Prevalence of anemia and factors affecting its management strategies among children below five years at Mityana general hospital, Mityana district. A cross-sectional study.

Ibrahim Kabunga*

Medicare Health Professionals College.

Abstract

Background

Anemia is a public health concern in the world affecting both developing and developed countries. It is one of the major causes of death among children under five years in Africa, with a prevalence of 64.6% among preschool children. (BMC Pediatrics, 2017)

Methodology

This was a cross-sectional study that involved health workers attending to children admitted to the Paediatric ward at MGH. The sample size was 85 health workers, it was determined using the Kish and Leslie formula. Data were analyzed using tables and pie charts. It was conducted to assess the prevalence of anemia and factors affecting its management strategies among children below five years at MGH, Mityana district.

Results

Study findings revealed that anemia is one of the commonest conditions encountered in the pediatric ward with 20-30 children with anemia being admitted to the pediatric ward on a daily basis. 45, (53%) reported that 20-30 children with anemia are admitted on a daily basis.75 (88%) reported that 10-20 children report anemia as a complication on a daily basis. 65(76%) reported that 10-20 children present with complications as a result of long-standing anemia on a daily basis, Majority of health workers, 72 (85%) reported the use of a holistic/multidisciplinary approach in the management of anemia.

Conclusion

Anemia was found to be highly prevalent in children admitted to the ward, respondents managed anemia mostly with blood transfusion and oral ferrous sulfate. It was also found that they didn't have enough drugs to aid in the management of anemia in children below five years.

Recommendations

The researcher recommends Continuous Support supervision by health professionals to improve the management of anemia in children below five years and Frequently monitored supply of drugs in government facilities by the MOH

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1. Background of the study

Anemia is defined as a haemoglobin concentration below a specified cut-off point; that cut-off point depends on the age, gender, physiological

*Corresponding author.

Email address: kabungaibrahim25@gmail.com (Ibrahim Kabunga)

status, smoking habits, and altitude at which the population being assessed lives. Anemia in children aged under 5 years and pregnant women is defined as a haemoglobin concentration <110 g/L at sea level, and anemia in non-pregnant women as a haemoglobin concentration <120 g/L. (WHO, 2022)

Anemia is a critical health problem in Uganda with 53 percent of children and 32 percent of women anemic (UBOS and ICF 2017)

Anemia is a public problem among children below five years and it's the most common micronutrient deficiency disorder and the world's second leading cause of morbidity and morbidity, affecting 24.8% of the population, of which 47.4% are under-five children Anaemia can lead to reduced physical work capacity, poor maternal and perinatal health outcomes and delayed growth, cognition, and motor development in children (Alamneh, et al., 2021)

Anemia during childhood adversely affects the mental, physical and social development of children.

Anemia is a global problem affecting all countries. Resource-poor areas are often more heavily affected because of the prevalence of infectious diseases including Malaria, HIV/AIDS, hookworm infestation, schistosomiasis, and other infections such as tuberculosis which contribute to the high prevalence of anemia in some areas. (WHO, 2022)

A study carried out in Ethiopia about the Prevalence of anemia and its associated factors among children under five years of age attending Guguftu health center, South Wollo, Northeast Ethiopia revealed that, of the anemic under five children, 112 (67.5%) had mild anemia, 52(31.3%) had moderate anemia, and 2(1.2%) had severe anemia (Gebreweld, 2020)

The prevalence of anemia in Uganda was 46.6% among children less than 5 years, the total number of children in the research was 343 and out of these 160 children had anemia. This is slightly lower than the global prevalence of 47.7% (Ocan, Caesar, Fred, Bashir, & Ivan, 2018).

In the Mityana district, 10.6 percent of child mortalities by the year 2016 were due to anemia according to the Annual Health Sector Performance report by the MOH.

2. METHODOLOGY

2.1. Study design

The study was a descriptive cross sectional study where both quantitative and qualitative methods of data collection were employed. The study was descriptive because it was intended to describe the factors that influence the prevalence of anemia in children below the age of 5 years and medical interventions put in place at Mityana General Hospital and cross sectional was used because it was carried out in a short period of time and participants were interviewed at a single occasion without any follow-up.

2.2. Study area

The study was carried out in Mityana General Hospital, Pediatric ward between 29 th Nov, 2021-29th March 2022 at Mityana General Hospital. MGH is located in the central business district of the town of Mityana, about 85 kilometers (53 mi) east of Mubende Regional Referral Hospital, the regional referral hospital. This is approximately 69 kilometers (43 mi) west of Mulago National Referral Hospital, the largest hospital in the country. The coordinates of Mityana Hospital are 0°23'48.0"N, 32°02'34.0"E Latitude: 0.396667; Longitude: 32.042778). It is a healthy facility funded by the Ministry of Health and it is the main healthcare facility in the district serving over 600,000 people in Mityana, Mpigi, Kiboga, and Gomba districts. It is a 100-bed capacity hospital. It also serves many more patients from its catchment area.

2.3. Study population

The study involved health workers attending to children admitted to pediatric wards that are to say nurses, clinical officers, and medical officers.

Sample size determination

The study involved 85 health workers who attend to children admitted to the Acute Pediatric ward.

Sample size, $N = Z^2Pq$

d^2

Where,

Z= Standard Normal distribution taken at 95%= 0.95 N = Sample size

P = Estimated prevalence 28% q = 1-p = (1-0.28) = 0.72

d = allowed error = 7% or 0.07 Therefore, n = $0.95^2 \times 0.64 \times 0.72$

0.07×0.07

$= 0.9025 \times 0.4608$

0.0049

= 84.87

= 85

The study used convenient sampling and use of resource persons like the health workers in the study.

A purposive sampling technique was used and it involved selecting individuals to participate in the study because of their qualifications. Health workers were selected because they were believed to have firsthand information about the prevalence and management of anemia in children below 5 years. These techniques were used because it was less expensive and not complicated.

Systematic random sampling was used to select children. Systematic random sampling is a method in which samples from a larger population are selected according to a random starting point and a fixed periodic interval.

2.4. Sampling procedures

A simple random sampling procedure was used whereby every health worker working in Mityana General Hospital was selected and interviewed as long as they accepted to participate in the study. This involved the researcher folding papers that had even numbers and odd numbers and putting them in the box so that every health worker who picked an odd number participates in the study.

2.5. Data collection methods

Both qualitative and quantitative data were collected using a questionnaire designed by the researcher. This was interviewer-administered for convenience and to capture the interviewer's interest. Questionnaires were used to collect data from health workers. It involved administering questionnaires to the respondents, and they were required to answer the questions following the instruction given to them. The answers to the questionnaire were compiled, analyzed, and processed by the researcher to get the information needed.

2.6. Data collection tools

Data were collected using questionnaires. Data collection procedure

The researcher introduced himself and explained the study to each respondent. Consent was then obtained from the respondents and the questionnaire was handed to him or them to fill, out and then collected after. No compensation was made to participants because they were found in hospital areas and no transport costs were incurred because they were already in their working areas.

Questionnaires were used to collect data from the nurses, clinical officers, and medical officers in pediatric ward because the population was wide. The questionnaire had both open and close-ended questions about the topic. The respondents were required to answer these questions following the instruction given to them.

2.7. Piloting the study

The researcher pre-tested the questionnaire on 15 health workers at the pediatric ward because the area was convenient and Patients could easily be monitored. Piloting was done to ensure the validity, credibility, and reality of the questions in the questionnaire.

3. DATA PRESENTATION AND ANALYSIS.

After data collection, it was analyzed both quantitatively and qualitatively by hand sorting and tallying and the use of computer packages like Microsoft Excel, and SPSS to generate tables, pie-charts, bar graphs, and histograms for easy interpretation. Each independent variable was considered at a time and results were presented in frequencies and percentages. Qualitative data were analyzed by quoting the words of the respondents supported with secondary data.

3.1. Quality control

Quality control measures were put in place to ensure the validity and reliability of the collected data, and the questionnaires were written in English. Furthermore, adequate time was allocated for data collection in order to prevent errors brought about by limited time, the confidentiality of the health workers was kept by coding them in order to avoid their real names.

3.2. Data collection criteria

Inclusion criteria: The study included all health workers working in Mityana General Hospital who were available during the time of study and were interested and consented to the study

Exclusion criteria: All health workers working in Mityana General hospital who were not available during the time of study and those who were not interested and who never consented to the study.

3.3. Ethical consideration

The research report was approved by the research committee of the college and an introductory letter was availed to the Mityana General Hospital Ethics committee for review. Consent was sought from all the participating health workers in pediatric ward and confidentiality was ensured.

4. Dissemination of results.

This was achieved by carrying out a pretest using questionnaires on health workers of different sexes at the hospital to ensure that the data which was collected was correct. Health workers were interviewed individually and separately to ensure that no biased data is collected as they were chosen randomly from different classes.

4.1. Study limitations

The researcher encountered financial constraints in gathering information from the internet, libraries, and printing costs, and this was overcome with the budget which will be strictly followed.

The researcher encountered time constraints in the course of the research study and this was overcome by drawing up a timetable that was strictly followed to overcome the time barriers.

Respondents might provide incorrect information that could bias the study results and this was minimized by the appropriate sample size of respondents, informed consent, and assurance of privacy and confidentiality for respondents.

5. Demographic data of respondents

The outcome in table 1 shows that as far as the respondent's age is concerned 35 respondents (41%) were in the age group between 21-30years, 40 respondents (47%) were in the age group between 31-40 years and only 10 of them (12%) were between 41- 50 years, therefore, the majority of the respondents 40 (47%) were in the age bracket of 21 –30 years.

In regards to gender,17 health workers (20%) were males and the majority of the respondents 68(80%) in the research study were females.

In regards to religion,40 health workers (47%) were Catholics, 20 (24%) were Muslims, 12(14%) were protestants and 13 (15%) were born-again Christians. So, most of the respondents 40(47%) were Catholics

In line with the working experience, 20(24%) had a working experience of 1-5 years, 35(41%) had a working experience of 6-10 years, 12(14%) had a working experience of 11-15 years, 3(3%) had a working experience of 16-20 years and 15(18%) had a working experience of more than 21 years. Therefore, the majority of health workers 20(24%) had a working experience greater than 5 years but less than 11 years.

Concerning the role of respondents, majority of the respondents 46(54%) were nurses, 13(15%) were area managers, 12(14%) were ward in charges and 14(17%) were doctors.

5.1. Proportion of children under 5 years affected by anemia.

The biggest percentage of health workers 60(71%) reported that anemia is one of the commonest conditions encountered in pediatric wards and only 25(29%) reported it as uncommon.

Table 1: **Respondents by socio-demographic data (n=85)**

Socio-demographic data		**Frequency**	**Percentage (%)**
Age of respondents	21-30 years 31-40 years 41-50 years Total	35 40 10 85	41 47 12 100
Gender	Male Female Total	17 68 85	20 80 100
Religion	Catholic Muslim Protestant Born again Christian Total	40 20 12 13 85	47 24 14 15 100
Working experience	1-5 years 6-10 years 11-15 years 16-20 years 21 years and above Total	20 35 12 3 15 85	24 41 14 3 18 100
Position (Role) in ward	Ward in charge Staff nurse Area managers Doctors Total	12 46 13 14 85	14 54 15 17 100

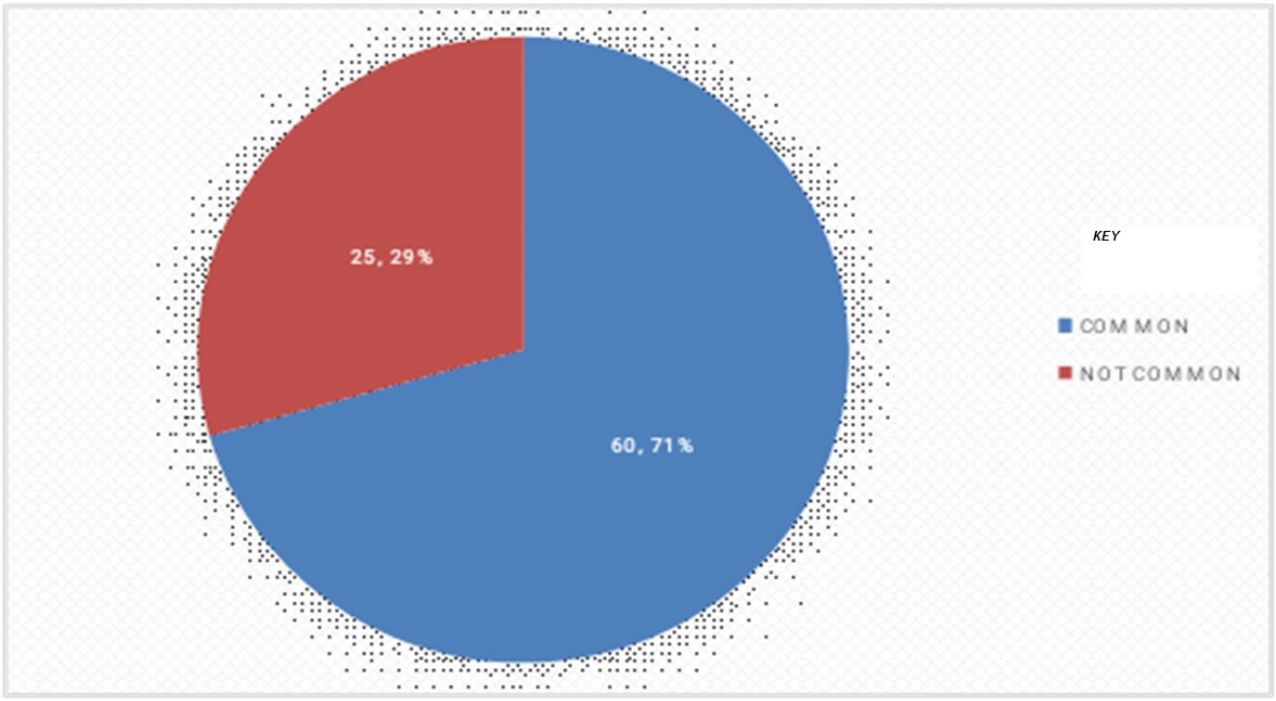

Figure 1: **Respondents by percentage who chose anaemia as one of the commonest condition encountered on pediatric ward (n=85)**

Table 2: Respondents by number of children admitted to pediatric ward daily (n=85)

Number of children	**Frequency**	**Percentage**
10-20	**22**	**26%**
20-30	**45**	**53%**
30-40	**18**	**21%**

The biggest number of health workers 45(53%) reported that 20-30 children with anaemia are admitted on paediatric ward on a daily basis,22 (26%) reported that 10-20 children are admitted on paediatric ward on a daily basis and only 18 (21%) reported that 30-40 children are admitted on pediatric ward on a daily basis.

The biggest proportion of health workers, 75(88%) reported that 10-20 children present with anemia as a complication daily, 7(8%) reported 20-30 children and only 3 (4%) reported 30-40 children.

The biggest proportion of health workers, 65 (76%) reported that 10-20 children present with complications as a result of long-standing anemia daily, 11 (13%) reported 20-30 children and only 9 health workers (11%) reported 30-40 children.

5.2. Management strategies of anemia in children below 5 years.

72 (85%) of the health workers reported the use of a holistic / multidisciplinary approach in the management of anemia, and only 13 health workers (15%) reported that this approach is not used in the management of anemia.

The biggest proportion, 54(64%) reported oral ferrous sulphate supplementation as the commonest management plan for children with iron deficiency anaemia, 22 of them (26%) reported blood transfusion, 6(7%) reported other unspecified management plans and only 3(3%) reported vitamin B12.

58(68%) of the health workers reported CBC as the commonest investigation plan opted for in children presenting with anaemia, 18(21) reported Hb electrophoresis, 8(9%) reported blood film and only 1(2%) reported other unspecified investigation plan**.**

46(54%) of the health workers reported that during the management of anemia, blood transfusion is opted for in cases of acute blood loss, 30 (35%) reported using blood transfusion for Hb<7, 8(9%) reported blood transfusion for Hb< 10 and only 1(2%) reported blood transfusion for other cases not specified.

51(60%) of the health workers reported Sickle cell anaemia as the commonest type of anaemia in children below 5 years, 24(28%) reported IDA, 5(6%) reported aplastic anaemia and other 5(6%) reported megaloblastic anemia.

5.3. Health system related factors affecting the management of anaemia in children under 5 years.

Biggest proportion of health workers,80(94%) reported that there isn't enough drugs in the hospital and only 6 health workers (6%) reported presence of enough drugs in the hospital.

82(96%) of the health workers reported that they do not receive external funds to aid in the management of anaemia and only 3 health workers (4%) reported receiving external funds to aid in the management of anaemia.

The biggest proportion of health workers, 64(75%) reported shortage of drugs in stock as the commonest challenge faced while managing children with anaemia, 14(17%) reported inadequate machines for investigation 5(6%) reported inadequate health workers and only 2 (2%) reported other un specified challenges.

6. DISCUSSION, CONCLUSION, AND RECOMMENDATION.

7. The proportion of children under five years affected by anemia

Data analysis and presentation revealed the following major findings under this objective.

It revealed that the biggest percentage of health workers involved in the study ie 60(71%) reported anemia as one of the commonest conditions encountered in the paediatric ward. These findings indicate that anemia is a critical health problem in Uganda. This is probably because the Mityana district is one of the malaria-endemic areas in Uganda and malaria is one of the leading causes of anemia in Uganda and African countries. These findings agree with a study about the prevalence of anemia in children below five years conducted in Maryland where 58% of health workers reported anemia as the commonest condition encountered in paediatric wards. (UBOS & ICF 2017)

Table 3: Respondents by number of children who present with anaemia as a complication on a daily basis (n=85)

Number of children	Frequency	Percentage (%)
10-20	75	88
20-30	7	8
30-40	3	4
TOTAL	85	100

Table 4: Respondents by number of children who present with complications as a result of long-standing anemia (n=85)

Number of children	Frequency	Percentage
10-20	65	76%
20-30	11	13%
30-40	9	11%

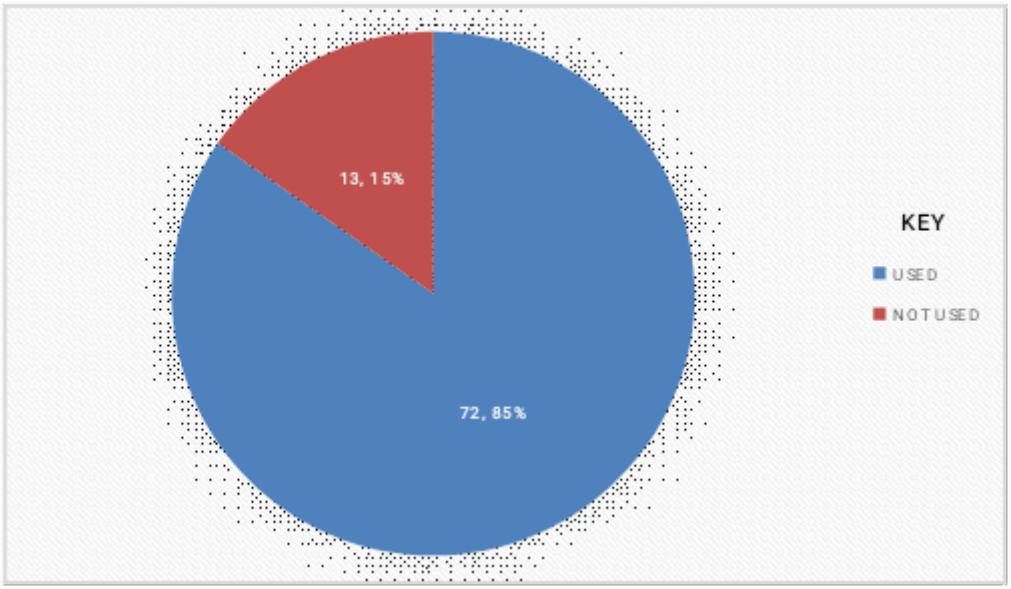

Figure 2: **Respondents by the percentage who reported the use of holistic/multidisciplinary approach in the management of anemia (n=85)**

Table 5: Respondents by the commonest management plan adopted for children with

Management plan	Frequency	Percentage (%)
Blood transfusion	22	26
Oral ferrous sulphate	54	64
Vitamin B12	3	3
Others	6	7
TOTAL	85	100

Table 6: Respondents by the commonest investigation plan opted for in children presenting with anemia (n=85)

Lab tests	Frequency	Percentage
CBC	58	68%
Hb electrophoresis	18	21%
Blood Film	8	9%
Others	2	2%
TOTAL	85	100

Table 7: Respondents by when blood transfusion is opted for during management of anemia (n=85)

When BT is opted for	Frequency	Percentage
Acute blood loss	46	54
Hb<7	30	35
Hb<10	8	9
Others	1	2
TOTAL	85	100

Table 8: Respondents by the commonest type of anaemia in children below 5 years (n=85)

Type of anemia	Frequency	Percentage (%)
IDA	24	28
Aplastic anemia	5	6
Megaloblastic anemia	5	6
Sickle cell anemia	51	60
TOTAL	85	100

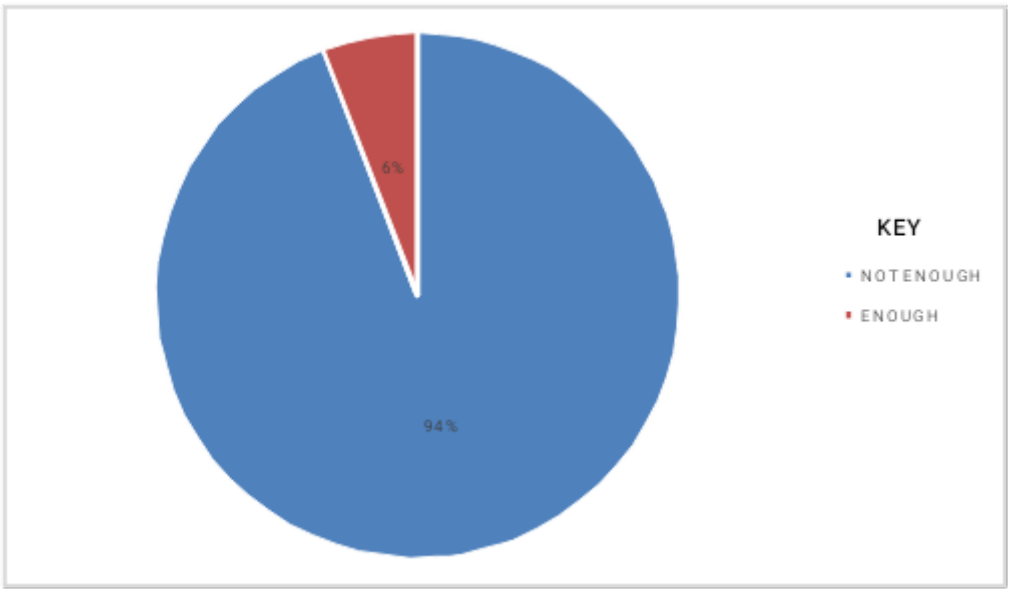

Figure 3: Respondents by the percentage who reported the availability of enough drugs in the hospital (n=85)

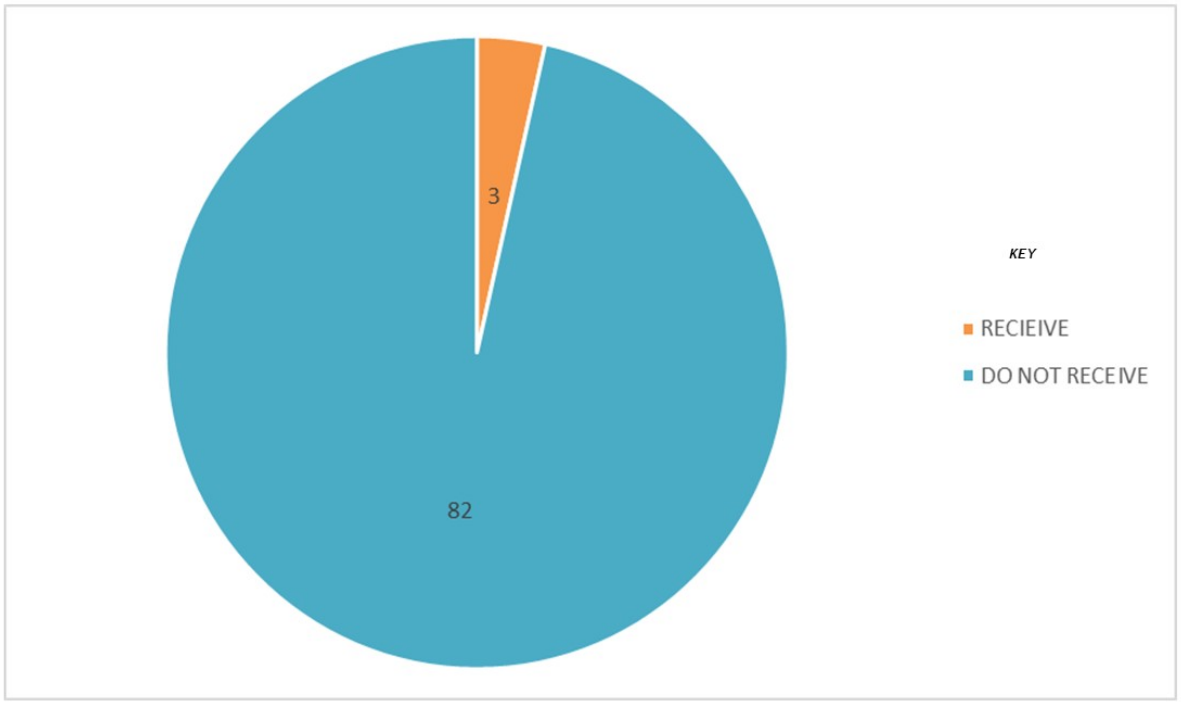

Figure 4: Respondents by the percentage who reported receiving external funds to aid in the management of anaemia (n=85)

Table 9: Respondents by the commonest challenge faced while managing children with anaemia (n=85).

Challenge	**Frequency**	**Percentage (%)**
Inadequate health workers	5	6
Shortage of drugs in stock	64	75
Inadequate machines for Investigations	14	17
Others	2	2
TOTAL	85	100

Out of the 85 health workers who participated in the study, the biggest proportion of them 45, (53%) reported that 20-30 children with anemia are admitted to paediatric ward daily. These findings indicate that anemia is a global health problem in children below 5 years. This is probably because MGH is the biggest hospital in the Mityana district, and different health centers refer children with anemia to MGH. Besides that, MGH is a government hospital where treatment is given at a free cost and all these accounts for this big number. These findings agree with a study conducted in the Namutamaba district on prevalence and factors associated with anemia among children aged 6-59 months where 54.6% of health workers involved in the study

reported admitting 26 children with anemia daily. (BMC Pediatrics, 2017)

Out of the 85 health workers who participated in the study,75 of them (88%) which is the biggest proportion reported that 10-20 children report anemia as a complication daily. These findings indicate that anemia is one of the commonest complications associated with other medical conditions. This is probably because most of the common medical conditions in MGH and Uganda

as a whole including malaria and other parasitic infestations are among the leading causes of anemia globally. These findings agree with a study conducted in the Democratic Republic of Congo on the prevalence of anemia, iron deficiency anemia, and associated factors among children 1-5 years where 90% of the health workers involved in the study reported that 15 children report with anemia as a complication on the paediatric ward daily. (Mbunga, et al., 2021)

Out of the 85 health workers who participated in the study, 65(76%) of them reported that 10-20 children present with complications as a result of long-standing anemia daily. These results indicate that anemia is one of the leading causes of death among children below 5 years. This is probably because long-standing untreated anemia results in fatal complications including cardiovascular diseases. These findings agree with a study conducted in Uganda on anemia in children where 78% of the health workers reported that 18 children present with complications as a result of long-standing anemia daily. (Alkali, et al., 2017).

7.1. Management strategies of anemia in children below 5 years.

The majority of health workers, 72 (85%) reported the use of a holistic/multidisciplinary approach in the management of anemia. These findings indicate that it's very important to treat the patient as a whole. This is probably because the holistic approach encompasses health education of the caretakers about diet which would be so important in preventing some types of anemia like IDA and megaloblastic anemia. These findings agree with a study conducted in the Orthopaedic Department of the Ondo State Trauma and Surgical Centre where the multidisciplinary approach showed positive results in the management of anemia (Oyebunmi, et al., 2016).

Out of the 85 health workers who participated in the study, the biggest proportion,54(64%) reported oral ferrous sulfate supplementation as the commonest management plan for children with IDA. These results indicate that oral ferrous sulfate supplementation is very much effective in children with IDA. This is probably because oral ferrous sulphate is one of the cheapest drugs used in the management of anemia and one of the commonest drugs provided by the ministry of health in government hospitals to manage anemia. In addition, IDA is in most cases a result of decreased dietary intake of iron-rich foods. Therefore supplementation with oral ferrous sulphate is expected to demonstrate positive results in IDA. These findings agree with a study conducted in Indonesia on the aetiology of microcytic anemia in children where 65% of the health workers reported the use of ferrous sulphate in managing childhood anemia. (Sanjaya, et al.,2018).

The majority of the health workers, 58(68%) reported CBC as the commonest investigation plan opted for in children presenting with anemia. These findings indicate that the CBC is an important investigation tool in the diagnosis and management of anemia in children below 5 years. This is probably because the CBC machine is available in MGH and many health workers in MGH prefer it over other diagnostic tools because it estimates the Hb levels, the MCV, and other parameters which can give a clue on the type of anemia and aid in generating an appropriate management plan. These findings agree with a study conducted in the USA on iron deficiency treatment response to oral therapy where 70% of the health workers reported CBC as the commonest investigation plan opted for in children presenting with anemia. (Okam, et al., 2016).

46(54%) of the health workers which is the biggest proportion reported that during the management of anemia, blood transfusion is opted for in cases of acute blood loss. These findings indicate that blood transfusion is an important management plan in cases where there is reduced blood volume. This is probably because many health workers believe that blood loss is most time acute whereas other treatment plans like oral ferrous sulphate will demonstrate a long duration of action. These findings agree with a study conducted in Louisville, KY, USA where blood transfusion demonstrated positive outcomes in the management of anemia. (Carolyn, 2022).

The majority of the respondents, 51(60%) reported Sickle cell anemia as the commonest type

of anemia in children below 5 years. These findings indicate that there is an urgent need to screen all neonates and pregnant mothers for sickle cell during routine antenatal visits. This is probably because many health workers believe that a positive family history of sickle cell predisposes a newly born baby to sickle cell anemia. These findings agree with a study conducted in Indonesia on etiology of microcytic anemia in children where 53% of the health workers reported sickle cell anemia as the commonest type of anemia in children below five years. (Sanjaya, et al., 2018).

8. Health system-related factors affecting the management of anemia in children under 5 years.

The biggest proportion of health workers,80(94%) reported that there aren't enough drugs in the hospital. These findings indicate that there is an urgent need to increase the drug supply to hospitals by the ministry of health. This is probably because many health workers in MGH believe that shortage of drugs used in the management of other medical conditions like malaria and parasitic infestations can cause anemia as a complication for these specific conditions. These findings agree with a study conducted in Egypt on the perception of Egyptian physicians about drug shortages during political disturbances where 96% of the health workers reported a shortage of drugs for managing anemia in children below five yearsa. (Ammar, 2016).

Out of the 85 health workers who participated in the study, 82 of them (96%) reported that they do not receive external funds to aid in the management of anemia. These findings indicate that there is an urgent need for the government and policymakers to bridge access to external funds to aid in the management of anemia. This is probably because many health workers believe that most of the policymakers and regional government officials do not take time to interact with the hospital administrators to find what is needed for the appropriate management of childhood illnesses. These findings agree with a study conducted in West Africa on Africa's healthcare suffering from lack of funding where 91% of the health workers reported that they do not receive external funds to aid in the management of anemia. (Ghani, 2017).

The biggest proportion of health workers, 64(75%) reported a shortage of drugs in stock as the commonest challenge faced while managing children with anemia. These findings indicate that there is an urgent need for the ministry of health to increase the drug supply in health sectors at all levels. This is probably because many health workers believe that however there are enough health workers at the facility, there is no single way a treatment plan can be drawn without a drug prescription. These findings agree with a study conducted in Egypt on the perception of Egyptian physicians about drug shortage during political disturbances where 72% of the health reported shortage of drugs as the commonest challenge faced while managing children with anemia. (Ammar, 2016).

9. Conclusion

According to the findings from the study, anemia was more prevalent in children admitted to paediatric ward with 20-30 children being admitted with anemia daily as reported by 45 health workers (53%).

From the finding of the study, Blood transfusion and oral ferrous sulphate supplementation are the best management options for childhood anemia with CBC as the best investigation plan as reported by 58 health workers (68%).

According to the study, the majority of respondents 80(94%) reported that the commonest health system-related factor affecting the management of anemia in children below five years is a shortage of drugs in stock

10. Recommendations

To the ministry of health

- Provision of enough drugs to aid in the management of anemia in children below 5 years.
- Support supervision by experienced health professionals to improve the management of anemia in children

- To educate the public on how to prevent anemia by feeding their children nutritious food and other aspects of prevention

To the District Health officer

- Organization for motivational rewards to the best serving recognized health workers such as awarding certificates, promotions, and wages to modify their attitude toward the management of anemia

To the Hospital administrators

- Printing and supply of current management protocols for anemia to the ward in charge and carrying out continuous medical education about the new management protocols to make health workers more comfortable in the management of anemia accordingly.

- Advice health workers to carry out health education about aneamia prevention to mothers

Areas of further research

- The study should be taken to another topic on the assessment of children with sickle cell anemia and their lifestyle after management.

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12. LIST OF ABBREVIATIONS

CBC : Complete Blood Count.
CHW : Community Health Worker.
Hb : Haemoglobin.
HSCT : Hematological Stem Cell Transplant.
IDA : Iron Deficiency Anemia.
MGH : Mityana General Hospital
MOH. : Ministry of health
OECD : Organisation for Economic Co-operation and Development.
RBC : Red Blood Cells.
UDHS : Uganda Demographic Health Survey. **UNICEF** : United Nations International Children's Fund. **VHW** : Village Health Worker.
WHO : World Health Organization.

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