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Maternal Knowledge and Practices Regarding Childhood Anemia in Cameroon: A Hospital-Based Cross-Sectional Study

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Abstract

Introduction: Anemia is a significant cause of morbidity and mortality in children under 5 in Cameroon. This study aimed to assess whether mothers' knowledge of children aged 6 to 59 months about the causes and prevention of anemia influences their practices. **Methods:** This study employed a cross-sectional design with both descriptive and analytical components to investigate the impact of knowledge on practices. A questionnaire was administered during an interview to all mothers of children aged 6 to 59 months attending the selected services. Knowledge was poor or insufficient if the percentage of correct answers for knowledge questions was <65%, and practices were considered harmful if the rate of correct answers for practice questions was <50%. Fisher's Mid-P exact test was used to compare proportions, and logistic regression was used to determine the association between knowledge level and practices. **Results:** In our study, 436 mothers were approached, 31 refused participation, and 405 (92.9%) agreed to participate. Our study showed that having a primary (RR = 6.558; CI = [2.165 - 19.86], $p < 0.05$) or secondary (RR = 2.731; CI = [1.790 - 4.166], $p < 0.05$) level of education increased the risk of having poor or insufficient knowledge, while having a higher level of education (RR = 0.219; CI = [0.137 - 0.351]; $p < 0.05$) or a child who suffered from anemia (RR = 0.430; CI = [0.231 - 0.802], $p = 0.008$) decreased the risk of having poor or insufficient knowledge. Poor and inadequate knowledge was associated with harmful practices (RR = 83.79; CI = [39.33 - 178.51]; $p < 0.05$). **Conclusion:** Mothers' knowledge of their child's anemia influences their practices, and this

knowledge needs to be improved to optimize them.

Keywords

Knowledge, Practices, Anemia, Children, Mothers, Cameroon

1. Introduction

Anemia in children is a hemoglobin level below the 5th percentile for age [1]. It is a significant public health problem in sub-Saharan Africa, contributing significantly to infant and child morbidity and mortality. The prevalence in the general population is estimated at 24.8%, representing 1.62 billion people. Preschool children are the most affected, with a prevalence of around 47.4%, or 293 million children worldwide. The highest prevalence is found in Africa (67.6%) and Southeast Asia (65.5%) [2].

A compilation of data from Demographic and Health Surveys (DHS) in 11 French-speaking African countries, published between 2006 and 2013, revealed that over 72% of children aged 6 months to 5 years suffered from anemia [3]. In 2008, a study of 401 children found anemia in 75.3% of Indian children [4]. In Nigeria, in 2010, the authors reported a prevalence of anemia of 57.1% in a series of 312 children aged under 60 months [5]. A 2012 study in Cameroon showed that 88.5% of children aged between 6 months and 14 years suffered from anemia, including 87.3% aged between 6 and 59 months [6]. In 2018, the latest Demographic and Health Survey (DHS) among children aged 6 to 59 months revealed that 57% suffer from anemia, 2% of which was severe [7].

Maternal knowledge and practices are essential in the prevention and management of childhood anemia [8]. Mothers play a primary caregiver role, and their understanding of the causes, symptoms, and prevention methods of anemia directly influences the health outcomes of their children [9]. Studies in similar settings have shown a relationship between maternal knowledge and improved child health behaviors related to anemia reduction [9].

Despite the known importance of maternal factors, the specific landscape of maternal knowledge and practices regarding childhood anemia and their impact on practices in the Cameroonian context, particularly in hospital settings, requires further investigation. This study aimed to assess the knowledge and practices of mothers regarding childhood anemia among children aged 6 to 59 months at the Dschang Regional Hospital Annex in Cameroon, utilizing a hospital-based cross-sectional design. The findings aim to inform targeted interventions that reduce the prevalence and impact of childhood anemia by empowering mothers with essential knowledge and promoting beneficial practices.

2. Methods

2.1. Study Design

We conducted a cross-sectional study with both descriptive and analytical compo-

nents over a 4-month period, from February 1 to May 31, 2023. A questionnaire was administered during an interview to mothers of children aged 6 to 59 months attending the vaccination, pediatric hospitalization, and pediatric outpatient departments of the Dschang Regional Hospital Annex (DRHA), which receives an average of 3000 to 3500 children per year. For the analytical component, we compared participants with poor or insufficient knowledge to those with harmful practices. The DRHA is a 3rd-category hospital, according to the national health pyramid in Cameroon, offering curative, preventive, and health-promoting pediatric care. It is located in a semi-urban and university zone.

2.2. Study Population and Eligibility Criteria

The study population consisted of mothers of children aged 6 to 59 months who visited the inpatient and outpatient pediatric and immunization departments of the Hôpital Régional Annexe de Dschang between February 1 and May 31, 2023. We excluded mothers who were unable to complete the questionnaire.

2.3. Data Collection Procedure

Data was collected anonymously after participants provided informed consent. The questionnaire was divided into three sections, and the variables collected included socio-demographic characteristics (age, marital status, profession, religion, and level of education), mothers' knowledge of anemia (definition, causes, symptoms, information received on preventing anemia, treatment, and the risks incurred by an anemic child), and practices (measures taken when faced with a child with anemia and means of prevention used).

2.4. Operational Definitions

Knowledge: Theoretical knowledge possessed by mothers of children under the age of five relating to the causes, symptoms, treatment, and prevention of anemia. Knowledge levels were assessed based on mothers' correct answers to questions about the definition of anemia, as well as its causes, symptoms, and risks for anemic children. Each correct answer was worth 1 point, and each incorrect answer was worth 0. The participants' correct answers to these questions were divided into four categories. The percentage of correct answers < 50% was associated with a poor level of knowledge, [50% - 65%[with an insufficient level of knowledge, [65% - 85%[with an average level of knowledge, and >85% of correct answers corresponded to a good level of knowledge.

Practices: all actions (transporting the child to the hospital, consulting a traditional healer, administering homemade treatments, administering iron or paracetamol, or receiving a blood transfusion) reported by mothers of children aged 6 to 59 months regarding the management of anemia. Levels of practice were assessed based on participants' correct answers to questions about the treatment and prevention of anemia in children. Each correct answer was worth 1 point, and each incorrect answer was worth 0. Correct answers were divided into three categories.

A percentage of correct answers below 50% was associated with harmful practices, 50% - 85% with inadequate practices, and above 85% with adequate practices.

2.5. Ethical Considerations

This study was approved by the Regional Ethics Committee for Human Health Research in the West Region, Cameroon (ethical clearance n˚ 278/29/03/2023/CE/CERSH-OU/VP). Informed consent forms were signed by mothers who agreed to participate in the study. Participation was voluntary, and data confidentiality was ensured.

2.6. Statistical Analysis

Data was entered into an Excel spreadsheet and then exported to Statistical Package for the Social Sciences v22 for Windows (SPSS, IBM, Chicago, IL, USA) for statistical analysis. Variables were presented as percentages with 95% confidence intervals (CI) and mean ± standard deviation (SD) in figures and tables where appropriate. Logistic regression was applied to assess associations between variables.

3. Results

In our study, 436 mothers were approached, and 405 agreed to participate, with a participation rate of 92.8%.

3.1. Socio-Demographic Characteristics of Mothers

The average age of the mothers was 27.7 ± 5.8 years, with 137 (38.8%) aged between 20 and 24 years. In terms of educational level, 238 (58.5%) of the mothers had secondary education, 101 (24.9%) were employed, and 279 (68.9%) were married. The most represented religion was Christianity, 182 (94.3%). More than half the mothers had a child under the age of five 214 (52.2%). (**Table 1**)

The average age of the children was 7.6 ± 0.2 months, with the most common age range between 1 and 9 months. Females were most represented (53.1%), with a sex ratio of 1.1 in favor of girls.

3.2. Mothers' Sources of Information on Anemia and Prevention

Of the 405 participants, 347 (85.7%) had already heard of anemia. The mothers' primary sources of information were health professionals (72.3%), school (65.4%), television (61.5%), family (59.9%), and social networks (52.3%). Over half of the mothers (59.3%) reported that they had never heard of anemia prevention. For the 160 (40.7%) who had, the primary sources of information were health personnel (35.3%), school (26.7%), and family and friends (25.7%).

3.3. Mothers' Knowledge of the Definition and Causes of Anemia

Each mother defined anemia according to her understanding. The most common definition was "lack of blood in the body" for 48.9% of participants, and 66.5% of mothers were able to give valid definitions of anemia. The causes of anemia

Table 1. Socio-demographic characteristics of participants.

Socio-demographic characteristics	n	%	95% CI (%)
Marital status			
Single	65	16	[12.8 - 19.8]
Concubinage	59	14.6	[11.4 - 18.0]
Divorced	2	0.5	[00.0 - 01.5]
Married	279	68.9	[64.5 - 73.1]
Study level			
Primary	19	4.7	[02.7 - 06.9]
Secondary	238	58.5	[53.8 - 64.0]
Superior	148	36.5	[31.9 - 41.5]
Age ranges (years)			
15 - 19	14	3.5	[01.7 - 05.4]
20 - 24	137	38.8	[29.1 - 38.3]
25 - 29	101	24.9	[20.7 - 29.1]
30 - 34	99	24.4	[20.7 - 29.8]
35 - 39	40	9.9	[07.4 - 13.1]
40 - 45	14	3.5	[01.5 - 05.2]
Profession			
Framer	10	2.5	[01.5 – 04.0]
Hairdresser	22	5.4	[04.5 - 07.7]
Trader	42	10.4	[07.7 - 13.1]
Dressmaker	46	11.4	[08.4 - 14.8]
High School Student	28	6.9	[04.2 - 09.3]
Employee	101	24.9	[20.3 - 28.9]
University Student	68	16.8	[13.3 - 20.7]
Housewife	88	21.7	[17.8 - 25.9]
Religion			
Animism	12	3	[01.5 - 04.7]
Christianism	382	94.3	[91.6 - 96.5]
Islam	11	2.7	[01.2 - 04.4]
Number of children under 5			
1	214	52.2	[48.1 - 57.3]
2	136	33.6	[29.1 - 38.5]
3	54	13.3	[10.1 - 16.5]
4	1	0.2	[00.0 - 00.7]

recognized by the mothers were iron deficiency (67.9%), malnutrition (67.4%), abnormal bleeding (65.7%), malaria (62.5%), vitamin deficiency (51.4%), and intestinal parasites (39%). (Table 2)

Table 2. Mothers' knowledge of anemia definitions and causes.

Definitions and causes of anemia	n	%	95% CI (%)
Definitions of anemia			
Lack of blood in the body	198	48.9	[44.4 - 53.3]
Don't know	101	24.9	[20.7 - 29.8]
Insufficient red blood cells in the body	51	12.6	[09.9 - 15.8]
Other	35	8.6	[06.2 - 11.6]
Decrease in hemoglobin levels in the blood	20	4.9	[03.0 - 06.9]
Causes of anemia			
Iron deficiency			
Don't know	112	27.7	[23.5 - 32.3]
No	18	4.4	[02.5 - 06.6]
Yes	275	67.9	[63.2 - 71.9]
Malaria			
Don't know	115	28.4	[24.4 - 33.3]
No	37	9.1	[06.4 - 11.9]
Yes	253	62.5	[57.6 - 66.7]
Vitamin deficiency			
Don't know	138	34.1	[29.1 - 38.8]
No	59	14.6	[11.1 - 18.3]
Yes	208	51.4	[46.2 - 56.0]
Intestinal parasites			
Don't know	158	39	[34.3 - 43.2]
No	89	22	[18.5 - 25.9]
Yes	158	39	[34.9 - 43.9]
Malnutrition			
Don't know	109	26.9	[22.8 - 31.6]
No	23	5.7	[03.5 - 08.1]
Yes	273	67.4	[62.5 - 72.1]
Abnormal bleeding			
Don't know	111	27.4	[23.2 - 32.6]
No	28	6.9	[04.5 - 09.6]
Yes	266	65.7	[60.8 - 69.9]

3.4. Distribution of Mothers According to Their Knowledge of Anemia Symptoms and Risks

The symptoms that mothers were able to cite included general fatigue (73.1%), dizziness (71.6%), paleness of the eyes, hands, and feet (71.4%), headaches (55.3%), shortness of breath (53.6%), and palpitations (47.9%). Out of 405 mothers surveyed, 279 (68.9%) recognized that an anemic child runs the risk of losing weight, 271 (66.9%) the risk of dying, 258 (63.3%) the risk of losing appetite, and 249 (61.5%) the risk of poor school results. (Table 3)

Table 3. Mothers' knowledge of anemia symptoms and risks.

Symptoms and risks of anemia	n	%	95% CI (%)
Types of symptoms			
General fatigue			
Don't know	103	25.4	[21.0 - 29.6]
No	6	1.5	[00.5 - 02.7]
Yes	296	73.1	[68.9 - 77.8]
Vertigo			
Don't know	107	26.4	[21.7 - 30.9]
No	8	2	[00.7 - 03.7]
Yes	290	71.6	[66.7 - 76.3]
Palpitation			
Don't know	157	38.8	[33.8 - 43.5]
No	54	13.3	[10.2 - 16.5]
Yes	194	47.9	[43.5 - 52.6]
Headaches			
Don't know	140	34.6	[29.9 - 40.0]
No	41	10.1	[07.4 - 13.1]
Yes	224	55.3	[50.4 - 60.0]
Shortness of breath			
Don't know	136	33.6	[28.6 - 38.3]
No	52	12.8	[09.6 - 16.0]
Yes	217	53.6	[48.4 - 58.8]
Pale eyes, hands and feet			
Don't know	106	26.2	[21.5 - 30.1]
No	10	2.5	[01.0 - 04.2]
Yes	289	71.4	[67.0 - 76.3]
Risks for children with anemia			

Continued

Death			
Don't know	105	25.9	[21.5 - 30.1]
No	29	07.2	[04.7 - 09.6]
Yes	271	66.9	[62.5 - 71.4]
Weight loss			
Don't know	109	26.9	[22.5 - 31.4]
No	17	04.2	[02.2 - 06.2]
Yes	279	68.9	[64.5 - 73.3]
Loss of appetite			
Don't know	126	31.1	[26.9 - 35.3]
No	21	36.3	[03.2 - 07.7]
Yes	258	63.3	[59.0 - 68.4]
Poor school results			
Don't know	118	29.1	[24.9 - 33.8]
No	38	09.4	[06.7 - 12.3]
Yes	249	61.5	[56.5 - 65.7]

3.5. Distribution of Mothers According to Children Who Suffered or Died from Anemia

In our study, 59 (14.6%) of mothers reported having experienced a child with anemia, and 17 (4.2%) had lost a child to anemia.

3.6. Mothers' Knowledge of Anemia Treatment

Most mothers, 289 (71.4%), stated that there was a treatment for anemia. Among the possible treatments for anemia, mothers reported using blood transfusions (62.5%), iron supplementation (60.4%), and homemade remedies (32.4%). The "homemade" treatments they used most often were a mixture of grenadine soda, tomato concentrate, and sugar-free milk (7.20%), or a potion based on a mix of cassava leaf juice and sugar-free milk (6.40%). (**Figure 1**)

3.7. Mothers' Practices When Faced with an Anemic Child

When faced with an anemic child, mothers' first recourse was to the health center (83.8%). The iron syrup was self-medicated by 28.2% of mothers, 25.6% administered "homemade" treatments, 13.8% used paracetamol syrup, and 4.5% consulted traditional healers. (**Table 4**)

3.8. Mothers' Practices in Preventing Anemia

The most commonly used methods for preventing anemia were good nutrition (69.6%), protecting the child against malaria by using insecticide-impregnated

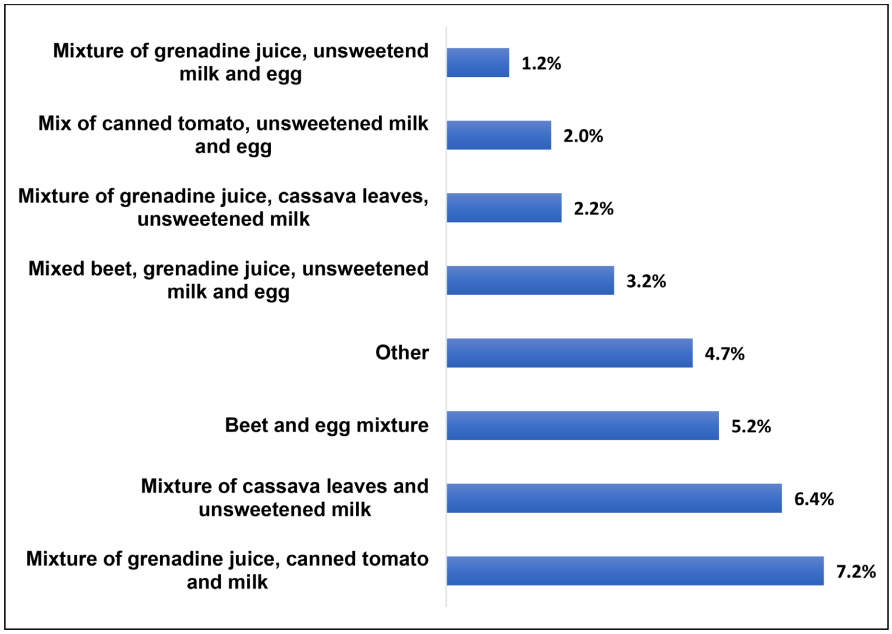

Figure 1. Distribution of mothers' practices regarding the homemade treatments they use to treat anemia in children.

Table 4. Distribution of mothers according to their practices when faced with an anemic child.

Practices	n	%	95% CI (%)
Getting the child to the hospital			
No	50	16.2	[12.0 - 20.4]
Yes	259	83.8	[79.6 - 88.0]
Going to a traditional healer			
No	295	95.5	[93.2 - 97.4]
Yes	14	4.5	[02.6 - 06.8]
Administer a homemade treatment			
No	230	74.4	[69.6 - 79.3]
Yes	79	25.6	[20.7 - 30.4]
Administer iron syrup			
No	222	71.8	[66.0 - 77.0]
Yes	87	28.2	[23.0 - 33.0]
Administer paracetamol syrup			
No	267	86.4	[82.5 - 90.0]
Yes	42	13.6	[10.0 - 17.5]
Blood transfusion			
Don't know	108	26.7	[22.2 - 31.1]
No	44	10.9	[07.9 - 14.1]

Continued

Yes	253	62.5	[57.5 - 67.2]
Iron supplementation			
Don't know	108	26.7	[22.5 - 31.1]
No	52	12.8	[09.6 - 16.6]
Yes	245	60.5	[55.6 - 65.4]
Homemade treatments			
Don't know	108	26.7	[22.2 - 31.1]
No	167	41.2	[36.0 - 45.9]
Yes	130	32.1	[27.7 - 36.8]

mosquito nets and adequate malaria treatment (61.7%) and administering iron supplements (50.1%). Twenty-four percent of mothers used "home" treatments to prevent anemia in their children. (Table 5) The "home-made" treatments they most frequently administered were a mixture of grenadine soda with tomato concentrate and raw eggs (24.74%), a decoction made from manioc leaves and sugar-free milk (20.61%), or a beet juice and sugar-free milk beverage (15.46%). (Figure 2)

Table 5. Distribution of mothers' practices in preventing anemia.

Prevention methods	n	%	95% CI (%)
Good nutrition			
Don't know	104	25.7	[21.2 - 30.1]
No	19	4.7	[02.5 - 06.7]
Yes	282	69.6	[65.2 - 74.3]
Adequate treatment of malaria			
Don't know	109	26.9	[22.5 - 31.3]
No	46	11.4	[08.4 - 14.5]
Yes	250	61.7	[57.1 - 66.6]
Iron administration			
Don't know	108	26.7	[22.5 - 31.1]
No	94	23.2	[18.6 - 27.2]
Yes	203	51.1	[45.4 - 54.8]
Homemade treatments			
Don't know	107	26.4	[22.0 – 31.0]
No	201	49.6	[44.7 - 55.5]
Yes	97	24	[20.0 - 27.9]

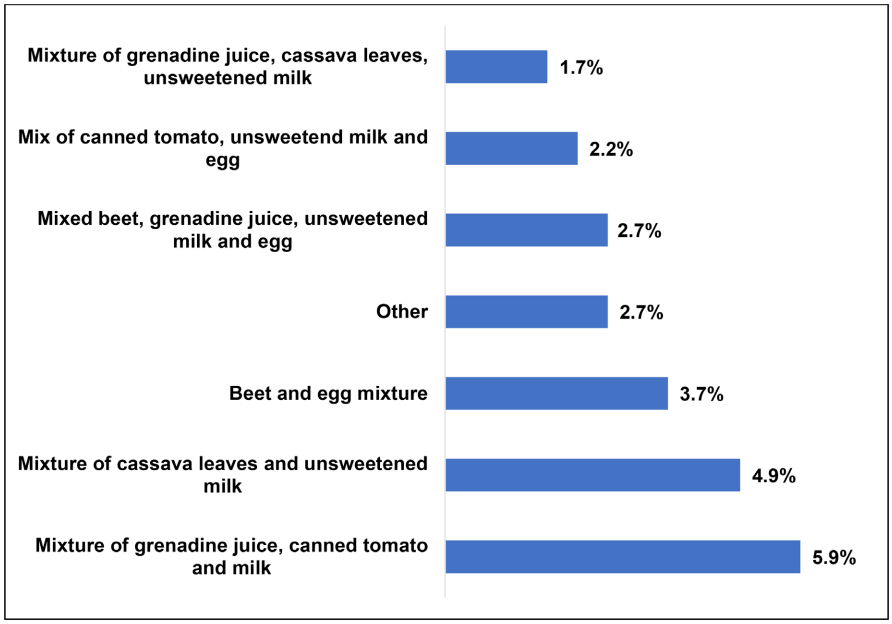

Figure 2. Distribution of mothers by type of homemade treatment used to prevent anemia in children.

3.9. Distribution of Knowledge Levels and Practices

Knowledge was poor in 138 (34.1%) participants and inadequate in 177 (43.7%). (Table 6)

Table 6. Distribution of participants according to their level of knowledge and practice of anemia in children.

Categories	n	%
Knowledge		
Poor	138	34.1
Insufficient	30	07.4
Mean	120	29.6
Good	117	28.9
Practices		
Harmful	140	34.6
Inadequate	177	43.7
Adequate	88	21.7

3.10. Factors Associated with Poor Knowledge and Practices

Our study shows that having a primary (RR = 6.558; CI = [2.165 - 19.86], $p < 0.05$) or secondary (RR = 2.731; CI = [1.790 - 4.166], $p < 0.05$) level of education increased the risk of having poor or insufficient knowledge, while having a higher level of education (RR = 0.219; CI = [0.137 - 0.351]; $p < 0.05$) or a child who suffered from anemia (RR = 0.430; CI = [0.231 - 0.802], $p = 0.008$) decreased the risk

of having poor or insufficient knowledge. Poor and insufficient knowledge were associated with harmful practices (RR = 83.79; CI = [39.33 - 178.51]; $p < 0.05$).

4. Discussion

This study reveals that barely 1 in 5 mothers reported adequate practices when faced with a child with anemia. While it seems logical that a poor level of knowledge should be significantly associated with inadequate practices, the fact that such a low proportion of mothers reported adequate practices, even though over half the participants had average or good knowledge, suggests that good knowledge is not the only determinant of practices. Indeed, in Africa, the cultural representations surrounding anemia are an avenue worth exploring, and some authors have suggested that "belief in evil spirits persists and may be an obstacle to seeking timely medical care for severe anemia in children" [10] [11]. One of the weaknesses of the present work is that it is confined to the hospital and medical setting. Subsequent studies, conducted in the community and focused on exploring cultural representations and beliefs surrounding anemia in children, will provide a deeper understanding of community perceptions and thus help explain certain practices.

4.1. Socio-Demographic Data

In our series, mothers aged 20 - 29 accounted for 63.7% of participants. This result is similar to that of Koffi *et al.* in Togo in 2012, where 61% of participants were between 20 and 29 years old [12]. The majority of mothers had secondary or higher education (58.5% and 36.5%, respectively). Employed mothers were the majority (24.9%), followed by housewives (21.7%) and students (16.8%). This socio-demographic profile can be attributed to the fact that the target population consisted of mothers of young children.

4.2. Knowledge

Of the 405 mothers surveyed, 347 or 85.7% had heard of anemia from various sources, whereas in Togo in 2012 only 60% of participants had heard of anemia, and even fewer (55.0%) in the series by Ngimbudzi *et al.* in Tanzania [8] [12]. This difference could be explained by the mothers' level of education, as only 8% of participants in the Koffi *et al.* series had a higher level of education, compared with 36.5% in our series [12]. On the other hand, our results are similar to those of Souganidis *et al.* in Indonesia in 2012, where 87% of mothers had heard of anemia, and Kamo *et al.* in Cameroon [9] [13]. The fact that the city of Dschang in Cameroon is a university town could explain the high proportion of mothers with higher education.

Mothers' primary sources of information on anemia were health personnel (72.3%), school (65.4%), and television (61.5%). This highlights the importance of health personnel, schools, and the media in informing communities about public health issues in general and anemia in particular. The media and social networks can be effective relays for disseminating relevant messages within the com-

munity.

In our series, 66.5% of mothers were able to define anemia, whereas in the series by Koffi *et al.* only 44% of mothers were able to provide a correct definition of anemia [12]. This difference could be explained by the fact that, in the present study, all participants had attended school, and 95% of them had a secondary education or higher, whereas in the study carried out in Togo, 36% of mothers had a primary education or were illiterate. Kamo *et al.* in Cameroon in 2020 found that 57% of mothers provided a correct definition of anemia [13].

Iron deficiency (67.9%), malnutrition (67.4%), abnormal bleeding (65.7%) and malaria (62.5%) were cited by the majority of mothers as causes of anemia. Koffi *et al.* found malaria (24%) and malnutrition (19%) to be the leading causes, while Djadou found malaria (60.5%) and Kamo found witchcraft (12.5%) in addition to malaria (53.3%). This could be explained either by the mothers' knowledge of anemia or by personal experience with their child or other children around them (prescription of iron to treat anemia, blood transfusion to treat severe anemia in the case of severe malaria) [12]-[14].

The signs of anemia most frequently cited by mothers were general fatigue (73.1%), dizziness (71.6%), and paleness of the eyes, hands, and feet (71.4%). Koffi and Djadou found pallor less often (32%), which could be explained by the mothers' low level of knowledge in their series [12] [14].

We found that 59.3% of mothers had never heard of anemia prevention. In the series by Koffi *et al.*, 90% of participants had never received an anemia prevention message [12]. This low level of knowledge about prevention suggests that particular emphasis should be placed on communicating how to prevent anemia.

In our study, the risk incurred by an anemic child most frequently recognized by mothers was the loss of appetite (63.3%), whereas in the series by Koffi *et al.* in Togo in 2012, death (71%) was the risk most reported by mothers. This could be explained by the fact that, in this study, 41% of mothers had had a child who had died or suffered from anemia [12].

Of the 405 mothers questioned, 94.4% recognized the existence of a treatment for anemia. The treatments most frequently cited by mothers were blood transfusion (62.5%) and iron supplementation (60.4%). This could be explained by the experience acquired by these mothers during pregnancy, or if they had a previous child with anemia. Indeed, iron supplementation is often prescribed as a preventive measure for pregnant women during their first prenatal consultation and after delivery. Some mothers (32.4%) cited traditional treatment. This could be explained by the fact that, in the popular imagination, the red color of blood influences the choice of foods likely to prevent or treat anemia, according to their color. Thus, products with a red color, such as tomatoes and beets, are considered, in the popular imagination, likely to prevent or treat anemia. To this end, there are mixtures commonly used by mothers as remedies. This explains the use of mixtures of grenadine soda, tomato concentrate, and raw egg (24.74%), as well as cassava leaf juice and sugar-free milk (20.61%), and beet juice and sugar-free milk

(15.46%) as remedies in our study. Similar attitudes were reported by Kamo *et al.* in northern Cameroon [13].

4.3. Mothers' Practices Regarding Anemia in Children

In terms of practices, mothers' first recourse in the event of anemia in their child was the health center (83.8%). Our results are similar to those of Kamo *et al.*, who reported that 84.8% of mothers considered the health center as their first resort in case of anemia [13]. These results differ from those of Koffi *et al.*, where mothers' first recourse was to the health center (65.8%) [12]. Other practices cited by mothers included the administration of iron syrup (28.2%), the use of homemade treatments (25.6%), the administration of paracetamol syrup (13.8%), and recourse to traditional healers (4.5%). Mothers recognized Iron supplementation for its preventive and curative effects, and this would have motivated some mothers to administer iron syrup to an anemic child without visiting the health center. Some mothers' lack of knowledge about anemia may also explain their belief that home treatment and traditional healers can cure anemia.

As for the most frequently cited means of prevention, good nutrition (69.6%), adequate malaria treatment (61.7%), and iron administration (50.1%) are the most common. Kamo *et al.* reported that 36% of mothers mentioned vaccination as a measure to prevent anemia, and the use of an impregnated mosquito net (34%), while good nutrition accounted for only 21% of responses in this series [13].

In the end, our study revealed that only 117/405 (28.9%) of mothers had good knowledge and 88/405 (21.7%) adequate practices, which remains relatively low. We found that the level of education and the fact of having had a child with anemia were associated with the level of knowledge, which in turn determined practices. However, factors such as financial limitations and the decision-making roles of other household members might affect the implementation of health practices by mothers.

Financial constraints represent a substantial hurdle. Even with adequate knowledge about the importance of iron-rich foods, iron supplementation, or timely medical care, a mother's ability to act can be restricted by a lack of financial resources. Purchasing nutritious food, which is often more expensive than staple, less nutrient-dense options, may be beyond the reach of many families. Similarly, acquiring iron supplements or other prescribed medications requires disposable income. Furthermore, accessing healthcare facilities, particularly for specialized or repeated visits, incurs costs related to transportation, consultation fees, and treatment, which can be prohibitive for financially limited households.

The hierarchical structure and decision-making processes within a household also profoundly influence a mother's autonomy and ability to implement health practices. In many cultural contexts, particularly in sub-Saharan Africa, major health decisions for children may require approval or be the sole responsibility of the father, grandparents, or other senior family members. Discrepancies in health beliefs, priorities, or knowledge between the mother and these key decision-mak-

ers can lead to delays or resistance to adopting recommended practices. For instance, a mother who understands the need for a blood transfusion for severe anemia might face opposition from a spouse who fears the procedure or adheres to traditional beliefs about blood. This "decision-making role of other household members" may affect practice implementation, highlighting the need to consider the broader family unit in health interventions [14].

Cultural explanations for illness, including anemia, constitute another powerful influence that can impact health practices. Traditional beliefs about the etiology of anemia can lead mothers (or other family members) to prioritize or exclusively pursue conventional healing methods or administer homemade remedies, as noted in our study, even when they possess some knowledge of biomedical causes and treatments. These cultural interpretations can delay or supplant the use of evidence-based medical interventions, contributing to adverse outcomes [8].

5. Conclusion

This study revealed that mothers' knowledge and practices regarding anemia were limited, and there was a lack of awareness about its prevention. A higher level of education and having had a child with anemia were significantly associated with good knowledge. Poor knowledge was significantly associated with inadequate practices. Mothers' knowledge and practices concerning anemia in children need to be improved. This could be achieved by increasing mothers' information and awareness of anemia and, more specifically, its prevention. A study of the beliefs and perceptions of mothers in the community would provide a better understanding of certain attitudes and practices. Advocacy for a holistic approach that combines health education with efforts to address socio-economic barriers and incorporate cultural considerations is essential for significantly reducing the burden of childhood anemia in Cameroon.

Authors' Contributions

Research design and implementation: DE, DNN, BK; Data collection: FPK, DE; Data analysis and interpretation: FPK, DE, DNN; Manuscript writing: DE, DAKT, AAST; Manuscript review for intellectual content: PHA, MCAE, CEB; Supervision: BK; All authors approved the final version of the manuscript.

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Compliance with Ethical Standards

This study was approved by the Regional Ethics Committee for Human Health Research in the West Region, Cameroon (ethical clearance n˚ 278/29/03/2023/CE/CERSH-OU/VP).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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