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# Assessment of infant feeding knowledge among mothers in the cabinda integrated

## Evaluación del conocimiento sobre alimentación infantil de madres del proyecto integrado de Cabinda

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**ABSTRACT**

Mothers' nutritional knowledge plays a critical role in the fight against childhood malnutrition, particularly regarding infant feeding practices. Inadequate knowledge is linked to high neonatal mortality rates. Conversely, mothers with better knowledge can contribute to improved feeding practices, potentially reducing the prevalence of this disease and its negative consequences. This study aimed to assess the level of nutritional knowledge among mothers participating in the Cabinda Integrated Project. Employing a cross-sectional quantitative design, the study enrolled 372 mothers of children under five during a four-month period (January-April 2023). A probability sampling technique with a Raosoft sample size calculator ensured representativeness. Data collection utilized two questionnaires: the Sociodemographic Variables Questionnaire and the Questionnaire for Evaluating Parents' Knowledge on Infant Complementary Feeding. Chi-square tests ($p < 0.05$) analyzed relationships between variables. Analysis revealed that a majority (51.34%) of mothers demonstrated adequate nutritional knowledge. Interestingly, a statistically significant disparity emerged between income, area of residence, and knowledge. Mothers from lower socioeconomic backgrounds displayed higher knowledge (60.87%) compared to those with income ($p = 0.0001$). Similarly, mothers in rural areas (75.80%) exhibited superior knowledge compared to urban counterparts (33.49%) ($p = 0.000$). Notably, no significant association was found between nutritional knowledge and educational attainment or age. The study concludes that nearly half of the mothers possess adequate nutritional knowledge. However, income and area of residence appear to have a stronger influence than education or age. This suggests that solely focusing on education and age may be insufficient to improve mothers' nutritional knowledge.

**Palabras clave:**
Proyecto Integrado de Cabinda, desnutrición infantil, prácticas de alimentación infantil, mortalidad

**RESUMEN**

El conocimiento nutricional de las madres desempeña un papel fundamental en la lucha contra la desnutrición infantil, especialmente en lo que respecta a las prácticas de alimentación de los bebés. La falta de conocimiento está asociada a altas tasas de mortalidad neonatal. Por otro lado, las madres con mayor conocimiento pueden contribuir a mejorar las prácticas alimentarias, reduciendo potencialmente la prevalencia de

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| neonatal, conocimiento nutricional, madres. | esta enfermedad y sus consecuencias negativas. Este estudio tuvo como objetivo evaluar el nivel de conocimiento nutricional entre las madres participantes del Proyecto Integrado de Cabinda. Utilizando un diseño transversal cuantitativo, el estudio involucró a 372 madres de niños menores de cinco años durante un período de cuatro meses (enero a abril de 2023). Una técnica de muestreo probabilístico con una calculadora de tamaño muestral Raosoft garantizó la representatividad. La recolección de datos utilizó dos cuestionarios: el Cuestionario de Variables Sociodemográficas y el Cuestionario de Evaluación del Conocimiento de los Padres sobre Alimentación Complementaria Infantil. Las pruebas de chi-cuadrado ($p < 0,05$) analizaron las relaciones entre las variables. El análisis reveló que la mayoría (51,34%) de las madres demostró un conocimiento nutricional adecuado. Curiosamente, surgió una disparidad estadísticamente significativa entre los ingresos, el área de residencia y el conocimiento. Las madres de origen socioeconómico más bajo demostraron un mayor conocimiento (60,87%) en comparación con las madres de mayor ingreso ($p = 0,0001$). De la misma manera, las madres en áreas rurales (75,80%) demostraron un conocimiento superior en comparación con las madres urbanas (33,49%) ($p = 0,0001$). Cabe destacar que no se encontró ninguna asociación significativa entre el conocimiento nutricional y el nivel educativo o la edad. El estudio concluye que casi la mitad de las madres posee un conocimiento nutricional adecuado. Sin embargo, los ingresos y el área de residencia parecen tener una influencia más fuerte que la escolaridad o la edad. Esto sugiere que enfocarse solo en la escolaridad y la edad puede ser insuficiente para mejorar el conocimiento nutricional de las madres. |

## Introduction

The early years of life are a critical window for shaping a child's overall well-being. From the moment they enter the world, children absorb information and behav-iors from their environment, particularly their mothers. Mothers play a central role in nurturing and caring for their children, especially when it comes to nutrition. The foods a child is introduced to early on establish patterns that can influence their health for life.

Equipping mothers with a strong understanding of infant and young child nutrition empowers them to make informed dietary decisions. Studies have shown that mothers with a good grasp of nutrition can significantly reduce the risk of childhood illnesses like malnutrition, anemia, and stunted growth. Conversely, inadequate knowledge can have detrimental consequences.

The benefits of well-informed maternal dietary practices are far-reaching. Studies, such as the one conducted by (1) have shown that mothers with a strong understanding of nutrition can significantly reduce the risk of a multitude of childhood health challenges in their children. These challenges include malnutrition (a condition where a child doesn't get enough nutrients to be healthy), anemia (a deficiency in red blood cells that can cause fatigue), stunted growth (where a child's height or weight is lower than expected for their age), common childhood illnesses, and even premature death.

Unfortunately, these very issues – malnutrition, anemia, stunted growth, and preventable childhood illnesses – are prevalent not only in Angola but also throughout the world. This underscores the critical need to invest in programs that empower mothers with the knowledge and tools they need to nourish their children and build a foundation for a healthier future. By focusing on Cabinda Province, Angola, we can begin to make a real difference in the lives of mothers and their children, paving the way for a generation where all children have the opportunity to thrive.

According to a study by (2) and published in The Lancet, the global prevalence of severe acute malnutrition (SAM) in children under five reached an alarming 14.3 mil-lion in 2019. This concerning finding highlights the magnitude of SAM as a global public health problem with serious consequences for child morbidity and mortality. In Angola, the situation is particularly alarming, with a staggering 38% of children under five experiencing chronic malnutrition (3).

Another study emphasizes the urgency of intervention, warning that without immediate action, 56 million children under five could perish by 2030 globally (4).

Multiple factors contribute to the rise of malnutrition in its various forms. Poverty, dis-eases, natural disasters, and limitations in food accessibility all play a role (5). Addition-ally, work, school, and neighborhood environments can influence dietary choices (5).

Beyond the immediate threats of child morbidity and mortality, the world faces a growing burden of chronic non-communicable diseases (NCDs) such as cancer, diabetes, cardiovascular diseases, chronic respiratory conditions, injuries, and mental health conditions (6). These diseases often manifest in adulthood, but a growing body of research suggests that poor dietary habits, behaviors, and cultural practices established during childhood and adolescence may lay the foundation for these problems (6). Notably, NCDs account for approximately 74% of all deaths globally, with a disproportionate impact on individuals in poorer countries (6).

To the best of our knowledge, this is the first comprehensive investigation of its kind in Cabinda. The findings of this research will be instrumental in empowering the nutrition specialists at World Vision Angola, who are responsible for implementing the Cabinda Integrated Project. This knowledge will equip them with a deeper understand-

ing of the nutritional knowledge and dietary habits of mothers participating in the project. In turn, this understanding can inform the development and implementation of targeted interventions to improve child health outcomes in Cabinda.

This study aimed to assess the nutritional knowledge of mothers participating in the Cabinda Integrated Project.

## Methods

### *Research Design*

This is a non-experimental, descriptive cross-sectional study with a quantitative approach, conducted on a probabilistic sample of mothers from the Cabinda Integrated Project.

### *Population and Sample*

From June 6, 2022, to March 2023, the Cabinda Integrated Project (CIP) served 11,077 mothers of the 35,778 children tracked throughout the province, representing the study universe.

A sample of 372 mothers of both malnourished and healthy children who agreed to provide verbal informed consent and permission to use their data was selected. Other caregivers and mothers who did not agree to provide informed consent were excluded.

To determine the sample size, the Raosoft sample calculator (7,8) was used. For this purpose, the adopted confidence level was 95%, the margin of error and response distribution were 5% and 50%, respectively.

### *Variables*

In light of the problem presented and the objectives to be achieved in this research, the independent and dependent variables were measured. In this case, sociodemographic information constituted the independent variables: age, education, marital status, occupation, place of residence (urban and rural), religion and family income. On the other hand, the dependent variables were constituted by: mothers' knowledge of complementary feeding introduction, knowledge about types of complementary foods anda feeding method.

### *Measurement Instruments and Techniques*

The Questionnaire for Evaluating Parents' Knowledge on Infant Complementary Feeding (QPAC) consists of 35 closed-ended questions grouped into 3 domains (complementary feeding introduction, types of complementary foods, and feeding method).

This questionnaire has been previously tested in other research to study parental knowledge about infant feeding (9).

A score of 1 (one) was assigned to each of the 35 questions for correct answers and 0 (zero) for incorrectly answered questions. Mothers' knowledge was classified into 4 categories adapted locally and based on the total percentage of correct answers: insufficient<30%, reasonable (≥30 and <50%), good (≥50 to <70%), very good (≥70 to 100%).

Sociodemographic data were collected using a sociodemographic variables questionnaire (Q-SV) indicated by (10). Only caregiver variables (age, education, marital sta-

tus, occupation, place of residence (urban and rural), religion, and family income) were used in this questionnaire.

### *Procedures*

Data collection took place between January and March 2023, through face-to-face interviews conducted at the homes of participants from urban and rural areas of all municipalities in Cabinda Province (Cabinda, Cacongo, Buco-Zau, and Belize), mainly in areas where the Cabinda Integrated Project (CIP) is being implemented. All women with children under five years of age were invited to participate in the research, but only mothers who agreed to provide informed consent and permission to use their data were included.

The data collection process was carried out by Community Development and Health Agents trained for this purpose and by the main researcher. In addition to participating in data collection, the main researcher coordinated and supervised the entire data collection process.

Six main steps were necessary to carry out this research. Initially, the main researcher sought to identify data collection tools that would allow assessing mothers' nutritional knowledge about infant feeding, which were subsequently approved by the research supervisor.

Next, the main researcher built the questionnaires in Kobotoolbox.

The third step involved requesting research authorization from World Vision Angola. This step culminated in the approval of data collection by the Ethics Committee of the Universidad Europea del Atlántico, as recorded in minute number CE-118.

After this process, the main researcher requested 10 of the 100 Community Development and Health Agents from the Cabinda Integrated Project to participate in data collection from World Vision Angola.

The questionnaires were sent to the KoBoCollect on the smartphones (Android) of the Community Development and Health Agents in the fifth step, after the main researcher had trained the agents on the research objectives, goals, questionnaire elements, and how to use KoBoCollect.

All questionnaire questions were explained clearly to all participants. Even so, whenever a mother did not understand the question, the interviewers provided guid-ance and explanations in a simpler way, both in the local language and in Portuguese.

60 minutes were set aside for the interview, but in practice, the conversations lasted between 30 and 40 minutes. The completed questions were sent to Kobotoolbox daily to facilitate the supervision.

The final step was the preparation of a report, statistical analysis, and data processing by the main researcher with the assistance of the supervisor.

### *Data Analysis*

The data was collected using KoboToolbox software and analyzed using the Statistical Package for the Social Sciences (SPSS) version 29.01.0(171). The chi-square test was used to determine the relationship between nutritional knowledge and the independent variables (age, area of residence, education, and monthly income). The statistical significance level was $P<0.05$.

## Results

A sample of 372 mothers from the Cabinda Integrated Project was selected to participate in the study. Sociodemographic data analysis revealed that the majority of mothers, 152 (40.86%), were between the ages of 25 and 34, followed by 103 (27.69%) between 18 and 24 years old, 79 (21.24%) between 35 and 45 years old, 28 (7.53%) between 16 and 17 years old, 8 (2.15%) over 45 years old, and 2 (0.54%) under 15 years old, as shown in Figure 1.

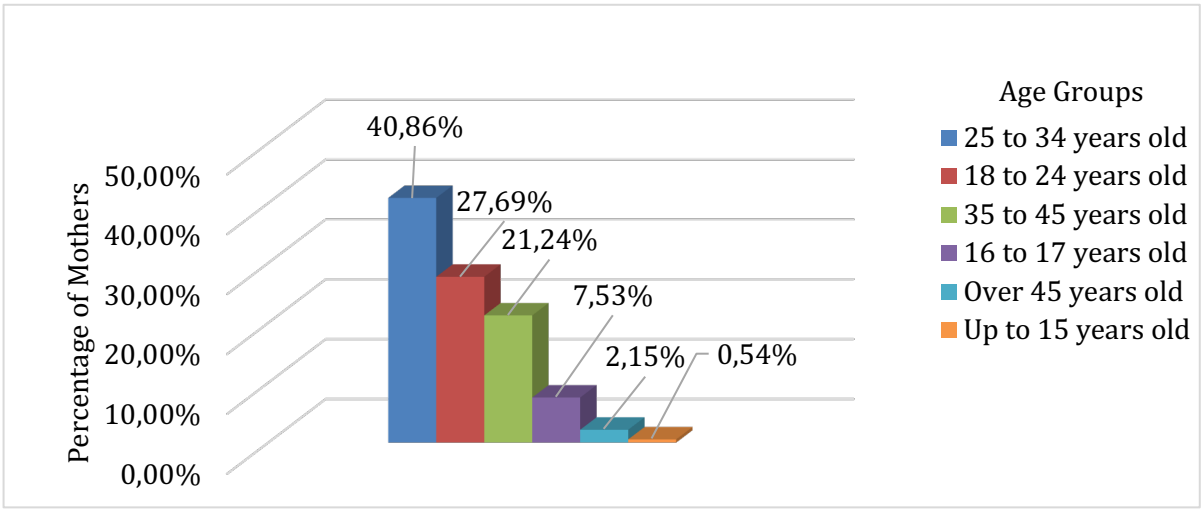


**Figure 1.** Distribution of Cabinda Integrated Project Mothers by Age Group, 2023

*Area of Residence*

Regarding the area of residence, Figure 2 shows that 215 (57.80%) of the mothers resided in urban areas, while 157 (42.20%) resided in rural areas.

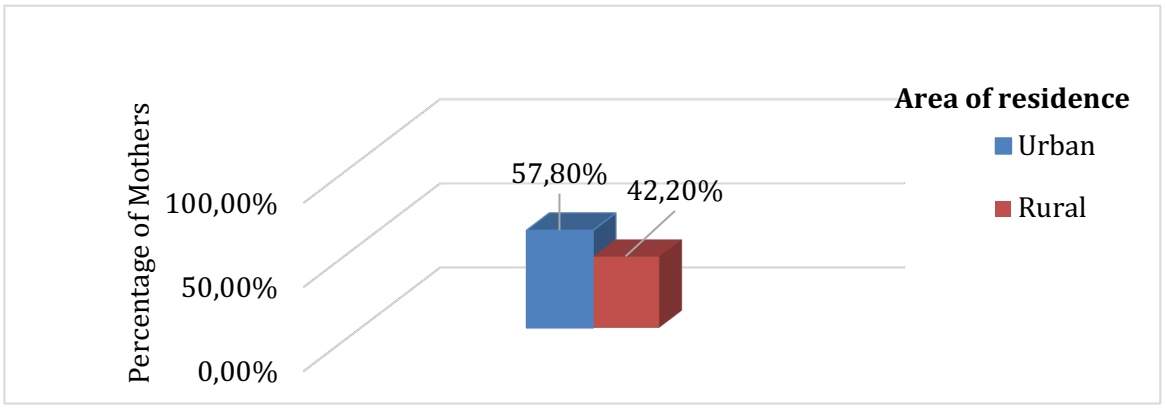


**Figure 2.** Distribution of Cabinda Integrated Project Mothers by Area of Residence, 2023

*Analysis of Marital Status*

Figure 3 illustrates the marital status distribution of the participating mothers. The ma-jority of the participants identified as single, accounting for 207 (55.65%) of the

sample. This was followed by those in stable unions (148 or 39.78%), married individuals (9 or 2.42%), and divorced mothers (2.15%).

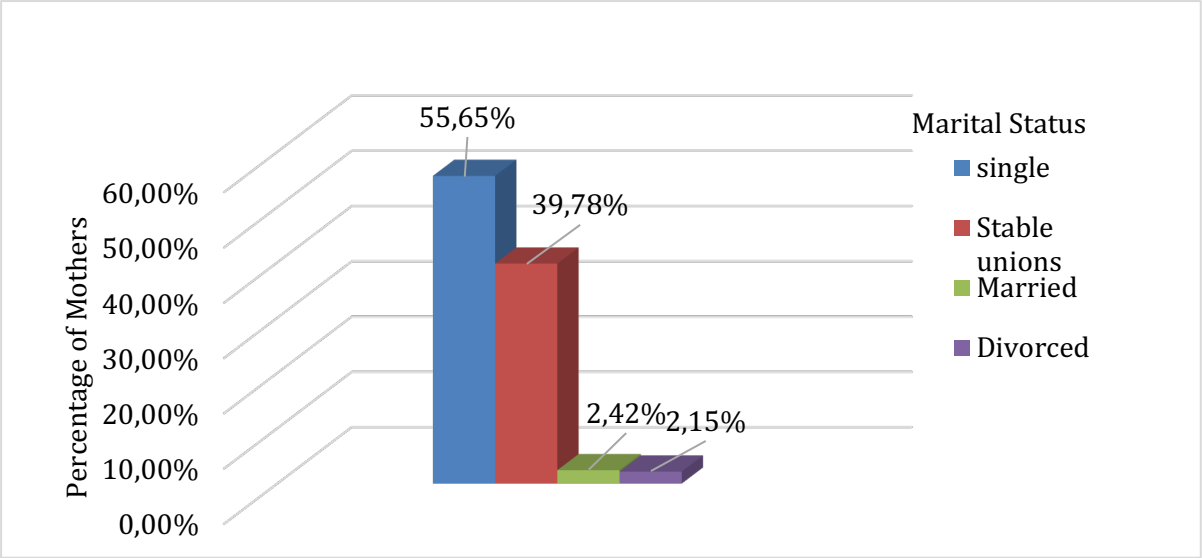


**Figure 3.** Distribution of Marital Status among Mothers in the Cabinda Integrated Project, 2023.

### *Religious Affiliation*

Figure 4 presents the religious affiliations of the participating mothers. The majority of the participants identified as Catholic, accounting for 194 (52.15%) of the sample. This was followed by those belonging to evangelical churches (110 or 29.57%), Pentecostal churches (25 or 6.72%), the Kimbanguist Church (17 or 4.57%), other denominations (16 or 4.30%), the New Apostolic Church (6 or 1.61%), and the Tocoísta Church (4 or 1.08%).

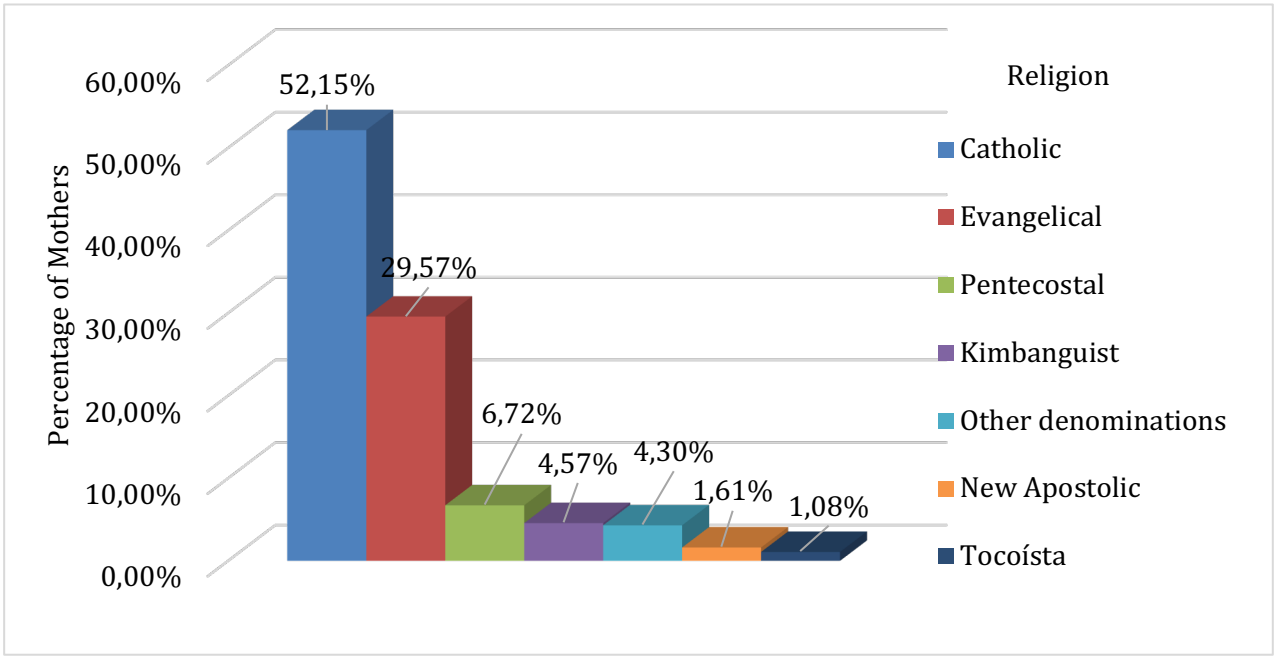

**Figure 4.** Distribution of Religions among Mothers in the Cabinda Integrated Project, 2023.

### *Occupational Analysis*

Figure 5 presents the occupational distribution of the participating mothers. The data reveals that a significant portion of the mothers were unemployed, accounting for 97 (26.08%) of the sample. This was followed by those who identified as students (92 or 24.73%), those engaged in informal work (72 or 19.35%), employed individuals (67 or 18.01%), public servants (26 or 6.99%), interns (2 or 0.54%), an entrepreneur (1 or 0.27%), and a self-employed individual (1 or 0.27%).

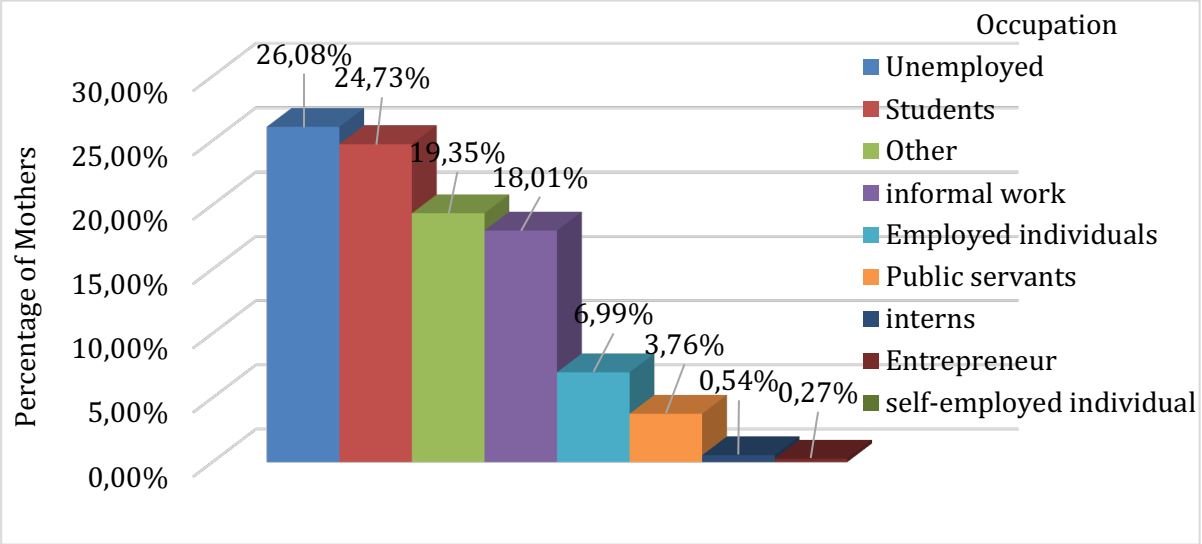


**Figure 5.** Occupational Distribution of Mothers in the Cabinda Integrated Project, 2023

### *Educational Analysis*

Figure 6 presents the educational attainment distribution of the participating mothers. The data reveals that a significant portion of the mothers had completed incomplete secondary education, accounting for 79 (21.24%) of the sample.

This was followed by those with completed secondary education (68 or 18.28%), completed lower secondary education (grades 7-9) (53 or 14.25%), no formal education (51 or 13.71%), completed primary education (35 or 9.41%), incomplete lower secondary education (grades 7-9) (33 or 8.87%), incomplete primary education (31 or 8.33%), incomplete higher education (10 or 2.69%), completed higher education (9 or 2.42%), and those who had only completed literacy education (3 or 0.81%).

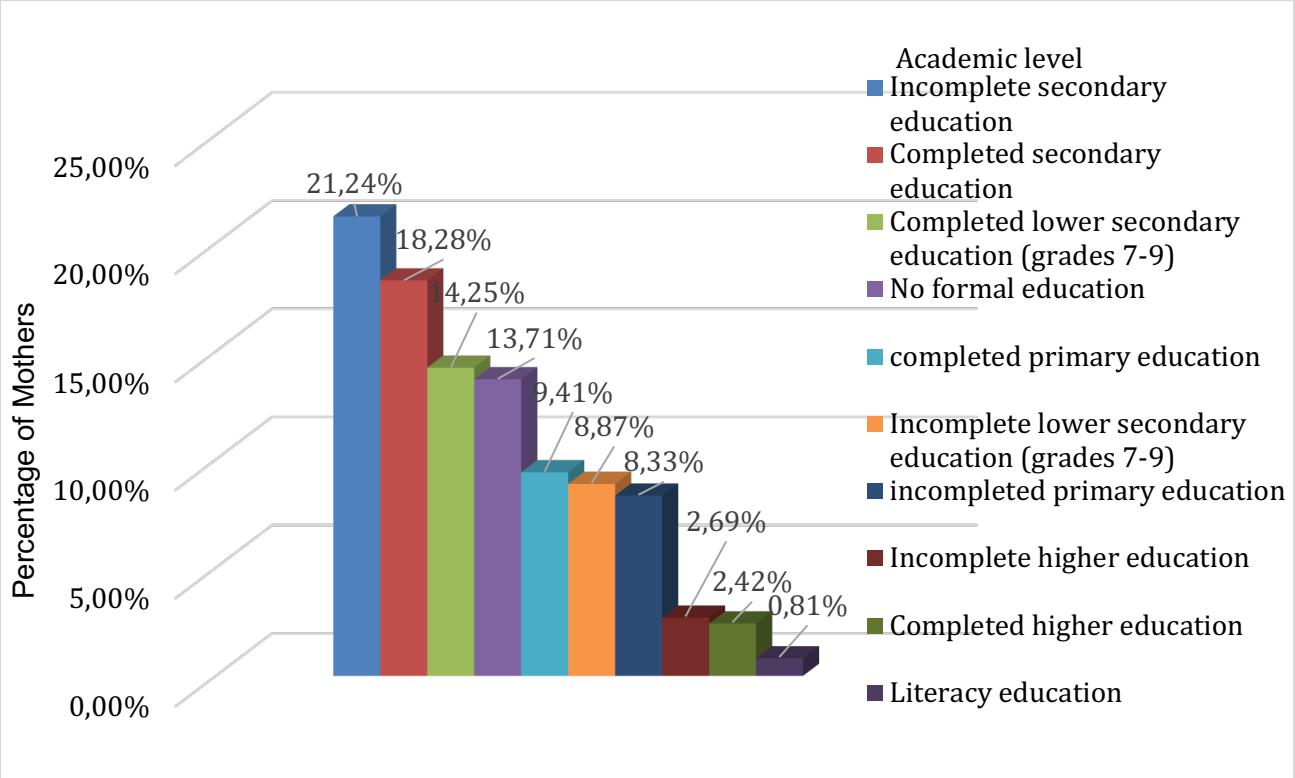


**Figure 6.** Distribution of Educational Attainment among Mothers in the Cabinda Integrated Pro-ject, 2023

### *Income Analysis*

Figure 7 presents the distribution of monthly income among the participating mothers. The general trend of the data is that the majority of mothers (30.91%) earn between 10,000 and 70,000 Kwanzas per month. This is followed by mothers earning between 100,001 and 150,000 Kwanzas (28.76%). A significant portion of mothers (12.37%) reported no monthly income.

Additionally, 24 (6.45%) mothers earned between 200,001.00 and 300,000.00 Kwanza, while a smaller group of 4 (1.08%) earned more than or equal to 500,001.00 Kwanza. Another 4 (1.08%) mothers reported earning between 300,001.00 and 500,000.00 Kwanza.

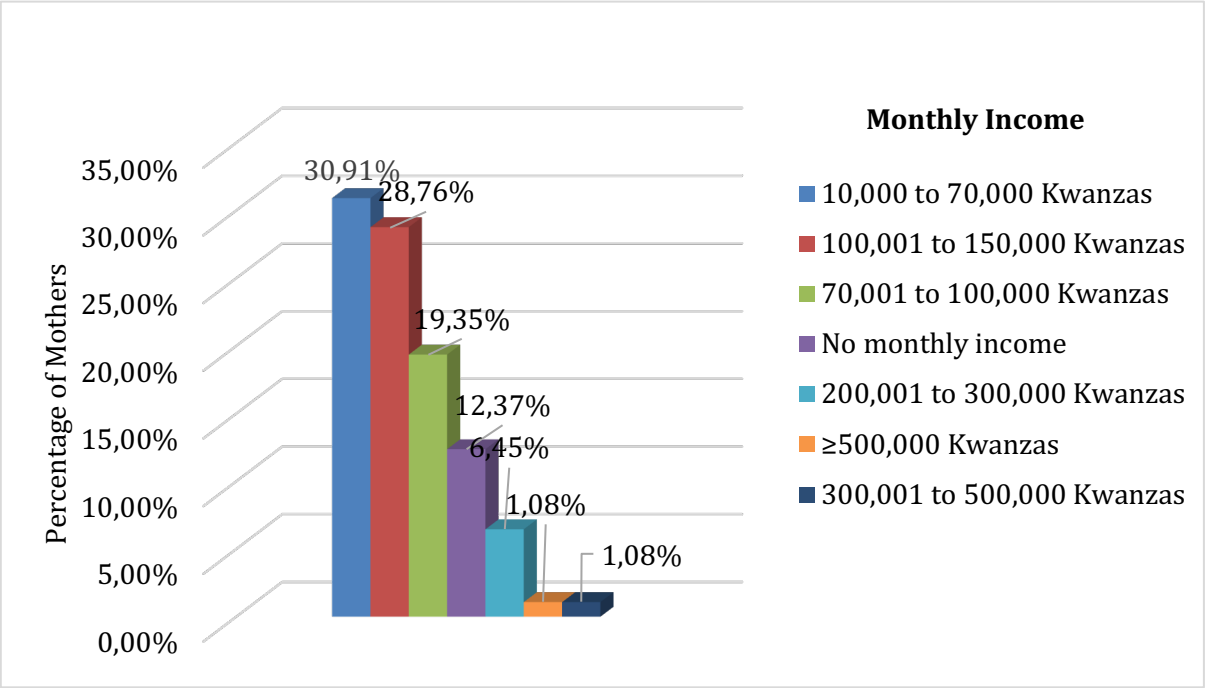


**Figure 7.** Distribution of Monthly Income among Mothers in the Cabinda Integrated Project, 2023

### *Knowledge of Mothers Regarding Infant Nutrition and Feeding Practices*

The findings presented in Table 1 indicate the accuracy rates achieved by the mothers who participated in this assessment. The table reveals that the mothers' knowledge is varied. In this case, the mothers demonstrated high levels of accuracy in three questions:

Question 27: When preparing a child's plate, it is essential to present the food items separately so that the child can recognize different flavors and textures. 98.12% of the sample achieved the highest level of nutritional knowledge in this question.

Question 24: Cow's milk, whether powdered or liquid, should not be offered to children under one year of age as it can cause anemia. 93.55% of respondents demonstrated ac-curate knowledge in this question.

Question 8: Efforts should be made to feed children with locally available, healthy, and easily accessible and prepared foods. The accuracy score for this question was 92.47%.

Another significant finding of this study is the above-average level of unaware-ness displayed by a large proportion of these mothers in many of the questions. For in-stance, 67.20% of the mothers do not believe that exclusive breastfeeding (EBF) should be offered to a child from birth until six months of age.

Regarding the establishment of mealtimes for infants: 91.13% of the mothers emphasized the importance of setting specific times for offering meals to children.

Regarding food preparation methods: 91.13% of the mothers evaluated demon-strated that the finer the soup or porridge, the better the absorption of vitamins for the child.

Regarding food portion sizes: 91.13% of the mothers stated that food should be offered in pieces to babies from 8 months of age onwards, without regard to the size of the pieces.

Regarding feeding methods: 88.98% of the mothers believe that if a child refuses to eat, they should be motivated in some way (reward or punishment) to finish the meal.

Regarding food preparation: 72.04% of the participants were unaware that be-fore starting to prepare food, they should soak it in clean water mixed with bleach or hypochlorite and then rinse it with water only.

Regarding hygiene practices: 93.82% of the mothers agreed that it is not neces-sary to wash the child's hands before meals, as they will not be the ones handling the food.

Regarding food variety: 81.72% of the mothers believe that the food prepared for a child's meal should be used throughout the day to prepare their other meals.

**Table 1.** Knowledge of Mothers Regarding Infant Nutrition and Feeding Practices.

| Nº | Questions | Hits | % |
|---|---|---|---|
| 1 | Exclusive Breastfeeding (EB) is recommended for infants from birth to 6 months of age. After 6 months, breastfeeding should continue along with complementary foods until the child is two years old or older. | 122 | 32,80% |
| 2 | Continue breastfeeding your child alongside complementary foods until they are two years old or older | 224 | 60,22% |
| 3 | At 6 months of age, introduce other liquids (such as water and tea) and solid foods in addition to breast milk | 321 | 86,29% |
| 4 | Set regular mealtimes for your child when introducing complementary foods | 33 | 8,87% |
| 5 | Give cow's milk (powdered or liquid) only after one (1) year of the child's life | 124 | 33,33% |
| 6 | Meat contains less iron than vegetables | 127 | 34,14% |
| 7 | At 6 months, avoid giving your child iron-rich foods like meat, vegetables, and greens | 114 | 30,65% |
| 8 | Feed your child healthy foods that are readily available and easy to prepare in your area | 344 | 92,47% |
| 9 | Introduce fruits and vegetables into your child's diet during the first year of life | 241 | 64,78% |
| 10 | Provide foods with low amounts of sugar and salt or without these ingredients altogether | 232 | 62,37% |
| 11 | Even if your child shows signs of hunger, avoid offering snacks (such as plain fruits or crackers) between meals | 209 | 56,18% |
| 12 | Exclude sugar, coffee, canned foods, fried foods, sodas, candies, snacks, sweets, excess salt, and ready-to-eat foods (instant noodles, bouillon cubes) from your child's diet | 236 | 63,44% |
| 13 | Do not give breast milk if the child is sick, because it no longer has the vitamins that the child needs | 293 | 78,76% |
| 14 | In order for the child to accept a food offered for the first time, a single presentation to the food is required | 216 | 58,06% |
| 15 | During complementary feeding, ensure your child's diet includes at least four food groups: grains, tubers, vegetables, legumes/meat | 270 | 72,58% |
| 16 | Always mix food before feeding the child | 99 | 26,61% |
| 17 | The purees prepared for the baby should be thick enough to stay on the spoon even after turning it over | 212 | 56,99% |
| 18 | Purchased ready-to-eat foods (soups, juices) are not recommended for babies | 228 | 61,29% |
| 19 | The thinner the soup or porridge, the better the use of vitamins for the child | 33 | 8,87% |

| | | | |
|---|---|---|---|
| 20 | From the age of six months, the food offered to babies should only be kneaded, never blended or strained | 284 | 76,34% |
| 21 | We should offer food in pieces to the baby from 8 months of age without caring about the size of the pieces | 33 | 8,87% |
| 22 | At the age of 1, the child should eat the same meal as the family, as long as the food is low in fat and salt, respecting the needs of the child | 284 | 76,34% |
| 23 | Cow's milk (powder or liquid) should not be offered to children under 1 year of age, as it can cause anemia | 112 | 30,11% |
| 24 | From the age of six months, the child should receive supplementation of vitamins A, C, D and iron | 348 | 93,55% |
| 25 | When feeding the baby, show patience and respect when the child is satisfied | 173 | 46,51% |
| 26 | If the child refuses to eat, motivate him in some way (reward or punishment) to finish the meal | 41 | 11,02% |
| 27 | When assembling the child's plate, it is essential that the food is presented separately, so that the child can recognize the different flavors and consistencies | 365 | 98,12% |
| 28 | It is not necessary to encourage the child to eat alone | 271 | 72,85% |
| 29 | It is important that food in the first months of food introduction is prepared exclusively for the child | 202 | 54,30% |
| 30 | Before starting to prepare food, soak it in clean water mixed with bleach or hypochlorite and rinse it afterwards with water only | 104 | 27,96% |
| 31 | You don't need to wash your child's hands before the meal, as they won't be the same one who picks up the food | 23 | 6,18% |
| 32 | The food prepared for the child's meal should be used throughout the day for the preparation of his other meals | 68 | 18,28% |
| 33 | From the beginning of the introduction of new foods encourage and offer the food to the child using a cup, plate and cutlery | 51 | 13,71% |
| 34 | The bottle should be used to offer liquids to the child | 262 | 70,43% |
| 35 | Objects to prepare the child's food must be well washed, dried and stored in a cool place, covered or covered in a larger container, free from contact with insects and other objects of use by all, and their use is exclusive to the child | 309 | 83,06% |

### *Nutritional Knowledge of Mothers in the Cabinda Integrated Project*

An assessment of the overall nutritional knowledge of mothers participating in the Cabinda Integrated Project revealed that slightly over half (51.34%) demonstrated good knowledge, while 46.24% exhibited moderate knowledge. A small percentage (1.34%) had insufficient knowledge and only 1.08% showed very good knowledge, as shown in Table 2.

**Table 2.** Level of General Nutritional Knowledge on Infant Feeding among Mothers in the Ca-binda Integrated Project, 2023.

| **Level of Knowledge** | | | | |
|---|---|---|---|---|
| Total | Insufficient | Moderate | Good | Very Good |

| N | % | *N* | % | N | % | N | % | N | % |
|---|---|---|---|---|---|---|---|---|---|
| 372 | 100% | 5 | 1,34% | 172 | 46,24% | 191 | 51,34% | 4 | 1,08% |
| **372** | **100%** | **5** | **1,34%** | **172** | **46,24%** | **191** | **51,34%** | **4** | **1,08%** |

*Relationship between Participants' Nutritional Knowledge and Age*

While the data presented in Table 3 suggests no statistically significant correlation between participants' nutritional knowledge and their age (p = 0.497), a closer examination reveals a more nuanced picture.

Interestingly, within the youngest age group (mothers 15 or younger), a balanced distribution of knowledge was observed. Half of the mothers demonstrated a "reasonable" understanding of infant feeding practices, while the other half exhibited "good" knowledge. It's noteworthy that no mothers in this age group scored within the "insufficient" or "very good" knowledge categories. This finding may warrant further investigation to understand the specific sources of knowledge acquisition for these young mothers.

As we move through the subsequent age groups, a gradual trend emerges. Among mothers aged 16-17, "reasonable" knowledge remains prevalent (64.29%), with a notable portion (35.71%) exhibiting "good" knowledge. Similar to the youngest age group, no mothers fell within the "insufficient" or "very good" categories. For mothers aged 18-24, "reasonable" knowledge continues to be the most common (55.77%), but the pro-portion of mothers with "good" knowledge increases (40.38%). A small percentage (2.88%) within this age group scored as having "insufficient" knowledge, suggesting potential knowledge gaps that could be addressed through targeted interventions.

The data indicates a shift in knowledge distribution within the older age groups (25 and above). The majority of mothers aged 25-34 possess "good" knowledge (55.26%), with a significant portion demonstrating "reasonable" knowledge (41.45%).

It's also noteworthy that a small percentage (1.97%) within this age group scored within the "very good" knowledge category, potentially reflecting personal experiences or exposure to additional educational resources. The trend of mother's exhibiting "good" knowledge continues in the 35-45 age group, with an even higher prevalence (59.49%).

"Reasonable" knowledge remained present (40.51%), with no mothers falling within the "insufficient" or "very good" categories in this age group. Finally, mothers over 45 years old displayed the strongest knowledge base, with the majority (62.50%) demonstrating "good" knowledge and the remaining portion (37.50%) exhibiting "reasonable" knowledge. Similar to the older age groups, there were no mothers in this category with "insufficient" or "very good" knowledge levels.

While no statistically significant correlation was found between age and nutritional knowledge, this analysis highlights a potential trajectory of knowledge acquisi-tion.

**Table 3.** Relationship between nutritional knowledge on infant feeding and participants' age.

| Age( Years) | Knowledge Level | | | | | | | | | | P-value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | Insufficient | | Reasonable | | Good | | Very Good | | |
| | N | % | N | % | N | % | N | % | N | % | |
| Up to 15 | 2 | 0,54% | 0 | 0,00% | 1 | 50,00% | 1 | 50,00% | 0 | 0,00% | 0,497 |
| 16 to 17 | 28 | 7,53% | 0 | 0,00% | 17 | 60,71% | 11 | 39,29% | 0 | 0,00% | |
| 18 to 24 | 103 | 27,69% | 3 | 2,91% | 56 | 54,37% | 43 | 41,75% | 1 | 0,97% | |
| 25 to 34 | 152 | 40,86% | 2 | 1,32% | 63 | 41,45% | 84 | 55,26% | 3 | 1,97% | |
| 35 to 45 | 79 | 21,24% | 0 | 0,00% | 32 | 40,51% | 47 | 59,49% | 0 | 0,00% | |
| Over 45 | 8 | 2,15% | 0 | 0,00% | 3 | 37,50% | 5 | 62,50% | 0 | 0,00% | |
| Total | 372 | 100% | 5 | | 172 | | 191 | | 4 | | |

### *Nutritional Knowledge Distribution by Educational Attainment*

While the data presented in Table 4 suggests no statistically significant difference in overall nutritional knowledge across various educational attainment levels (p=0.051), a closer examination reveals a more nuanced picture. Interestingly, mothers who had not completed higher education exhibited a promising proficiency in nutri-tional knowledge, with a prevalence of 80% demonstrating a good understanding of this critical subject area. Conversely, mothers with completed lower secondary education (7th to 9th grade) primarily displayed a reasonable level of knowledge, reflected in a score of 58.49%.

**Table 4.** Relationship between mothers' knowledge about infant feeding and their educational attainment

| Educational Attainment | Total | Insufficient Knowledge | Reasonable Knowledge | Good Knowledge | Very Good Knowledge | P-value |
|---|---|---|---|---|---|---|
| Incomplete Primary Education | 31 | 0 (0%) | 9 (29.03%) | 22 (70.97%) | 0 (0%) | 0,051 |
| Complete Primary Education | 35 | 0 (0%) | 13 (37%) | 22 (62.86%) | 0 (0%) | |
| Literacy Education | 3 | 0 (0%) | 3 (100%) | 0 (0%) | 0 (0%) | |
| Lower Secondary Education (7th to 9th Grade) - Complete | 53 | 1 (2%) | 31 (58.49%) | 20 (37.74%) | 1 (1.89%) | |
| Lower Secondary Education (7th to 9th Grade) - Incomplete | 33 | 2 (6%) | 12 (36%) | 19 (57.58%) | 0 (0%) | |
| Incomplete Secondary Education | 79 | 0 (0%) | 42 (53.16%) | 37 (46.84%) | 0 (0%) | |
| Complete Secondary Education | 68 | 2 (3%) | 27 (39.71%) | 36 (52.94%) | 3 (4.41%) | |
| Incomplete Higher Education | 10 | 0 (0%) | 2 (20%) | 8 (80%) | 0 (0%) | |
| Complete Higher Education | 9 | 0 (0%) | 5 (55.56%) | 4 (44.44%) | 0 (0%) | |
| Never Studied | 51 | 0 (0%) | 28 (54.90%) | 23 (45.10%) | 0 (0%) | |

| | | | | | |
|---|---|---|---|---|---|
| Total | 372 | 5 | 172 | 191 | 4 |

### *Nutritional Knowledge Distribution by Area of Residence*

Table 5 sheds light on a compelling association between a mother's place of residence and her level of nutritional knowledge. This relationship is statistically significant, as evidenced by a p-value of 0.0001. A closer look at the data reveals a geographically differentiated knowledge landscape. Mothers residing in rural areas exhibited a distinct prevalence of good nutritional knowledge, with a remarkable 75.80% demonstrating a strong understanding of this critical topic. Conversely, mothers dwelling in urban areas primarily displayed a reasonable level of knowledge, reflected in a score of 63.72%.

**Table 5.** Relationship between mothers' knowledge about infant feeding and area of residence

| Monthly Income (in Kwanzas) | Total | Insufficient Knowledge | Reasonable Knowledge | Good Knowledge | Very Good Knowledge | P-value |
|---|---|---|---|---|---|---|
| 10,000 to 70,000 | 115 | 4 (3.48%) | 43 (37.39%) | 67 (58.26%) | 1 (0.87%) | |
| 100,001 to 150,000 | 107 | 0 (0%) | 61 (57.01%) | 46 (42.99%) | 0 (0.00%) | |
| 70,001 to 100,000 | 72 | 1 (1.39%) | 28 (38.89%) | 41 (56.94%) | 2 (2.78%) | |
| 200,001 to 300,000 | 24 | 0 (0%) | 18 (75.00%) | 6 (25.00%) | 0 (0.00%) | 0,0001 |
| 300,001 to 500,000 | 4 | 0 (0%) | 3 (75.00%) | 1 (25.00%) | 0 (0.00%) | |
| ≥500,000 | 4 | 0 (0%) | 1 (25.00%) | 2 (50.00%) | 1 (25.00%) | |
| No monthly income | 46 | 0 (0%) | 18 (39.13%) | 28 (60.87%) | 0 (0.00%) | |
| Total | 372 | 5 | 172 | 191 | 4 | |

## Discussion

The assessment of nutritional knowledge among mothers participating in the Integrated Cabinda Project revealed a complex scenario. While just over half (51.34%) of mothers demonstrated good knowledge of infant feeding, a significant proportion (46.24%) exhibited only moderate knowledge. This result is similar to studies conducted in São Luís, Brazil (53.5%) and Malaysia (68.3%) (11, 12), indicating the need to deepen nutritional education interventions in the region. Compared to other studies in similar contexts, the data reveal that, despite efforts, there is still room for improvement in mothers' nutritional knowledge.

The evidence from this study shows that the mothers evaluated have a very low level of knowledge about the issue of breastfeeding. Thus, these results indicate that 67.20% of the mothers evaluated are unaware that exclusive breastfeeding (EBF) should be offered to the child from birth until 6 months of life, coinciding with this find-ing. Similar results were found in a Brazilian study, where 78.3% of the participants studied did not know the correct duration of the exclusive breastfeeding period (13).

However, studies conducted in Italy and Nigeria showed opposite results, where 71% and 80.2% of the mothers surveyed were more aware of the recommended duration of the exclusive breastfeeding period (14,15)

In relation to the place of residence, the results of this study show that mothers living in rural areas (75.80%) are more likely to have good knowledge than mothers living in urban areas (33.49%). A study conducted in the Free State Province, South Afri-ca, showed similar results, indicating that 34.2% of rural residents had good levels of nutritional knowledge, compared to 22.6% of urban residents (16).

Still, the findings of this study agree with the results of a study conducted in one of the Tuhuledere Woreda areas in Ethiopia, showing that rural mothers (37%) were more likely to have good nutritional knowledge compared to semi-urban mothers (34%) (17). Non-governmental organizations in partnership with local governments have promoted more nutritional education programs in rural communities than in ur-ban areas, it seems that this disparity may mean that mothers in rural areas have more knowledge than in urban areas. An Indian study revealed that the greater presence of health activists in rural areas was related to the good levels of knowledge among moth-ers in this region compared to those in urban areas (18).

The evidence from this study showed that maternal nutritional knowledge was positively associated with monthly family income. It can be found that mothers without income probably have good nutritional knowledge. The result was similar to a study conducted with pregnant women in Ethiopia, revealing that mothers with high income had a low level of knowledge about infant feeding compared to mothers with low in-come. However, the authors report that there is a statistically significant difference be-tween the nutritional knowledge and monthly income of the mothers (Tesfa et al., 2022). This distinction, can be attributed to the fact that several nutritional and food education programs in Cabinda focus on more vulnerable social groups, which encour-ages mothers to acquire more knowledge about food.

Another study in Somalia showed that knowledge of infant feeding among moth-ers with children under 2 years of age was positively associated with maternal income (20), thus coinciding with the results of this study.

Although there was no statistically significant difference between maternal ages in infant feeding knowledge, this study found that mothers over 25 years of age achieved better levels of nutritional knowledge. Similar evidence was presented in a study con-ducted in the rural areas of Brobo, Côte d'Ivoire, indicating that mothers aged 25 or over had more nutritional knowledge than younger women, although the difference was not statistically significant (21).

The findings of this study are in line with the results of a study conducted among Nigerian mothers, where it was possible to observe that there is no statistically significant correlation between maternal age and the level of knowledge about complemen-tary foods (15).

In addition, a study conducted in Limpopo, South Africa, with mothers of children under 2 years of age reinforced that evidence confirming a statistically significant rela-tionship between these two variables was not found (21).

Even though there was no statistically significant difference in the education of the participants in this study, the statistical analysis showed that mothers with incom-plete higher education had good knowledge. The results of a study evaluating maternal nutritional knowledge about infant diet and nutritional practices in the Karachi district, Pakistan, clearly show that there is no statistically significant relationship between ma-ternal knowledge and education (22).

A study of mothers attending a hospital in Ekiti State, Nigeria, found no significant association between mothers' knowledge of complementary feeding introduction and their educational levels (23). In addition, it was found in the evidence from a study conducted in the Rajshahi District, Bangladesh, that the mothers' educational level did not have a positive effect on their nutritional knowledge in relation to child feeding (24).

In contrast to these results, data from a study conducted in the city of Unaizah, Saudi Arabia, showed that both maternal education and age were positively correlated with maternal and child knowledge (25).

Another study conducted in Assiut Province, Egypt, showed that age and education likely had a positive effect on maternal knowledge levels about infant and young child nutrition (26) .

## Conclusions

This study assessed the level of nutritional knowledge among mothers participating in the Cabinda Integrated Project in Angola. The findings reveal that over half (51.34%) of the mothers demonstrated adequate nutritional knowledge regarding in-fant feeding practices. However, a significant portion (46.24%) exhibited only moderate knowledge, highlighting the need for targeted interventions.

Interestingly, the study identified a lack of statistically significant correlation between mothers' age and their nutritional knowledge. However, a closer analysis sug-gests a potential trajectory of knowledge acquisition, with mothers in older age groups demonstrating a stronger knowledge base.

Furthermore, while no statistically significant difference was found in overall knowledge based on educational attainment, mothers who had not completed higher education displayed a surprisingly high prevalence of good knowledge. This may sug-gest the effectiveness of alternative knowledge dissemination channels outside of for-mal education systems.

In contrast, mothers with completed lower secondary education primarily exhibited a reasonable level of knowledge. This finding underscores the need to tailor educational interventions to address knowledge gaps within specific educational attainment groups.

The study also revealed a surprising disparity in knowledge based on area of residence. Mothers residing in rural areas demonstrated a significantly higher level of knowledge (75.80%) compared to their urban counterparts (33.49%). This finding warrants further investigation to understand the potential factors contributing to this difference.

These results suggest that interventions aimed at improving mothers' nutritional knowledge should consider a multifaceted approach. Age, education level, and area of residence should all be factored into the design and implementation of these programs.

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**Conflict of Interest**

I declare that the work submitted for publication in the MLS Health & Nutrition Research Journal is original and has not been or is not currently under review in any journal or conference. Likewise, I am responsible for its content and agree that my name be included as an author. Finally, I declare that I have no conflict of interest in those activities that could introduce bias into the results of the work.

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