Management Strategies of Malnourished Children and Its Associated Factors in Yenagoa, Bayelsa State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by authors PTO and JEM. Authors CCO and EUN managed the literature searches. The first draft of the manuscript was written by author PTO and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aim: Malnutrition being a public health problem among children is more common in low- middle-income countries such as Nigeria, with a nationwide prevalence rate of 32 percent among children under the age of five years. This study aims to assess the management strategies of malnourished children and its associated factors in Yenagoa, Bayelsa State, Nigeria.

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Methods: This was a prospective descriptive observational study conducted among a randomly selected sample of 360 health workers who managed malnutrition among children aged 5 years and below. Ten (10) Primary healthcare facilities and 5 private hospitals were randomly selected across the 8 local government areas in Bayelsa State, Nigeria. Data was obtained using a self-administered questionnaire. The level of significance was determined using a confidence interval of 95% and a P-Value less than 0.05.

Results: the majority 355 (98.6%) of the respondents were female, with the age group 25 to 34 years old accounting for the highest proportion of participants 160 (44.4%). Doctors 53 (14.8%), Registered Nurses 171 (47.8%), and Community Health Extension Workers (CHEW) 73 (20.3%) were the major categories of the health workers that participated in this study. Two-hundred and seventeen (60.3%) of the health workers claimed that 33% (one-third) of the children they see at the clinic weekly are malnourished. In the management of malnutrition, majority (71.15%) of the malnourished children were managed using supplements and ready-to-use therapeutic foods. Other strategies include; formula (8.61%), and treating underlying illness (13.89%). The factors that affect the eradication of malnutrition were found to include beliefs (19%), socioeconomic status of parents and caregivers of the children (18%), food insecurity (23%), immune factors (15%), and malnutrition in form of poor dietary habits (25%).

Conclusion: Ready-to-use therapeutic foods was the major strategy employed in the management of malnutrition in children in Bayelsa State. Malnutrition, food insecurity Cultural beliefs were factors that affect the eradication of malnutrition.

1. INTRODUCTION

Malnutrition has been defined by the World Health Organization as a condition in which there is an inadequate or excessive intake of nutrients, an imbalance of critical nutrients, or an impaired utilization of nutrients in the body [1]. The concept of malnutrition encompasses both the state of overnutrition, which is associated with excessive weight gain and obesity, as well as undernutrition, which refers to a range of conditions such as wasting, stunting, and impaired immunity due to deficiencies in essential micronutrients [1]. Undernutrition is most common form of malnutrition in low and middle-income countries, especially among children of low socioeconomic status [2,3]. Malnutrition in this study refers to only undernutrition. Research has also shown that chronic malnutrition can exert significant effects on an individual's health, cognitive development, and productivity throughout their whole lives, hence there is a need for prompt detection of malnutrition and appropriate management which should be toward the goal of malnutrition eradication [4]. Undernutrition that occurs due to inadequate intake of vitamins and minerals, commonly known as micronutrients often results in micronutrient deficiency [4]. Micronutrients play a crucial role in facilitating the synthesis of enzymes, hormones, and other vital components necessary for optimal growth and development of the human body. Hence, its deficiency impairs the growth and development of children [4,5]. Approximately 45% of mortality cases in the population of children under the age of 5 in low-income and middle-income countries are attributed to the condition of undernutrition [6]. Nigeria exhibits a substantial burden of malnutrition among children, ranking second globally, as indicated by a nationwide prevalence rate of 32 percent among children under the age of five [6]. It is estimated that over 2 million children in Nigeria are afflicted with Severe Acute Malnutrition (SAM), and the present rate of treatment only reaches two out of every 10 affected children [7]. The Nigerian government and healthcare professionals are actively engaged in addressing malnutrition, particularly in children, through various approaches such as nutritional planning, direct nutrition and health interventions, as well as food-based initiatives that emphasize the consumption of a balanced diet using locally available food items including fruits and vegetables [8]. Efforts to eradicate malnutrition such as education and counseling of mothers and carers about appropriate feeding practices for their children, and how to make balanced meals from locally available food items have been identified. However, several factors such as poverty, low levels of education, and poor access to health services by the parents of carer of children have been shown to affect the effectiveness of eradicating malnutrition among children [7,9]. Therefore, this study aims to assess the management strategies of

malnourished children and its associated factors in Yenagoa, Bayelsa State, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Design

This is a descriptive cross-sectional study of the management strategies of malnutrition by health workers for children aged 5 years and below. Ten (10) Primary healthcare facilities and 5 private hospitals were randomly selected across the 8 local government areas in Bayelsa State, South-South geopolitical zone, Nigeria. The study population for this study was health workers comprising registered nurses, doctors, community health workers, and auxiliary nurses. The auxiliary nurses were found in the private hospitals.

2.2 Sample Size

The minimal sample size for this study was obtained with a calculation based on the single proportion formula [4].

$$n = \frac{Z^2 pq}{e^2}$$

With;

n = sample size desired (when population is >10,000)
Z = the abscissa of a normal curve that cuts off the area-α at the tails (1 - α equals
the desired confidence level, e.g., 95%) which is 1.96.
e = the desired level of precision (degree of accuracy) which is 5% (0.05)
p = the estimated proportion of an attribute that is present in the population which is taken as 71% i.e 0.71 [4].
Minimum sample size (n) = 316 Participants.

Thus, the sample size for this research was 360 health workers

2.3 Sampling Techniques and Method of Data Collection

A sample size of 360 health workers seeing different patients at diferent healthcare facilities over a period of six (6) months (February to July, 2023) was randomly chosen from the 8 local government areas in Bayelsa state. During the first stage, 10 Primary healthcare facilities and 5 private hospitals were randomly selected across the 8 local government areas in Bayelsa State. During the second stage, 24 participants were

selected from each of the 10 public healthcare facilities and 5 private healthcare facilities resulting in a total of 360 research participants for the study.

The research data were collected using self-administered questionnaires designed by the study group to suit the research settings. Participants (N=360) included in this study were health workers comprising registered nurses, doctors, community health workers, and auxiliary nurses selected from the 8 local government areas in Bayelsa state. The survey questionnaire combined closed-ended Likert-scaled and open-ended questions. Part A focused on the respondent's demographic variables while Part B focused on strategies employed in the management of malnourished children as well as the factors associated with eradication of malnutrition in Yenagoa Bayelsa State of Nigeria.

2.4 Validity and Reliability

The questionnaire was designed by the research authors and validated by the professor of community health, Department of Public and Community Health, Novena University, Ogume, Delta State, Nigeria. A pilot study of 30 health workers outside the study area was carried out to test the feasibility and repeatability of the questionnaire, as well as to train and familiarize the research assistants on accurate collection of data.

2.5 Method of Data Analysis

The collected data were analyzed using descriptive statistics in Excel and IBM SPSS version 27. The results were reported in terms of frequency and percentage. The level of significance was determined using a confidence interval of 95% and a P-value of *P=.05*.

3. RESULTS AND DISCUSSION

3.1 Results

Table 1 indicates that the majority of the research respondents, specifically 98.6%, were female, whilst a small proportion of only 1.4% were men. The age cohort that had the highest proportion of participation was the 25 to 34-year-old group, accounting for 44.5% of all respondents, closely followed by the 35-44-year-old group with 42.2%. Married individuals constituted the bulk of the participants, accounting for 54.2% of the total, whereas 37.2% were single mothers. The respondents were primarily from the Ijaw ethnic group, accounting for 85.8% of the total. The

remaining participants were Igbos (10%), Deltans (2.53%), and Akwa Iboms (1.67%).

The categories of the health workers showed that 36 (10.1%) of them were auxiliary nurses, 73 (20.3%) were community health workers, 171 (47.8%) were registered nurses, 53 (14.8%) were doctors and 24 (6.7%) were public health nurses (Fig. 1).

Fig. 2 shows the percentage of malnourished children that are seen in the clinic per week. 77 (21.4%) of the health workers seeing different patients reported that in a week, 20% of the children they see at the clinic are malnourished, and 1 (0.3%) of them reported that 25% of the children they see in the clinic per week are malnourished. 217 (60.3%) of the health workers claimed that 33% of the children they see at the clinic weekly are malnourished while 0.3% of the health workers submitted that 1 (50%) of the children they encounter at the clinic per week are malnourished. This implies that the majority of health workers encounter many malnourished on a weekly basis at the clinic.

Fig. 3 shows the number of malnourished children that are treated in the clinic per week. 203 (56.4%) of the health workers reported that in a week, they treat 1 malnourished child per week. 79 (21.9%) of them reported that they treat 2 malnourished children per week. 30 (8.3%) of them reported that they treat 3 malnourished children per week. 3 (0.8%) of them reported that they treat 4 malnourished children per week and 45 (12.5%) of them reported that they treat 5 malnourished children per week.

Table 1. Sociodemographic variables of respondents

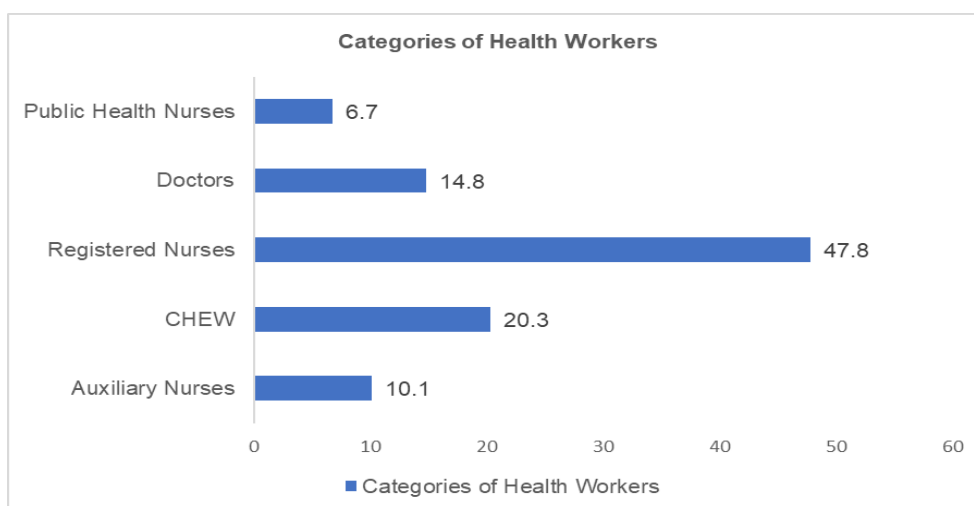| Variables	Options	Frequency (N=360)	Percentage (%)
	Male	5	1.4
Sex	Female	355	98.6
	15 – 24	16	4.45
	25– 34	160	44.4
	35 – 44	152	42.25
Age	45- 54	17	4.8
	55 – 64	13	3.6
	Above 64	2	0.5
	Single	134	37.2
	Married	195	54.2
Marital status	Divorced	27	7.5
	Widowed	4	1.1
	Akwa Ibom	6	1.67
	Deltans	9	2.53
Ethnic group	Igbos	36	10
	Ijaws	309	85.8

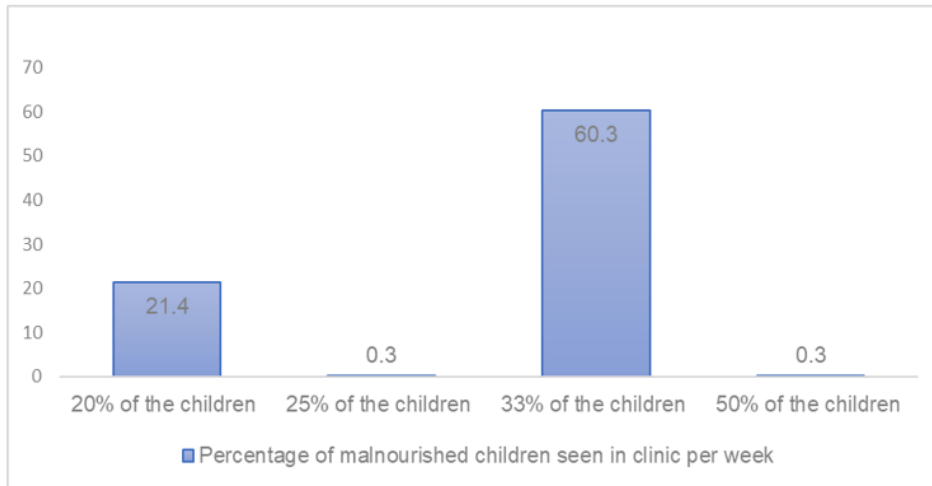**Fig. 1. Categories of the health workers Respondents**

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Fig. 2. Percentage of malnourished children seen in clinic per week
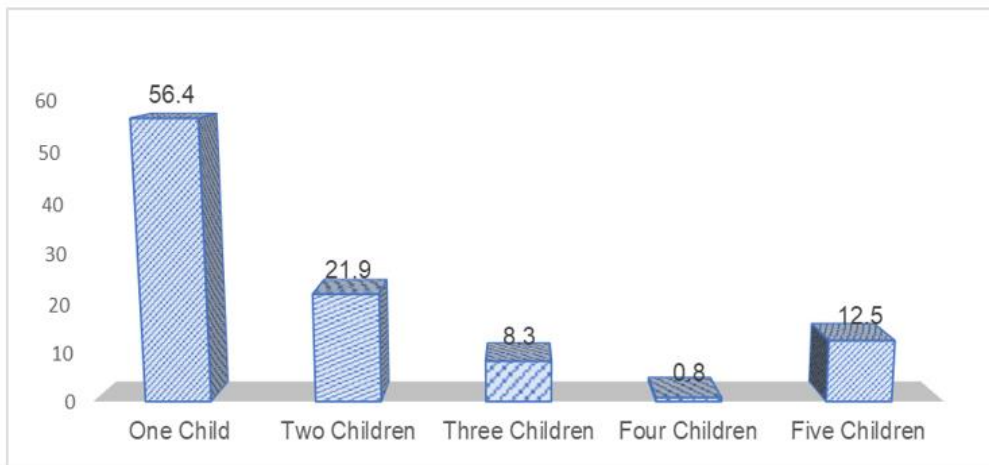

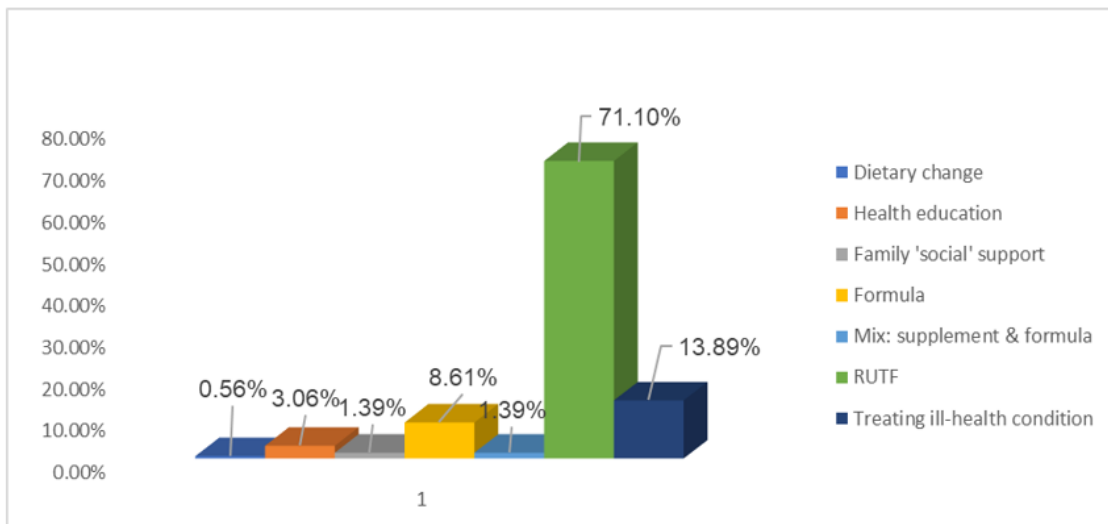**Fig. 3. Number of malnourished children treated per week**

Fig. 4. Strategies used by health workers in the management of malnourished children

Fig. 4 shows the themes identified from the responses as the treatment prescribed for micronutrient deficiency among children under 5 years of age include; home-based dietary changes (0.56%), health education (3.06%), family/social support (1.39%), formula (8.61%), mix of micronutrient supplement and formula (1.39%), treating underlying illness such as helminthiasis, malaria and sepsis (13.89%) and giving ready-to-use therapeutic food known as "RUTF" (71.1%).

Fig. 5 shows the responses of health workers about following up with the children treated for malnutrition to find out if they recovered from malnutrition. 192 (53.3%) health workers sometimes conducted follow up with the children they treated for malnutrition to monitor recovery, 118 (32.8%) of the respondents' follow-up while 50 health workers (13.9%) did not do any follow-up.

Fig. 6 shows factors that affect the eradication of malnutrition among the children treated for malnutrition in the form of themes. The factors include cultural beliefs (19%), the socioeconomic status of parents and caregivers of the children (18%), food insecurity (23%), immune factors due to both primary and secondary immunodeficiency (15%), and undernutrition from poor dietary habits (25%).
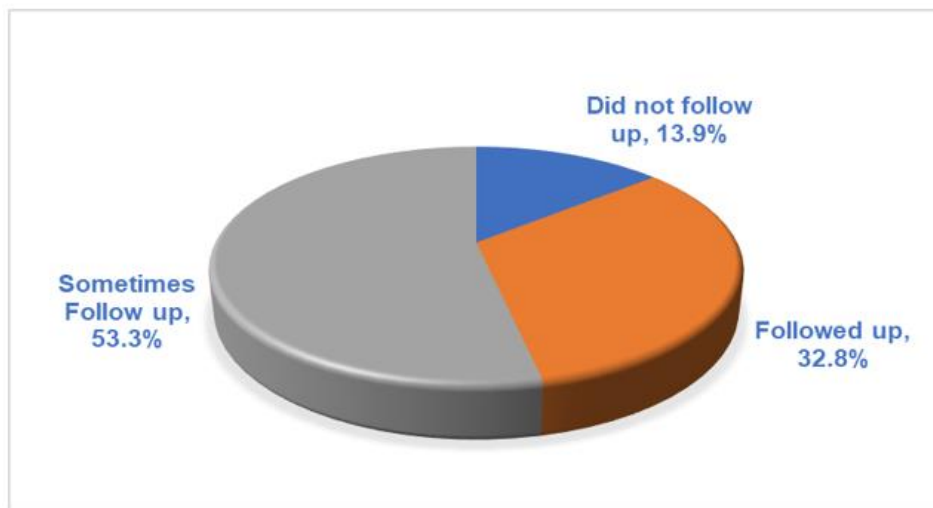

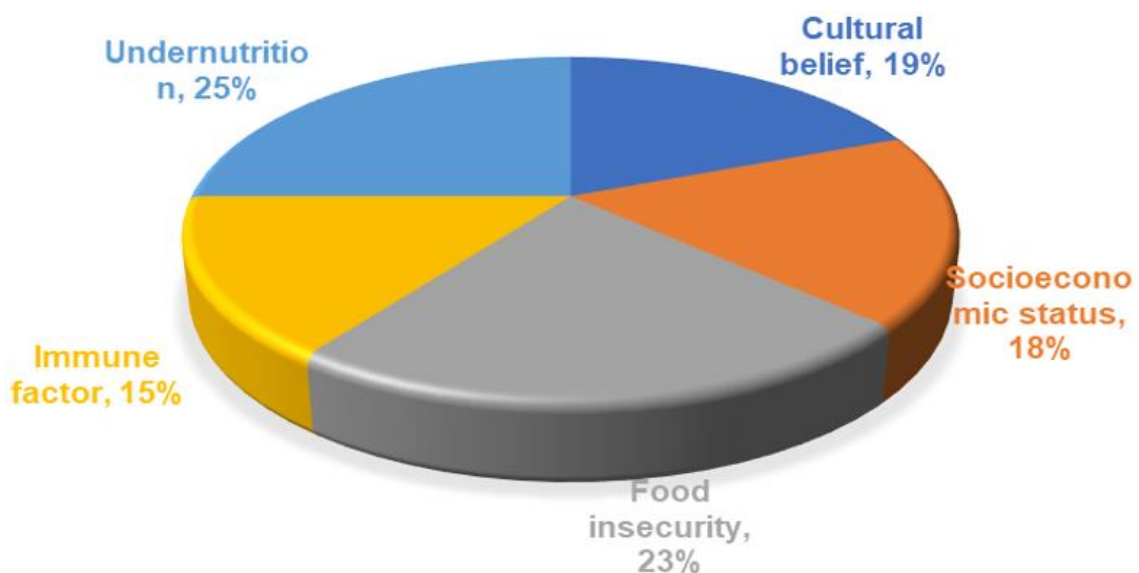**Fig. 5. Health workers' follow up approach in the management of malnutrition**

Fig. 6. Factors that affect the eradication of malnutrition

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3.2 Discussion

This study identified various strategies used by the research participants in the management of malnutrition which included the use of ready-to-use therapeutic foods, modification of dietary patterns to include highly nutritious foods, administering micronutrient supplements and formula, educating parents and carers about balanced diet, family/ social support, and treatment of diseases that contribute to the development of malnutrition in children. It is worth noting that a small proportion, (0.5%), of the children suffering from malnutrition in this study were managed with home-based dietary changes. The majority (approximately 71.1%,) of the malnourished children managed by the health workers were managed using ready-to-use therapeutic foods (RUTF). A previous studies have also identified similar strategies for managing the occurrence of malnutrition in children which included food supplements, micronutrient supplements, and ready-to-use therapeutic foods [10–13]. Ready-to-use foods (RUFs) which are available in pharmaceutical shops and supermarkets in Nigeria refer to a category of food products that are specifically designed to be consumed without any additional preparation. They come in bars, pastes, or biscuits, and are created to contain optimal amounts of high-quality protein, energy, and essential micronutrients [14]. Researchers posit that ready-to-use therapeutic foods have a higher nutrient density compared to the locally available food items that are found at home. They do not require further preparation or processing before consumption, and they are highly effective in the management of malnutrition [15,16]. However, other studies have also indicated that therapeutic foods that are beneficial to malnourished children can be made from locally available food items such as locally grown pulses and cereals such as soybean and corn to enhance sustainability [17]. Another study opined that therapeutic foods can be locally made at home using legumes as an alternative to the conventional peanut base used for ready-to-use therapeutic foods [18]. This study therefore recommends that it would be beneficial to train health workers on how to educate parents and caregivers on the prevention and management of malnutrition using locally available food items.

This study identified factors that affect the eradication of malnutrition to include; cultural beliefs, the socioeconomic status of parents and carers, food insecurity, immune-related issues, and undernutrition. Previous research has also identified several factors that affect the eradication of malnutrition among children which include cultural perspectives, socioeconomic status, food insecurity, educational and occupational backgrounds of parents, levels of knowledge and awareness of balanced nutrition, living environments that are either urban or rural, and the availability of nutritious food items and the purchasing ability of parents and caregivers [19–21]. Moreover, studies in other countries have shown that poverty and the resulting poor purchasing power is the most common factor that affects the eradication of malnutrition among children [12,13].

To effectively address socioeconomic issues, home cultivation of nutritious food items including fruits and vegetables should be encouraged as well as debunking the prevalent myths and misconceptions that hinder parents and carers from providing enough balanced meals to their children. Example of such is the cultures that believe that giving meat to children will make the children steal [17]. Studies shows that malnutrition can be eradicated through encouragement of home gardening, policy and government support for local farming, provision of school meals and micronutrient supplements for children, and health education [10,12].

4. CONCLUSION

This study identified various strategies used by the health workers in the management of malnutrition among Children in Bayelya State, Nigeria. Ready-to-use therapeutic foods was the major strategy employed in the management of malnutrition in children. Cultural beliefs, socioeconomic status of parents and carers, food insecurity, immune-related issues, and undernutrition were the identified factors that affect the eradication of malnutrition.

CONSENT

Informed consent was obtained from all participants included in this study after detailed explanation of the study procedure both in English Language and local dialect.

ETHICAL APPROVAL

Ethical approval for this study was obtained from the research and ethics committee of Novena University, Ogume, Delta State with ethical approval number: NUO/PCH VOL 1/582. Permission was taken from the chairman of

Patani Local Government Council. Informed consent was obtained from all participants after detailed explanation of the study procedure with assurance of confidentiality of the information that was collected.

ACKNOWLEDGEMENTS

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

QUESTIONNAIRE FOR HEALTH WORKERS THAT CARE FOR CHILDREN AGED 6 MONTHS TO 5 YEARS OLD

Participant ID---------------------------- **Date**: ------------------**Cadre of health worker:** ------------------

Age---------------------- **Sex**-----------------**Marital Status**----------------------- **Ethnic Group**------------------

1. What is the average number of malnutrition/micronutrient cases you meet among children? --------------

2. What is your estimation of the average number of malnutrition/micronutrient deficiency treated per week among children?

   a) 1
   b) 2
   c) 3
   d) More than 3

3. What do you prescribe for the treatment of micronutrient deficiency among children aged 6 months to 5 years? ---------------------------------------

4. What did the healthcare service prescribe for the treatment of micronutrient deficiency treated per week among children? -------------------------------

5. How many of the children you treated for malnutrition recovered?

   a) 1
   b) 2
   c) 3
   d) More than 3

6. How do you monitor the recovery of the children placed on treatment for malnutrition?

7. Do you follow up with the children treated for malnutrition to find out if they recovered from malnutrition? ---

8. How do you follow up with the children treated for malnutrition to find out if they recovered from malnutrition?

9. How many children aged 6 months to 5 years have you seen in recent practice?

   a. In the last one week--
   b. In the last one month--------------------------------------
   c. In the last 3 months---------------------------------------
   d. In the las 6 months--
   e. In the last 1 year--

10. Out of all the children aged 6 months to 5 years that have you seen in recent practice, how many of them were malnourished?

    a. In the last one week--
    b. In the last one month--------------------------------------
    c. In the last 3 months---------------------------------------
    d. In the las 6 months--
    e. In the last 1 year--

11. Do you document cases of malnutrition among children aged 6 months- 5 years separately from general pediatric patient records?

    a. Yes
    b. No

12. How do you assess the eradication of malnutrition among the children you treat for malnutrition?