International Journal of Scientific Research and Engineering Development-– Volume 8 Issue 4, July-Aug 2025
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Factors Contributing to Anaemia Among Children Under Five Years of Age in Health Facilities in Sheema District

Namirembe Alex*, Assoc. Prof. Francis Kazibwe **
*(Public Health, Bishop Stuart University, Uganda
Email: namirembealex11@gmail.com
** (Public Health and Biomedical sciences, Bishop Stuart University, Uganda
Email: fkazibwe@nhs.bsu.ac.ug

----------**********----------

ABSTRACT:

Background

Anaemia is a major public health concern in Uganda, particularly among children under five years, where it contributes to impaired growth, cognitive delays, and increased morbidity and mortality. This study assessed the prevalence and associated socio-economic, cultural, and health system factors of anaemia among children aged 6–59 months in Sheema District.

Methods

A mixed-method cross-sectional design was employed, involving quantitative data from 179 caregiver-child pairs and qualitative interviews with eight health workers. Quantitative data were analyzed using STATA 18 software while qualitative data were thematically analyzed using NVivo software.

Results

Anaemia prevalence was 53.1% (95/179), highest among infants aged 0–11 months (79.3%, p = 0.006). Caregiver education was significantly associated, with prevalence highest among children of caregivers with no formal education (75.7%, p = 0.010). Family history of anaemia (p = 0.008) and dietary restrictions (p = 0.011) also showed significant associations. Qualitative findings revealed poverty, food insecurity, cultural food taboos, malaria, worm infestations, and poor hygiene as major contributors, further compounded by limited diagnostic tools and staff shortages.

Conclusion

Anaemia in Sheema District is multifactorial. Effective interventions require integrated, community-based approaches, emphasizing caregiver education, improved nutrition, and health system strengthening through culturally sensitive programs.

Keywords — **Anaemia, Under-Five years, Sheema, Children**

----------**********----------

I. INTRODUCTION

Anaemia remains a significant public health and nutritional challenge worldwide, disproportionately affecting children under five years of age. It is defined as a lower than normal concentration of haemoglobin in the blood, limiting oxygen delivery to body tissues (WHO, n.d.). Globally, more than 273 million children are estimated to suffer from anaemia, making it one of the most widespread childhood health problems (Safiri et al., 2021). Iron deficiency, the leading cause of anaemia, affects large segments of the population in nearly every country. In Latin America, anaemia prevalence among children under five ranges between 30% and 70%, with countries such as Mexico and

Ecuador reporting particularly high burdens (Safiri et al., 2021).

In Africa, the situation is more severe, with sub-Saharan Africa recording an anaemia prevalence of 67% among children under five, equivalent to 83.5 million children (Ashenafi et al., 2025; Tesema et al., 2021). Anaemia is also one of the leading causes of hospital admissions and child mortality in the region, with case fatality rates as high as 6-18% even where transfusion services are available. Progress in anaemia control has been slow, largely due to its multifactorial causes, including nutritional deficiencies, infections, socio-economic deprivation, and weak health systems.

In Uganda, childhood anaemia remains widespread. A study by Kuziga (2017) reported a prevalence of 58.8% among children under five, with the highest burden among those aged 12-23 months. Regional analyses have similarly identified age, maternal education, stunting, malaria, and family socio-economic status as significant determinants (Komakech et al., 2025; Legason et al., 2017). Despite these findings, most existing studies have generalized results across wider regions, with limited focus on district-level dynamics.

In Sheema District, routine health information indicates persistently high childhood anaemia, with Kitagata Hospital reporting that 35% of paediatric referrals involve severe anaemia (Kirabo, 2022). However, no published study has specifically examined the socio-economic, cultural, and health system factors driving anaemia in this district. Understanding these localized determinants is critical to designing targeted, context-sensitive interventions. This study therefore sought to assess the prevalence and risk factors contributing to anaemia among children under five years in health facilities in Sheema District, western Uganda.

II. METHODOLOGY

Study Design

A cross-sectional mixed-methods design was employed, integrating both quantitative and qualitative approaches. The design allowed simultaneous measurement of prevalence and exploration of socio-economic, cultural, and health system factors contributing to anaemia among children under five years of age in Sheema District.

Study Area

The study was conducted in the paediatric wards of Kitagata Hospital and Kabwohe Health Centre IV, located in Sheema District, western Uganda. Sheema was carved out of Bushenyi District in 2010 and is predominantly inhabited by the Banyankole, with agriculture as the main livelihood activity. Kitagata Hospital has a 100-bed paediatric capacity and receives about 200 patients daily, while Kabwohe HC IV has 50 paediatric beds and an average daily attendance of 100 patients. These sites were selected because they serve as referral centres for under-five children within the district.

Study Population

The study population included children aged 6–59 months attending the selected health facilities, their mothers/caregivers, and health workers with experience in managing paediatric anaemia. Clinical and laboratory records were reviewed to determine prevalence.

Sample Size Determination

Sample size was determined using Fisher's formula (1962) at 95% confidence interval and 5% margin of error, assuming anaemia prevalence of 35% (HMIS, 2016). The calculated sample was 179 caregiver child pairs. Additionally, eight health workers were purposively selected for qualitative interviews.

Sampling Procedure

A combination of probability and non-probability techniques was applied. Simple random sampling was used to select caregiver–child pairs from clinical and laboratory registers. Prevalence

was estimated by dividing the number of anaemic children by the total tested during the study period. Purposive sampling identified health workers and caregivers of anaemic children for qualitative exploration of socio-economic, cultural, and health system factors.

Data Collection Methods

Both quantitative and qualitative approaches were applied. Structured questionnaires were administered to mothers/caregivers to capture demographic information and potential risk factors, Clinical and laboratory records were reviewed for haemoglobin levels to establish prevalence quantitatively. Qualitative data as conducted using Key informant interviews with health workers, and in-depth interviews with caregivers explored socio-economic, cultural, and health system influences.

Data Collection Instruments

Structured, pretested questionnaires contained four sections: demographics, prevalence of anaemia, socio-economic factors, and cultural practices. Likert-scale questions were used to quantify responses. Semi-structured guides captured detailed narratives from health workers on cultural practices, health system barriers, and community perspectives.

Data Collection Procedures

Approval was obtained from Bishop Stuart University Research Ethics Committee and permission sought from Sheema District health authorities. After informed consent, data were collected within health facility premises in private areas to ensure confidentiality. Questionnaires were administered face-to-face, while interviews lasted 30-45 minutes. All tools were pretested, and adjustments made for clarity. Interviews were audio-recorded with participant permission, and responses transcribed verbatim.

Validity and Reliability

Content validity was ensured through expert review and pilot testing (10% of sample). A Content Validity Index (CVI) ≥0.7 confirmed adequacy. Reliability of questionnaire items was established using Cronbach's alpha ($\alpha = 0.72$), indicating acceptable internal consistency.

Data Analysis

Quantitative data were cleaned, coded, and analyzed using STATA version 18. Descriptive statistics (frequencies, means, percentages) summarized prevalence and characteristics. Associations between anaemia and independent variables were tested using chi-square and logistic regression at 95% confidence level ($p < 0.05$ considered significant).

Qualitative data was Transcribed were imported into NVivo for coding and thematic analysis. Emerging themes were categorized around socio-economic, cultural, and health system factors influencing anaemia. Findings were triangulated with quantitative results for complementarity.

III. RESULTS

Demographic Characteristics of Children and Caregivers

Table 1: Children's Demographic characteristics (n=179)

Variable	Frequency(n)	Percentage (%)
GENDER		
Female	97	54.19
Male	82	45.81
AGE		
0-11	29	16.20

12-23	44	24.57
24-35	53	29.61
36-59	53	29.61

Of the 179 children, 97 (54.2%) were female and 82 (45.8%) male, reflecting a nearly balanced gender distribution. The majority of children were aged 24–35 months (29.6%) and 36–59 months (29.6%), while the smallest proportion were infants aged 0–11 months (16.2%)

Association Between Gender and Anaemia

Table 2: Testing association between Child's Gender and Anemia using chi2

Children's Gender	ANEMIA STATUS		Total
	Negative	positive	
Female	52	45	97
Male	32	50	82
Total	84	95	179

Pearson Chi2(1) =3.7947 Pr=0.051

The prevalence of anaemia was slightly higher among male children (50/82; 61.0%) compared to females (45/97; 46.4%) (Table 3). A chi-square test revealed a borderline association between gender and anaemia status ($\chi^2 = 3.79$, $p = 0.051$).

Prevalence of Anaemia among Children Under Five Years

Of the 179 children assessed, 95 (53.1%) were diagnosed with anaemia while 84 (46.9%) were non-anaemic. Among children with anaemia, 40 (22.4%) had mild anaemia and 55 (30.7%) had severe anaemia, while 84 (46.9%) had no anaemia. A total of 163 children (91.1%) presented with at least one symptom commonly associated with anaemia. Reported symptoms included dizziness/lightheadedness (24.6%), fatigue (19.6%), pale skin (16.7%), and headaches (20.1%). Only 16 children (8.9%) were asymptomatic.

Association between symptoms and anaemia

Table 3: Anemia status and anaemia symptom

Anemia Status	No Anaemia	Fatigue	Shortness of_breath	Pale skin	Dizziness
Negative	16	8	9	5	14
Positive	0	0	0	7	30
Total	16	8	9	12	44

Chi2= 51.8401 Pr=0.0001

There was a statistically significant association between anaemia status and presence of symptoms ($\chi^2 = 51.84$, $p < 0.001$). Among anaemic children (n = 95), dizziness (31.6%), rapid/irregular heartbeat (24.2%), and headache (18.9%) were the most commonly reported symptoms

Table 4: Age group and Anaemia

Children's Age in months	No Anaemia	Anaemia	Total
0-11	20	9	29
12-23	17	27	44
24-35	21	32	53
36-59	26	37	49
Total	84	95	179

Chi2=9.2709 Pr=0.055

Prevalence was highest among children aged 12–23 months (61.4%), followed by 24–35 months (60.4%) and 36–59 months (58.7%). The lowest prevalence was observed among infants

aged 0–11 months (31.0%). The association between age group and anaemia was not statistically significant ($\chi^2 = 9.27$, $p = 0.055$)

This section presents qualitative findings on the prevalence, diagnostic practices, and contextual factors influencing anaemia among children under five, based on interviews with health workers in Sheema district."

Theme 1: Anaemia as a Common Childhood Condition

Health workers consistently described anaemia as a prevalent and persistent problem among children under five, with higher vulnerability reported among female children. Estimates of prevalence ranged from 32.5% to 60%, with fluctuations depending on location and season. A notable increase in cases was observed during the rainy season, when malaria transmission peaked. One respondent explained:

"*About four out of ten children received daily are anaemic, especially during the rainy season due to increased malaria.*" (Participant 3)

This perception of anaemia as a routine clinical challenge reflects both the magnitude of the burden and its close association with endemic infections such as malaria.

Theme 2: Diagnostic Practices

Diagnosis of anaemia was reported to rely on a dual approach: clinical assessments as the first line, followed by laboratory confirmation. Health workers highlighted pallor of the mucous membranes and fatigue as common presenting signs, while haemoglobin testing remained the gold standard for confirmation. As one health worker noted:

"*We look at the pallor of mucus membranes, and confirm using haemoglobin tests.*" (Participant 8)

This highlights the importance of strengthening laboratory capacity in peripheral facilities to ensure timely and accurate diagnosis.

Theme 3: Seasonal and Age-Related Vulnerability

Respondents emphasized that children between 6 months and 3 years were the most affected group. This was attributed to increased nutritional demands, weaning practices, and greater exposure to infections. Seasonal variations were also strongly emphasized, with rainy periods linked to surges in malaria and worm infestations, both of which exacerbate anaemia risk.

"*Rainy seasons bring more malaria, which increases anaemia cases."* (Participant 8)

Together, these findings illustrate the complex interplay between age, infection burden, and environmental factors in shaping anaemia prevalence among young children.

Socio-Economic Factors Contributing to Anaemia among Children Under Five

Caregiver's education level was found to have a significant association with childhood anemia ($\chi^2 = 11.44$, $p = 0.010$). Children of caregivers with no formal education had the highest prevalence, with 75.7% (28/37) affected. In contrast, only 38.5% (15/39) of children whose caregivers had tertiary education were anemic. This demonstrates that lower education levels are strongly linked to higher rates of anemia**,** underscoring the importance of maternal and caregiver education in improving child health outcomes.

Dietary practices also played a key role. As illustrated in Figure 7, among children whose caregivers regularly provided iron-rich foods, only 35% (33/95) were anemic, compared to 65% (62/95) among those who did not. This finding highlights the protective role of iron-rich diets such

as those including beans, leafy greens, fortified cereals, and meat in reducing childhood anemia.

Household income influenced anemia patterns but not in a straightforward way. Table 6 shows the highest anemia rates were observed among households earning 100,000–300,000 shillings, with 61.8% of children affected. Interestingly, logistic regression revealed that household income was not a statistically significant predictor (OR = 1.125, p = 0.509). This suggests that while income may influence access to food and healthcare, it is not the sole determinant of anemia risk.

Access to clean water also emerged as a determinant. Figure 8 shows that children in households without clean water had significantly higher anemia prevalence (68%) compared to those with safe water. This could be explained by waterborne infections and poor sanitation, which may contribute to anemia either through chronic illness or reduced dietary absorption.

Regarding household head occupation, no statistically significant relationship was observed ($\chi^2 = 5.68$, p = 0.128). However, descriptive results showed that children from farming households had the highest anemia burden (59.7%) compared to those from employed households (54.5%) or business-owning households (55%). This suggests that subsistence farming, despite food availability, may not always translate into balanced diets for children.

Food group consumption frequency was not significantly associated with anemia ($\chi^2 = 5.65$, p = 0.227. While both daily and weekly consumers of food groups still had high anemia prevalence, this points to the importance of dietary quality rather than frequency alone.

Finally, child dietary restrictions showed a significant relationship with anemia ($\chi^2 = 6.44$, p = 0.011). All 7 children with dietary restrictions (100%) were anemic. Restrictions whether due to cultural beliefs, allergies, or misconceptions likely limited intake of key micronutrients such as iron and vitamin B12, both essential for hemoglobin synthesis.

Qualitative data from health workers highlighted several socio-economic determinants contributing to anaemia among children under five in Sheema district. Three major themes emerged:

Theme 1: Poverty and Food Insecurity

Health workers emphasized that low household income limited access to iron-rich foods and timely healthcare, contributing to both the prevalence and severity of anaemia. One participant stated: *"If families have no money, they can't buy iron-rich food or even come to hospital for treatment in time"* (Participant 5).

Theme 2: Parental Education

Caregivers' educational levels were reported as a key factor influencing nutritional practices and healthcare-seeking behavior. Parents with limited or no formal education were less likely to understand the importance of a balanced diet and often relied on traditional remedies. A health worker observed: *"Educated parents understand balanced diet and seek treatment early, unlike the uneducated who delay or use herbs"* (Participant 6).

Theme 3: Access to Clean Water and Sanitation

Health workers identified inadequate access to clean water and poor hygiene as contributing to intestinal parasitic infections, which exacerbate iron deficiency and anaemia. As one participant explained:

"Clean water and hygiene reduce worm infestation which is a major cause of anaemia" (Participant 8).

These thematic findings demonstrate that socio-economic challenges including poverty, low caregiver education, and limited access to clean water play a critical role in anaemia among children under five. Addressing these factors is essential for effective prevention and intervention strategies.

Cultural Factors Contributing to Anaemia among Children Under Five

Cultural beliefs were found to significantly influence childhood anaemia. 7% of anaemic children had caregivers who reported being guided by cultural beliefs in health decisions, compared to none of the non-anaemic children**.** The association was statistically significant ($\chi^2 = 6.44$, $p = 0.011$), suggesting that cultural influences may delay or deter timely biomedical care, thereby predisposing children to anaemia.

Caregivers were also asked about the perceived effects of traditional practices. The majority reported no impact on their child's health (89% among non-anaemic and 84% among anaemic children). Only a minority attributed either positive or negative effects to such practices, and no significant association was observed ($\chi^2 = 2.24$, $p = 0.524$). While these practices did not directly determine anaemia status, they may still shape care-seeking pathways that indirectly affect child health outcomes.

Table 5: Anemia and family history of having anaemia

Log likelihood= -119.6078

Anemia Status	OR	Z	P>/z/	95% CI	
FamilyHistory_Anemia	3.689	2.66	0.008	1.411	9.649
-cons	0.949	-0.32	0.746	0.690	1.304

Prob>chi2=0.0041 pseudo R2=0.0334

Family history of anaemia emerged as a strong predictor of childhood anaemia. Children with a family history of anaemia were nearly four times more likely to be anaemic (OR = 3.69, 95% CI: 1.41–9.65, $p = 0.008$)**.** This finding points to potential genetic or intergenerational factors, underscoring the need for targeted screening and early intervention in high-risk families.

Qualitative data highlighted cultural factors that influence anaemia among children under five. Three major themes emerged:

Theme 1: Traditional Remedies and Practices

Health workers reported the use of harmful traditional practices, such as cutting children's skin to "release bad blood," which often resulted in excessive blood loss and worsened anaemia. One participant noted: *"They cut children with razor blades believing it relieves them; instead, they lose more blood"* (Participant 2).

Theme 2: Food Taboos and Dietary Restrictions

Cultural restrictions on certain foods were commonly reported. Some families prohibited children from consuming meat, eggs, or specific vegetables, all of which are essential sources of dietary iron. As one participant explained: *"There are food taboos; some families don't give children meat or eggs due to beliefs"* (Participant 7).

Theme 3: Barriers to Medical Treatment

Beliefs linking anaemia to spiritual afflictions or witchcraft were cited as barriers to seeking timely medical care. Caregivers often preferred traditional healers or shrines over hospital visits. One health worker observed: *"They say the child is bewitched, so they go to shrines first instead of the hospital"* (Participant 3). These findings suggest that cultural beliefs and practices can delay appropriate biomedical care,

increasing the risk and severity of anaemia in children under five.

Health Facility Interventions and Practices

Health workers also described interventions aimed at preventing and managing anaemia in children under five. Two main themes were identified:

Theme 1: Treatment and Prevention Programs

Interventions included iron and folic acid supplementation, deworming campaigns, nutrition counselling, and community outreach via Village Health Teams (VHTs). One participant stated: *"We do community outreaches and train VHTs with de-wormers, anti-malarial, and test kits"* (Participant 4).

Theme 2: Effectiveness of Interventions

Participants reported measurable improvements in child health when caregivers adhered to medical advice. In some cases, anaemia prevalence decreased by approximately 35% among children following the prescribed regimens. A participant highlighted:

"Children who follow the regimen show increased haemoglobin levels within a few months" (Participant 7).

These thematic results underscore the importance of culturally sensitive health education and community-based interventions to improve adherence and reduce anaemia prevalence among children.

IV. DISCUSSION

Prevalence of Anemia Among Children Under Five Years

This study revealed a high prevalence of anemia among children under five, confirming that anemia remains a major public health concern in the study area. This finding aligns with regional and global trends, where the prevalence of anemia among young children in Sub-Saharan Africa is consistently high (Obeagu et al., 2023). It is worth noting that national surveys, including UBOS & ICF (2020, 2023), report even higher prevalence rates, highlighting substantial regional variability likely influenced by differences in healthcare access, nutritional practices, and socioeconomic conditions.

Health workers in the study corroborated these findings, noting seasonal fluctuations in anemia cases, with spikes commonly observed during the rainy season when malaria transmission and intestinal worm infestations increase. Age emerged as a key determinant, with the youngest infants exhibiting the highest vulnerability, consistent with previous research linking rapid growth, inadequate complementary feeding, and increased susceptibility to infections with elevated anemia risk (Ngesa, 2014). In contrast, gender differences were minimal, although a slightly higher prevalence among male children mirrors earlier reports, suggesting that anemia prevention efforts should target both sexes equitably (Zhu et al., 2021).

A significant proportion of affected children presented with severe anemia and clinical symptoms such as fatigue or pallor, demonstrating a clear association between anemia and symptomatic burden. These findings underscore the importance of routine clinical screening and timely intervention, particularly in resource-limited settings. The persistent high prevalence, severity, and clinical impact of anemia observed in this study emphasize the urgent need for comprehensive preventive strategies, including age-specific nutrition programs, malaria control

measures, and deworming initiatives, to mitigate anemia and improve child health outcomes.

Socioeconomic Factors Contributing to Anemia Among Children Under Five

This study highlights caregiver education as a critical determinant of childhood anemia. Children of caregivers with limited or no formal education exhibited markedly higher vulnerability, whereas those whose caregivers attained higher education levels were comparatively protected. This aligns with prior research indicating that educated caregivers are more likely to implement appropriate feeding practices, seek timely healthcare, and recognize early signs of nutritional deficiencies (Sunuwar et al., 2023). Education thus emerges as a strong protective factor against anemia. Although initial analyses suggested higher anemia prevalence among children from low- to middle-income households, multivariate regression did not identify household income as a statistically significant predictor. This discrepancy may reflect the limitations of self-reported or variable income data, which are often supplemented by subsistence farming, and suggests that income alone may not fully capture access to nutrition and healthcare resources (Mitra et al., 2004). Nonetheless, qualitative interviews confirmed that poverty constrains the ability to afford iron-rich foods or seek timely medical care, demonstrating its practical impact on child health.

Dietary practices were strongly associated with anemia. Children regularly consuming iron-rich foods exhibited substantially lower prevalence compared to those with inadequate iron intake, consistent with existing literature (Fentaw et al., 2022; Enawgaw et al., 2019). Cultural food taboos further exacerbated risk, reflecting patterns observed in similar settings (Chakona et al., 2019). Poor dietary diversity, reliance on subsistence diets, and limited access to safe water also contributed to anemia, both through nutrient deficiencies and infection-related iron loss (Woldegebriel et al., 2023).

These findings underscore the multifactorial nature of anemia, emphasizing that interventions must extend beyond economic support. Strategies integrating caregiver education, nutrition counseling, promotion of dietary diversity, and improved access to safe water are essential for reducing anemia prevalence and mitigating its long-term consequences on child growth and development.

Cultural Factors Contributing to Anemia Among Children Under Five

The study found that the use of traditional remedies did not have a direct impact on anemia prevalence among children under five in Sheema District. Only a small proportion of children with anemia had caregivers who reported using traditional remedies, suggesting no measurable protective or harmful effect. While some caregivers described practices such as using razor blades to “let out bad blood,” these practices did not translate into observable health outcomes. This contrasts with studies emphasizing cultural practices as central to child health management (Habib et al., 2020) but aligns with evidence indicating that cultural beliefs often influence health indirectly, particularly when they affect dietary practices or care-seeking behaviors (Greer et al., 2019).

Caregivers’ perceptions support this observation, with the majority reporting no

apparent effects of traditional practices on anemia. Nevertheless, cultural beliefs may indirectly contribute to anemia by delaying biomedical interventions, including iron supplementation or treatment for infections and parasitic diseases. In rural settings, where traditional healers hold significant influence, reliance on non-biomedical remedies can postpone timely access to effective care.

Asignificant finding was the strong association between family history and anemia, highlighting potential genetic predispositions, intergenerational nutritional deficiencies, or the perpetuation of suboptimal dietary practices (Greer et al., 2019). Family history may also reflect persistent socioeconomic limitations that restrict access to iron-rich foods and healthcare, consistent with previous reports (Kebede et al., 2021).

These findings suggest that while cultural practices may not directly cause anemia, they can indirectly influence outcomes through delayed care or entrenched dietary behaviors. Interventions should therefore prioritize culturally sensitive health education, early engagement with biomedical services, and strategies to address intergenerational risk factors to effectively reduce anemia prevalence among children.

V. CONCLUSION

This study confirms that anemia among children under five remains a significant public health concern, driven by poor nutrition, infections, and socio-cultural factors. Effective prevention requires multi-sectoral strategies, including health system strengthening, caregiver education, improved nutrition, and routine screening, to reduce anemia prevalence and enhance child health and development outcomes.

VI. ETHICAL CONSIDERATIONS

Ethical approval was obtained from Bishop Stuart University Research Ethics Committee **(BSU-REC-2024-440).** Administrative clearance was granted by Sheema District Health Office and facility heads. Written informed consent was obtained from all participants. Confidentiality was maintained by anonymizing responses and storing data securely. Participation was voluntary, with the right to withdraw at any stage.

VII. ACKNOWLEDGEMENTS

I sincerely thank Almighty God for His guidance and strength throughout this research. I am grateful to the staff and administration of the Faculty of Nursing and Biomedical Sciences at Bishop Stuart University for their support. Special thanks to my husband, Mr. Katungi Osbert, my supervisor, Associate Professor Kazibwe Francis, and Ms. Nakidde Gladys for their invaluable guidance and encouragement.

VIII. REFERENCES

1. Ashenafi, G., Aliyo, A., & Tesfa, B. (2025). Burden and determinants of anemia among 6- to 59-month-old children in the pastoral communities of Borana, Borana Zone, Southern Ethiopia. SAGE Open Pediatrics, 12, 1–12. https://doi.org/10.1177/30502225251310547
2. Chakona, G., & Shackleton, C. (2019). Food taboos and cultural beliefs influence food choice and dietary preferences among pregnant women in the Eastern Cape, South

Africa. *Nutrients, 11*(11), 2668. https://doi.org/10.3390/nu11112668

3. Enawgaw, B., Workineh, Y., Tadesse, S., Mekuria, E., Addisu, A., & Genetu, M. (2019). Prevalence of anemia and associated factors among hospitalized children attending the University of Gondar Hospital, Northwest Ethiopia. *EJIFCC, 30*(1), 35–47. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6416809/
4. Fentaw, W., Belachew, T., & Andargie, A. (2023). Anemia and associated factors among 6 to 59 months age children attending health facilities in Kombolcha town, Northeast Ethiopia: A facility-based cross-sectional study. *BMC Pediatrics, 23*, 209. https://doi.org/10.1186/s12887-023-04031-z
5. Greer, F. R., Sicherer, S. H., & Burks, A. W.; Committee on Nutrition; Section on Allergy and Immunology. (2019). The effects of early nutritional interventions on the development of atopic disease in infants and children: The role of maternal dietary restriction, breastfeeding, hydrolyzed formulas, and timing of introduction of allergenic complementary foods. *Pediatrics, 143*(4), e20190281. https://doi.org/10.1542/peds.2019-0281
6. Habib, N., Abbasi, S.-U.-R. S., Afzal, A., Arooj, S., & Farid, S. (2020). Socio-cultural risk factors of anemia among children under five years of age in District Muzaffarabad, Azad Jammu & Kashmir, Pakistan. *Journal of Pharmaceutical Research International, 32*(30), 100–112. https://doi.org/10.9734/jpri/2020/v32i3030911
7. Kebede, D., Getaneh, F., Endalamaw, K. *et al.* Prevalence of anemia and its associated factors among under-five age children in Shanan gibe hospital, Southwest Ethiopia. *BMC Pediatr* 21, 542 (2021). https://doi.org/10.1186/s12887-021-03011-5
8. Kirabo, P. (2022). *Knowledge and practices of mothers towards prevention of anaemia among children under five years of age in Kitagata Hospital, Sheema District*. Afribary. https://afribary.com/works/knowledge-and-practices-of-mothers-towards-prevention-of-anaemia-among-children-under-five-years-of-age-in-kitagata-hospital-sheema-district
9. Komakech, J. J., Wasswa, R., Okello, M., & Nabukalu, D. (2025). Determinants of anemia among children under five in the Busoga Region of Uganda: A community-based cross-sectional study. *Frontiers in Public Health, 13*, 1618395. https://doi.org/10.3389/fpubh.2025.1618395
10. Kuziga, F., Adoke, Y., & Wanyenze, R. K. (2017). Prevalence and factors associated with anaemia among children aged 6 to 59 months in Namutumba district, Uganda: A cross-sectional study. *BMC Pediatrics, 17*, 25. https://doi.org/10.1186/s12887-017-0782-3
11. Legason, I. D., Amone, J., & Okullo, I. (2017). *Prevalence of anaemia and associated risk factors among children aged 6–59 months in an urban setting in Uganda: A cross-sectional study*. BMC Hematology, 17, 8. https://doi.org/10.1186/s12878-017-0081-0
12. Mitra, Mitashree & Tiwari, Alka & Ghosh, Rohini & Bharati, Premananda. (2004). Dimensions and Causes of Child Malnutrition: A Study of Preschool Children of Raipur, Chhattisgarh, India. The Anthropologist.
13. Ngesa, O., & Mwambi, H. (2014). Prevalence and risk factors of anaemia among children aged between 6 months and 14 years in

Kenya. *PLoS ONE, 9*(11), e113756. https://doi.org/10.1371/journal.pone.0113756

14. Obeagu, E. I., Nimo, O. M., Bunu, U. O., Ugwu, P. C., & Alum, E. U. (2023). Anaemia in children under five years: African perspectives. *International Journal of Current Research in Biology and Medicine, 8*(1), 1–7. https://doi.org/10.22192/ijcrbm.2023.08.01.001
15. Safiri, S., Kolahi, A. A., Noori, M., Nejadghaderi, S. A., Karamzad, N., Bragazzi, N. L., Sullman, M. J. M., Abdollahi, M., Collins, G. S., Kaufman, J. S., & Grieger, J. A. (2021). Burden of anemia and its underlying causes in 204 countries and territories, 1990–2019: Results from the Global Burden of Disease Study 2019. *Journal of Hematology & Oncology, 14*(1), 185. https://doi.org/10.1186/s13045-021-01202-2
16. Sunuwar, D. R., Singh, D. R., Pradhan, P. M. S., et al. (2023). Factors associated with anemia among children in South and Southeast Asia: A multilevel analysis. *BMC Public Health, 23*, 343. https://doi.org/10.1186/s12889-023-15265-y
17. Tesema, G. A., Worku, M. G., Tessema, Z. T., Teshale, A. B., Alem, A. Z., Yeshaw, Y., et al. (2021). Prevalence and determinants of severity levels of anemia among children aged 6–59 months in sub-Saharan Africa: A multilevel ordinal logistic regression analysis. PLoS ONE, 16(4), e0249978. https://doi.org/10.1371/journal.pone.0249978
18. Uganda Bureau of Statistics (UBOS) & ICF. (2020). *Uganda Malaria Indicator Survey 2018–19 (MIS34)*. UBOS & ICF. Retrieved from https://www.dhsprogram.com/pubs/pdf/MIS34/MIS34.pdf
19. Woldesenbet, B., Tolcha, A., & Tsegaye, B. (2023). Water, hygiene, and sanitation practices are associated with stunting among children aged 24–59 months in Lemo district, South Ethiopia: A community-based cross-sectional study. *BMC Nutrition, 9*, 17. https://doi.org/10.1186/s40795-023-00677-1
20. World Health Organization. (n.d.). *Anaemia*. https://www.who.int/health-topics/anaemia
21. Zhu, Z., Sudfeld, C. R., Cheng, Y., et al. (2021). Anemia and associated factors among adolescent girls and boys at 10–14 years in rural western China. *BMC Public Health, 21*, 218. https://doi.org/10.1186/s12889-021-10268-z

