

Knowledge of Nursing Mothers on the Role of Micronutrients in Cognitive Development in the first 1000 Days of Life

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Abstract:

Background: The first 1000 days of life which has been tagged the “window of opportunity” is a susceptible phase in the life of an individual in which poor nutrition can have both a short and lifelong consequence in the health and function of child. Ability to know and recognize this period is a highway to making use of this window of opportunity. Micronutrients have been found to play a significant role in cognitive development within this period as its deficiencies is a critical concern to a child’s development. It is worthy to note that micronutrient deficiency is a major public health challenge as report has it that an estimate of 250 million children living in Africa and South Asia are susceptible to failure of meeting developmental potential by the age of five. Since there are few studies in Nigeria addressing this topic, this study has set out to assess the knowledge of nursing mothers on the role of micronutrients in cognitive development in the first 1000 days of life.

Materials and Methods: In this descriptive quantitative study, 110 nursing mothers attending infant welfare clinic of the State Specialist Hospital, Asubiaro Osogbo, Nigeria were recruited into the study through systematic sampling technique. Data was collected using a self administered questionnaire which had 26 items to assess the nursing mothers’ knowledge on role of micronutrient in cognitive development in the first 1000 days..

Results: The study findings revealed that 70.9% of the respondents have adequate knowledge of the first 1000 days of life while 29.1% of the respondents have inadequate knowledge. 75.5% of the nursing mothers are knowledgeable on the role of micronutrients in cognitive development of children while, 24.5% are not knowledgeable on the role of micronutrients in cognitive development. The study also found that there was no significant association between the nursing mothers’ academic qualifications and their knowledge on the role of micronutrients on cognitive development in the first 1000 days of life.

Conclusion: The study revealed that more than half of the nursing mothers were knowledgeable about the role of micronutrients on cognitive development.

Key Word: Knowledge; Micronutrients; Cognitive; Development; Nursing mothers.

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I. Introduction

The period for setting the foundation for optimum health and brain development is the first 1000 days of life and it is referred to as the great window of opportunity. The first 1000 days which spans from conception to the age of two years is a period of intense growth and development for the brain of the child. The 1000 days window of opportunity period is classified into three phases which are the 270 days of pregnancy, 365 days of the baby’s first birthday and the 365 days of the baby’s second birthday¹. The significant period for positive impact on a child’s cognitive development spans between pregnancy and a baby’s second birthday². During this vital period, the foundation for the formation of organs and tissues within the body is being laid and this impacts on the lifelong health and wellbeing³.

Environmental factor specifically nutrition plays an enormous role during this period, as adequate nutrition affects the health and well being of the mother and the baby positively, likewise under nutrition impacts greatly on the growth and development of the baby adversely. Adequate nutrition will deeply enhance the baby’s cognitive development and reduce the risk of disease, as well as protect the mother’s health². Likewise, poor nutritional intake during this golden window of opportunity will achieve lasting and irreversible damage to the baby with effects on the physical health and the cognitive development. Thus, adequate nutrition during this critical period of 1000 days is one of the fundamental requirements for survival, growth, optimal health and lifelong development³.

Micronutrients have been discovered to have a direct relationship to children's cognitive functioning in their early days, whereby its deficiency in the diet can negatively affect cognitive development⁴. Poor supply of some micronutrients in the diet may have an adverse effect on brain structure and function⁵. Four micronutrients linked to cognitive functioning include, iodine, iron, zinc and vitamin B₁₂⁴. Numerous studies both preclinical and clinical have helped in explaining the responsibility and mechanism of human macro- and micronutrients on cognitive development⁶. As almost all the nutrients are essential, only a subset of nutrients play a significant function in a variety of critical neurodevelopmental processes across brain regions. The significant nutrients include macronutrients (protein, long-chain polyunsaturated fatty acids, and glucose) and micronutrients like iron, iodine, zinc and vitamins⁷. Thus, this study focuses on the role of micronutrients on cognitive development in the first 1000 days of life.

II. Background and Need for the Study

Worldwide, at least 2 billion people have been affected by micronutrient deficiencies. ⁸ reported that an estimate of 250 million children living in Africa and South Asia are susceptible to failure of meeting developmental potential by the age of 5. Over the decades, Nigeria has experienced continuous micronutrient deficiencies prevalence at an alarming rate ⁹ and this has been considered as a foremost factor influencing child survival in Nigeria¹⁰. Data around the world have suggested that micronutrient deficiencies are critical concerns which play major role in children's development.

Economic losses, decreased intellectual potential and decreased productivity in adulthood has been reported to be some of the consequences of malnutrition during the childhood period¹¹. Micronutrient deficiency (hidden hunger) which has been associated to poor cognitive development and reduced quality of life and general wellbeing in later years ¹² has been reported to have far-reaching effects in the developing countries ¹³. Despite huge consequences of micronutrient deficiency on economic and human development, micronutrient deficiency still remains a consistent problem in Nigeria¹⁴.

Several studies have been conducted on the relationship between malnutrition and cognitive development in Nigeria and around the world, also several studies has been conducted on the relationship between micronutrient and cognitive development but only few studies in Nigeria has addressed the relationship between micronutrient and cognitive development. Also, there is scarcity of studies in Nigeria addressing the first 1000 days of a baby's life in association with cognitive development. Thus, this study set out to focus on the knowledge of nursing mothers attending infant welfare clinic of State Specialist Hospital Osogbo on the role of micronutrients in cognitive development in the first 1000 days of life.

III. Material And Methods

Design and Sampling

A descriptive design was employed to assess the Knowledge of Nursing Mothers on the role of micronutrients in cognitive development in the first 1000 days of life in a secondary care hospital in Osun state, Nigeria. A total of 110 nursing mothers aged ≥ 15 years attending the Infant welfare clinic of the hospital were recruited into the study using systematic sampling technique. Nursing mothers who were involved in the care of infants and were available at the time of data collection were included in the study. Nursing mothers who were not attending the infant welfare clinic were excluded from the study.

Instruments

A self-administered questionnaire consisting of 26 questions based on the knowledge of micronutrients in cognitive development in the first 1000 days of life was used to obtain data for the study. Four research experts in the medical and nursing fields helped in determining the content validity of the instrument. The instruments contain two sections:

Section A: Demographic variables: It included age, religion, academic qualification, tribe, occupation, socio-economic status, number of children delivered, and marital status.

Section B: Knowledge items. It consisted of question items on the first 1000 days of life, micronutrients, cognitive development, cognitive development in the first 1000 days and relationship between micronutrients and cognitive development.

Date Collection Procedure

Data were collected using a structured questionnaire. The structured questionnaire was developed by the researchers and was based on existing literatures. Ethical Clearance was obtained from the Hospital Management Board which was forwarded to the Directorate of Nursing department in State Specialist Hospital, Asubiaro osogbo. Permission was sought from the Nurse Managers in charge of the Clinic. Consent was obtained from the respondents, purpose of the study was explained and questionnaires were distributed to

eligible consenting nursing mothers. The data was gathered in six clinic days within a period of two weeks from 17th September, 2019 to 27th September, 2019.

Statistical analysis

Data was analyzed using SPSS version 20. Data was tabulated and analyzed using descriptive and inferential statistics

IV. Result

Data was tabulated and analyzed using descriptive and inferential statistics.

Table 1: Demographic profile of respondents

Variable		Frequency	Percent
Age range of the respondents	15-24 years	16	14.5
	25-34 years	55	50.0
	35-44 years	21	19.1
	45 years and above	18	16.4
	Total	110	100
Academic qualification	primary education	10	9.1
	secondary education	53	48.2
	tertiary education	47	42.7
	Total	110	100

Demographic findings revealed that 14.5% of the respondents belonged to the age group 15-24 years, 50% belonged to the age group 25-34 years, 19.1% belonged to the age group 35-44 years while 16.4% belonged to the age group 45 years and above.

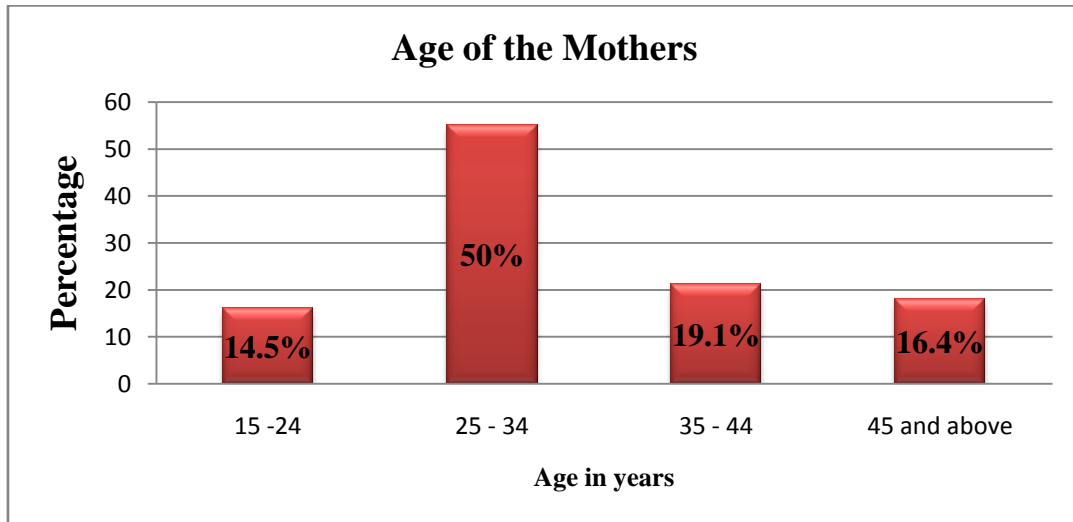


Figure 1: Distribution of the Nursing mothers based on their age

Data from the academic qualifications of the respondents revealed that 9.1% of the respondents attained primary education, 48.2% had secondary education while 42.7% had tertiary education.

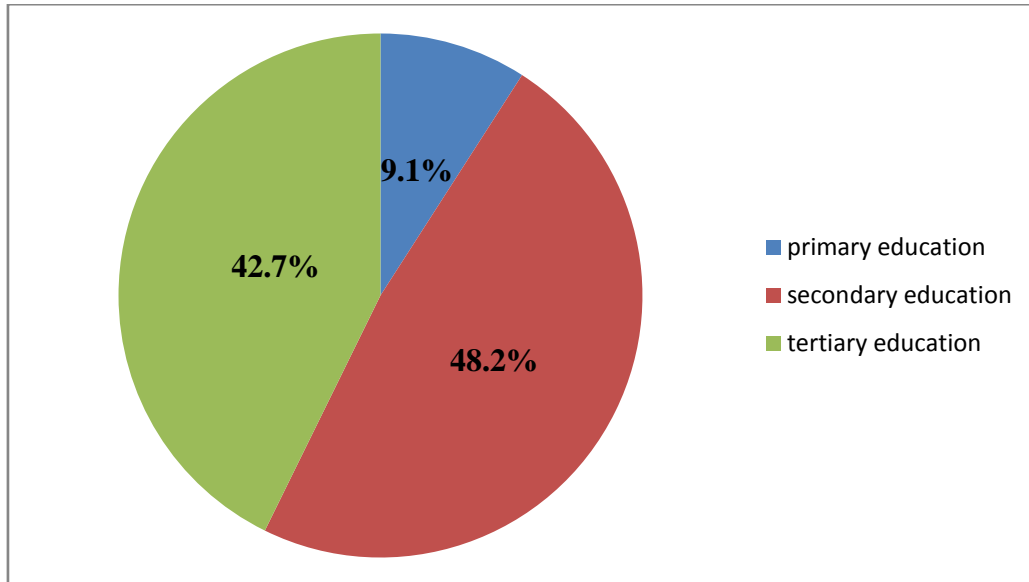


Figure 2: Distribution of the academic qualification of the respondents

Table 2: Knowledge of respondents on the first 1000 days of life

The first 1000 days of a child's life is between		
Variable	Frequency	Percentage
Conception to baby's 2 nd birthday	78	70.9
Birth – baby's 2 nd birthday	19	17.3
I am not sure	13	11.8
Total	110	100.0

Findings revealed that majority of the respondents have knowledge on what the first 1000 days is. 70.9% identified it as conception to a baby's second birthday, 17.3% identified it as Birth – baby's 2nd birthday while 11.8% were not sure.

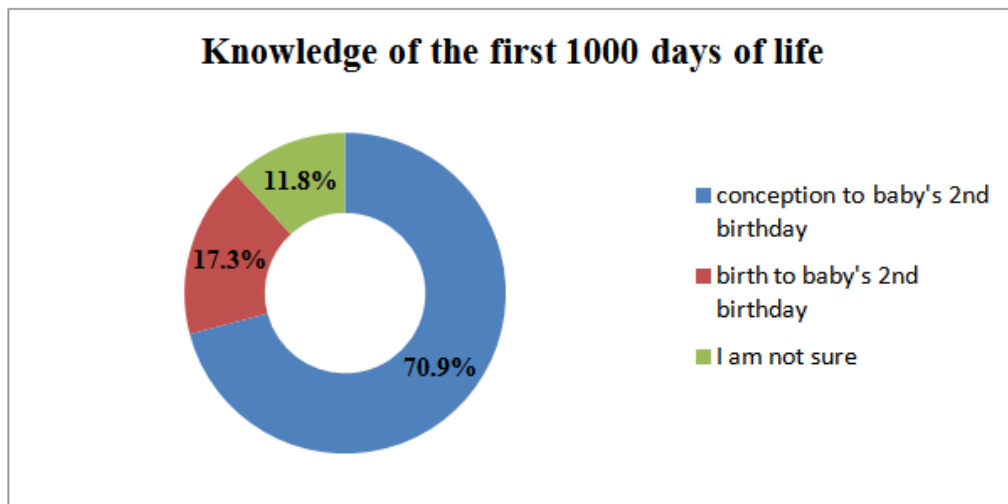


Figure 3: Distribution of the knowledge of first 1000 days of life

Table 2: Relationship between Micronutrients and Cognitive development

Category	Frequency	Percentage
Is there any relationship between micronutrients and cognitive development in children		
Yes	83	75.5
No	27	24.5
Total	n = 110	100
Children cognitive development can be aided by adequate micronutrients		
Strongly agree	59	53.6
Agree	38	34.5

Undecided	32	1.8
Disagree	7	6.4
Strongly disagree	4	3.6
Total	n = 110	100
Micronutrients that help in cognitive development include iodine, iron, zinc and vitamin B₁₂		
Strongly agree	59	53.6
Agree	12	10.9
Undecided	18	16.4
Disagree	10	9.1
Strongly disagree	11	10
Total	n = 110	100

Findings from the Table 2 revealed that 75.5% of the respondents identified that there is a relationship between micronutrients and cognitive development while 24.5% identified that there is no relationship between micronutrients and cognitive development.

Table 4: Association between respondents' Educational status and their knowledge of Micronutrients

Variable	What do you know about micronutrients					Chi-Square Tests			
Academic qualification		vitamins and minerals needed in the body in small amounts	food nutrients needed by the body in large amounts	has nothing to do with the health of an individual	no idea	Chi-square tests	Df	value	p-value
primary education	9	1	0	0	Pearson Chi-Square	6	8.377	0.212	
	90.0%	10.0%	.0%	.0%					
secondary education	33	10	10	0					
	62.3%	18.9%	18.9%	.0%					
tertiary education	34	7	4	2					
	72.3%	14.9%	8.5%	4.3%					

The result of Chi-square analysis (Pearson Chi-Square =8.37df=6, P=0.212) revealed that there is no significant relationship between nursing mothers' educational status and their knowledge on micronutrients.

V. Conclusion

There is a wealth of evidence suggesting the relationship between micronutrients and cognitive development. It is reported that environmental factors like nutrition play a major role and provide the basis for cognitive and socio-emotional role. Also, data implies that the timing of micronutrient deficiencies can significantly affect brain development¹⁵. Though majority of the women seem to be knowledgeable about the first 1000 days and more than average of the respondents are knowledgeable about the relationship micronutrients have with cognitive development. It is imperative for nurses at the maternity sections; antenatal clinic, postnatal clinic and the infant welfare clinic to take cognizance on emphasizing the importance of adequate micronutrients in the diet of the mother during pregnancy and the baby up until two years as this is when the major development occur in the brain.

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