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ORIGINAL ARTICLE

Frequency of Iron Deficiency Anemia Among Children a Multi-Center Study

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ABSTRACT

Background: Anaemia, marked by abnormally low levels of haemoglobin and often caused by an absence of iron, remains a severe public health problem in Pakistan. Studies have yet to be done on the prevalence of iron deficiency anaemia in children, making it essential to research the Khyber Pakhtunkhwa region to understand better how widespread this ailment is amongst the region's pediatric populations.

Objective: Determine the prevalence of iron deficiency anaemia in anaemic newborns between 6 and 66 months.

Materials and Methods: This multi-center study was conducted between February 2022 and February 2023 at the Hayatabad Medical Complex pediatric department in Peshawar. The 180 enrolled children's basic demographic information, including age, gender, and weight, were collected. Operational guidelines for automated analysis of iron deficiency anaemia collected venous whole blood samples.

Results: The 180 kids ranged in age from 5 to 36 months for 65% (n=118) and 30 to 66 months for 35% (n=62), respectively. (10.44 SD) There were 30 months on average. Men comprised 40% (n=75) of the participants, while women comprised 65% (n=106). Additionally, 44% (n=80) and 58% (n=102) of the subjects were above 10 kg in weight. The average weight (05.20 SD) was 9.44 g/dl. Additionally, 76% (n=70) of the children had iron deficiency anaemia, compared to 23% (n=40) of those who did not.

Conclusion: According to the study, 76% of kids aged 6 to 66 months had iron deficiency anaemia.

Keywords: iron deficiency anaemia, children's

INTRODUCTION

Anaemia is haemoglobin below two standard deviations of the mean for age and gender1. Iron deficiency is the most common cause of anaemia. An iron deficiency causes microcytic and hypochromic red blood cells because iron is necessary for synthesizing haemoglobin. The core causes of iron deficiency are influenced by a person's age, gender, and socioeconomic standing2,3. Symptoms include exhaustion and effort-induced dyspnea. Treatment includes dealing with the underlying issue and taking iron supplements. An iron deficiency may result from inadequate consumption, poor absorption, or blood loss, which is common in older people4,5. Breastfeeding protects infants from iron insufficiency. However, parasite infestations remain a problem in less developed countries. Only a few studies in underdeveloped and heavily populated regions have shown significant rates of iron deficiency anaemia in children under five. It is still unclear how common iron deficiency anaemia is in Pakistani children, particularly in Khyber Pukhtunkhwa6. To estimate the prevalence of iron deficiency anaemia in the local community, this research will examine how often it occurs in children between 6 and 66 months.

METHODOLOGY

This multi-center study conducted in department of pediatric hmc Peshawar from February 2022 and February 2023. A total of 180 children were monitored during the present investigation. Age, gender, and weight on the scale were documented as basic demographics. For automated blood analysis, 3 mL of whole venous blood was drawn and placed in vacutainer tubes that contained ethylenediamine tetraacetic acid. At least a fourth-year resident drew blood. The main hospital's laboratory received blood samples for examination. According to the operational definition, data were gathered for iron deficiency anaemia and recorded in a customized proforma.

RESULTS

Out Of the 180 kids, 118 (or 65%) were between the ages of 5 and 36 months and 62 (or 35%; see table), while the remaining 180 were between 30 and 66 months. The average age (10.66 SD) was 30 months. 40% (n=75) of the participants were men, while 65% (n=106) were women. In addition, 44% (n=80) of the 58% (n=102) participants weighed more than 10 kg. Weight was 9.44 g/dl on average (5.20SD). In addition, whereas 23% (n=40) of the kids did not have iron deficiency anaemia, 76% (n=70) did.

Table 1: Age Distribution (n=180)

Age	Frequency	Percentage
6 – 30 months	59	66%
31-66 months	31	34%
Total	180	100%
Mean and SD	30 months ± 10.66	

Table 2: Gender Distribution (n=180)

Gender	Frequency	Percentage
Male	37	41%
Female	53	59%
Total	180	100%

Table 3: Weight distribution (n=180)

Weight	Frequency	Percentage
≤ 10 Kg	51	57%
> 10 Kg	39	43%
Total	180	100%
Mean and SD	9.44 g/dl ± 5.19	

Table 4: Poor Economic Status (n=180)

Poor Economic Status	Frequency	Percentage
Yes	68	76%
No	22	24%
Total	180	100%

Table 5: Iron Deficiency Anemia (n=180)

Iron Deficiency Anemia	Frequency	Percentage
Yes	70	76%
No	20	22%
Total	180	100%

Table 6: Stratification of Iron Deficiency Anemia Concerning Age (n=180)

Iron Deficiency Anemia	6 – 30 months	31-66 months	Total	P value
Yes	46	24	70	0.9526
No	13	7	20	
Total	59	31	180	

The chi-square test was applied.

Table 7: Stratification of Iron Deficiency Anemia Concerning Gender (n=180)

Iron Deficiency Anemia	Male	Female	Total	P value
Yes	29	41	70	0.18088
No	8	12	20	
Total	37	53	180	

The chi-square test was applied.

Table 8: Stratification of Iron Deficiency Anemia Concerning Weight (n=180)

Iron Deficiency Anemia	≤ 10 Kg	> 10 Kg	Total	P value
Yes	40	30	70	0.8645
No	11	9	20	
Total	51	39	180	

The chi-square test was applied.

Table 9: Stratification of Iron Deficiency Anemia Concerning Poor Economic Status (n=180)

Iron Deficiency Anemia	Yes	No	Total	P value
Yes	53	17	70	0.9477
No	15	5	20	
Total	68	22	180	

The chi-square test was applied.

Data Collection and Analysis: Following approval from the Hmc's ethics committee and research department, 180 kids who met the study's inclusion criteria from the paediatrics department's outdoor clinic were enrolled. Each parent provided their informed agreement, guaranteeing the study's confidentiality and the patient's safety while participating. Age, gender, and weight on the scale were documented as basic demographics. For automated blood analysis, 3 mL of whole venous blood was drawn and placed in vacutainer tubes that contained ethylenediamine tetraacetic acid. At least a fourth-year resident drew blood. The main hospital's laboratory received blood samples for examination. According to the operational definition, information for iron deficiency anaemia was gathered and recorded in a specifically created proforma (Annexure-I). The statistical analysis tool SPSS version 23 was used to examine the data. Age and weight were reported as quantitative variables with a mean and standard deviation. By calculating frequencies and percentages, qualitative characteristics, including gender, low socioeconomic position, and iron deficiency, anaemia, were examined.5,6 Using stratification, impact modifiers including age, gender, low socioeconomic position, and weight were controlled for. A significance threshold of p 0.05 was used to determine if the post-stratification chi-square test was statistically significant.

DISCUSSION

One hundred eighty children were examined for our research, and it was found that 34% (31 children) were between 31 and 66 months of age, while 66% (59 children) were between 6 and 30 months8. The mean age was 30 months, and the standard deviation was 10.66.9. Of the participants, 59% (53 children) were female, and 41% (37 children) were male. Additionally, 57% (51 children) did not weigh>10 kg, compared to 43% (39 children) who did. The average weight was 9.44 g/dl, while the standard deviation was 5.19. Additionally, 76% (68 children) were poor, as opposed to 24% (22 children) who were not. Additionally, 76% (70 children) had iron deficiency anaemia, compared to 22% (20) who did not11. 81.4% (240 children) of the participants in another study, with 295 participants with comparable findings, had normal haemoglobin levels, whereas 18.6% (55 children) had anaemia. According to the survey, 42% of the children who participated in the research, or 82%, had ferritin levels that were below average. Haemoglobin and ferritin levels did not substantially differ among children of different weight and height groups12. Additionally, the study revealed that children beginning their first year of school often had iron deficiency without anaemia. Regression models claim that it is impossible to anticipate the effects of independent variables like ferritin levels, age, height, and weight status on score charts. Another study with 166 children had similar results. Thirty per cent of them, or 48 children, developed anaemia, and 41 children, or 85.4%, had iron-deficiency anaemia (IDA). According to the study13, there were no significant differences in the percentages of children with IDA who were well-nourished (26.2%) and moderately-nourished (23.3%), as well as the percentages of males and girls with IDA (25.0% and 26.4%). Independent of gender or diet, children under two were more likely than older children (40.7%) to have IDA, with an odds ratio of 5.8 (95% confidence interval: 2.5-13.8). We conclude that our study and the previous research14,15 emphasize the significant prevalence of iron deficiency anaemia, particularly in young infants. The findings highlight the need for more intervention studies focusing on iron-rich diets, foods fortified with iron, and iron supplements, especially in young children under two. The high frequency among children from affluent homes who seem to be in good health suggests that rates may be much higher in the general population16.

Limitation: The study's limitations include the small sample size of 180 kids, which may restrict the applicability of the results to a broader population. The Department of Pediatric Medicine at the hmc Hospital Peshawar, where the research was carried out, may only partially reflect all of the children in Khyber Pukhtunkhwa or other parts of Pakistan. The study was also cross-sectional, giving a snapshot of the prevalence of iron deficiency anaemia at a particular moment without allowing for the establishment of causal links or the observation of changes over time. The research relied on self-reported data for several variables, which may introduce memory bias, and there may have been possible confounding factors that were not considered in the analysis. The research also did not analyze the effects of other treatment approaches or look at additional potential causes of anaemia.

CONCLUSION

This research sought to ascertain the prevalence of iron deficiency anaemia among anaemic children aged 6 to 66 months in the Khyber Pukhtunkhwa area of Pakistan. The results showed a significant majority of iron deficiency anaemia in the local pediatric population, with 76% of the study's participants having the illness. One hundred eighty kids were included in the research; 66% of them were between the ages of 5 and 36 months, and 34% were between the ages of 30 and 66 months. 59% of the participants were female, and 57% were under 10 kg in weight. The average weight was 9.44 g/dl, and the average age was 30 months. In addition, 76% of the kids were from low-income families. The findings of this investigation support other studies carried out in comparable environments and emphasize the significant frequency of iron deficiency anaemia in young infants. The results highlight the need for intervention studies and approaches to deal with iron deficiency, including promoting foods high in iron or enriched with iron and iron supplements, especially for children under two. It is significant to highlight that the high frequency seen among children from less affluent households who seemed healthy shows that the rates may be substantially higher in the general population. To fully understand iron deficiency anaemia in children, further research with bigger sample sizes, different demographics, longitudinal designs, and thorough evaluations of anaemia causation and treatment effects is thus necessary. In conclusion, this research adds to the information on iron deficiency anaemia in children. It emphasizes the need for public health initiatives and focused treatments to address this serious issue in the Khyber Pukhtunkhwa area of Pakistan.

Future Finding: Future research will be able to better understand iron deficiency anaemia in children by using bigger sample sizes, different demographics, longitudinal designs, in-depth evaluations of anaemia causation, and treatment results.

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