

Effect of total exclusive breast feeding on the prevalence of malaria among children at the pediatric outpatient ward of a Tertiary health care center in Owerri, Southeastern Nigeria

Raymond Ikechukwu Nnadozie ¹, Nicholas Chinedu Ewelike ^{2, *}, MacAnthony Nnanyereugo Echendu ², Godfrey Ikechukwu Eberendu ³, Samuel Okechukwu Njoku ⁴ and Joseph Uchechukwu Ozor ⁵

¹ Department of Biology, Federal University of Technology, P.M.B 1526 Owerri, Nigeria.

² Department of Microbiology, Federal University of Technology, P.M.B 1526 Owerri, Nigeria.

³ Department of Pediatrics, Imo State University Teaching Hospital, P.M.B 08 Orlu, Nigeria.

⁴ Department of Microbiology, Madonna University, Nigeria.

⁵ Department of Animal and Environmental Biology, Imo State University, P.M.B 2000, Owerri, Imo State, Nigeria.

World Journal of Biology Pharmacy and Health Sciences, 2022, 10(02), 030–036

Publication history: Received on 15 April 2022; revised on 17 May 2022; accepted on 20 May 2022

Article DOI: <https://doi.org/10.30574/wjbphs.2022.10.2.0078>

Abstract

This study was undertaken to assess the effect of total exclusive breast feeding on the prevalence of malaria among children, 0-2 years of age. A simple random sampling method was used to select 176 nursing mothers, having children aged 0-2 years during consultation hours at the pediatric outpatient ward of the Federal Medical Center, Owerri, Nigeria. A well-structured interviewer administered questionnaire was used to source information from the nursing mothers that provided answers to the questions on socio demographic characteristics and breast feeding practices. Blood samples also were collected from the concerned children, stained with Giemsa and Leishman for both thick and thin film preparations respectively, and examined under the oil immersion microscopy for malaria parasites. The results showed that 100% of the mothers had good knowledge of breast feeding, but their practice of total exclusive breast feeding was low (22.7%). Out of 40 exclusively breast-fed children examined in the study, only 4(10.0%) were infected with malaria, while out of the 136 non-exclusively breast-fed children, 50(36.8%) had malaria. The prevalence of malaria was also lowest (6.7%) among the exclusively breast-fed children in the age group 0-6 months. Total exclusive breast feeding practice should be sustained and recommended to all nursing mothers in order to gain from its numerous and indispensable benefits including reduction in the prevalence of malaria among children.

Keywords: Total Exclusive Breast Feeding; Children; Nursing Mothers; Malaria Prevalence

1. Introduction

Malaria is a major health concern in the world and more especially among pregnant women and children because of their vulnerability. Children are more susceptible to malaria attack. Their low immunity and frequent exposure to the bite of female *Anopheles* mosquito vector complicates their malaria situation [1]. The disease is endemic in over one hundred countries in the world. Approximately, over half of the world's population is at risk of malaria and nearly one million people die of the disease each year [2]. Most malaria cases and deaths occur in Sub-Saharan Africa and most of the victims are children under two years of age [3]. The number of deaths resulting from malaria in Africa is on the increase due to increased insecticide resistance, antimalaria drug resistance and environmental change [4-6].

* Corresponding author: Nicholas Chinedu Ewelike
Department of Microbiology, Federal University of Technology, P.M.B 1526 Owerri, Nigeria.

Breastfeeding remains the best option for infants in the first six months of life. It is natural, cost effective and nutritional activity that promotes the optimal wellbeing and survival of infants [7]. Breast milk contains antibodies and essential nutrients, necessary for the promotion of health and adequate development of infants and very young children. Breast feeding has been shown to protect infants from several morbidity [8]. The practice of exclusive breast feeding has been less than optimal in many developing countries including Nigeria. More than 50% of Nigerian infants are fed complementary foods too early, which are often of very poor nutritional value. In spite of all the efforts of the health authorities to promote mother's milk as the best food for the infant, the prevalence of exclusive breast feeding still remains very low. Again, it is a common observation that most nursing mothers in the study area indulge in non-exclusive breast feeding without minding the pediatric implications. Several studies have been carried out on the childhood malaria but the effect of total exclusive breast feeding on the prevalence of childhood malaria has not been documented in the study area. The aim of this research work is to determine the effect of total exclusive breast feeding on the prevalence of malaria among children of 0-2years of age at the pediatric outpatient ward of a tertiary health care center in Owerri, Nigeria.

2. Material and methods

The study was carried out at the Federal Medical Center Owerri, Imo State, Nigeria between the months of October and December. A hospital based cross-sectional survey was adopted. The study population were exclusively and non-exclusively breast-fed children aged 0-2 years.

2.1. Sampling method

Simple random method was used to select 176 nursing mothers having infants 0-2 years. They were chosen during consultation hours at the pediatric outpatient ward.

2.2. Ethical consideration

Oral informed consent was obtained from the management of the hospital before carrying out the project. Assurance of confidentiality of information provided by the respondents was guaranteed. The purpose of the study was explained to them and approval was gotten before the investigation commenced.

2.3. Data collection with questionnaire

Well structured, interviewer administered questionnaires were used to source information from the nursing mothers. The questionnaires were distributed to the mothers during consultation hours at the pediatric outpatient ward. Mothers whose conditions were acknowledged as contraindication to breast feeding, for example HIV/AIDS and use of cytotoxic drugs were excluded. Mothers with babies who had received blood transfusion either exchange or straight forward transfusion or had congenital malaria also were excluded from the study. The questionnaire comprised of two sections: section one contained information regarding to sociodemographic characteristics of the mother and the child while section two contained information relating to the knowledge and practice of exclusive and non-exclusive breast feeding and occurrence of malaria and other illnesses in early infancy amongst others. Completely and correctly filled questionnaires were retrieved and used for analysis.

2.4. Collection of blood samples

The blood samples were collected from the children with the help of the nurses. The patient's third finger was selected, cleaned with cotton wool soaked in alcohol and then punctured with a sterile lancet. Using a quick rolling action, the ball of the finger was pressed to squeeze out blood. The drops of blood were collected on clean grease free slide for parasitological analysis. The collected samples were labeled and immediately transported to laboratory for analysis.

2.5. Parasitological analysis

Thick blood smear was prepared. The blood was slightly spread out on the centre of the slide, air dried, and stained with Giemsa using standard method. The slides were respectively examined under the microscope using oil immersion objective (x100) lens. The *Plasmodium* species seen were identified using standard taxonomic keys as described by Ukaga et al [9].

2.6. Data analysis

The data obtained were analyzed in SPSS software (version 13.0) using simple statistics of tables, frequencies and percentages

3. Results and discussion

3.1. Prevalence of malaria among the children

Table 1 shows the prevalence of malaria among the children based on the method of breast feeding. Out of 176 children examined in this study, 40 (22.7%) were exclusively breast fed, while 136 (77.3%) were non - exclusively breast fed. Out of the 40 exclusively breast fed children, only 4 (10.0%) were infected with malaria. On the other hand, out of the 136 non-exclusively breast fed children, 50 (36.8%) were infected with malaria. These results are consistent with the findings of previous researchers [8, 10]. This observation could be attributed to the protective advantages of exclusive breast feeding to infants. Breast feeding may contribute to protection by its components, such as lactoferrin which binds iron, requisite for parasite survival, and secretory IgA found in breast milk and in maternal and infant sera. Additionally, the metabolic substrate, para-aminobenzoic acid which is present only in low levels in breast milk is required for the replication of the parasite [11].

Table 2 shows the age related prevalence of malaria among the exclusively breast fed children. There was a progressive increase in malaria prevalence among the children with increasing age. Hence the age group 19-24 months had the highest (16.7%) prevalence of malaria, while the age group 0-6 months had the least (6.7%). Similar studies from other places have reported that malaria in young infants may be asymptomatic and often poses diagnostic difficulty, mimicking sepsis [12]. Although, the overall malaria mortality in infants aged under six months is highly uncertain, neonatal malaria is thought to be rare owing to trans placentally transferred immunoglobins. Hemoglobin F, present in high concentrations at birth can inhibit parasite development and can protect infant in the first few months of life [13].

The prevalence of malaria among the children by gender is shown in table 3. There was a significant difference ($p < 0.05$) in the prevalence of malaria among the male and female children in both the exclusively breast fed and non-exclusively breast fed children. In each of these methods, males were more infected than the females and the infections were more among the non-exclusively breast fed than among the exclusively breast fed children. The results showed that among the exclusively breast fed children, more male children (15.4%) were infected than the female children (7.4%). The male children also recorded higher (41.3%) prevalence of malaria than the female children among the non-exclusively breast fed. The reason for this might be because the male children in 1-2 years of age are more adventurous and active than their female counterparts and hence might have been more exposed to mosquito bites.

Table 1 Prevalence of malaria among the children (0-2 years) based on the method of breast feeding

Method of breast feeding	Number examined	Number infected	Prevalence (%)
Total exclusive breast feeding	40	4	10
Non-exclusive breast feeding	136	50	36.8
Total	176	54	30.7

Table 2 Prevalence of malaria among exclusively breast fed children by age

Age group (months)	Number examined	Number infected	Prevalence (%)
0-6	15	1	6.7
7-12	11	1	9.1
13-18	8	1	12.5
19-24	6	1	16.7
Total	40	4	10.0

Table 3 Prevalence of malaria among the children by gender

Exclusively breast fed				Non-exclusively breast fed			
Gender	Number examined	Number Infected	Prevalence (%)	Gender	Number examined	Number infected	Prevalence (%)
Male	13	2	15.4	Male	63	26	41.3
Female	27	2	7.4	Female	73	24	32.9
Total	40	4	10.0	Total	136	50	36.8

3.2. Socio-demographic characteristics of the respondents and their practice of breast feeding.

The socio-demographic characteristics of the nursing mothers and their practice of breast feeding are shown in table 4. The ages of the mothers ranged from 18-52 years. Majority 123 (69.9%) of the mothers were married, 159 (90.3%) were Christians and 157 (89.25) were from Igbo extraction. Most of the mothers 82 (46.6%) had primary education while 50 (28.4%) had no formal education. Some of the women 40 (22.7%) practiced total exclusive breast feeding, while the rest 136 (77.3%) practiced nonexclusive breast feeding. Among those who practiced exclusive breast feeding, 19 (10.8%) fed their children with breast milk only, while 21 (11.9%) fed their children with breast milk supplemented with vitamins and minerals. The mothers who practiced nonexclusive breast feeding fed their children with breast milk, food and water. It was also observed that most of the mothers (86.2%) breast fed their babies within one hour after delivery. This observation is similar to reports from other studies [14]. It is obvious from this study that the practice of non-exclusive breast feeding was higher than the practice of total exclusive breast feeding. The reason for this might be due to ignorance of the health benefits of total exclusive breast feeding to children or due to education levels of the mothers. It can be explained that improved maternal educational status enhances the mother's understanding of the importance of total exclusive breast feeding and its role in protection of the children from malaria and other diseases.

Table 4 Socio-demographic characteristics of the nursing mothers and their practice of breast feeding

Variables	Frequency	Response (n=176) Percentage (%)
Age (years) of the mother		
18-22	20	11.4
23-27	22	12.5
28-32	24	13.6
33-37	35	19.9
38-42	37	21.0
43-45	21	11.9
46-52	17	9.7
Total	176	100.0
Marital status		
Married	123	69.9
Single (Unmarried)	2	1.1
Divorced	15	8.5
Widowed	36	20.5
Total	176	100.0
Religion		
Christianity	159	90.3
Muslim	10	5.7
Others	7	4.0
Total	176	100.0

Ethnicity		
Igbo	157	89.2
Hausa	8	4.5
Yoruba	5	2.8
Others	6	3.5
Total	176	100.0
Educational level		
None	50	28.4
Primary	82	46.6
Secondary	31	17.6
Tertiary	13	7.4
Total	176	100.0
Knowledge of total exclusive and non-exclusive breast feeding		
Yes	174	98.9
No	2	1.1
Total	176	100.0
Preferred method of breast feeding		
Total exclusive breast feeding	40	22.7
Non-exclusive breast feeding	136	77.3
Total	176	100.0
Source of nutrient for child		
Breast milk only	19	10.8
Breast milk with minerals and vitamins	21	11.9
Breast milk with food and water	136	77
Total	176	100.0
Weaning period		
6 months	40	22.7
12 months	127	72.2
18 months	6	3.5
24 months	3	1.6
Total	176	100.0
Previous case of malaria attack to child		
Yes	93	52.8
No	83	47.2
Total	176	100.0
Commencement of breast feeding after delivery		
Within hour	150	86.2
After 1-3 days	15	8.5
Within 1 week	11	6.3
Total	176	100.0

4. Conclusion

This study revealed that total exclusive breast feeding can significantly reduce prevalence of malaria among children. This implies that this method of breast feeding of infants can increase their resistance to malaria, and consequently increase their chances of survival. Public education on total exclusive breast feeding should be promoted and the practice should continuously be recommended to nursing mothers in order to gain from its numerous health benefits including reduction in the prevalence of malaria among children.

Compliance with ethical standards

Acknowledgments

The authors are thankful to the management of the Federal Medical Center, Owerri, Nigeria for their assistance.

Disclosure of conflict of interest

The authors declare that no competing interest exists.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Iwu RU, Ijeoma BC, Egeruoh A, Awurum IN, Ohalete ON. Awareness and use of insecticide treated nets among pregnant women attending antenatal clinic at Federal Medical Center and General Hospital Owerri, Imo state. Report and Opinion. 2010; 2(2): 154-158.
- [2] Oparaocha ET. Mother's perception and management of childhood malaria in Umuahia South Local Government Area of Abia State, Nigeria. Nigerian Journal of Parasitology. 2007; 28(2): 55-60.
- [3] Momodu I, Umar A, Uchekukwu G, Aminu H. Hematological changes in malaria-infected children in North-West Nigeria. Turkish Journal of Medical Sciences. 2013; 43: 838-842.
- [4] Umuenae PU, Ekejindu IM, Ifeanyichukwu MO. Prevalence and intensity of malaria in blood donors at Nnamdi Azikiwe University teaching Hospital, Nnewi, Anambra State. Nigerian Journal of Parasitology. 2006; 27: 11-15.
- [5] Ursos LM, Roepe PD. Chloroquine resistance in the malarial parasite, *Plasmodium falciparum*. Med. Res. Rev. 2002; 22(5): 465-91.
- [6] Tanser FC, Sharp B, Le SD. Potential effect of climate change on malaria transmission in Africa. Lancet. 2003; 362(9398): 1792-1798.
- [7] World Health Organization [Internet]. Planning guide for national implementation of the global strategy for infant and young child feeding. Geneva, Switzerland, WHO; 2007.
- [8] Ibadin OM, Ofili NA, Morrison O, Nkwu OE. Exclusive breast feeding and malaria in early infancy: Experience from Benin City, Nigeria. Journal of Biomedical Sciences. 2012; 11: 16-22.
- [9] Ukaga CN, Nwoke BEB. Practical medical parasitology for biological and medical sciences. 2nd Edn. Nigeria: Meges publishing. 2007.
- [10] Lamounier JA, Moulin ZS, Xavier CC. Recommendations for breast feeding during maternal infections. J. Pediatr. 2004; 80(5): 181-8.
- [11] Kassim OO, Ako-Anai KA, Torimiro SE, Hollowell GP, Okoye VC, Martin SK. Inhibitory factors in breast milk, maternal and infant sera against in vitro growth of *Plasmodium falciparum* malaria parasite. Journal Tropical Pediatrics. 2000; 46: 92-96.
- [12] D'Allesandro U, Ubben D, Hamed K, Ceesay SJ, Okebe J, Taal M, Lama EK, Keita M, Koivogu L, Nahum A, Bojang K, Sonko AAJ, Lalya HF, Barbin B. Malaria in infants aged less than six months – is it an area of unmet medical need? Malaria Journal. 2012; 11: 400.
- [13] Riley EM, Wagner GE, Akajmori BD, Koram KA. Do maternally acquired antibodies protect infants from malaria infection? Parasite immunology. 2011; 23(2): 51-59.

- [14] Prameels KK. Breast feeding and risk of parasitic infection: a review. *Asian Journal of Tropical Biomedicine*. 2014; 4(11): 847-858