International Journal of Pharmacy and Biological Sciences
ISSN: 2321-3272 (Print), ISSN: 2230-7605 (Online)
IJPBS | Volume 6 | Issue 1 | JAN-MAR | 2016 | 87-93
Research Article – Biological Sciences

A STUDY TO ASSESS THE RELATIONSHIP BETWEEN FEEDING PATTERN AND DEVELOPMENTAL OUTCOME OF CHILDREN IN A SELECTED PLAY SCHOOL AT CHENGALPATTU, KANCHEEPURAM DISTRICT, TAMILNADU

Abirami.P

Associate Professor, SRM College Of Nursing, Potheri, Kattankulathur, Kancheepuram District, Pin Code: 603203, TamilNad, India

***Corresponding Author Email: abiramikarnamurthy@gmail.com**

ABSTRACT

The healthy citizens are the strong pillars of a nation. Mothers play a vital role in preparing healthy citizen from the beginning of their in the womb by taking care of themselves. Mother's breast is the pitcher for her baby. The mother's milk will give most precious components for the cognitive and Physical development and physical growth of the children. The aim of my study was to assess and Compare the developmental outcome of breastfed and artificially fed children. Non-experimental expost-facto retrospective design was used. The setting of my study was Sri Ramakrishna Mission vidyalaya English Medium school and Usha English Medium School.60 mothers and their children fulfilling inclusion and exclusion criteria were selected by using Non probability purposive Sampling Technique. Out of which 30 mothers who fed breast milk and 30 mothers who had given artificial feeding to their children up to 2 years. Cognitive development was assessed by Modified Gesell developmental Schedule, Vineland Social maturity Scale and Physical Growth was assessed by Checking height, weight and Mid-arm Circumference for both the group children. The study findings revealed that majority of the breast fed children 29 (96.67%) had excellent cognitive development, 19 (63.33%) had above average height of >95cm, 20 (66.67%) had average weight of 13.1 to 14 kg and 18 (60%) had above average mid-arm circumference of 13.5cmthan artificially fed children. The study concludes that the breast fed children had optimal cognitive development and Physical growth. Findings of the study suggest that the longer the duration of breast feeding will improve the cognitive development and Physical growth of children.

KEY WORDS

Breast fed and Artificially fed Children, Cognitive development, Gesell developmental Schedule, Vineland Social maturity Scale, Physical Growth

INTRODUCTION

Breast feeding is natural way of nurturing the child, creating a strong bond between the mother and the child and also provides development and learning opportunities to the infant. It fosters emotional security and affection with a lifelong impact on psychosocial development. Breast feeding is not only important for young child's survival, health, Nutrition, the development of trust and sense of security, but it also enhances brain development and learning as well. Breast milk is species specific, made uniquely for the human infant.[1]

Breastfeeding and breast milk are the global standard for infant feeding in undeveloped and developed countries. This statement is supported by the World Health Organization, the U.S. Surgeon General, the American Academy of Pediatrics[2] the American College of Obstetricians and Gynecologists, the American Academy of Family Practice, and the Academy of Breastfeeding Medicine. **The American Academy of Pediatrics has recently published an endorsement for breastfeeding at least through the first year of life and as an exclusive method for the first 6 months.**[3] The Healthy People 2020 (www.healthypeople.gov/2020) objectives (MICH 21.1-21.5, MICH 22.2) are as follows: any breastfeeding, 81.9%; any breastfeeding at 6 months, 60.6%; any breastfeeding at 12 months, 34.1%;

exclusive breastfeeding at 3 months, 46.2%; exclusive breastfeeding at 6 months, 25.5%; and reduce the number of infants who receive supplemental formula in the first 48 hours by one half to 14.2%.

Breastfeeding provides significant benefits for both the mother and the infant. A number of these benefits are documented in an evidence-based analysis in the Agency for Healthcare Research and Quality (AHRQ) Report on Breastfeeding in Developed Countries. The benefits are so significant that the AAP and the ACOG recommend exclusive breastfeeding for the first 6 months of life and continued breastfeeding through 12 months or more. [4,5]

Protein in breast milk is readily digested and is present in amounts that can be handled by the developing kidney. Various minerals (e.g., iron) and nutrients exist in a form that, in conjunction with other components, make them easily absorbed to meet infants' needs during periods of rapid growth.[1,6] Cholesterol and docosahexaenoic acid have been shown to play a role in central nervous system development and may contribute to the enhanced intelligence quotient measurements reported in breastfed infants. [7, 8, 9]

Cognitive and psychological benefits for breastfed infants have been suggested, including developmental performance,[10] visual acuity, [11,12,13]school performance, and performance on standardized [14] and intelligence quotient tests. More recent articles continue to support the impact of breastfeeding on intellectual development while fostering debate over the relative contributions of nutrition, genetics, and environment to the intellectual development of infants and the possible influence on the child's or adult's future cognitive abilities as measured by intelligence quotient testing.[15,16] The psychological benefits are more difficult to measure but are well described by Newton and Newton[17], and indeed by most mothers who have successfully breastfed their infants.[18]One of the most consistent findings of exclusive breastfeeding is its influence on later intelligence, with a few test point advantages to the breastfed infant.

In this fast moving modern world, the fact breastfeeding is being neglected by many mothers, resulting in ill health and increasing morbidity among children. If breast feeding is not practiced by genuinely it can be a source of infection to the infant. The healthy practice of breastfeeding is declining in most of the industrialized societies due to various reasons. It is the time to awake the health care providers who can have greatly influence the family regarding the importance and benefits of breast feeding. The literature supports breastfeeding in many ways, one among it is exclusively breastfed children's Cognitive and physical development is much better than non exclusive breast fed children. So the Researcher conducted this study to analyze the facts and make it as evidence based practice study.

OBJECTIVES

1. To assess and compare the developmental outcome between breast fed and artificially fed children.

2. To associate developmental outcome of breast fed and artificially fed children with their demographic variables.

Participants and Methods: Quantitative approach and Non experimental expost facto Retrospective design was adopted. Sample Size was detected using power analysis. The setting of the study was Sri Ramakrishna Mission vidyalaya English Medium School and Usha English Medium School. 60 mothers and their children fulfilling inclusion and exclusion criteria were selected by using Non probability purposive Sampling Technique. To assess the feeding pattern structured questionnaire was used and by random allocation they were grouped as 30 mothers who fed breast milk and 30 mothers who had given artificial feeding to their children up to 2 years.

Inclusion criteria:

1. Children in the age group of 3 years.
2. Children who are able to understand tamil
3. Mother who are able to write and understand tamil

Exclusion Criteria:

1. Children with Congenital anomalies, Cerebral palsy and mentally challenged

Ethical consideration: Formal approval was obtained from the Institutional review board and Institutional ethical committee of SRM University, Kattankulathur, Chennai, Tamilnadu, India. In addition, the participants were informed of their right to withdraw anytime during the course of the study.

Instruments: Questionnaires comprises two sections. Section I includes demographic data,. Section II comprises structured questionnaire to assess the feeding pattern, Section III comprises of Modified Gesell developmental Schedule and Vineland Social maturity Scale to assess the Cognitive development and Section IV Comprises of Anthropometric measurements to assess the physical growth.

METHOD OF DATA COLLECTION

On the first day of contact, the investigator had collected the information about socio demographic variables and Obstetrical variables from all the study participants by structured interview schedule. By using the structured questionnaire the investigator assessed the feeding pattern of the children. Then the investigator assessed the Cognitive development by Modified Gesell developmental Schedule and Vineland Social maturity Scale and Physical Growth was assessed by Checking height, weight and Mid-arm Circumference for both the group children. The investigator had spent 10 to 15 minutes per sample to collect that information. Confidentiality about the data and findings was assured to the Participants

Statistical analysis:

The information collected from the study participants was scored and tabulated. The data was entered into the master coding sheet and saved in EXCEL. Statistical analysis was conducted with the help of the Statistical Package for Social Sciences (SPSS)-16. . Mean, percentage and Standard deviation was used to explain the demographic, Obstetrical variables and Independent't' test was used to compare the developmental outcome for both the group children and Chi-square was used for association.

RESULTS

Table 1: Frequency and percentage distribution of Demographic and obstetrical variable of Mothers and their Children. N=60

Demographic and Obstetrical variables		Groups			
		Mothers and their Children of Breast Fed group (n=30)		Mothers and their Children of Artificially Fed group (n=30)	
		n	%	n	%
Age	20 to 25 yrs	7	23.33	12	40.0
	26 -30 yrs	18	60.0	6	53.33
	31 -35 yrs	5	16.67	2	6.67
Habitat	Rural	1	3.33	2	6.67
	Urban	29	96.67	28	93.33
	Suburban	-	-	-	-
Educational status	Illiterate	-	-	-	-
	primary school certificate	2	6.67	1	3.33
	Middle school certificate	6	20.00	11	36.67
	High School certificate	10	33.33	10	33.33
	Higher secondary	3	10.00	3	10.0
	Graduate or postgraduate	9	30.00	5	16.67
Work pattern	Sedentary	-	-	3	10.0
	Moderate	28	93.33	26	86.67
	Heavy	2	6.67	1	3.33

Regarding the demographic and obstetrical variables of Mothers and their Children of Breast Fed group Majority 60.0%(18)of the mother belong to the age group of 26 to 30 yrs,96.67%(29) mothers were living in urban area,33.33%(10)mothers were completed High School certificate education,93.33%(28 mothers were moderate nature of worker. In Artificially fed group majority 53.33%(16)of the mother belong to the age group of 26 to 30 yrs,93.33%(28) mothers were living in urban area,33.33%(10)mothers were completed High School certificate education 86.67%(26) mothers were moderate nature of worker.

Table 1a: Frequency and percentage distribution of Demographic and obstetrical variable of Mothers and their Children (cont,d) N=60

Demographic and Obstetrical variables		Groups			
		Mothers and their Children of Breast Fed group (n=30)		Mothers and their Children of Artificially Fed group (n=30)	
		n	%	n	%
Monthly income	< Rs.1600	2	6.67	5	16.67
	Rs.1601 – Rs.4809	11	36.67	8	26.67
	Rs.4810- Rs.8009	9	30.0	16	53.33
	Above Rs 8009	8	26.66	1	3.33
Type of family	Joint family	12	40.0	13	43.33
	Nuclear family	18	60.0	17	56.67
	Extended family	-	-	-	-
Number of Family Members	Two	1	3.33		
	Three	4	13.33	7	23.33
	Four	16	53.33	16	53.34
	Five and above	9	30.0	7	23.33
Type of marriage	Non consanguineous	10	33.33	16	53.33
	Consanguineous	20	66.67	14	46.67
Type of Delivery	Normal Vaginal delivery	24	80.0	25	83.33
	Forceps delivery	-	-	1	3.33
	Vaccum Delivery	-	-	-	-
	LSCS	6	20.0	4	13.33
Sex of the child	Female	20	66.67	`15	50.0
	Male	10	33.33	15	50.0
Birth weight	<2.5kg	-	-	-	-
	2.5kg to 3 kg	20	66.67	20	66.67
	>3 kg	10	33.33	10	33.33

Regarding the demographic and obstetrical variables of Mothers and their Children of Breast Fed group majority36.67% (11) mother's income was between Rs.1601 – Rs.4809, 60 % (18) of the mother were living as a Nuclear family, 53.33% (16) mothers were having four family members, 66.67 (20) mothers were belong to the category of Non consanguineous marriage, 80% (24) Mothers delivered Normally, 66.67 (20) children were female and their birth weight was 2.5to 3 Kg. In Artificially fed group majority 53.33%(16) mother's income was between Rs.4810- Rs.8009, 56.67 %(17) of the mother were living as a Nuclear family, 53.34% (16) mothers were having four family members, 53.33% (16) mothers were belong to the category of consanguineous marriage, 83.33% (25) Mothers delivered Normally, 50.0% (15) children were female and 66.67% (20) children birth weight was 2.5to 3 Kg.

Table 2: Frequency and percentage distribution of level of cognitive development of Breast fed and artificially fed Children N=60

Cognitive Development		Excellent ≥90%		Very Good 75 to 89%		Good 60 to 74%		Poor 51 to 59%		Very Poor ≤50%	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequ Ency	%
Breast Fed Children		29	96.67	1	3.33	-	-	-	-	-	-
Artificially Fed Children		2	6.67	12	40	15	50	1	3.33	-	-

It is evident from the table that 29(96.67%)of the breastfed children were having excellent cognitive development where as in artificially fed group majority of the children 15(50%) of them were having good cognitive development.

Table 3: Frequency and percentage distribution of level of physical development of Breast fed and artificially fed Children N=60

Physical Development	Breast Fed Children						Artificially Fed Children					
	Below average		Average		Above average		Below average		Average		Above Average	
	F	%	F	%	F	%	F	%	F	%	F	%
Height	-	-	11	36.67	19	63.33	-	-	27	90	3	10
Weight	5	16.67	20	66.67	6	16.67	24	80	4	10.33	2	6.67
Midarmcircumference	-	-	12	40	18	60	21	70	7	20.33	2	6.67

It is evident from the table that majority 19 (63.33%) of the breastfed children were having above average Height of more than 95 cm,20 (66.67%) were having average weight of 13.1 to 14 kg and 18 (60%) of the children had above average Mid-arm circumference of above 13.5 cm, Where as in artificially fed group majority of the children 27 (90%)of the breastfed children were having average Height of 80 to 95 cm,24(80%) were having below average weight of below 13kg and 21 (70%) of the children had below average Mid-arm circumference of below12.5cm.

Table 4: Comparison of developmental outcome between breastfed and artificially fed children

S.No	Developmental outcome	Category	Mean	SD	Range		"t" value
					Min	Max	
1	Cognitive development	Breastfed children	47.63	1.87	44	50	11.87*** df=58 S P<0.001
		Artificially fed children	36.83	4.64	26	50	
2	Height	Breastfed children	96.3	3.78	86	102	7.34*** Df=58 S P<0.001
		Artificially fed children	87.2	5.62	80	100	
3	Weight	Breastfed children	13.39	1.16	10	15.5	3.94*** Df=58 S P<0.001
		Artificially fed children	12.17	1.21	10	14.5	
4	Mid-arm circumference	Breastfed children	13.85	0.91	16	15	8.17*** Df=58 S P<0.001
		Artificially fed children	11.93	0.91	10.5	14	

***P<0.05, **P<0.01, ***P<0.001**

The table shows that the breast fed children mean score of cognitive development, Height, Weight and mid-arm circumference was higher than the artificially fed children. The calculated t value was higher than the table value which proves that all the variables were highly significant at P<0.001 level
Regarding association, none of the developmental outcome variables were associated with their demographic variables

DISCUSSION

Stumm S, Plomin R 2015 conducted a study on Breast feeding and IQ Growth from Toddlerhood through Adolescence. They have reported that the benefits of breastfeeding for cognitive development continue to be hotly debated but are yet to be supported by conclusive empirical evidence. They used here a latent growth curve modeling approach to test the association of breastfeeding with IQ growth trajectories, which allows differentiating the variance in the IQ starting point in early life from variance in IQ gains that occur later in childhood through adolescence. Breastfeeding (yes/ no) was modeled as a direct predictor of three IQ latent growth factors (i.e. intercept, slope and quadratic term) and adjusted for the covariates socioeconomic status, mother's age at birth and gestational stage. Data came from the Twins Early Development Study (TEDS), a prospective cohort study of twins born between 1996 and 1994 in the United Kingdom, who were assessed 9 times on IQ between age 2 and 16 years (N = 11,582)..Having been breastfed was associated with a small yet significant advantage in IQ at age 2 in girls (β = .07, CI 95% from 0.64 to 3.01; N = 3,035) but not in boys (β = .04, CI 95% from -0.14 to 2.41). Having been breastfeeding was neither associated with the other IQ growth factors in girls (slope: β = .02, CI 95% from -0.25 to 0.43; quadratic: β = .01, CI 95% from -0.02 to 0.02) nor in boys (slope: β = .02, CI 95% from -0.30 to 0.47; quadratic: β = -.01, CI 95% from -0.01 to 0.01).Breastfeeding has little benefit for early life intelligence and cognitive growth from toddlerhood through adolescence.[19]

Fonseca AL, Albernaz EP et al 2013 conducted a study on Impact of breastfeeding on the intelligence quotient of eight-year-old children. This study aimed to determine the influence of breastfeeding on the intellectual capacity of children from a cohort in a developing country, with a control for the main confounding factors. A prospective cohort study was performed including all infants born in the hospitals of a medium-size city, and a random sample of these newborns was monitored at 30, 90, and 180 days of life, and at age 8 years. Several aspects of breastfeeding were assessed in the follow-up and, at 8 years, general intellectual capacity was assessed through the Raven's Colored Progressive Matrices test. The statistical analyses used Student's t-test, ANOVA, and linear regression and logistics, considering p-values less than 0.05 as statistically significant associations. At age 8 years, 560 children were assessed with Raven's Colored Progressive Matrices test. The average score was 22.56 points, with a standard deviation of 5.93. The difference in the averages found between the breastfed and non-breastfed groups at six months of age was 1.33 (p=0.008). Mother's and child's skin color, social and economic class, maternal education and smoking, and breastfeeding at six months of age (p=0.007) were still associated with the outcome. Children that were breastfed for six months or more had better performance in the general intellectual assessment, even after adjusting for the main confounding factors.[20]

The basic food for baby is milk. Breast feeding is not only the best, but also must for baby to meet nutritional as well as emotional needs of the infant. It is recommended that babies should be given exclusive breast feeding for first six months with adequate and appropriate complementary foods thereafter, along with continued breast feeding for up to two years or beyond. The advantages of exclusive breast feeding are many but the newly discovered benefits for example its role in increasing intelligence, reduction in risk of asthma and allergy, reduction in risk of Diabetes and Heart diseases and the Psychological developmental benefits to both mother and child are worth mentioning. based on this fact the researcher analyzed and concluded this study stating that cognitive and Physical development for breastfed children are highly significant than the artificially fed children.

ACKNOWLEDGEMENT

The author acknowledges Dr.A.V.Raman, Principal, Omayal achi College of Nursing Dr.Vijayalakshmi ,Prinicipal,Vignesh Nursing College and Dr. Jaya Mohan Raj, Former Dean, SRM College of Nursing for constant guidance, Mr. sakthival Bio-Statistician, for his guidance and constant support in advanced statistical analysis. We would like to thank study participants from the Government Hospital, Tambaram, Tamilnadu, India. The author would also

like to thank Mr. Karnamurthy P and friends for their constant support.

Conflict of Interest:

Dr. Abirami.P, declares that no conflict of interest. In addition, this study was not funded

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Statement of Informed Consent

Informed consent was obtained from all study participants for being included in the study

REFERENCES

1. Lawrence RA, and Lawrence RM: Breastfeeding: a guide for the medical profession. St Louis: Mosby, 2010.
2. American Academy of Pediatrics, Work Group on Breast feeding: Breastfeeding and the use of human milk. Pediatr 2005; 115: pp. 625.
3. Committee on Health Care for Underserved Women, American College of Obstetricians and Gynecologists: American College of Ob/Gyn, Breastfeeding: Maternal and Infant Aspects ACOG Committee Opinion, 361, February 2007.
4. Ip S, Chung M, Raman G, et al: Breastfeeding and maternal and infant health outcomes in developed countries. Evid Rep Technol Assess (Full Rep) 2007; 153: pp. 1-186.
5. Ip S, Chung M, Raman G, et al: A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. Breastfeed Med 2009; 4: pp. S17-S30.
6. Dewey KG: Nutrition, growth, and complementary feeding of the breastfed infant. Pediatr Clin North Am 2001; 48: pp. 87.
7. San Giovanni JP, Berkey CS, Dwyer JT, et al: Dietary essential fatty acids, long-chain polyunsaturated fatty acids, and visual resolution acuity in healthy full term infants: a systematic review. Early Hum Dev 2000; 57: pp. 165.
8. Horwood LJ, Darlow BA, and Mogridge N: Breast milk feeding and cognitive ability at 7-8 years. Arch Dis Child Fetal Neonatal Ed 2001; 84: pp. F23.
9. Schack-Nielsen L, and Michaelsen KF: Advances in our understanding of the biology of human milk and its effects on the offspring. J Nutr 2007; 137: pp. 503S.
10. Lucas A, Morley R, Cole TJ, et al: Breast milk and subsequent intelligence quotient in children born preterm. Lancet 1992; 339: pp. 261.
11. Neuringer M: Infant vision and retinal function in studies of dietary long-chain polyunsaturated fatty acids: methods, results, and implications. Am J Clin Nutr 2000; 71: pp. 256.
12. Jorgensen MH, Hernell O, Lund P, et al: Visual acuity and erythrocyte docosahexaenoic acid-status in breastfed and formula-fed term infants during first four months of life. Lipids 1996; 31: pp. 99.
13. San Giovanni JP, Parra-Cabrera S, Colditz GA, et al: Meta-analysis of dietary essential fatty acids and long-chain polyunsaturated fatty acids as they relate to visual resolution acuity in healthy preterm infants. Pediatrics 2000; 105: pp. 1292.
14. Horwood LJ, and Fergusson DM: Breastfeeding and later cognitive and academic outcomes. Pediatrics 1998; 101: pp. 91.
15. Lucas A, Morley R, Cole TJ, et al: Randomized trial of early diet in preterm babies and later intelligence quotient. BMJ 1998; 317: pp. 1481.
16. Jacobson SW, Chiodo LM, and Jacobson JL: Breastfeeding effects on intelligence in 4- and 11-year old children. Pediatrics 1999; 103: pp. 71.
17. Newton M, and Newton NR: Psychologic aspects of lactation. N Engl J Med 1967; 277: pp. 1179.
18. Zhou SJ, Baghurst P, Gibson RA, et al: Home environment, not duration of breast-feeding, predicts intelligence quotient of children at four years. Nutrition 2007; 23: pp. 236.
19. Von Stumm S, Plomin: Breast feeding and IQ Growth from Toddlerhood through Adolescence. R - PLoS ONE - January 1, 2015; 10 (9); PP e0138676.
20. Fonseca AL, Albernaz EP, Kaufmann CC, Neves IH, Figueiredo VL: Impact of breastfeeding on the intelligence quotient of eight-year-old children. - J Pediatr (Rio J) - July 1, 2013; 89 (4); 346-53.

***Corresponding Author:**
Abirami.P
Email: **abiramikarnamurthy@gmail.com**