Prolonged milk feeding is also associated with several micronutrient deficiencies [15]. Causes and epidemiology of anemia in two to five year olds appear to differ from those in infants [16]. As children reach their third year and growth velocity decreases, daily iron requirements reduce [17]. Recent national surveys show the prevalence of anemia at 12-23 and 48-59 months to be 69.1% and 38.2% in Ethiopia, 83.0% and 53.0% in India, 72.7% and 42.0% in Malawi, 70.6% and 20.7% in Nepal and 71.5% and 45.6% in Zimbabwe [18-23]. A Brazilian study found that anemia prevalence was 64% in 12 to 16 month old infants, reflecting that ID may be a less common cause of anemia after 2 years of age compared with other causes including malnutrition, vitamin B12 and folate deficiency [24]. Daily iron supplementation considered a standard approach for treatment and prevention of ID [17,25]. World Health Organization (WHO) previously recommended that, as a public health measure, all preschool aged children receive a course of daily iron supplementation where the baseline prevalence of anemia is >40%.

Afghanistan is one of those poor setting countries where the prevalence of ID and IDA are at a higher level [26]. The national nutrition survey 2013 showed that 40% of women and 44.9% of children were anemic and 26.1% of children aged 6-59 months were iron deficient. However, after the iron supplementation in 2015, the prevalence of ID decreased in some provinces. This study aimed to evaluate iron supplementation among children under the age of five years in 34 provinces of Afghanistan in 2015.

SUBJECTS AND METHODS

Study participants

This report is a part of the 2015 Afghanistan Demographic and Health Survey (AfDHS) which implemented by the Central Statistics Organization (CSO) and Ministry of Public Health (MPH). The United States Agency for International Development (USAID) and United Nations Children's Fund (UNICEF) facilitated the implementation of the survey through technical and financial support. This survey took place from June 2015 to February 2016. The sampling frame used for the 2015 AfDHS is an updated version of the household listing frame, provided by the CSO including information on 25,974 enumeration areas (EAs). The 2015 AfDHS followed a stratified two stage sampling design for each of the 34 provinces of Afghanistan. In the first stage, a total of 950 clusters were selected, 260 in urban areas and 690 in rural areas and in the second stage a fixed number of 27 households per cluster were selected through an equal probability systematic selection process, for a total sample size of 25,650 households.

Questionnaire: Three questionnaires were used in this survey: The household questionnaire, the woman's questionnaire, and the man's questionnaire prepared and adapted to reflect the population and health issues relevant to Afghanistan. The information collected on food and supplement consumption among the youngest children under age two to assess the daily intake of iron rich food groups and iron supplements.

Data collection

Data collection was carried out by 34 field teams, each consisting of one team supervisor, one field editor, three female interviewers and three male interviewers. However, the team composition had to be adjusted during the different phases of the fieldwork operation because of security challenges. The processing of the 2015 AfDHS data began simultaneously with the fieldwork. All completed questionnaires were edited immediately while in the field by the field editors and checked by the supervisors before being dispatched to the data processing center at the CSO central office in Kabul. These completed questionnaires were edited and entered by 23 data processing personnel specially trained for this task.

Statistical analysis

All data were entered twice for 100% verification. Data were entered using the CSPro computer package. The concurrent processing of the data offered a distinct advantage because it maximized the likelihood of the data being error free and authentic. Moreover, the double entry of data enabled easy comparison and identification of errors and inconsistencies. Inconsistencies were resolved by tallying with the paper questionnaire entries. The secondary editing of the data was completed in the first week of March 2016. The final cleaning of the data set was carried out by the DHS program data processing specialist and was completed by mid-April 2016. 25,741 households were selected for the study, which 24,395 were successfully interviewed, yielding a response rate of 98%.

RESULTS

The percentage of children who received iron supplement was estimated and reported based on age, sex, breastfeeding status, mother's age and education, economic level of family, residence and province. Nearly one third of the children (30%) under age two years old in Afghanistan consumed iron rich foods in the 24 hours before the interview. Non breastfeeding children were more likely to consume foods rich in iron (43% versus 27%) than breastfeeding children were. Only 6% of children 6-59 months received iron supplements in the seven days prior to the survey and 19% received deworming medication in the six months before the survey. The lowest percentage of iron supplementation was reported in the age groups of 6-8 and 9-11 months. Higher education of mother and better economic status were related to more intakes of iron-rich foods and iron supplements in children (Table 1).

Iron intake from food and supplements were both higher in urban districts comparing rural areas. The highest percentage of iron supplement consumption was in Laghman province (24.1%) and the lowest percentage was in Nimroz province (0.1%). Information on iron supplements are based on the mother's recall (Table 2).

Table 1: Background characteristics of children; Afghanistan Demographic and Health Survey 2015.

Background characteristics	Percentage of children given iron rich foods in the last 24 hours (6-23 months)	Percentage of children given iron supplement in the last 7 days (6-59 months)	Number of children
Age in months			
06-Aug	13.9	4.8	1,572
09-Nov	25	5.3	1,148
12-17	35.7	6.1	3,723
18-23	37.2	6.7	1,985
24-35	Na	6.4	6,598
36-47	Na	7.2	6,282
48-59	Na	5.7	5,902
Sex			
Male	29.9	6.4	13,961
Female	30.7	6.1	13,248
Breastfeeding status			
Breastfeeding	27	6.9	7,810
Not Breastfeeding	43	6	19,208
Don't Know	*	4.1	192
Mother's age at birth			
15-19	32	6.5	739
20-29	32	6.3	15,407
30-39	27	6.1	8,945
40-49	23	6.1	2,118
Mother's education			
No education	29.6	5.8	22,774
Primary	27.6	6.5	2,152
Secondary	36.3	10.2	1.854
More than secondary	452.2	11.9	428
Wealth quintile			
Lowest	25.8	4	5,265
Second	33.9	6.2	5.518
Middle	27	6	5.695
Fourth	26.7	5.9	5,717
Highest	38.3	9.4	5.014
Total	30.3	6.3	27.209

Table 2: Residence characteristics of children; Afghanistan Demographic and Health Survey 2015.

Residence and province	Percentage of children given iron-rich foods in the last 24 hours (6-23 months)	Percentage of children given iron supplement in the last 7 days (6-59 months)	Number of children
Residence			
Urban	36.2	7	6,271
Rural	28.3	6	20,938
Province			
Kabul	48.7	7.6	3.277
Kapisa	33.6	3.2	192
Parwan	25.5	1.6	613
Wardak	10.1	15.7	293
Logar	33.2	6.6	356
Nangarhar	59.7	7.4	873
Laghman	39	24.1	687
Panjsher	30.6	17.1	37
Baghlan	45.8	15.4	641
Bamyan	7.2	2.6	279
Ghazni	22.6	11.8	717
Paktika	62.6	13.9	714
Paktya	8.3	10.3	537

Khost	24.4	8.8	895
Kunarha	23	6.6	605
Nooristan	13.1	0.2	262
Badakhshan	11.3	3.5	782
Takhar	15.5	0.8	1,050
Kunduz	39.8	1.1	1,071
Samangan	33.3	1.2	306
Balkh	38.6	9.1	1,680
Sar-E-pul	42.7	1.6	524
Ghor	35.5	14	761
Daykundi	18.4	6.4	272
Urozgan	9.9	1.4	354
Kandahar	6.2	1.2	2,484
Jawzjan	5	3.1	54
Faryab	12.2	8.9	2,067
Helmand	53.3	0.8	844
Badghis	28.7	3.9	656
Herat	46.3	1.8	1,849
Farah	27.5	3.6	698
Nimroz	17.8	0.1	266
Total	30.3	6.3	27.209

DISCUSSION

Iron deficiency (ID) remains the most pervasive nutritional deficiency worldwide [27]. Prevalence rate for IDA in young children exceeds 50% in low income countries, resulting in impaired immune response and cognitive function [28,29]. The American Academy of Pediatrics and World Health Organization (WHO) have proposed recommendations for prevention of iron deficiency including enrichment of foods with iron, giving iron rich formulas when breast milk is insufficient and avoiding cow's milk in the first year of life [30,31]. In addition, low cost iron supplements are efficacious in combating IDA; thus in countries with anemia rates more than 40%, World Health Organization (WHO) recommended universal supplementation of pregnant women and young children [32].

According to the data of AfDHS survey, about 30% of the children under age two in Afghanistan consumed iron rich foods in the 24 hours before the interview. Non breastfeeding children were more likely to consume foods rich in iron comparing breastfeeding children. Only 6% of children 6-59 months received iron supplements in the seven days prior to the survey. The lowest percentage of iron supplementation reported in the age groups of 6-11 months. Higher education of mother and better economic status related to more intakes of iron rich foods and iron supplements in children. Iron intake from food or supplements was both higher in urban districts comparing rural areas.

Many other countries in Middle East are facing ID as a major health problem, it is estimated that about 18% to 38% of Iranian children under age 5 years are anemic [33]. One study about iron deficiency anemia among under 5 years children in southwest Iran showed that the main causes were inappropriate nutrition, affected by a series of socioeconomic and cultural factors, failure to allow adequate time between pregnancies among young mothers because of poverty and lack of knowledge [17].

There were some limitations for the present study. One of them was the lack of data about the presence of inhibitors and enhancers of iron absorption in the diet, which are important factors in determining the bioavailability of iron. Further studies are needed to associate the effects of iron intake and contributing dietary factors with iron status. Insight in these components of the diet of children may contribute to improved dietary guidelines for these children [18]. In addition, our research team faced a number of challenges during data collection, especially in provinces under the control of the insurgents. There was a need to get support from security officers and local civil elders to obtain access to the selected clusters. This process delayed the fieldwork schedule but the data collection was completed.

CONCLUSION

Although iron deficiency and IDA is very common in developing countries like Afghanistan, the importance of iron supplementation is still neglected. Health policy makers should keep focusing on iron malnutrition and improve parents' knowledge on choosing iron rich foods and iron supplementation.

STATEMENT OF AUTHORSHIP

AMB contributed in conception, design, search, data interpretation and supervised the study. BB contributed in data clearing and drafting the manuscript. All authors approved the final manuscript for submission.

CONFLICTS OF INTEREST

All authors declared no potential personal or financial conflicts of interest.

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