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# Knowledge, Attitudes, and Practices on Nutrition among Mothers with Under 5 Years Undernourished Children in Kicukiro District, Rwanda

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## Abstract

This study aimed to assess the knowledge, attitudes and practices on nutrition among mothers with under five years undernourished children in Kicukiro District of Rwanda.Malnutrition constitutes a big threat to the public health especially among children less than five years and it is a burden in developing countries. The study used across sectional design with quantitative and qualitative approaches. A sample of 255 mothers living in Kicukiro District who have undernourished children below 5years were chosen using a convenience sampling process, whereby every mother that had an undernourished child was give equal chance to be enrolled in the study. Data analysis was done using SPSS version 22. Qualitative data were treated using Atlas. Univariate, bivariate and multivariate analysis were applied. The significance was set at p-value less than 0.05.The findings on knowledge level revealed that 51% of mothers knew the types of food, 55.3% were not able to give examples of each type of food and 52.2% did not know the composition of a balanced diet. Concerning attitude on nutrition among mothers,85.1% had no food restrictions. Concerning practices, 52.2% prepare a balanced diet for their children, 54.9% practiced exclusive breastfeeding until six months; 52.2% respected hygiene measures before feeding their children and 43.5% and 26.3% gave their children two and three meals a day respectively. Concerning the factors associated with nutrition practices, the bivariate analysis showed that the mother being aged under 21 years old presented a positive relationship with poor nutritional practices with 73.3%, $X^2$=14.274, p<0.006; Also, the mother being single presented a positive relationship with poor nutritional practices with 77.6%, $X^2$=16.860, p<0.014. The motherhaving not done any formal education presented a positive relationship with poor nutritional practices with 83.3%, $X^2$=21.643, p<0.003. Also, wealth index presented a positive relationship with nutritional practices with 75.6%, $X^2$=20.151, p<0.001; religion presented a positive relationship with nutritional practices with 65.9%, $X^2$=11.129, p<0.011. Also, multivariate analysis showed that mothers aged under 21 years old were three-fold less likely to be associated with good nutritional practices compared to mature mothers with AOR 0.389 95% CI (0.195-0.774), p<0.007. Also, being married was twice more likely than being a widow/separated associated to good nutritional practices with AOR 2.119 95% CI (1.053-4.264), p<=0.035. Having not done any formal education was 0.133 times more likely than having done

tertiary education associated to good nutritional practices, AOR 1.133 95% CI (0.048-0.0.378), p<=0.026. Being poor was 0.237 times more likely than being rich associated with good nutritional practices, AOR 0.237 95% CI (0.123-0.458), p<=0.004. The study recommends the reinforcement of the functioning of nutritional centers, the organization of outreach campaign programmers constantly in order to educate the mothers more on the effects and prevention of malnutrition in children, and the emphasis on exclusive breastfeeding from 0-6 months.

Key words: Knowledge, Attitude, Practice, Nutrition, Under 5 year children

## Introduction

Child under nutrition in different forms includes stunting (low length/height for age), wasting (low weight for length/height), underweight (low weight for age), and deficiencies of essential vitamins and minerals and it is recognized as one of the main public health challenges of the 21st century, especially in low- and middle-income countries where they cause a huge number of deaths as well as disability-adjusted life years lost among children younger than 5 years (Victora, et al. 2018).

Child under nutrition does not only affect childhood but may also lead to short adulthood height, impaired cognitive development and reduced economic development in the long run and may as well lead to low offspring birth weight. Under nutrition in children below five years of age which manifests itself as underweight contributes significantly to the global burden of disease. Most of the deaths caused by different infections such as malaria, pneumonia and diarrhea are attributable to under nutrition (Butterly, 2014).

For children to develop a strong immunity, good muscle, proper organ formation and function, adequate neurological and cognitive development, sufficient and good quality nutrition is of great importance. Adequate nutrition especially in children leads to economic development as well as human development as they are able to learn new skills, think critically, and contribute to their communities as they grow healthy.

Poor infant feeding practices can lead to risen malnutrition especially during the first two years of childhood (McLaren, 2016)

Based on 2020 WHO global report, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 38.9 million were overweight or obese. Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries (WHO, 20220).

The number of undernourished people in sub-Saharan Africa rose from 181 million in 2010 to almost 222 million in 2016. Among children, although the prevalence of stunting decreased from 38.3% in 2000 to 30.3% in 2017, the numbers affected increased from 50.6 million to 58.7 million due to population growth. The rate of wasting in 2017 was 7.1% or 13.8 million children, of whom 4 million were severely wasted (WHO, 2020).

In Rwanda, according to the National Institute of Statistics, 33% of Rwandan children aged 6-59 months are stunted (short for their age), 1% are wasted (thin for their height), 8% are underweight (thin for their age), and 6% are overweight (heavy for their height) (NISR, 2020).

Consequently, the Rwanda National Food and Nutrition Policy in its seven strategy directions has emphasized on prevention of stunting among children below two years of age as well as prevention and management of all forms of malnutrition among other strategic directions. This policy is being formulated to address nutrition priority problems with assistance from international and local agencies like UNICEF, Save the Children, Plan International, etc (MoH, 2020).

Rwanda being signatory to the Global and Regional frameworks such as the United Nations Convention on the rights of children (UNCRC), Education for All (EFA), Sustainable Development Goals (SDGs), has developed National Early Childhood Development Program National strategic plan for ensuring the rights of children are fulfilled and this through Early Child Development (ECD) platform (MoH, 2020). ECD focuses on children from conception to 6 years of age and so far, has improved a lot in different domain including children undernutrition. Rwanda aims to reducing stunting in children to 19% by 2024 and this requires multisectoral efforts (MoH, 2020).

Malnutrition in young children is not only related to unavailability of food, but can also be associated with inadequate knowledge about how to feed the child, what is the right complementary food to give when the baby is ready to start eating, and what are the appropriate feeding practices. To get that information on feeding young children, family beliefs and community practices play an important role (WHO, 2020).

While Rwanda has made tremendous progress towards reduction of acute malnutrition in recent years, the country is still struggling with levels of 36% of chronic malnutrition and38% of micronutrient deficiency (NISR, 2020). Almost half of all deaths in children under 5 years of age are related to undernutrition that itself exposes children to common infections related deaths,

increased frequency and severity of such infections, prolonged sickness, growth and cognitive retardation (MoH, 2020). Effective nutrition is one of the most important health determinants among citizens of any country including Rwanda.

Kicukiro District which is concerned by the present study recorded 11% , 0.6% and 2.6% of children below 5years with stunting, wasting and underweight respectively (NISR, 2020). However, given that this District is among the wealthiest in the country, it is very important to find out the reasons behind this prevalence since it is populated by people whose living standard is higher than the national average, and with the highest number of highly educated people (NISR, 2020).

Different studies have been carried out to understand why the problem is still present such as factors contributing to malnutrition in less wealthier Districts of Rwanda but a little has been done as well on identifying the knowledge and practices of mothers of wealthiest Districts on this matter. However better understanding of the KAP of mothers of children under five years is paramount to finding sustainable solutions to the problems of undernutrition with evidence-based interventions. For improved and maintenance of nutritional status of children, mothers' knowledge is of great importance so they need to be made more aware of feeding practices of children and other health-care practices.



## 2. Literature review

### 2.1 Level of knowledge of mothers on nutrition

In his book entitled "Nutrition in developing countries", Michaël (2019) stated that mothers have low level of knowledge on malnutrition and its causes. According to him, 48% of the mothers believe that malnutrition results from a macronutrient deficit and 62% said that malnutrition is very often associated with infections. Also, 57% of his respondents said that loss of appetite, alteration of the intestinal mucosa and increased nutritional needs resulting from infections and diarrhea promote the onset of malnutrition (Michaël, 2019).

In addition to this study, the researcher also found the study that was conducted by Kirere in 2017. It is a cross-sectional study that was conducted in a rural health area in the northeast of the Democratic Republic of Congo. It focused on 326 children from 0 to 59 months. This sample was obtained by the following procedure: 30% of households in each of the seven neighborhoods of the health area were randomly selected, i.e. a total of 260 households out of a total of 868.In the selected households, all the children of the age group concerned, of whom at least one parent was present, were included in the sample (Kirere, 2017).

The low level of knowledge of the mother on the preparation of a balanced meal was considered as the leading factor of undernutrition as it was found that 61% of the mothers whose children suffer from undernutrition do not know the elements that constitute a balanced diet. Other factors include: weaning with unvaried foods (cassava paste),household size greater than or equal to six people, illiterate level of the mother, poor hygiene in the child's living environment and poor socio-economic level of the family (Kirere, 2017).

A similar study has been conducted in Ethiopia. Indeed, Etkin conducted a study for his doctoral thesis in 2018 entitled: Protein-calorie malnutrition in children under five at the Yalgado National Hospital Center. It is a descriptive retrospective study. The survey involved 1,376 files of hospitalized children under five. This sample was obtained by reasoned choice: all children in the age group hospitalized from October 2017 to March 2017 at Yalgado National Hospital Center were selected. The documentary review of the records of these patients was used as a data collection method. The analysis of the results showed that the mothers of these children were illiterate, which is proof that their level of knowledge was low. Also, 44% of the respondents failed to name the composition of a balanced diet and 39% were not able to prepare a balanced diet for their children (Etkin, 2018).

There is also a study that the NISD conducted in 2016 and which is entitled: Specific study on poverty and health in Ghana. It is a cross-sectional study based on the results of the Priority II Survey conducted by the NISD in 2015. The survey involved 8,478 households, including 2,593 in towns and 5,885 in rural areas. In terms of individuals, the sample consisted of 63,509 people. One of the objectives of the study was to specifically study the level of knowledge of mothers of children suffering from malnutrition. According to this study, being underweight is significantly influenced by the level of knowledge of the mother and the majority of the respondents (61%) ignored the advantages of practicing exclusive breastfeeding (NISD, 2016).

Also, developing countries have a low literacy rate, which is a limit to learning. That is why the level of education influences the health of a person. Thus, the prevalence of child malnutrition decreases when the mother has a high level of education (Vollmer, 2014). According to Umeta (2013), 43% of the mothers knew the types of food, 50% were not able to give the examples of each type of food and 48% did not know the composition of a balanced diet. Therefore, it is important to adapt teaching to the literacy level of the subject (Umeta, 2013). In sum, a lot of study concerning the level of knowledge of the mothers on the nutritional aspects of their children focuses on the types of food, example of each type of food, Composition of a balanced meal and the source of information.

### 2.2 Attitudes of mothers on nutrition of their children

The attitude of children's mothers is different to the choice of diet. A person's culture can have a positive or negative impact on how they manage their child's diet.To this end, in a study conducted by Giashuddin et al. (2019), the authors conducted an assessment of the mother's attitude towards the duration of breastfeeding and the socioeconomic and demographic factors that influence it in Bangladesh. From a 2018 census, a sample of 30 households was selected from each primary sample unit. Mothers who were still breastfeeding at the time of the survey and children under five who died before the end of the survey were excluded from the study. The findings confirmed that 67.3% had positive attitude towards nutrition of their children (Giashuddin et al., 2019). This state of affairs has also been highlighted by Duong et al. in 2015.

Following a low rate of exclusive breastfeeding, Duong et al. (2015) attempted to determine sociodemographic, psychological and perinatal factors related to exclusive breastfeeding up to six months in Harare, Zimbabwe. To this end, they recruited women who had given birth in an obstetric care unit as well as their husbands or partners. The data were obtained from a questionnaire including socio-demographic characteristics, perinatal and psychological factors and information on paternal beliefs related to the baby's diet.

The results showed that 75% of the mothers had the perception of insufficient milk as a reason of not practicing exclusive breastfeeding; 71% said that nipple pain was the reason of not practicing exclusive breastfeeding and 68% thought that the impression that the baby is hungry pushed them to include other food on the child’s diet. In sum, different studies concerning the attitudes of the mothers on the nutritional aspects of their children focuses on the food restrictions, foods prohibited for children, necessity of hygiene and opinion of mothers on the balanced meal (Duong et al., 2015).

### 2.3 Practices of mothers on nutrition of their children

According to Hagan (2018), knowledge, beliefs and practices regarding health and disease are influenced by culture. In his study conducted in 2018, he found that 57% of the mothers prepared a balanced diet for their children while 43% prepared a lean diet. Also, 66% practiced exclusive breastfeeding until six months while 34% did not do so. The majority of his respondents (69%) respected hygiene measures before feeding their child. According to this author, cultural determinants have an impact on breastfeeding, the timing of weaning, the introduction of complementary foods and the way of stimulating the child. Beliefs about illness are also guided by cultural context and religion. Thus, in certain animist beliefs, malnutrition may be associated with the influence of evil spirits or the transgression of taboos (Hagan, 2018).

According to Massamba et al. (2018), “mothers’ cultural beliefs and practices play an important role in decisions about feeding behavior”. In this case, malnutrition can be caused by poor dietary practices, dictated by erroneous beliefs or cultural attitudes. According to this author, 36% of bad practices are the result of taboos on nutritious foods, 27% result from healer treatments causing diarrhea, 44% result in the distribution of food within the family or poor choices in the management of the food budget (Massamba et al., 2018).

Having enough to eat at home does not necessarily guarantee sufficient nutrition for each member of the family, particularly for children. Indeed, there is an inequality in the division of resources within families. Men often receive higher quality food, at the expense of young children. According to Duong et al. (2015), in so-called hot climate countries, i.e. developing countries, the model of society is community-based, the culture is centered on the group and hierarchy is important. This way of living in community influences the food and the psycho-emotional development of the child. These findings are almost the same as those found by Edith and Priya (2016). In their study entitled Knowledge, attitude and practice (KAP) survey on dietary practices on prevention of malnutrition among mothers of children under five years, they found that 43% of the mothers having undernourished children have enough food in their households. In sum, a lot of study concerning the practices of mothers on the nutritional aspects of their children focuses on the type of prepared meal (food diversity), hygiene measures practiced, barriers preventing compliance with the preparation of a balanced meal and barriers preventing compliance with hygiene measures.



**2.4 Factors influencing nutrition practices of mothers**

According to Vollmer (2014), a lot of factors can contribute to the high prevalence of undernutrition among children: these are poor practices of breastfeeding and complementary feeding and especially dietary habits. It was found that 17.4% of mothers breastfeed up to 6 months and that there is a lack of specific food for children from 6 to 24 months. Moreover, this inadequate practice of breastfeeding does not promote birth spacing. According to this author, education has a positive impact on nutrition as having done secondary or university education was twice more likely to be associated with good nutritional practices compared to those who have done primary or no formal education.

In Rwanda a study conducted by Basinga (2013) showed that the proportion of mothers capable of composing a balanced meal remains low (24-38%) and this is among the factors of the high prevalence of undernutrition among children. Also, Basinga (2013) pointed out that being

recorded in category 1 and 2 of Ubudehe (Rwandese wealth index) is firmly associated with undernutrition among children.

In a study carried out by Eyob et al. (2013), it has been shown that malnutrition in children aged 0-5 years is largely due to socio-economic factors (poverty, household income, mother's education, family size, etc.) with AOR 1.956 95% CI (0.141-1.25), $p<0.012$; environmental factors (access to drinking water, hygiene, etc.) with AOR 2.182 95% CI (0.255-1.314), $p<0.004$; as well as factors related to the health of the child (breastfeeding and early weaning, vaccination coverage, dietary habits, infectious and diarrheal diseases, etc.).

## 3. Materials and methods

### 3.1 Research design

In this study, the researcher used a cross-sectional research design and adopted both qualitative and quantitative research approaches.

### 3.2 Participants

The study focused on mothers of children under five years with undernutrition in Kicukiro District.

The total population of the survey was composed of 255 mothers of orless than five-year-old children recorded in different Sectors of Kicukiro District and recorded to be in a situation of undernutrition.

For qualitative data, the study interviewed 32 key informants namely Director of health and the in charge of nutrition at the district, 10 community health workers, 10 Heads of health centers of the ten sectors in Kicukiro as well the nutritionists of the health centers.

### 3.3 Research instruments

A well-structured questionnaire and translated in Kinyarwanda was used to collect data from the mothers. The questionnaires were sectioned into I, II, III and IV parts where section I captured demographic characteristics data of the respondents (age, marital status, education level, ubudehe category and religion) and sections II, III and IV captured data about the level of knowledge on nutrition of mothers (types of food and examples, composition of balanced diet), attitudes of mothers on nutrition of their children (community or religion restriction on certain foods, mother perception on preparation of balanced food and hygiene of the child), and practices of mothers

on nutrition (such as exclusive breastfeeding, hygiene practices, how many meals per day) of their children respectively.

The interview guide captured information related to knowledge, attitudes and practices of mothers of undernourished children under five years in Kicukiro District, Rwanda. It was composed of four sections: Level of knowledge on nutrition of mothers, attitudes of mothers on nutrition of their children, Practices of mothers on nutrition of their children and factors influencing undernutrition among children. Interviews were held in respective office of key informants and the researcher was asking different questions of the interview guide and the key informant gave his/her point of view on the asked question.This instrument enabled the researcher to obtain verbal responses which have been used to supplement the information extracted from the questionnaires and were analyzed to arrive at reliable findings.

### 3.4 Data collection procedure

Prior to collecting data, the researcher received a letter of approval from Mount Kenya University's School of Health Sciences. This was presented to the authorities of Kigali City to apply for permission for data collection in Kicukiro District. The data collection was done by the researcher herself together with other three trained data collectors.

The participants were met at their respective households and others at the health centers. To reach them in the community, the researcher was guided by local community health workers as they know every nutritional status of the children in their respective villages. Mothers were asked questions and answers were filled in the questionnaire by the researcher or data collectors. Also, to allow the researcher to obtain verbal answers, interviews were conducted orally with key informants in order to complete the information obtained from the questionnaire and were objectively evaluated to arrive at accurate results.

### 3.5 Data analysis procedure

As input, primary data was collected from the respondents in sampled mothers of undernourished children. Data were organized in a more meaningful and interpretive way to attain the study objectives. After the collection from the field, data was entered into a computer using SPSS version 22 to allow easy interpretation and analysis.

As output, concerning objective one, descriptive analysis was done and frequencies and percentages were computed to determine the level of knowledge on nutrition among mothers of

children under five years with undernutrition in Kicukiro District of Rwanda. Was considered as having sufficient knowledge any mother able to cite the types of food, to give example of each type of food and able to explain the composition of a balanced diet. The mothers who were not able to give satisfaction to those three questions were considered as not having sufficient knowledge on nutrition as explained in FAO's guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (FAO, 2014).

Concerning objective two, descriptive analysis was done and frequencies and percentages were computed to assess the attitudes on nutrition among mothers of children under five years with undernutrition in Kicukiro District of Rwanda. Was considered as having positive attitude the mothers who have no restriction (Religious or community-based) on the composition of their meals and who found necessary to ensure hygiene of the child and prepare a balanced diet every day. Others were considered as having negative attitude as explained in FAO's guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (FAO, 2014).

Concerning objective three, descriptive analysis was done and frequencies and percentages were computed to identify the practices on nutrition among mothers of children under five years with undernutrition in Kicukiro District of Rwanda. The score for good practices on nutrition was 4/4. Were considered having good practices mothers who breastfedd their children exclusively for six months, practicised hygiene practices for children, prepared a balanced diet and fed their children 3 or four meals a day. Those with scores below 4/4 were considered as having poor practices.

Concerning objective four, logistic regression was conducted and bivariate analysis was done to determine the relationship between different factors and undernutrition among children together with multivariate analysis to determine the association between those factors and undernutrition among children. To analyze qualitative data, the researcher used Atlas.

## 4. Results

### 4.1 Findings

**Tables 4.1 Characteristics of mothers with under five years undernourished children in Kicukiro District, Rwanda (255 mothers)**

| Variables | Frequency | Percentage |
|---|---|---|
| **Age of the mother** | | |
| Under 21 | 90 | 35.3 |
| 21-35 | 105 | 41.2 |
| Over 35 | 60 | 23.5 |

| | | |
|---|---|---|
| **Child age** | | |
| 0-12 | 88 | 34.5 |
| 13-36 | 103 | 40.4 |
| 37-60 | 64 | 25.1 |
| **Child birth status** | | |
| At term | 222 | 87.1 |
| Premature | 33 | 12.9 |
| **Mother status** | | |
| Single | 58 | 22.7 |
| Married | 153 | 60.0 |
| Widow/Separated | 44 | 17.3 |
| **Education** | | |
| No formal education | 54 | 21.2 |
| Primary | 101 | 39.6 |
| Secondary | 70 | 27.5 |
| University | 30 | 11.8 |
| **Wealth index** | | |
| Poor | 90 | 35.3 |
| Middle | 87 | 34.1 |
| Rich | 78 | 30.6 |
| **Religion** | | |
| Protestant | 135 | 52.9 |
| Catholic | 71 | 27.8 |
| Muslim | 27 | 10.6 |
| No religion | 22 | 8.6 |

Source: Primary data, 2022

As shown in Tables 4.1, the group of 21-35 years old among mothers dominated other groups with 41.2%. Also, children aged 13-36 months dominated other groups with 40.4%. The great majority of the children were born at term with 87.1% versus 12.9% of premature children. Most of mothers are married with their percentage equating 60%. The education level showed that the participants with primary school were majority with 39.6% followed by 27.5% of participants with secondary education. The little majority of the respondents are recorded in the category of poor people with 35.3% while those of middle class are 34.1% whereas the rich are 30.6%. The majority of the respondents were Protestants with 52.9% followed by Catholic members who were 27.8%

Findings showed that 51% knew the types of food, 55.3% were not able to give the examples of each type of food and 52.2% did not know the composition of a balanced diet. On the other hand, the knowledge level responses were ranked to the high level of knowledge and low level of knowledge. The high level or knowledge scored was composed of the mothers that obtained 3/3 while answering to the three questions while the low level was below 3/3as explained in FAO's guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (FAO, 2014).

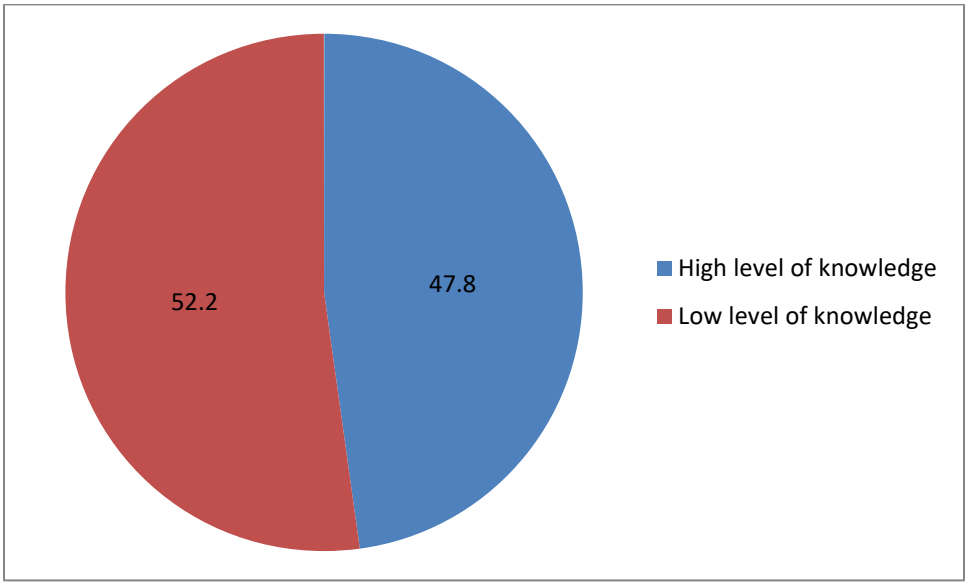


**Figure 4.1 Proportion of knowledge of mothers with under five years malnourished children**

**Table 4.3 Attitudes of mothers with under five years undernourished children in Kicukiro District, Rwanda**

| Variables | Frequency | Percentage |
|---|---|---|
| **In your community or religion, what foods are commonly forbidden to children?** | | |
| Some kinds of meat | 18 | 7.1 |
| Milk or fish | 12 | 4.7 |
| Other (Specify) | 8 | 3.1 |
| None | 217 | 85.1 |
| **Is it necessary to ensure the hygiene of the child every day?** | | |
| It is necessary | 128 | 50.2 |
| It is not necessary | 127 | 49.8 |
| **According to you, is it necessary to prepare a balanced food for the child every day?** | | |
| It is necessary | 144 | 56.5 |
| It is not necessary | 111 | 43.5 |

Source: Primary data, 2022

The findings of this study as depicted by Table 4.3 showed that 7.1% of the respondents followed food restrictions related to some kinds of meat due to their respective religion and communities, 4.7% followed food restrictions related to milk or fish and 3.1% are subjected to

other food restrictions. However, 85.1% had no food restrictions. Concerning the necessity to ensure the hygiene of the child every day, 50.2% found that it is necessary versus 49.8% who found it not to be necessary. Concerning the necessity to prepare balanced food for the child every day, 56.5% found it to be necessary while 43.5% found it not to be necessary.

On the other hand, the attitude level responses were ranked to the high level of attitude (Positive attitude) and low level of attitude (Negative attitude) as explained in FAO's guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (FAO, 2014).

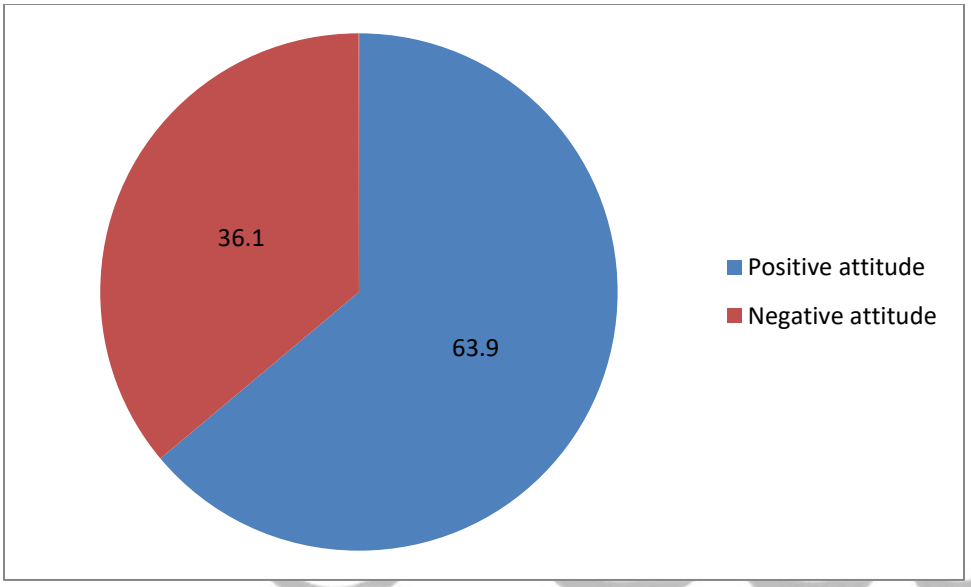


**Figure 4.2 Proportion of positive and negative attitudes of mothers with under five years undernourished children in Kicukiro District, Rwanda**

**Table 4.4 Practices of mothers with under five years malnourished children in Kicukiro District, Rwanda**

| Variables | Frequency | Percentage |
|---|---|---|
| **What kind of diet do you prepare for your child?** | | |
| Lean diet | 122 | 47.8 |
| Balanced | 133 | 52.2 |
| **Have you practiced exclusive breastfeeding until six months?** | | |
| Yes | 140 | 54.9 |
| No | 115 | 45.1 |
| **Do you respect the following hygiene measures before feeding your child: Washing hands with soap after toilet or after cleaning baby's bottom, food or environmental cleanliness, child hygiene, supervise the child when he eats?** | | |

| | | |
|---|---|---|
| Respect | 133 | 52.2 |
| Don't respect | 122 | 47.8 |
| **How many meals a day does your child get?** | | |
| 1 meal | 37 | 14.5 |
| 2 meals | 111 | 43.5 |
| 3 meals | 67 | 26.3 |
| 4 meals and more | 40 | 15.7 |

Source: Primary data, 2022

The findings of this study on objective three regarding the practices as shown in Table 4.4, demonstrated that 52.2% prepare a balanced diet for their children while 47.8% prepare a lean diet. Also, 54.9% practiced exclusive breastfeeding until six months while 45.1% did not do so. About 52.2% respected hygiene measures before feeding their child including washing hands with soap after toilet or other activities, food or environmental cleanliness, child hygiene, supervise the child when he/she eats. Finally, 26.3% and 15.7% gave their children three and four meals a day respectively.

The score for good practices on nutrition was 4/4. Those with scores below 4/4 were considered as having poor practices while those with 4/4 were considered as having good practices towards child nutrition as explained in FAO's guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (FAO, 2014).



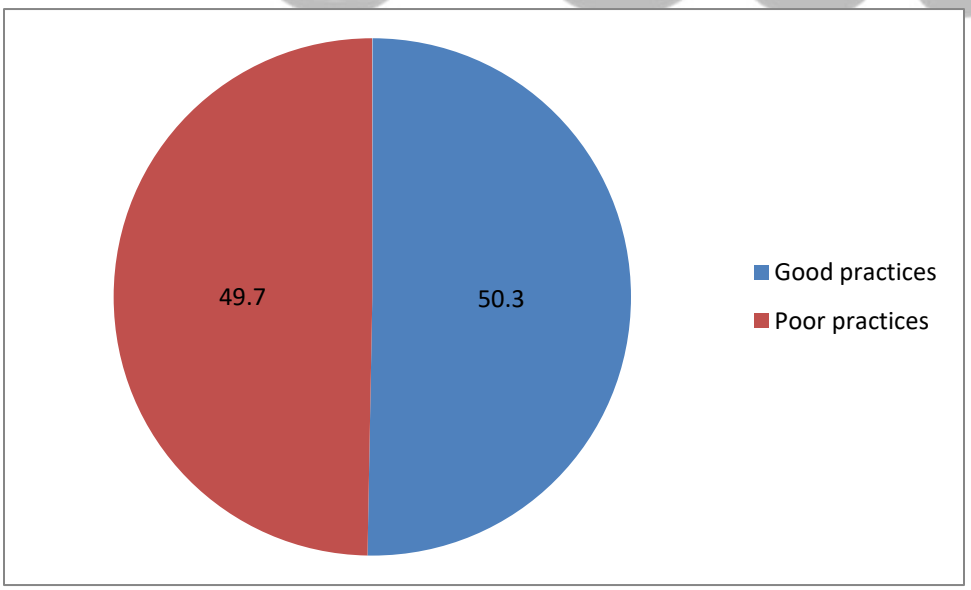


**Figure 4.3 Proportion of poor and good practices of mothers with under five years malnourished children in Kicukiro District, Rwanda**

**Table 4.1 Bivariate analysis of factors associated with good nutritional practices**

| Particulars | Nutritional practices | | Chi-square | Pearson's R | P-value |
|---|---|---|---|---|---|
| | Poor n(%) | Good n(%) | | | |
| **Age of the mother** | | | 14.274 | **0.88** | **0.006** |
| Under 21 | 66 (73.3) | 24 (26.7) | | | |
| 21-35 | 50 (47.6) | 55 (52.4) | | | |
| Over 35 | 31 (51.7) | 29 (48.3) | | | |
| **n=255** | | | | | |
| **Child age** | | | 2.007 | 0.04 | 0.367 |
| 0-12 | 53 (60.2) | 35 (39.8) | | | |
| 13-36 | 54 (52.4) | 49 (47.6) | | | |
| 37-60 | 40 (62.5) | 24 (37.5) | | | |
| **n=255** | | | | | |
| **Child birth status** | | | 0.149 | 0.02 | 0.699 |
| At term | 129 (58.1) | 93 (41.9) | | | |
| Premature | 18 (54.5 | 15 (45.5) | | | |
| **n=255** | | | | | |
| **Mother status** | | | 16.860 | **0.69** | **0.014** |
| Single | 45 (77.6) | 13 (22.4) | | | |
| Married | 73 (47.7) | 80 (52.3) | | | |
| Widow/Separated | 29 (65.9) | 15 (34.1) | | | |
| **n=255** | | | | | |
| **Education** | | | 21.643 | **0.91** | **0.003** |
| No formal education | 45 (83.3) | 9 (16.7) | | | |
| Primary | 57 (56.4) | 44 (43.6) | | | |
| Secondary | 33 (47.1) | 37 (52.9) | | | |
| University | 12 (40) | 18 (60) | | | |
| **n=255** | | | | | |
| **Ubudehe categories** | | | 20.151 | **0.95** | **0.001** |
| Poor | 68 (75.6) | 22 (24.4) | | | |
| Middle | 46 (52.9) | 41 (47.1) | | | |
| Rich | 33 (42.3) | 45 (57.7) | | | |
| **n=255** | | | | | |
| **Religion** | | | 11.129 | **0.74** | **0.011** |
| Protestant | 89 (65.9) | 46 (34.1) | | | |
| Catholic | 31 (43.7) | 40 (56.3) | | | |
| Muslim | 17 (63) | 10 (37) | | | |
| No religion | 10 (45.5) | 12 (54.5) | | | |
| **n=255** | | | | | |
| **Level of Knowledge** | | | 28.908 | **0.71** | **0.018** |
| Low level of knowledge | 95 (74.2) | 33 (25.8) | | | |
| High level of Knowledge | 52 (40.9) | 75 (59.1) | | | |
| **n=255** | | | | | |
| **Attitude** | | | 30.705 | **0.73** | **0.012** |
| Negative attitude | 91 (75.8) | 29 (24.2) | | | |

| | | |
|---|---|---|
| Positive attitude | 56 (41.5) | 79 (58.5) |
| **n=255** | | |

Source: Primary data, 2022

The findings of this study showed that the relationship of seven factors (age of the mother, mother status, education level, ubudehe category, religion, level of knowledge and attitude) towards nutritional practices, were statistically significant with $p<0.05$. The mother being aged under 21 years old presented a positive relationship with poor nutritional practices with 73.3%, $X^2=14.274$, $p<0.006$; Also, the mother being single presented a positive relationship with poor nutritional practices with 77.6%, $X^2=16.860$, $p<0.014$. The mother having not done any formal education presented a positive relationship with poor nutritional practices with 83.3%, $X^2=21.643$, $p<0.003$. Also, wealth index presented a positive relationship with nutritional practices with 75.6%, $X^2=20.151$, $p<0.001$; religion presented a positive relationship with nutritional practices with 65.9%, $X^2=11.129$, $p<0.011$; having a low level of knowledge on nutrition resented a positive relationship with poor nutritional practices with 74.2%, $X^2=28.908$, $p<0.018$. Having negative attitude on nutrition resented a positive relationship with the high level of having poor nutritional practices with 75.8%, $X^2=30.705$, $p<0.012$.



**Table 4.6 Multivariate analysis of factors associated with good nutritional practices**

| **Particulars** | **AOR** | **95% C.I** | | **P-value** |
|---|---|---|---|---|
| | | Lower | Upper | |
| **Age of the mother** | | | | |
| Under 21 | 0.389 | 0.195 | 0.774 | **0.007** |
| 21-35 | 1.176 | 0.623 | 2.219 | 0.617 |
| Over 35 | Ref. | | | |
| **n=255** | | | | |
| **Mother status** | | | | |
| Single | 0.559 | 0.232 | 1.343 | 0.193 |
| Married | 2.119 | 1.053 | 4.264 | **0.035** |
| Widow/Separated | Ref. | | | |
| **n=255** | | | | |
| **Education** | | | | |
| No formal education | 0.133 | 0.048 | 0.371 | **0.026** |
| Primary | 0.515 | 0.224 | 1.180 | 0.117 |
| Secondary | 0.747 | 0.314 | 1.781 | 0.511 |
| University | Ref. | | | |
| **n=255** | | | | |
| **Ubudehe category** | | | | |
| Poor | 0.237 | 0.123 | 0.458 | **0.004** |
| Middle | 0.654 | 0.353 | 1.210 | 0.176 |
| Rich | Ref. | | | |

| | | | | |
|---|---|---|---|---|
| **n=255** | | | | |
| **Religion** | | | | |
| Protestant | 0.431 | 0.173 | 1.072 | 0.070 |
| Catholic | 1.075 | 0.411 | 2.812 | 0.882 |
| Muslim | 0.490 | 0.156 | 1.543 | 0.223 |
| No religion | Ref. | | | |
| **n=255** | | | | |
| **Level of Knowledge** | | | | |
| Low level of knowledge | 0.241 | 0.142 | 0.410 | **0.017** |
| High level of Knowledge | Ref. | | | |
| **n=255** | | | | |
| **Attitude** | | | | |
| Negative attitude | 0.226 | 0.132 | 0.388 | **0.023** |
| Positive attitude | Ref. | | | |
| **n=255** | | | | |

Source: Primary data, 2022

The findings of this study as shown in Table 4.6, demonstrated that mothers aged under 21 years old were three-fold less likely to be associated with good nutritional practices compared to mature mothers with AOR 0.389 95% CI (0.195-0.774), p<0.007. Also, being married was twice more likely than being widow/separated associated to good nutritional practices with AOR 2.119 95% CI (1.053-4.264), p<=0.035. Having not done any formal education was 0.133 times more likely than having done tertiary education associated to good nutritional practices, AOR 1.133 95% CI (0.048-0.0.378), p<=0.026. Being poor was 0.237 times more likely than being rich associated to good nutritional practices, AOR 0.237 95% CI (0.123-0.458), p<=0.004. Having a low level of knowledge on child nutrition was 0.241 times more likely than having a high level of knowledge associated to good nutritional practices, AOR 0.241 95% CI (0.142-0.410), p<=0.017. Having negative attitude was 0.226 times more likely than having positive attitude associated to good nutritional practices, AOR 0.226 95% CI (0.132-0.388), p<=0.023.

### 4.2.5 Findings for qualitative data

The respondents were asked a question to obtain insight on how they consider the level of knowledge of mothers in matters related to nutrition in Kicukiro District. The results revealed that the level of that kind of knowledge among mothers whose children are malnourished is low. A community health worker in Kigarama Sector told the researcher that:

"*The level of knowledge of moms is really low because it is difficult to meet someone who is capable of the types of food or the composition of a balanced meal. They confuse everything*" (Community health worker).

When they were asked to say if mothers in Kicukiro District have sufficient knowledge on exclusive breastfeeding advantages, one head of a health center said:

"*Exclusive breastfeeding up to six months is an imperative from both the WHO and the Ministry of Health here in Rwanda. However, some mothers are unaware of the importance of strictly applying this directive, which is designed for their good. The level of knowledge of mothers about exclusive breastfeeding is low"* (Head of a health center).

Concerning the attitude of mothers on nutrition of their children, the interviewees were asked what attitudes are incompatible with the composition of the meals that mothers are advised to prepare at the nutritional center. A lot of the people who participated to the study told the researcher that:

"*A lot of mothers do not think that it is necessary to ensure the hygiene of the child every day or to prepare a balanced food for the child every day. Some of them respect hygiene measures once and other times they forget to think that it is necessary to apply them. Also, sometimes mothers prepare a balanced diet for their children and other times they forget to think that they are obliged to prepare such diet every time*" (A community health worker and a head of a health center).

This means that some of the mothers have a negative attitude concerning the composition of meals they are asked to prepare for their children.

Concerning practices of mothers on nutrition of their children, the interviewees were asked to say what kind of diet is commonly prepared by mothers. A community health worker told the researcher that:

"*Some of mothers prepare balanced diets for their children while others do not do so. When they gather the food, they are going to use to prepare the meal, they do not pay attention to whether the meal is complete, but rather to the food that is available*" (A community health worker).

However, the practices of the mothers concerning the practice of exclusive breastfeeding until six months are relatively positive. On this question, the Director of health told the researcher that: "*Mothers breastfeed exclusively until six months in general, but some of them start giving a support meal to their children before that period. It can be estimated that they practice exclusive breastfeeding at 75%*" (Director of health).

Concerning the factors influencing under nutrition among children, one head of a health center told the researcher that:

"*The absence of financial means of buying the needed meals is the main factor which influence undernutrition in Kicukiro District, especially for households that are recorded as poor in the national classification known as Ubudehe*" (A head of a health center).

On this issue a community health worker added that:

*"A good number of mothers are very busy all-day long and have no sufficient time to gather everything needed in the preparation of a balanced diet for their children. That is why some of them have undernourished children whereas they are not poor*" (A community health worker).

**4.2 Discussion**

This study findings on level of knowledge revealed that 51% knew the types of food, 55.3% were not able to give the examples of each type of food and 52.2% did not know the composition of a balanced diet. This knowledge results were frankly reported as higher in comparison with the study carried out by Kirere in 2017 in DRC. The possible explanation might be the fact that the present study concerned only mothers living in urban area while the one conducted in DRC concerned those living in rural areas.

The findings on attitudes on nutrition among mothers of children under five years with undernutrition in Kicukiro District of Rwanda showed that 7.1% of the respondents followed food restriction related to some kinds of meat due to their respective religion and communities, 4.7% followed food restriction related to milk or fish and 3.1% are subjected to other food restrictions. The level of positive attitude found in the present study is lower compared to the one found in Bangladesh. Certainly, Giashuddin et al. in 2019 found that 67.3% of mothers with undernourished children had positive attitude towards nutrition of their children. The reason for this variation may be due to the difference of cultural beliefs and socioeconomic status between the population in Rwanda and the population in Bangladesh.

The findings on the practices on nutrition among mothers of children under five years with undernutrition in Kicukiro District of Rwanda showed that 52.2% prepared a balanced diet for their children while 47.8% prepared a lean diet. Compared to other studies, the level of good practices is lower compared to the level of good practices found by Hagan in 2018. According to this author, 66% of his respondents had good nutritional practices regarding breastfeeding, the timing of weaning, the introduction of complementary foods and the way of stimulating the child (Hagan, 2018). This may be because the nutritional practices of African countries are different from those observed in western countries.

Concerning the factors influencing nutrition practices among mothers of children under five years with undernutrition in Kicukiro District of Rwanda, bivariate and multivariate analyses showed different factors associated to poor or good nutritional practices. Coherently, similar results were found in a study done by Sebastian Vollmer et al. in 2014. According to them, a lot

of factors contribute to the high prevalence of undernutrition among children: these are poor practices of breastfeeding and complementary feeding and especially dietary habits. In his study, it was found that 17.4% of mothers breastfeed up to 6 months and that there is a lack of specific food for children from 6 to 24 months and 45% prepared balanced food for their children. The leading factor of the low percentage of breastfeeding exclusively until six months and the failure to prepare a balanced food is illiteracy as he found that having done tertiary education was four times associated with the preparation of balanced food and twice associated to exclusive breastfeeding with respectively AOR=4.12 and AOR=2.04. The justification for this discrepancy might be because their study was done in 36 different countries with different culture and beliefs in matters related to child nutrition.

## 6. Conclusion

In conclusion, this study has revealed that more than half of the respondents possessed low level of knowledge, positive attitude and good practices towards child nutrition. The high level of knowledge and positive attitude were highly associated to good nutritional practices among mothers of children under five years with undernutrition in Kicukiro District of Rwanda.



## 7. Recommendations

At the end of this study, the researcher recommends the following:

-To reinforce the functioning of nutritional centers because it was found that most of mothers whose children are undernourished have no sufficient information on the types of food and the composition of a balanced diet.

-To organize outreach campaign at the community level to educate mothers more on the effects and prevention of malnutrition in children 0-5 years as it was found that the level of knowledge of the mothers on nutrition is low.

-To organize a district based-nutritional health promotion and inclusion of strengthened program in special activities for community outreach.

-To put into practices the advices received in the domain of nutrition of children with emphasis on preparation of a balanced diet and exclusive breast feeding from 0-6 months of a child.

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