BREASTFEEDING PATTERN AND ITS EFFECT ON COGNITIVE AND PHYSICAL DEVELOPMENT AMONG TODDLERS

By

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A DISSERTATION SUBMITTED TO THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

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CERTIFICATE

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Date

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ethical Committee of Dr. G. Sakunthala College of Nursing has discussed with its members the topic "A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy" opted by Mrs. P. KALYANI and its implication on study objects for her thesis for M.Sc. Nursing programme and the committee passed clearance for the same topic for her to persue.

Prof. Mrs. SANTHAM SWEETROSE, ***M.Sc.(N), Ph.D***

ETHICAL COMMITTEE

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ABSTRACT

A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy, 2010 - 2011.

Objectives of the study

1. To assess the cognitive and physical development of exclusively breastfed toddlers.
2. To assess the cognitive and physical development of partially breastfed toddlers.
3. To find out relationship between cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
4. To compare cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
5. To find out association of selected background variables with cognitive development of exclusively breastfed toddlers.
6. To find out association of selected background variables with cognitive development of partially breastfed toddlers.
7. To find out association of selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.
8. To find out association of selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

Conceptual framework	:	General System Theory.
Research design	:	Correlational design
Population	:	2 to 3yrs old toddlers.
Sample size	:	30 exclusively breastfed and 30 partially breastfed toddlers
Sampling technique	:	non probability convenience sampling
Setting	:	balwadi in Thiruverum balwadi area, Trichy
Tool	:	Observational checklist , Eliz health path and inch tape

Data collection

Pre assessment was done on mothers to divide exclusively and partially breast fed toddlers by structured interview schedule as inclusion criteria. The cognitive development was assessed by observational check list for 2 hours. And the physical assessment of height, weight, mid-arm circumference was found for 30 minutes.

Data Analysis

All the analysis was done by SPSS 13^{th} version. Data were analyzed by descriptive statistics (frequency, percentage, mean & standard deviation) and inferential statistics (correlation, independent sample‘t’ test, and chi – square test). All the statistics were done at the $p<0.05$ level of significance.

Major findings

1. There was a significant positive correlation between the cognitive and physical development [body mass index and mid arm circumference] of exclusively and partially breastfed toddlers.

2. The mean exclusively breastfed toddlers' cognitive development and physical development (BMI AND MAC) was higher than the mean partially breastfed toddlers' and the obtained 't'value was not significant.
3. There was no significant association between the selected background variables and cognitive development of exclusively and partially breastfed toddlers.
4. Significant association between the physical development (body mass index) of exclusively breastfed toddler and background variable only for the birth order and there is no significant association found between the selected background variable with physical development (Mid Arm Circumference) of exclusively breastfed toddler.
5. There was no significant association between the selected background variables with physical development (body mass index and Mid Arm Circumference) of partially breastfed toddlers.

Conclusion

Adequate nutrition during early years of life is of paramount importance for growth, development and long term health through adulthood. The essential fatty acids present in breast milk are solely responsible for the cognitive development in the children .So exclusively breastfed toddlers were shown excellent cognitive functioning. The physical development (BMI and MAC) of toddlers not only depends upon breastfeeding, it mostly relies on complementary feeding introduced at the correct age. The study concluded that the longer duration of breastfeeding will improve the cognitive development and physical development.

CHAPTER – I

INTRODUCTION

BACKGROUND OF THE STUDY

"…the global strategy includes as a priority for all governments…to ensure that the health and other relevant sectors protect, promote and support exclusive breastfeeding for six months and continued breastfeeding up to two years of age or beyond, while providing women access to the support they require – in the family, community and workplace – to achieve this goal."

-Global Strategy for Infant and Young Child Feeding, May 2002

Early childhood constitutes the most crucial period in life, when the foundations are laid for cognitive, social, emotional, physical, motor development and cumulative life-long learning.

India is the home to the largest child population in the world. "The development of children is the first priority on the country's development agenda, not because they are the most vulnerable, but because they are our supreme assets and also the future human resources of the country". In these words, our Tenth Five Year Plan (2002-07) underlines the fact that the future of India lies in the future of Indian children.

It is recognized that the period from birth to three years of age is a "critical window" for the promotion of optimal growth, health and cognitive development. Nutrition plays an important role in the physical, mental and emotional development of a child. Infants and toddlers are the most vulnerable group.

Marlow and Dorothy (2004) states that the toddler period extends from age one year to approximately three years of age. these years are often called" terrible two's". The toddler loves to experiment and explore the world around him.

WHO (2005), stated that the time of 6 months from birth, that a child received "no food or liquid other than breast milk, not even water" is called exclusive breast feeding.

The Indian Academy of Pediatrics (2005), has been recommending exclusive breast feeding and until at least one year of age as the best form of infant nutrition. Exclusive breast feeding for the first six months of life could save at least 1.3 million lives a year that's about 3500 children each day.

Wong (2007), states that partial breast feeding refers to the use of commercial milk formula or cow's milk along with the breast feeding.

Tambulwadkar (2005), states that toddlers can think and try to find the reason for actions. They use trial-and-error method to explore and get results. They learn to develop language. They learn to imitate with the intellectual ability. Identifications with the parents of the same sex occur by two years of age. They have a limited attention span.

SurajGupte (2001), states that the physical development is a measure of physical maturation, signifies an increase in the size of the body and its various organs thus, it can be measured in terms of centimeters and kilograms. It's mainly due to multiplication of cells and

an increase in intracellular substance unlike in the adult; it is an essential future of the child's life.

Elizabeth K.E. (2002), states that Body Mass Index is computed as weight in kilograms divided by square of height in meters. It correlates with subcutaneous fat and total body fat.

The Eliz health path for children is used to find body mass index of children under five. It is applicable to both the sexes and can be used to plan early intervention in case of obesity or underweight. The Eliz Health path for children is a simple screening chart, where height is plotted on the X and weight on Y axis and the BMI can be read from the right hand margin. Same chart is used for boys and girls, as the variation is only to the tune of decimals. The cut off curves selected to denote underweight, overweight, obesity and normal weight.

Park. K (2007), states that mid arm circumference yield a relatively reliable estimation of the body's muscle mass. It remains almost constant in children of 1-6 years of age with an early increase of about 0.25cm only.

SIGNIFICANCE AND NEED FOR THE STUDY

The child is the center of attraction in a family.

WHO recommends breastfeeding exclusively for the first six months of life, and recommends that it has to continue to at least one year. Healthy People 2010 is to have 75% of all new mothers begin breastfeeding, with 60% exclusively breastfeeding at 3 months, 50%

breastfeeding when the baby is six months old, 25% exclusively breastfeeding at six months, and 25% breastfeeding at one year.

Children are the future of any nation. In India about three fourths of the pediatric population lives in rural areas. It is imperative to preserve this wealth and to promote their well being through exercising utmost care in order to make them healthy.

Infants who continue to be exclusively breastfed tend to be those who remain healthy and on an acceptable growth trajectory; significant illness or growth faltering can lead to interruption of breastfeeding or supplementation with infant formula or solid foods. . Studies of intelligence and development have also shown lower IQ and lower developmental scores among children who were not breastfed.

Children who are breastfed have better neurodevelopment outcomes, and the duration of breastfeeding also affects a child's intelligence. There are three substances, which may explain the association between breastfeeding and higher scores on intelligence tests. There are two fatty acids associated with the development of nerve cells, retina and the brain, and are present in breast milk but are absent in infant formula and cow's milk. These, docosahexaenoic acid (DHA) and aracidonic acid (ARA), have been shown in experiments to improve eyesight and some motor responses in infants and young children.

Hoefer and Hardy, 1929 concluded that children breastfed for more than 4 to 9 months were mentally superior to those breastfed for shorter periods.

Nyarucucha CN., et al (2006) stated that malnutrition is increasingly recognized as a prevalent and important health problem in many developing countries. This problem has serious longterm consequences for the child and adversely influences their development. Poor nutrition or malnutrition is caused by not getting the proper nutrients needed for normal growth and development. Undernourished children do grow to their full potential of physical and mental abilities. Malnutrition makes the child more susceptible to infection and recovery is slower and mortality is higher.

Kumar, D and Goel (2006) conducted a study on "Influence on infant feeding practices and nutritional status of under-five children**"**. This study included 217 under-five children. Exclusive Breast Feeding: 23.5 per cent had exclusive breast feeding among whom 27.4 percent underweight, 49.0 percent stunting and 5.6 percent wasting were found. And 76.5 percent who did not have exclusive breast feed also suffered from underweight, stunting and wasting i.e. 43.7 percent, 52.4 percent and 12.0 percent respectively.

Children's health is tomorrow's wealth. The professionals who work with the children must have the knowledge of existing feeding practices among mothers and the physical and cognitive development of their children. She must be able to identify the various feeding practices and taboos that exist and which in turn affect the nutritional status of children, should share her skill and knowledge to prevent malnutrition.

Hence, the investigator suggests that this study aims at assessing the breast feeding patterns and their effect on physical and cognitive development among toddlers.

STATEMENT OF THE PROBLEM

A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy, 2010 - 2011.

OBJECTIVES OF THE STUDY

1. To assess the cognitive and physical development of exclusively breastfed toddlers.
2. To assess the cognitive and physical development of partially breastfed toddlers.
3. To find out the relationship between cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
4. To compare cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
5. To find out association of selected background variables with cognitive development of exclusively breastfed toddlers.
6. To find out association of selected background variables with cognitive development of partially breastfed toddlers.
7. To find out association of selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.
8. To find out association of selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

RESEARCH HYPOTHESES

At $p<0.05$ level

H1 : There is a significant relationship between the cognitive and physical development of exclusively and partially breastfed toddlers.

H2 : There is a significant difference between the mean scores of cognitive and physical development of exclusively and partially breastfed toddlers.

H3 : There is a significant association between selected background variables with cognitive development of exclusively breastfed toddlers.

H4 : There is a significant association between selected background variables with cognitive development of partially breastfed toddlers.

H5 : There is a significant association between selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.

H6 : There is a significant association between selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

OPERATIONAL DEFINITION

Breast feeding pattern includes exclusive and partial breastfeeding.

Exclusive breastfeeding means a child received “no food or liquid other than breast milk, not even water”.

In this study it refers to an infant’s breast milk consumption with no supplementation of any type of food or drink (no water, no juice, no non-human milk and no solids), except for vitamins, minerals, and medications up to the age of four months.

Partial breastfeeding means replacing one or more of the feedings from the breast.

In this study, it refers to the time in 4 months, from birth, that a child received “breast milk along with feedings of other liquids or milk”.

Toddler

The children of age between 1 to 3 years.

In this study, it refers to the children of age between 2 to 3 years.

Cognitive development

The toddler’s way of thinking and perception of the world.

In this study, it refers to the object constancy; trial and error; spatial perspective of height; spacial perspective of object; egocentricity; imagination and reality as measured by observational check list.

Physical development

The physical development is a measure of physical maturation, and it signifies an increase in the size of the body and its various organs.

In this study it refers to the toddlers, body mass index and mid arm circumference as measured by Eliz health path and by inch tape.

ASSUMPTIONS

1. Exclusively breastfed toddler will have increased cognitive and physical development.
2. Partially breastfed toddler will have poor cognitive and physical development.

DELIMITATIONS

The study was delimited to

toddlers of 2 to 3 years

only balwadis

sixty samples only

a period of six weeks for data collection.

CHAPTER – II

REVIEW OF LITERATURE

Review of literature is a key step in research process. Review of literature refers to an extensive, exhaustive and systematic examination of publications relevant to the research project. The review of related literature is valuable guide to define the problem, recognizing its significance, suggesting promoting data gathering devices, appropriate study design and source of data.

Review of literature for the present study has been organized under the following headings:

1. Literature related to breastfeeding and its effect on cognitive development.
2. Literature related to breastfeeding and its effect on physical development (Body mass index and Mid arm circumference).

LITERATURE RELATED TO BREASTFEEDING AND ITS EFFECT ON COGNITIVE DEVELOPMENT

Judith Ann Allender et al., (2010) state that a healthy start is foundational to well- being later in life. Both nutrition and bonding can be accomplished by breast-feeding. Breast feeding for the infant is well established and includes long – term increased cognitive development through adolescence.

Foroushani AR et al., (2010) conducted a study on effect of breastfeeding on cognitive performance in a British birth cohort. . Children who were exclusively breastfed scored higher in cognitive tests.

Catharine R Gale (2010) conducted a study on to investigate the relation between breastfeeding, use of docosahexaenoic acid (DHA)-fortified formula and neuropsychological function in children. It's a prospective cohort study in which 241 children aged 4 years were followed up from birth. The study concluded that Differences in children's intelligence according to the type of milk fed in infancy may be due more to confounding by maternal or family characteristics than to the amount of long-chain polyunsaturated fatty acids they receive in milk.

Data from Healthy People 2010 indicate that even partial breastfeeding is helpful and offers some of the health benefits of breastfeeding. Pediatric nurses in the community and the hospital are in an excellent position to promote and support breastfeeding ,thereby contributing to the Healthy people 2010 goal of increasing the proportion of mothers who breastfeed their babies.

Morrow-Tlucak. M. et al., (2009) measured cognitive development in children at the age of 2 years. Using the Bailey scale, it showed that those breastfed for four months or less had a 3.7 point advantage over those artificially fed. Those fed for over four months were at a 9.1 point advantage. As with the above study, this study shows a dose response relationship between the duration of breastfeeding and the subsequent I.Q.

Terri Kyle (2009) states that breastfed babies have higher intelligent quotient. There is possible enhancement of cognitive development in infants.

Park. K (2009) states that special fatty acids in breast milk lead to increased intelligence quotients. A breastfed baby is likely to have an IQ of around 8 points higher than a non breastfed baby.

Oddy WH et al., (2008) conducted a study on breast feeding and cognitive development in childhood to examine prospectively the relation between duration of breast feeding and cognitive outcomes. This study reveals that the exclusively breastfed children had a higher cognitive development than the partially breastfed children.

James W etal., (2008) observed differences in cognitive development between breast-fed and formula-fed children then the study concluded that breast-feeding was associated with significantly higher scores for cognitive development than it was with formula feeding.

Turck (2007) reports that Higher levels of docosahexaenoic acid, important to brain development, are found in breast milk, and its benefits are correlated with the duration of breast feeding.

Avshalom Caspi et al., (2007) conducted a study to examine the moderation of breastfeeding effects on the IQ by genetic variation in fatty acid metabolism. This study reveals that breastfed children attain higher IQ scores than children who are not fed with breast milk, presumably because of the fatty acids uniquely available in breast milk. It shows that the association between breastfeeding and IQ is moderated by a genetic

variant in FADS2, a gene involved in the genetic control of fatty acid pathways. It also shows that genes may work via the environment to shape the IQ, helping to close the nature versus nurture debate.

Anjali Jain, MD etal., (2007) conducted many studies such as birth cohorts, school registry cohorts, and case-control studies to determine whether breastfeeding has a beneficial effect on intellect. This study concludes that the effect of breastfeeding on intellect was significant.

Abirami. P. (2006) conducted a study to assess the relationship between breast feeding pattern and cognitive developmental outcome of children. The study concludes that longer duration of breast feeding increases will improve the cognitive development and physical growth.

Der et al., (2006) found that breast feeding was associated with higher IQ in children, but that this effect was almost entirely accounted for by maternal IQ. More intelligent mothers were more likely to breast feed, and maternal IQ was more predictive of feeding choice than mothers' age, education, home environment, and antenatal smoking status, or children's birth weight and birth order.

Kevin Denny et al., (2006) stated how that to determine the effect of breastfeeding on children’s cognitive skills as measured at ages 0- 3. The study concluded that the effect of breastfeeding on intellect was significant.

Horwood LJ et al., (2006) stated about breast milk feeding and cognitive ability at 0-3 years. Increasing duration of breast milk feeding

was associated with significant increases in both verbal IQ and performance IQ. Children breastfed for eight months or longer had mean verbal IQ scores that were 10.2 points higher and performance IQ scores that were 6.2 points higher than children who did not receive breast milk . There was a significant association between duration of breast milk feeding and long term benefits for child cognitive development.

Rogan WJ (2006) conducted a study to determine whether the mode of infant feeding affected developmental scores or school grades, prospective data were collected on how the children were fed; 788 of the children had Bayley tests at 6 months, 720 at 12 months, 676 at 18 months and 670 at 2 years. There were statistically significant but small increases in scores among breast-fed children on at least some subscales of the Bailey and McCarthy at all time points from 2 years through 5 years. , those breast-fed scored slightly better than those bottlefed; the effect is small but still detectable at school age.

Angelsen. NK (2005) conducted a study to examine whether duration of breast feeding has any effect on a child's cognitive or motor development in a population with favourable environmental conditions and a high prevalence of breast feeding. The study concluded that Children breast fed for less than 3 months had an increased risk, compared to children breast fed for at least 6 months .So the study suggest that longer duration of breast feeding benefits cognitive development.

Meharban Singh (2004) reported that breastfed babies are smarter and have been shown to have higher intelligence quotient (IQ). High

concentrations of two key long chain fatty acids (arachidonic acid and decosahexaenoic acid) and lactose promote brain growth.

Lowder milk and Perry (2003) describe that human milk is designed specially for human infants and is nutritionally superior to any alternative. The nutrients in breast milk are more easily absorbed than those in formula. Breast milk may enhance cognitive development.

Anderson JW et al., (1999) described that Breastfeeding and cognitive development: a meta-analysis. In the analysis of 20 studies which compared cognitive development, it was determined that breastfeeding was associated with significantly higher scores for cognitive development than artificial feeding and that the developmental benefits of breastfeeding increased with the duration of feeding.

Adele pillitteri (1999) reports that breast milk contains the ideal electrolyte and mineral composition for human infant growth. It is higher than cow's milk in lactose, an easily digested sugar that provides ready glucose for rapid brain growth. The ratio of cysteine to methionine (two amino acids) in breast milk also appears to favour rapid brain growth in early months.

LITERATURE RELATED TO BREASTFEEDING AND ITS EFFECT ON PHYSICAL DEVELOPMENT

Judith Ann Allender et al., (2010) stated that long term health effects of breastfeeding exclusively for at least 6 months is associated with reduced risk of overweight in later life, and breastfed infants have slightly higher IQ scores.

Park. K (2009) states that lactation continues to make an important contribution to the child's nutrition for 18 months or longer.

Naveen Sha (2008) conducted a study to investigate feeding and weaning practices along with the nutritional status of children under five in rural Maharashtra, India. The study concludes that the critical window of the first five years of life highlights the importance of appropriate feeding and weaning practices in infants and toddlers. For most problems related to malnutrition may be tackled by engendering awareness in rural mothers and thereby promoting healthy eating.

Rosamma K. J. (2007) conducted a study on 'To Correlate Feeding Practices Of Mothers And Nutritional Status Of Their Children'. There was positive correlation between feeding practices and selected nutritional parameters like present weight, height, mid arm circumference and chest circumference.

Singhal (2007) states that several systematic reviews have found that the longer a mother breast-feeds her infant, the greater the protection against later obesity. This is thought to be due to the "growth acceleration hypothesis" that associates faster growth in infancy with later obesity levels and the fact that breast milk permits slower growth when compared to infant formulas.

Eregie CO. (2007) conducted a study on exclusive breastfeeding and toddlers growth studies of 219 exclusively breastfed toddlers were studied and analyzed. The standards identified 93 per cent (for height) and 94 per cent (for MAC ratio) of exclusively breastfed healthy toddlers as having normal growth for age significant at ($p < 0.001$) level.

Kramer was the first to report an association between breastfeeding effect and BMI of the toddlers since then, several other studies have attempted to elucidate the factors that confound and/or mediate the association between breastfeeding and weight status in later childhood. With respect to early feeding choices, both the decision to breast- or bottle-feed and the timing of the introduction of solid foods appear to have an impact on later weight status. Although the present review is focused on Breast milk, it has been shown to have positive effects on body composition and health outcomes later in life.

Berthold Koletzko (2007) conducted a study to assess the impact of breast feeding on the risk of obesity and risk of being overweight in children at the time of entry to school. It is concluded that in industrialized countries promoting prolonged breast feeding may help decrease the prevalence of obesity in childhood. Since obese children have a high risk of becoming obese adults, such preventive measures may eventually result in a reduction in the prevalence of cardiovascular diseases and other diseases related to obesity.

Emer cooper (2005) conducted a study to analysis of growth data for breastfed infants and its relevance to breast feeding. It is concluded that the infants in this study were recorded as having been exclusively breastfed, fully breastfed or breastfed to need and may have had the opportunity to gain more weight.

Elizabeth. K.E. and Manu Muraleedharan (2003) conducted a study to develop four appropriate three in one weight, height and built in body mass index (BMI) charts, for under fives, 0–5 year olds, > 5–10 year olds, > 10–18 year olds, and adults and to delineate the normal range,

underweight, overweight and obesity. It is concluded that the charts are applicable to both sexes and are user friendly. These are appropriate for general screening of nutritional status and to determine underweight, overweight, and obesity from birth to adulthood. They give a visual display of the ideal health path with respect to weight, height, and BMI and the adjustment in weight required to reach the normal range.

WHO and UNICEF in (2003) it provides a comprehensive framework for promoting appropriate feeding practices and reducing malnutrition. The strategy recommends that infants should be exclusively breastfed for the first six months of life and thereafter, should receive adequate and safe complementary foods while breastfeeding is continued for two years or beyond. The transition from exclusive breastfeeding to complementary feeding, covering the period from 6-24 months of age, is the most vulnerable period, when growth faltering starts in many children. Early introduction of complementary foods may displace breast milk and increase the risk of infection. Promotion of breastfeeding and appropriate complementary foods is important for achieving optimal growth and development of children.

Viswanathan. J. et al., (2000) stated that the health and nutritional status of a child and its subsequent growth and development depend upon successful feeding practices right from birth. Breastfeeding deserves encouragement from all concerned in the welfare of children.

CONCLUSION

Based on the above literature it was stated that, breastfeeding benefits more than partial feeding in children in cognitive and physical development.

CONCEPTUAL FRAMEWORK

This study is based on the General System Theory pioneered by Von Bertalanffy (1968).

General System Theory (GST) consists of the scientific explanation of “whole and wholeness”. The interdisciplinary nature of concepts, models and principles applying to “system” provides a possible approach towards the unification of science. A system is defined, “as a whole with interrelated parts, in which the parts have a function and the system as a totality has a function”. Each system has its subsystem with its own imaginary boundaries which separate the systems from its environment. These interacting elements or components or subsystems may not serve a different function but ultimately they all serve a common purpose to contribute to the overall goal of the system. General System Theory serves as a model for viewing people as interacting with the environment. Each system has definable boundaries that filter and regulate the flow of input and output exchange with the environment. The main concepts in the system theory are input, throughput and output.

Input

Input is any form of energy, information, material or human that enters into the system through its boundaries. Through the process of selection the system regulates the type and amount of input received.

In this study, the input consists of the exclusively and partially breastfed toddlers.

Through Put

It is the process that occurs between the input and output, which enables the input to be transformed as output in such a way that can be readily used by the system.

It includes the assessment of breastfeeding pattern among mothers of toddlers and cognitive and physical development of toddlers.

Output

It is any energy, information or material that is transferred, to the environment. After processing the input, the system's output to the environment is in an altered response.

In this study, output has both positive outcome and the negative outcome which include the excellent cognitive and physical development of toddlers and poor cognitive and physical development of toddlers.

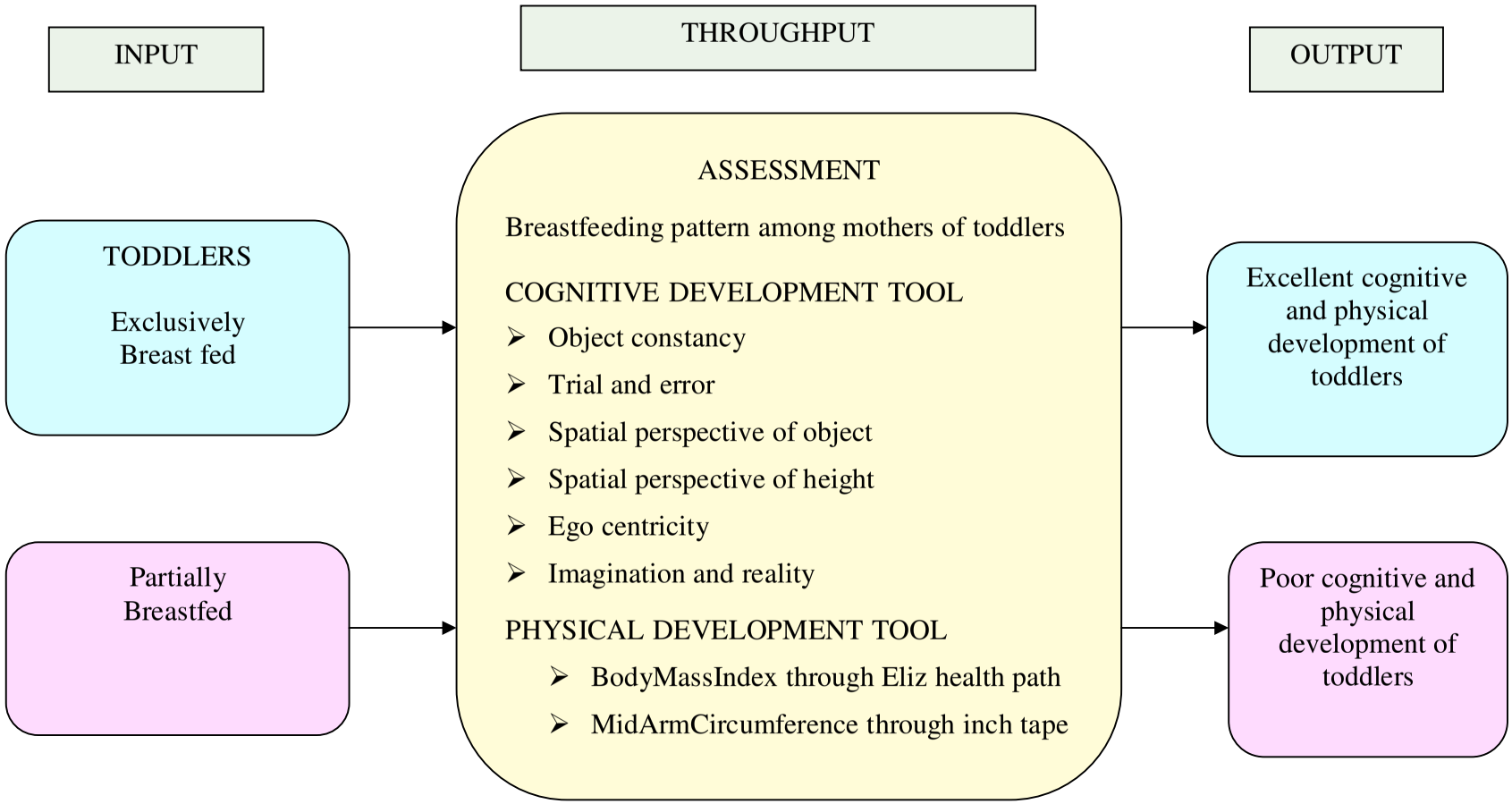


Figure-1-Conceptual framework – General System Theory (1968)

CHAPTER – III

RESEARCH METHODOLOGY

Methodology of research refers to investigations of the ways of obtaining, organizing and analyzing data. Methodology studies address the development, Validation and evaluation of research tools (or) methods.

(Polit – 2004).

RESEARCH APPROACH

The research approach used for this study was evaluative approach.

RESEARCH DESIGN

Research design is the overall plan for addressing a research question, including specifications for enhancing, the integrity of the study.

(Polit – 1999).

Correlational design was used in this study.

SETTING OF THE STUDY

The study was conducted in balwadi in Thiruverumbur area, Trichy-19. This area was located at a distance of about 20Kms away from the Dr.G.Sakunthala college of nursing, Trichy-5. It has strength of 75 children. It is the focal point for the delivery of services at community levels to children below six years of age.

POPULATION

The population of the study consisted of 2 to 3yrs old toddlers in the balwadi in Thiruverumbur area, Trichy-19.

SAMPLE

The sample was 60 toddlers of 2 to 3yrs of age in balwadi in Thiruverumbur area, Trichy.

SAMPLE SIZE

The sample of this study consisted of 30 exclusively breastfed and 30 partially breastfed toddlers of 2 to 3yrs of age in balwadi in Thiruverumbur area, Trichy.

SAMPLING TECHNIQUE

Sampling technique used for this study was non-probability convenience sampling.

CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria

1. Toddlers of 2 to 3 yrs of age.
2. Toddlers who had exclusively breastfed and partially breastfed.
3. Children of both sexes.
4. Those who are available at the time of data collection.
5. Those who are willing to participate.

Exclusion Criteria

1. Mothers who are having chronic ill child.
2. Mothers who are having special children.
3. Children who are having communicable disease.

RESEARCH TOOL AND INSTRUMENT

The instrument consisted of three sections which are described below.

DESCRIPTION OF THE INSTRUMENT

SECTION I: Consisted of 8 items of which first 3 items were related to child's age, sex and birth order and next 6 items were mothers background such as education, occupation, locality, family income, type of family and type of delivery.

SECTION II: Physical assessment consisted of body mass index (height, weight) and mid arm circumference.

SECTION III: Consisted of 6 items to assess the cognitive development of toddlers such as object constancy, trial and error, spacial perspective of object, spacial perspective of height, ego-centricity and imagination and reality.

SCORING PROCEDURE

The possible vital scores on physical development of toddlers was a "score of 0 for obesity, 1 for overweight, 2 for normal weight and 3 for underweight for body mass index and a score of 1 for normal ,2 for malnourished and 3 for severely malnourished for mid-arm circumference".

For Body mass index:

Obesity	-	> 20
Overweight	-	18.6-20
Normal weight	-	15-18.5
Underweight	-	<15

For Mid-arm circumference:

Normal	-	13.6-16
Malnourished	-	12.5-13.5
Severely malnourished	-	<12.5

The possible vital scores for observational checklist on cognitive development of toddlers was a “score of 1 for excellent, 2 for good and 3 for poor”.

Excellent	-	76% to 100%
Good	-	51% to 75%
Poor	-	0% to 50%

VALIDITY AND RELIABILITY

Validity

The tool was evaluated by 5 experts who were requested to give their valuable suggestions about the content areas, relevance, clarity and appropriate need of the items. Experts suggested that there was no modification in the tool. So that the major study was carried out.

Reliability

The reliability of the tool was established by assessing the quality and adequacy of the tool by split half method. The reliability of the observational checklist of cognitive development was r = 0.8. The reliability of the physical assessment was r = 0.8. Hence the tool was highly reliable.

PILOT STUDY

In order to test the feasibility, relevance and practicability of the study a pilot study was conducted among 5 toddlers from 12.04.10 to 17.04.10 at Thiruverumbur area. The result of study was analyzed. The data collected were amenable to statistical analysis and thus the study was found to be feasible.

DATA COLLECTION PROCEDURE

The period of data collection was started from 01.05.2010 to 15.06.2010. Before starting the study the investigator obtained formal permission from Child development programme officer of Thiruverumbur area, to conduct the study in selected balwadis. Samples were selected with convenience sampling technique and correlational study was used. The timing of data collection was from 8.30am to 4.00pm. Two or Three toddlers were selected per day. The nature and purpose of the study was explained to the selected mothers and informed consent was obtained.

Pre assessment was done on mothers to divide exclusively and partially breast fed toddlers by structured interview schedule as inclusion criteria. The cognitive development was assessed by observational check list for 2 hours. And the physical assessment of height, weight, mid-arm circumference was found for 30 minutes. Then the BMI was calculated using eliz health path.

DATA ANALYSIS

All the analysis was done by SPSS 13th version.

Data were analyzed by descriptive statistics (frequency, percentage, mean & standard deviation) and inferential statistics (correlation, independent sample‘t’ test, and chi – square test). All the statistics were done at the $p<0.05$ level of significance.

ETHICAL CONSIDERATION

The research proposal was approved by the dissertation committee prior to pilot study. Permission was obtained from the Principal, Head of Child Health Nursing Department.

The oral consent was obtained from each mother of toddlers before starting the data collection. Assurance was given to the subjects that the confidential information given by them would be maintained throughout the study. The mothers were informed that they were free to drop out from the study at any time.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

INTRODUCTION

The data themselves do not provide answer to research questions. So the data need to be processed and analyzed in an orderly coherent fashion. After the analysis, they must be systematically interpreted. Interpretation is the process of making sense of the results and examining their implications.

This chapter deals with the description of the sample analysis and interpretation of the data to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers. The obtained data have been classified, grouped and analyzed statistically based on the objectives of the study.

OBJECTIVES OF THE STUDY

1. To assess the cognitive and physical development of exclusively breastfed toddlers.
2. To assess the cognitive and physical development of partially breastfed toddlers.
3. To find out relationship between cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
4. To compare cognitive and physical development of exclusively breastfed and partially breastfed toddlers.

5. To find out association of selected background variables with cognitive development of exclusively breastfed toddlers.
6. To find out association of selected background variables with cognitive development of partially breastfed toddlers.
7. To find out association of selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.
8. To find out association of selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

THE STUDY FINDINGS ARE REPRESENTED AS FOLLOWS

SECTION –I: Frequency, percentage distribution of background variables of the toddlers and their mothers.

SECTION –II: Frequency and percentage distribution of cognitive and physical development of exclusively and partially breastfed toddlers.

SECTION – III: Correlation between the cognitive and physical development of exclusively and partially breastfed toddlers.

SECTION – IV: Comparison of mean scores of cognitive and physical development of exclusively and partially breastfed toddlers.

SECTION – V: Association between the selected background variables with cognitive and physical development of exclusively and partially breastfed toddlers.

SECTION - I

This section deals with background variables of the exclusively and partially breastfed toddlers and their mothers.

Table-1

Frequency, percentage distribution of background variables of the toddlers and their mothers.

N=30

S. no.	Background variables	Exclusively breastfed		Partially breastfed	
		f	%	f	%
	Child				
1.	Age in years/months				
	a) 2	6	20.0	6	20.0
	b) 2/5	11	36.7	11	36.7
	c) 2/9	6	20.0	6	20.0
	d) 3	7	23.3	7	23.3
2.	Sex				
	a) Male	10	33.3	15	50.0
	b) Female	20	66.7	15	50.0
3.	Birth order				
	a) One	16	53.3	14	46.7
	b) Two	7	23.3	10	33.3
	c) Three	7	23.3	6	20.0
	Mother of the child				
4.	Education				
	a) Illiterate	7	23.3	4	13.3
	b) Primary school	7	23.3	11	36.7
	c) Middle school	9	30.0	7	23.3

(Cont...)

	d) Secondary school	3	10.0	3	10.0
	e) Higher secondary school	3	10.0	1	3.3
	f) Graduate	1	3.3	4	13.3
5.	Occupation				
	a) Government	1	3.3	1	3.3
	b) Private	11	36.7	3	10.0
	c) Housewife	18	60.0	26	86.7
6.	Family income in Rupees				
	a) 1500-2500	14	46.7	12	40.0
	b) 2501-3500	9	30.0	12	40.0
	c) 3501 and above	7	23.3	6	20.0
7.	Type of family				
	a) Joint family	7	23.3	11	36.7
	b) Nuclear family	23	76.7	19	63.3
8.	Type of delivery				
	a) Vaginal delivery	25	83.3	18	60.0
	b) Caesarian delivery	5	16.7	12	40.0

The following inferences were made

Majority of exclusively breastfed toddlers were 11 (37) were between 2.5 years, 7 (23) of them were between 3 years.

Most of them 20 (67) were females and 10 (33) of them were males.

Most of the children 16 (53) were the first child, 7 (23) were the second child and the third child.

Majority of the mothers 9 (30) were finished middle school, 7 (23) were illiterates and finished primary school education, 3 (10) were finished secondary and higher secondary school and 1 (3) were graduates.

Most of the mothers 18 (60) were house wives, 11 (37) were private employees, 1 (3) was government employee.

Family income shows that 14 (47) were between Rs.1500-2500Rs/month, 9 (30) were between 2501-3500 Rs/month, 7 (23) were above 3501Rs/ month.

Most of them 23 (77) were living as nuclear families and 7 (23) were living in joint family.

Majority of them 25 (83) were delivered vaginaly and 5 (17) of them had a caesarian section.

Majority of partially breastfed toddlers were 11 (37) were between 2.5 years, 7 (23) of them were between 3 years.

All of them 15 (50) were females and of them 15 (50) were males.

Most of the children 14 (47) were the first child, 10 (33) were the second child and 6 (20) were the third child.

Majority of the mothers 11 (37) were finished primary school, 7 (23) were finished middle school, 4 (13) were illiterates and finished graduation and 1 (3) were finished higher secondary school.

Most of the mothers 26 (87) were house wives, 3 (10) were private employees, 1 (3) was government employee.

Family income shows that 12 (40) were between Rs.1500-2500Rs/month and 2501-3500 Rs/month, 6 (20) were above 3501Rs/ month.

Most of them 19 (63) were living as nuclear families and 11 (37) were living in joint family.

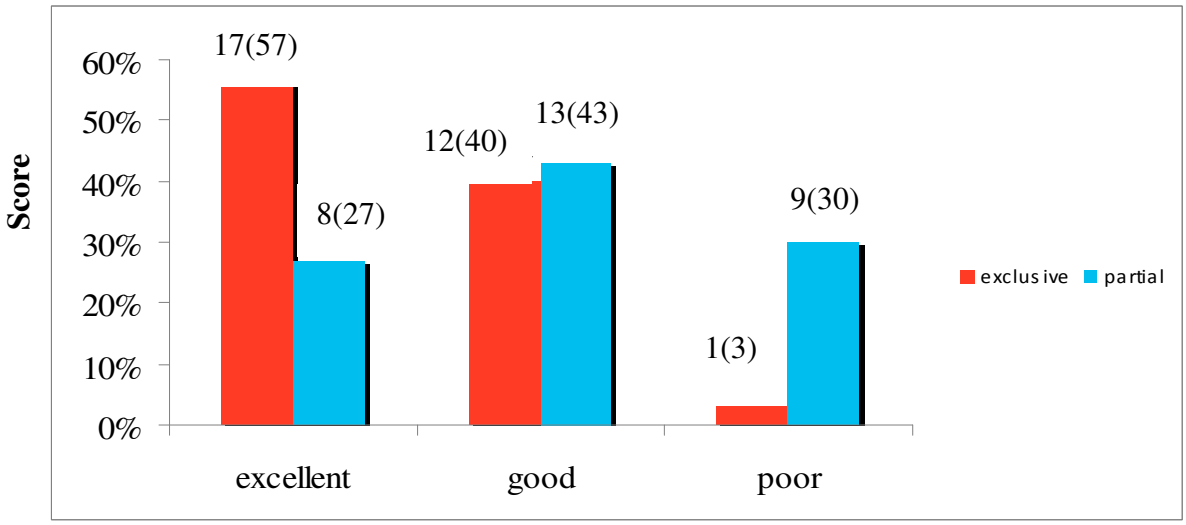
Majority of them 18 (60) were delivered vaginaly and 12 (40) of them had a caesarian section.

SECTION-II

This section deals with the frequency and percentage distribution of cognitive and physical development of exclusively and partially breastfed toddlers.

Figure-2:1:

Percentage distribution of cognitive development of exclusively and partially breastfed toddlers.



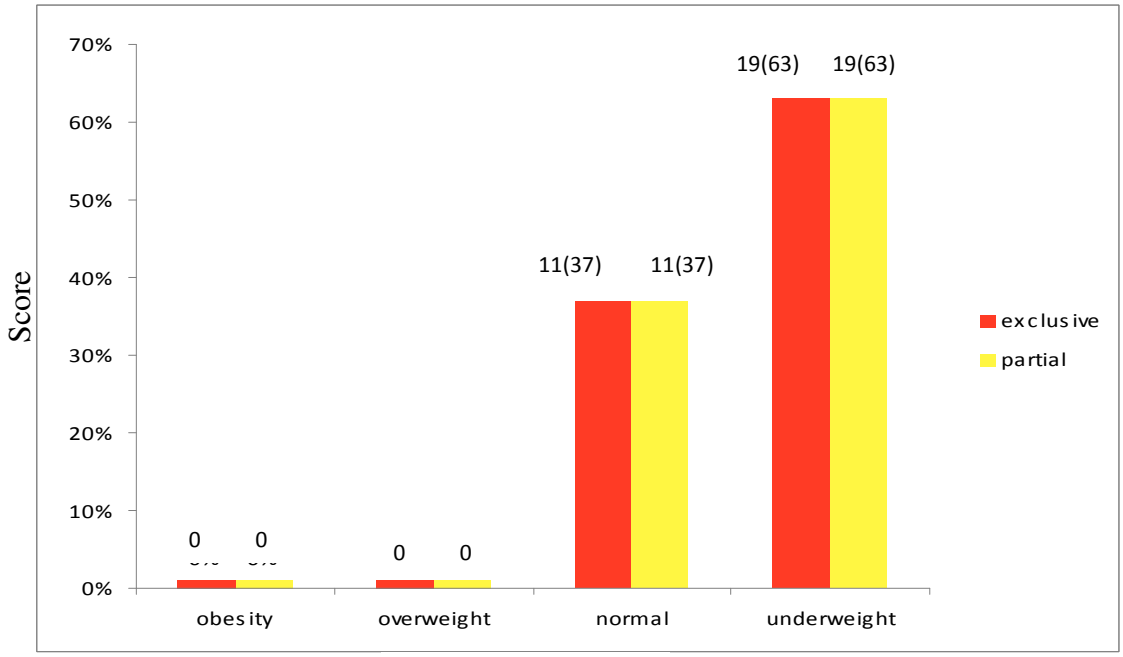
Cognitive development

The inferences made are

Among 30 exclusively breastfed toddlers, 17 (57) of them were excellent, 12(40) of them were good, 1(3) was poor according to their cognitive development. Among 30 partially breastfed toddlers, 8 (26) of them were excellent, 13 (43) of them were good, 9 (30) was poor according to their cognitive development.

Figure- 2:2:

Percentage distribution of physical development according to Body Mass Index of exclusively and partially breastfed toddlers.

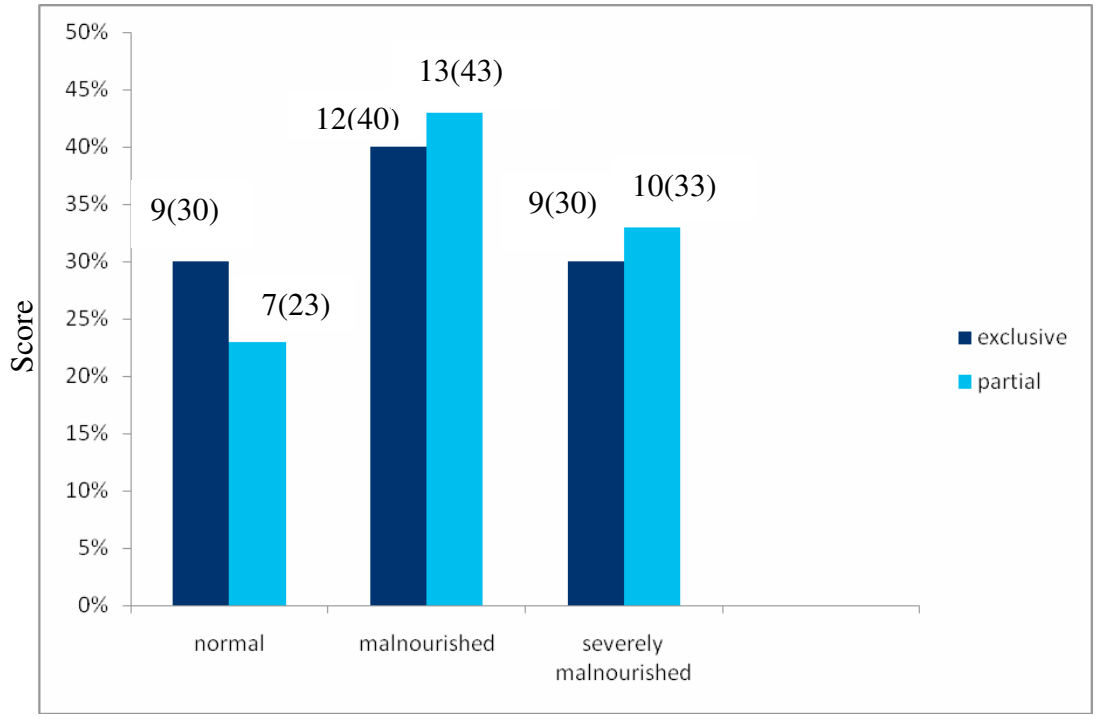


The inferences made are

Among 30 exclusively breastfed toddlers 11(37) of them were normal; 19(63) of them were underweight according to their Body Mass Index. Among 30 partially breastfed toddlers 11(37) of them were normal; 19(63) of them were underweight according to their Body Mass Index.

Figure- 2:3:

Percentage distribution of physical development according to MidArm Circumference of exclusively and partially breastfed toddlers.



Mid Arm Circumference

The inferences made are

Among 30 exclusively breastfed toddlers 9 (30) of them were normal; 12 (40) of them were malnourished and 9(30) of them were severely malnourished according to their Mid-arm circumference. Among 30 partially breastfed toddlers 7 (23) of them were normal; 13(43) of them were malnourished and 10 (33) of them were severely malnourished according to their Mid-arm circumference.

SECTION-III

Correlation between the cognitive and physical development of exclusively and partially breastfed toddlers.

Table-2

Relationship between physical and cognitive development of exclusive and partially breastfed toddlers.

S. no	Components	Mean	S.D	r
1.	Exclusively Breastfed			
	Cognitive development and Physical development (BMI)	75.521 12.967	8.830 2.0759	 0.810**
	Cognitive development and Physical development (MAC)	75.521 12.950	8.830 0.8826	 0.815**
2.	Partially Breastfed			
	Cognitive development and Physical development (BMI)	67.10 12.800	17.727 1.9722	 0.541**
	Cognitive development and Physical development (MAC)	67.10 12.767	17.727 1.0233	 0.544**

**Significant at p< 0.01 level.

The inferences made are

There was a significant positive correlation between the cognitive (mean = 75.521, standard deviation = 8.830) and physical development [Body Mass Index (mean = 12.967, standard deviation = 2.0759, r = 0.810) and Mid Arm Circumference (mean = 12.950,cstandard deviation = 0.8826, r = 0.815)]of exclusively breastfed toddlers.

There was a significant positive (r = 0.541) correlation between the cognitive (mean = 67.10, standard deviation = 17.727) and physical development [Body Mass Index (mean =12.800, standard deviation = 1.9722, r = 0.541) and Mid Arm Circumference (mean = 12.767, standard deviation = 1.0233, r = 0.544)] of partially breastfed toddlers. The score was significant at $p<0.01$ level.

So the hypothesis 1(h1) was accepted.

SECTION-IV

This section deals with the mean scores of cognitive and physical development of exclusively and partially breastfed toddlers.

Table-3

Comparison of exclusively and partially breastfed toddlers cognitive and physical development (BMI & MAC) scores.

Components	Exclusively Breastfed		Partially Breastfed		Mean difference	t' value
	Mean	SD	Mean	SD		
Cognitive	75.521	8.830	67.10	17.727	8.427	1.785
Physical Development (BMI)	12.967	2.0759	12.800	1.9722	0.1667	0.319
Cognitive	75.521	8.830	67.10	17.727	8.427	1.785
Physical Development (MAC)	12.950	0.8826	12.767	1.0233	0.1833	0.742

The inferences made are

The mean exclusively breastfed toddlers cognitive development (75.521) with the standard deviation (8.830) was higher than the mean partially breastfed toddlers (67.10), with the standard deviation (8.830) and the obtained't' value ($t = 1.785$) was not significant at $p< 0.05$.

The mean exclusively breastfed toddlers physical development (Body Mass Index) (12.967) with the standard deviation (2.0759) was higher than the mean partially breastfed toddlers (12.800) with the standard deviation (1.9722) and the obtained‘t’ value ($t = 0.319$) was not significant at $p < 0.05$.

The mean exclusively breastfed toddlers physical development (Mid Arm Circumference) (12.950) with the standard deviation (0.8826) was higher than the mean partially breastfed toddlers (12.767) with the standard deviation (1.0233) and the obtained‘t’ value ($t=0.742$) was not significant at $p < 0.05$.

So the hypothesis 2 (h2) was accepted.

SECTION-V

Association between the selected background variables with cognitive and physical development of exclusively and partially breastfed toddlers.

Table-4:

Association between the selected background variables of the sample and cognitive development of exclusively breastfed.

N=30

S.no.	Background variables	Exclusively breastfed			χ^2
		Excellent	Good	Poor	
	Child				
1.	Age in years/months				
	a) 2	2	1	0	
	b) 2/5	4	6	1	4.866
	c) 2/9	4	2	0	
	d) 3	4	3	0	
2.	Sex				
	a) Male	8	2	0	3.441
	b) Female	9	10	1	
3.	Birth order				
	a) One	7	8	1	
	b) Two	5	2	0	2.742
	c) Three	5	2	0	

(Cont...)

	Mother of the child				
4.	Education				
	a) Illiterate	3	4	0	
	b) Primary school	5	2	0	12.381
	c) Middle school	6	3	0	
	d) Secondary school	2	1	0	
	e) Higher secondary school	1	1	1	
	f) Graduate	0	1	0	
5.	Occupation				
	a) Government	0	1	0	
	b) Private	3	8	0	10.622
	c) Housewife	14	3	1	
6	Family income in ₹				
	a) 1500-2500	8	6	0	
	b) 2501-3500	4	4	1	3.142
	c) 3501 and above	5	2	0	
7	Type of family				
	a) Joint family	4	2	1	3.584
	b) Nuclear family	13	10	0	
8	Type of delivery				
	a) Vaginal delivery	16	8	1	5.400
	b) Caesarian delivery	1	4	0	

The inferences made are

Significant association was not found between the selected background variables like age, sex, birth order, education, occupation, type of family and type of delivery with cognitive development of exclusively breastfed toddlers.

So the hypothesis 3 (h3) was rejected.

Table-5

Association between the selected background variables of the sample and cognitive development of partially breastfed.

S.no.	Background variables	Partially breastfed			$\chi 2$
		Excellent	Good	Poor	
	Child				
1.	Age in years/months				
	a) 2	3	0	3	
	b) 2/5	2	6	3	6.501
	c) 2/9	2	3	1	
	d) 3	1	4	2	
2.	Sex				
	a) Male	4	9	2	4.701
	b) Female	4	4	7	
3.	Birth order				
	a) One	4	5	5	
	b) Two	2	6	2	1.761
	c) Three	2	2	2	
	Mother of the child				
4.	Education				
	a) Illiterate	0	4	0	
	b) Primary school	1	3	7	18.806
	c) Middle school	4	3	0	
	d) Secondary school	1	1	1	
	e) Higher secondary school	1	0	0	
	f) Graduate	1	2	1	

(Cont...)

5.	Occupation				
	a) Government	0	0	1	
	b) Private	1	2	0	3.672
	c) Housewife	7	11	8	
6.	Family income in Rupees				
	a) 1500-2500	3	6	3	
	b) 2501-3500	4	3	5	3.245
	c) 3501and above	1	4	1	
7.	Type of family				
	a) Joint family	2	6	3	1.016
	b) Nuclear family	6	7	6	
8.	Type of delivery				
	a) Vaginal delivery	4	9	5	0.869
	b) Caesarian delivery	4	4	4	

The following inferences could be made are

Significant association was not found between the selected background variables like age, sex, birth order, education, occupation, type of family and type of delivery with cognitive development of partially breastfed toddlers. So the hypothesis 4(h4) was rejected.

Table-6

Association between the selected background variables of the sample and physical development (BMI and MAC) of exclusively breastfed. N=30

S .no	Background variables	Exclusively breastfed (BMI)		$\chi 2$	Exclusively breastfed (MAC)			$\chi 2$
		Normal weight	under weight		Normal	malnourished	severely malnourished	
	Child							
1.	Age in years/months							
	a) 2	2	4		2	3	1	
	b) 2/5	3	8	1.022	3	4	4	1.887
	c) 2/9	3	3		2	3	1	
	d) 3	3	4		2	2	3	
2.	Sex							
	a) Male	7	3	7.177	4	3	3	0.875
	b) Female	4	16		5	9	6	
3.	Birth order							
	a) One	3	13		3	8	5	
	b) Two	3	4	5.970*	2	3	2	3.988
	c) Three	5	2		4	1	2	

(Cont...)

	Mother of the child						
4	Education						
	a) Illiterate	2	5		1	2	4	
	b) Primary school	3	4	4.026	1	4	2	10.21
	c) Middle school	2	7		3	4	2	
	d) Secondary school	2	1		2	0	1	
	e) Higher second-ary school	2	1		2	1	0	
	f) Graduate	0	1		0	1	0	
5	Occupation							
	a) Government	0	1	3.575	0	1	0	3.767
	b) Private	2	9		7	7	4	
	c) Housewife							
6	Family income in ₹							
	a) 1500-2500	5	9		3	6	5	
	b) 2501-3500	2	7	2.078	2	4	3	3.307
	c) >3501	2	1		4	2	1	

(Cont...)

7	Type of family							
	a) Joint family	4	3	1.648	3	3	1	1.273
	b) Nuclear family	7	16		6	9	8	
8	Type of delivery							
	a) Vaginal delivery	11	14	3.474	9	7	9	9.000
	b) Caesarian delivery	0	5		0	5	0	

*Significant at $p < 0.05$

The inferences made are

Significant association was found between the birth order and physical development (BMI) of exclusively breastfed toddlers ($\chi 2 = 5.970$, df=) at $p < 0.05$.

So the hypothesis 5 (h5) was accepted.

Table-7

Association between the selected background variables of the sample and physical development (BMI and MAC) of partially breastfed toddlers. N=30

S.no	Background variables	Partially breastfed (BMI)		$\chi 2$	Partially breastfed (MAC)			$\chi 2$
		Normal weight	Under weight		Normal	malnourished	severely malnourished	
	Child							
1.	Age in years/months							
	a) 2	2	4		1	4	1	
	b) 2/5	4	7	0.173	1	5	5	5.764
	c) 2/9	2	4		3	1	2	
	d) 3	3	4		2	3	2	
2.	Sex							
	a) Male	6	9	0.144	3	7	5	0.220
	b) Female	5	10		4	6	5	
3.	Birth order							
	a) One	5	9	0.082	2	7	5	3.161
	b) Two	4	6		4	4	2	
	c) Three	2	4		1	2	3	

(Cont...)

	Mother of the child							
4	Education							
	a) Illiterate	2	2		1	2	1	
	b) Primary school	3	8	2.816	1	5	5	8.498
	c) Middle school	3	4		3	3	1	
	d) Secondary school	1	2		0	2	1	
	e) Higher second-ary school	1	0		1	0	0	
	f) Graduate	1	3		1	1	2	
5	Occupation							
	a) Government	0	1		0	0	1	
	b) Private	1	2	0.629	0	1	2	4.281
	c) Housewife	10	16		7	12	7	
6.	Family income in ₹							
	a) 1500-2500	5	7		3	6	3	
	b) 2501-3500	1	2	1.292	2	7	3	6.346
	c) 3501 and above	1	5		2	0	4	

(Cont...)

7.	Type of family							
	a) Joint family	4	7	0.001	3	3	5	1.915
	b) Nuclear family	7	12		4	10	5	
8.	Type of delivery							
	a) Vaginal delivery	8	10	1.172	4	10	4	3.242
	b) Caesarian delivery	3	9		3	3	6	

The inferences made are

Significant association was not found between the selected background variables like age, sex, birth order, education, occupation, type of family and type of delivery with physical development of partially breastfed toddlers.

So the hypothesis 6 (h6) was rejected.

CHAPTER – V

DISCUSSION

This chapter presents the interpretation of the statistical findings. It has been discussed based on the objectives of the study.

The aim of the study was to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers.

A correlational design was used to conduct the study. Cognitive and physical development were assessed by using observational check list, Eliz health path and inch tape. Non-probability convenience sampling technique was used. The study sample consisted of 60 toddlers. Using the above tool, data were collected, grouped and analyzed through descriptive analysis (number, percentage, mean and standard deviation) and inferential statistics (Independent‘t’ test, correlation and chi-square).The study findings revealed the following:

The first objective of the study was to assess the cognitive and physical development of exclusively breastfed toddlers.

The finding shows that among 30 exclusively breastfed toddlers, 17 (57) of them were excellent, 12(40) of them were good, 1(3) was poor according to their cognitive development and 11(37) of them were normal; 19(63) of them were underweight according to their Body Mass Index and 9 (30) of them were normal; 12 (40) of them were malnourished and 9(30) of them were severely malnourished according to their Mid-arm circumference.

The essential fatty acids docosahexaenoic acid (DHA) and aracidonic acid (ARA) present in breast milk are solely responsible for the cognitive development in the children which are absent in cow's milk and other infant formulae. So exclusively breastfed toddlers were shown excellent cognitive functioning. Whereas the physical development which includes BMI and MAC results in underdevelopment, it shows that the exclusively breastfed toddlers were extended breast feeding habit.

- Meharban Singh (2004)

The findings was supported by Foroushani AR et al., (2010) conducted a study on effect of breastfeeding on cognitive performance in a British birth cohort. Children who were exclusively breastfed scored higher in cognitive tests.

The second objective of the study was to assess the cognitive and physical development of partially breastfed toddlers.

The findings showed that among 30 partially breastfed toddlers, 8 (27) of them were excellent, 13 (43) of them were good, 9 (30) were poor according to their cognitive development and 11(37) of them were normal; 19(63) of them were underweight according to their Body Mass Index and 7 (23) of them were normal; 13 (43) of them were malnourished and 10 (33) of them were severely malnourished according to their Mid-Arm Circumference.

The finding shows that, the cognitive development of the partially breastfed toddlers is not better when compared with the exclusively breastfed toddlers because of the lack of essential fatty acids in artificial feed. According to BMI and MAC measurement results, it is shown that

there are more toddlers found underweight and malnourished due to the nutritional deficiency because of artificial feeding.

-James W et al., (2008)

The findings were supported by Angelsen. NK (2005) conducted a study to examine whether duration of breast feeding has any effect on a child's cognitive or motor development in a population with favourable environmental conditions and a high prevalence of breast feeding. The study concluded that children breastfed for less than 3 months had an increased risk, compared to children breastfed for at least 6 months. So the study suggests that longer duration of breast feeding benefits cognitive development.

The third objective of the study was to find out the relationship between cognitive and physical development of exclusively breastfed and partially breastfed toddlers.

The investigator found that there was a significant positive correlation between the cognitive (mean = 75.521, standard deviation = 8.830) and physical development [Body Mass Index (mean = 12.967, standard deviation = 2.0759, r = 0.810) and Mid Arm Circumference (mean = 12.950, standard deviation = 0.8826, r = 0.815)] of exclusively breastfed toddlers.

There was a significant positive (r = 0.541) correlation between the cognitive (mean = 67.10, standard deviation = 17.727) and physical development [Body Mass Index (mean = 12.800, standard deviation = 1.9722, r = 0.541) and Mid Arm Circumference

(mean =12.767, standard deviation = 1.0233, r = 0.544)] of partially breastfed toddlers. The score was significant at p<0.01 level.
So the hypothesis 1(h1) was accepted.

The findings was supported by Rosamma K. J. (2007) who conducted a study to correlate feeding practices of mothers and nutritional status of their children. There was positive correlation between feeding practices and selected nutritional parameters like present weight, height, Mid Arm Circumference and chest circumference.

Abirami. P. (2006) conducted a study to assess the relationship between breast feeding pattern and cognitive developmental outcome of children. The study concludes that longer duration of breast feeding increases will improve the cognitive development and physical growth.

The fourth objective of the study was to compare cognitive and physical development of exclusively breastfed and partially breastfed toddlers.

The findings showed that the mean exclusively breastfed toddlers cognitive development (75.521) with the standard deviation (8.830) was higher than the mean partially breastfed toddlers (67.10), with the standard deviation (8.830) and the obtained‘t’ value (t = 1.785) was not significant at p< 0.05.

The mean exclusively breastfed toddlers’ physical development (body mass index) (12.967) with the standard deviation (2.0759) was higher than the mean partially breastfed toddlers (12.800) with the

standard deviation (1.9722) and the obtained‘t’ value (t = 0.319) was not significant at $p < 0.05$.

The mean exclusively breastfed toddlers’ physical development (mid arm circumference) (12.950) with the standard deviation (0.8826) was higher than the mean partially breastfed toddlers (12.767) with the standard deviation (1.0233) and the obtained‘t’ value (t = 0.742) was not significant at $p < 0.05$

So the stated research hypothesis 2 (h2) was accepted.

The findings were supported by James W etal., (2008) who observed differences in cognitive development between breast-fed and formula - fed children .Then the study concluded that breast-feeding was associated with significantly higher scores for cognitive development than was formula feeding.

The findings supported by Avshalom Caspi et al., (2007) show that encoding genes FADS1 and FADS2 are associated with breastfeeding and IQ moderated by their variant effects.

The fifth objective of the study was to find out association of selected background variables with cognitive development of exclusively breastfed toddlers.

The investigator found that there was no significant association between the selected background variables and cognitive development of exclusively breastfed toddlers.

So the hypothesis 3 (h3) was rejected.

To find out association of selected background variables with cognitive development of partially breastfed toddlers.

The investigator found that there was no significant association between the selected background variables and cognitive development of partially breastfed.

So the hypothesis 4(h4) was rejected.

The investigations' results point out that there was none of the variables that would influence over the cognitive development of exclusively and partially breastfed toddlers.

This study was contradicted by Der et al., (2006) saying that breast feeding was associated with higher IQ in children, but this effect was almost entirely accounted for by maternal IQ. More intelligent mothers were more likely to breastfeed, and maternal IQ was more predictive of feeding choice than mothers' age, education, home environment, and antenatal smoking status, or children's birthweight and birthorder. This finding shows that maternal education had influence over the cognitive development of the children. But in the present study there was no association found between maternal education and cognitive development.

To find out association of selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.

The present study showed that there was a significant association between the selected background variable such as birth order (X2 =5.970,

df = 2, $p<0.05$) with physical development (Body Mass Index) of exclusively breastfed toddler. There is no significant association found between the selected background variable with physical development (Mid Arm Circumference) of exclusively breastfed toddler.

So the hypothesis 5 (h5) was accepted.

Among the selected background variables in exclusively breastfed toddlers, the birth order alone has influence over the physical development (BMI) because the special care and attention given for the first child among other children shows variation in the physical development.

To find out association of selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

The present study showed that there was no significant association between the selected background variables with physical development (Body Mass Index) of partially breastfed toddlers.

So the hypothesis 6 (h6) was rejected.

The investigations' results that there was none of the variables which influence over the physical development. Because the physical development (BMI and MAC) of toddlers not only depends upon breastfeeding, it mostly relies on complementary feeding introduced at the correct age. The late introduction of complementary food, poor nutritional quality and insufficient amount of complementary food influence over the physical development of exclusively and partially breastfed toddlers.

CHAPTER – VI

SUMMARY, CONCLUSION, LIMITATION, IMPLICATION AND RECOMMENDATIONS

This chapter presents the summary of the study, conclusion and implications for different areas like Nursing practice, Nursing education, Nursing administration and Nursing research and recommendations for further study.

SUMMARY OF THE STUDY

The purpose of the study was to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers in selected balwadis.

THE FOLLOWING OBJECTIVES WERE SET FOR THE STUDY

1. To assess the cognitive and physical development of exclusively breastfed toddlers.
2. To assess the cognitive and physical development of and partially breastfed toddlers.
3. To find out relationship between cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
4. To compare cognitive and physical development of exclusively breastfed and partially breastfed toddlers.
5. To find out association of selected background variables with cognitive development of exclusively breastfed toddlers.
6. To find out association of selected background variables with cognitive development of partially breastfed toddlers.

7. To find out association of selected background variables with physical development (BMI and MAC) of exclusively breastfed toddlers.
8. To find out association of selected background variables with physical development (BMI and MAC) of partially breastfed toddlers.

The conceptual model of the study was based on Open system model. The study was conducted by using correlational design. The sample size used for this study was 30 exclusively and partially breastfed toddlers. Non probability convenience sampling technique was used to select the study samples. The instruments used for data collection were observational check list for cognitive development and Eliz health path for (Body Mass Index) and inch tape (Mid Arm Circumference) for physical development.

The data were analyzed and interpreted in terms of objectives and research hypothesis. Descriptive statistics (Frequency, Percentage, Mean and Standard deviation) and inferential statistics (correlation coefficient, independent‘t’ test and chi square) were used to test the hypothesis.

SIGNIFICANT FINDINGS ARE AS FOLLOWS:

Regarding percentage distribution of exclusively breastfed toddlers according to background variables, most of the subjects were between the age group of 2.5 yrs; majority of them were females; most of them were at the birth order of one.

Regarding percentage distribution of exclusively breastfed mothers of toddlers according to background variables, most of the subjects were educated at the level of middle school and majority of them were housewives in the nuclear family with a family income of between Rs.1500-2500 and most of them were delivered vaginally.

Regarding percentage distribution of partially breastfed toddlers according to background variables, most of the subjects were between the age group of 2.5 yrs; both the sexes were in equal distribution; most of them were at the birth order of one.

Regarding percentage distribution of exclusively breastfed mothers of toddlers according to background variables, most of the subjects were educated at the level of primary school and majority of them were housewives in the nuclear family with a family income of between Rs.1500-2500 and Rs.2501-3500 and most of them were delivered vaginally.

Exclusively breastfed toddlers' cognitive development was found that 17 (57) of them were excellent, 12(40) of them were good, 1(3) was poor according to their cognitive development and 11(37) of them were normal; 19(63) of them were underweight according to their Body Mass Index and 9(30) of them were normal; 12(40) of them were malnourished and 9 (30) of them were severely malnourished according to their Mid-Arm Circumference.

Partially breastfed toddlers' cognitive development was found that 8 (27) of them were excellent, 13(43) of them were good, 9(30) were poor according to their cognitive development and 11(37) of them were

normal; 19(63) of them were underweight according to their Body Mass Index and 7(23) of them were normal; 13 (43) of them were malnourished and 10(33) of them were severely malnourished according to their Mid-Arm Circumference.

There was a significant positive relationship (correlation) between the cognitive development and Body Mass Index (0.810), cognitive development and Mid-Arm Circumference (0.815) of exclusively breastfed, which was significant at 0.01 level. Then there was a significant positive relationship (correlation) between the cognitive development and Body Mass Index (0.541), cognitive development and Mid-Arm Circumference (0.544) of partially breastfed, which was significant at 0.01 level.

The present study showed that the exclusively breastfed toddlers' mean score value was 75.52 (SD = 18.830) and partially breastfed toddlers' mean score value was 67.10 (SD = 17.720). The independent't'test value was (1.785), according to their cognitive development.

The present study showed that the exclusively breastfed toddlers' mean score value was 12.967 (SD = 2.075) and partially breastfed toddlers' mean score value was 12.800 (SD = 1.9722). The independent't'test value was (0.319), according to their (Body Mass Index) physical development.

The present study showed that the exclusively breastfed toddlers' mean score value was 12.950 (SD = 0.884) and partially breastfed toddlers' mean score value was 12.767 (SD = 1.023). The

independent't'test value was (0.742), according to their (Mid-Arm Circumference) physical development.

The findings showed that the calculated 't' value was more than the table value, which implies that there was a significant difference between exclusively and partially breastfed toddlers at $p<0.05$ level.

No significant association was found between the selected background variables with cognitive development of exclusively and partially breastfed toddlers.

Significant association between the selected background variable such as birth order ($X2=5.970$, df =2, $p<0.05$) with physical development (Body Mass Index) of only exclusively breastfed toddlers but not in the partially breastfed toddlers.

There was no significant association between the selected background variables with physical development (Mid Arm Circumference) of exclusively and partially breastfed toddlers.

CONCLUSION

Adequate nutrition during early years of life is of paramount importance for growth, development and long term health through adulthood. It is during infancy and early childhood that irreversible faltering in linear growth and cognitive deficits occur. Poor nutrition during this critical period contributes to significant morbidity and mortality in developing countries. Although breastfeeding is common in regions, especially in Southeast Asia, inadequate and delayed complementary feeding leads to growth failure in young children. Early

detection of growth faltering and promotion of appropriate feeding practices are important for prevention of malnutrition and the very survival of children.

Based on the findings of the study, the following conclusions were drawn:

There was a positive relationship between the cognitive and physical development of exclusively and partially breastfed toddlers. Therefore, it means that if physical development, increased the cognitive development also increased on both exclusively and partially breastfed toddlers.

There was no significant difference between the cognitive and physical development of exclusively and partially breastfed toddlers. Therefore, it means that the cognitive and physical development of exclusively and partially breastfed toddlers were similar.

There was no association between cognitive development of exclusively and partially breastfed toddlers with background variables.

The present study showed that there was a significant association between the selected background variable such as birth order ($X2=5.970$, $df = 2$, $p<0.05$) with physical development (Body Mass Index) of exclusively breastfed toddler. There is no significant association found between the selected background variable with physical development (Mid Arm Circumference) of exclusively breastfed toddler.

There was no association found between physical development (BMI and MAC) of partially breastfed toddlers with background variables.

IMPLICATIONS

The findings of the study have several implications on nursing practice, nursing education, nursing administration.

Nursing Practice

1. Nursing is not only curing the people, but also creating awareness to disease and health. Toddlers were in a critical window period of growth and development.
2. Since the knowledge of mothers of toddlers were inadequate, it is necessary for the nurses to educate the mothers regarding importance of growth and development and feeding practices to promote the well being of the child.
3. Not only in the community, but also in hospital setting the nurses can schedule and plan for teaching programs to educate mother.

Nursing Education

1. The practical knowledge of nurse depends upon the education they receive. So the nursing education should prepare the nurses to realize their responsibity as ‘Nurse Educator’.
2. The nursing education should prepare the nurses to practise as ‘nurse communicator’ to render their health services in various settings like community, hospital and other areas.

The nursing curriculum has to focus the

3. The present study will help the nursing students to know the importance of breast feeding and its effect on cognitive and physical development.
4. The nurse educator should encourage the students to use observational check list to assess cognitive and physical development.
5. Students should be given opportunity to update knowledge, regarding current practices of breast feeding pattern.
6. It should be given special focus in the pediatric and community nursing curriculum.
7. In-service education should be carried out periodically to teach nurses and nursing students regarding the changing trends in the breast feeding pattern.

Nursing Administration

1. Studies of this nature will help the nursing administrator authorities to recognize the need for conducting in-service education and continuing education programmes for the nursing personnel.
2. Nursing administrator should formulate policies that will include staff and students to be actively involved in health teaching.
3. Nurse administrator should be knowledgeable about current trends and practices of breast feeding pattern.
4. They should arrange for mass health education campaigns.
5. Nurse administrator should be actively involved in initiating awareness programs that will help to bring down the under 5 mortality rate.

Nursing Research

1. The finding of the study helps to expand the body of professional knowledge upon which further researches can be conducted.
2. The Indian literature shows that there are only very limited studies conducted so far. Hence more studies can be conducted in this area in order to strengthen the expanded role of nurses.
3. One of the aims of nursing research is to expand and broaden the scope of nursing and provide evidence based practice in health setting.
4. This study helped to identify benefits of breast feeding pattern.
5. The research findings can be disseminated to stimulate further researchers using comparative study to determine breast feeding pattern and its effect on cognitive and physical development of the toddlers.
6. The study revealed the essentials of reviewing research findings to know about current practices of breast feeding pattern and its effect on cognitive and physical development of the toddlers.

LIMITATIONS

1. The sample size (60) was small which restricts generalization.
2. The study assessed only the cognitive and physical development of toddlers.
3. The toddlers were not randomly assigned. Hence the convenience sampling restricts the generalization.
4. Only certain parameters were used to assess the nutritional status of children.
5. Interview technique does not collect the accurate data regarding the breast feeding patterns.

RECOMMENDATIONS FOR FURTHER STUDY

1. Study can be replicated in different community settings for evidenced based nursing practice.
2. Structured teaching program can be arranged for mothers of toddlers as part of experimental study to improve their feeding pattern.
3. A comparative study can be conducted between rural and urban settings of exclusively and partially breastfed toddlers.
4. A longitudinal study can be done to evaluate breast feeding practice and its effect on later childhood.
5. Comparison of children in two birth cohorts, grouped according to the breastfeeding pattern.

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APPENDIX - A

LETTER REQUESTING TO VALIDATION

From

Mrs. P. Kalyani,
II Year M.Sc (N),
Dr. G. Sakunthala College of Nursing,
T.V. Kovil,
Trichy – 5.

To

Through

The Principal,
Dr. G. Sakunthala College of Nursing,
T.V. Kovil,
Trichy – 5.

Respected Sir,

Sub: *Letter Requesting opinion and suggesting from Experts for establishing content validity of the tool.*

I am P. Kalyani M.Sc. nursing student of Dr. G. Sakunthala College of Nursing, T.V. Kovil, Trichy – 5. As part of my course, I am doing study on the topic mentioned below.

'A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy'.

May I request you to go through and validate the content of the tool. Please give your valuable suggestion for modifying the tool.

Thanking you,

Your's sincerely,
P. Kalyani,
II Year M.Sc (N) Student,

APPENDIX – B

List of experts consulted for the content validity of research tool

1. **Prof. Mrs. Kalai Kuru Selvi,** ***M.Sc(N).***
   HOD, Pediatric Department,
   Madha College of Nursing,
   Manamadhurai.

2. **Mrs. Vani Chitra Devi,** ***M.Sc.(N)*****,**
   Lecturer, pediatric department,
   JJ college of Nursing,
   Pudukkottai.

3. **Mrs. Meenakshi,** ***M.Sc. (N)*****,**
   Department of Pediatrics,
   Annamalai University,
   Chidambaram.

4. **Mrs. Sagayamari, M.Sc. (N),**
   Principle,
   Our Lady of Health College of Nursing,
   Tanjore.

5. **Dr. Mr. V. Kanagaraj, M.D., DCH., D.L.O.,**
   Secretary Dr.G.V.N. Hospital,
   Trichy.

APPENDIX - C

A. RESEARCH INSTRUMENT

BREASTFEEDING PATTERN AND ITS EFFECT ON COGNITIVE AND PHYSICAL DEVELOPMENT

PART-I

Deals with Background Data

Child

1. Age in years/months
   - a) 2 ( )
   - b) 2/5 ( )
   - c) 2/9 ( )
   - d) 3 ( )

2 Sex
   - a) Male ( )
   - b) Female ( )

3 Birth order
   - a) One ( )
   - b) Two ( )
   - c) Three ( )

Mother of the child

4 Education
   - a) Illiterate ( )
   - b) Primary school ( )
   - c) Middle school ( )
   - d) Secondary school ( )
   - e) Higher secondary school ( )
   - f) Graduate ( )

5 Occupation
   - a) Government ( )
   - b) Private ( )
   - c) Housewife ( )

6 Family income in ₹

a) 1500-2500 ( )

b) 2501-3500 ( )

c) 3501 and above ( )

7 Type of family

a) Joint family ( )

b) Nuclear family ( )

8 Type of delivery

a) Vaginal delivery ( )

b) Caesarian delivery ( )

பகுதி - I

பொதுவான விவரங்கள்

குழந்தையின்

1. வயது

அ) இரண்டு வருடங்கள் ( )

ஆ)இரண்டு வருடம் ஐந்து மாதங்கள் ( )

இ) இரண்டு வருடம் ஒன்பது மாதங்கள் ( )

ஈ) மூன்று வருடங்கள். ( )

2. பாலினம்

அ) ஆண் ( )

ஆ)பெண் ( )

3. பிறப்பு வரிசை

அ) முதலாவது ( )

ஆ)இரண்டவது ( )

இ) மூன்றாவது ( )

குழந்தையின் தாயின்

4. கல்வி தகுதி

அ) படிக்காதவர் ( )

ஆ)ஆரம்பபள்ளி படிப்பு ( )

இ) நடுநிலை பள்ளி படிப்பு ( )

ஈ) உயர்நிலை பள்ளி படிப்பு ( )

உ) மேல்நிலை பள்ளி படிப்பு ( )

ஊ) பட்ட படிப்பு ( )

5. தொழில்

அ) அரசாங்க வேலை ( )

ஆ) தனியார் வேலை ( )

இ) குடும்பத்தலைவி ( )

6. மாதாந்திர குடும்ப வருமானம்

அ) ரூ. 1500-2500 ( )

ஆ) ரூ. 2501-3500 ( )

இ) ரூ. 3501 க்கு மேல் ( )

7. குடும்பத்தின் தன்மை

அ) கூட்டு குடும்பம் ( )

ஆ) தனிக் குடும்பம் ( )

8. பிரசவ முறை

அ) சுகப்பிரசவம் ( )

ஆ) அறுவை சிகிச்சை பிரசவம் ( )

PART-II

STRUCTURED INTERVIEW TO ASSESS BREASTFEEDING PATTERN:

Items to Assess Exclusively Breastfed

1. Breastfeeding initiated to the child within half to two hours after delivery

YES	NO

2. Breastfeeding is given to baby exclusively for 4 months

YES	NO

3. Demand feeding is given to the baby

YES	NO

4. Weaning is started on 5th month on words

YES	NO

5. Home based weaning were given to the child

YES	NO

6. Breastfeeding is continued up to half to two years

YES	NO

ITEMS TO ASSESS PARTIALLY BREASTFED

1. Breastfeeding is not initiated soon after delivery

YES	NO

2. Breastfeeding is not given to baby exclusively for 4 months

YES	NO

3. Feeding is given in planned timing

YES	NO

4. Weaning was started after age of 10th month

YES	NO

5. Home based weaning were not given to the child

YES	NO

6. Aavin milk, cow's milk and skimmed foods were given to the child

YES	NO

பகுதி - II

தாய்ப்பால் தரும் அமைப்பினை மதிப்பீடு செய்யும் நேர்முக விசாரணை கேள்விகள்

தாய்ப்பால் தரும் அமைப்பை பிரத்தியேகமாக மதிப்பீடு செய்வதற்கான வழிகள்

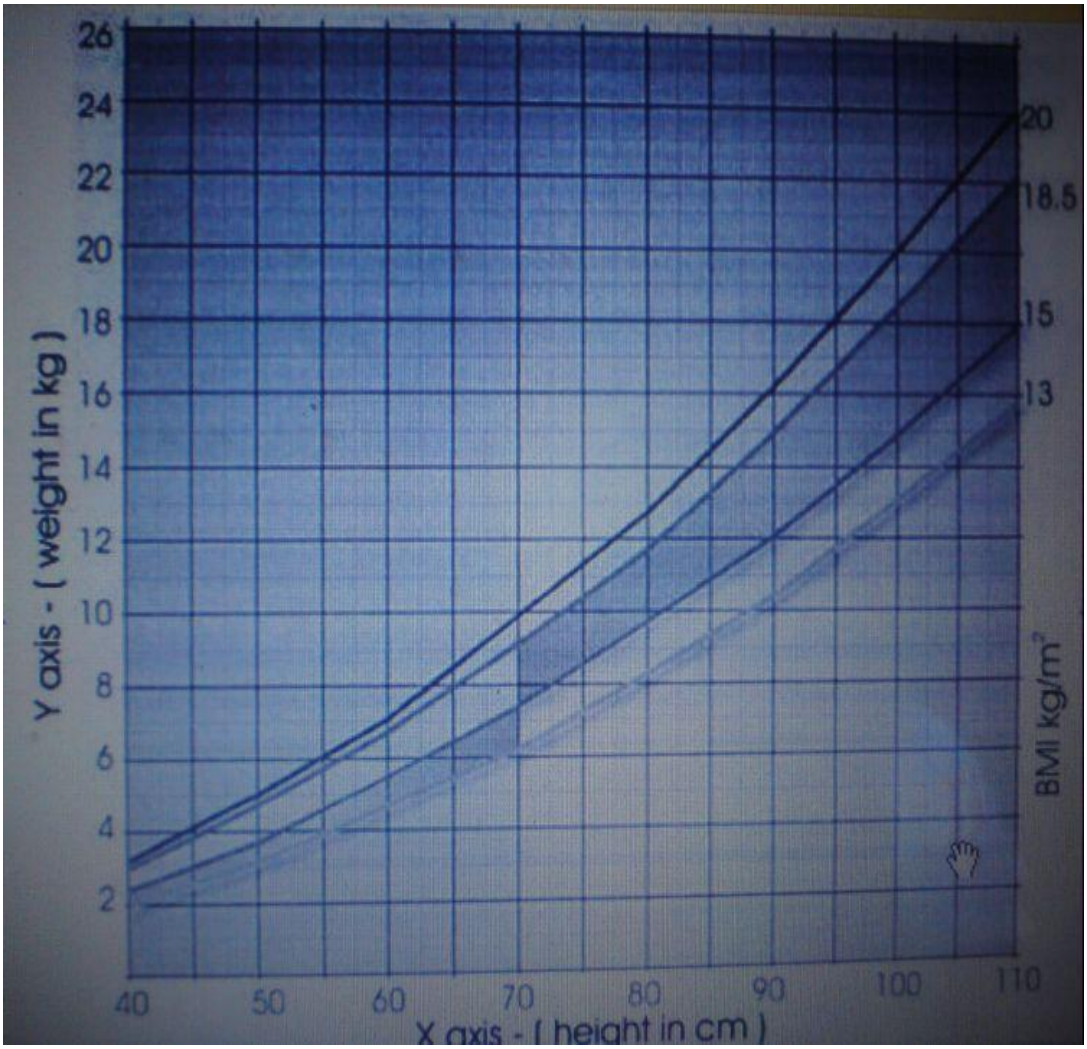
1. பிரசவத்திற்குப் பின் அரைமணி அல்லது இரண்டு மணி நேரத்திற்கு பின் தாய்ப்பால் தருவது ஆரம்பிக்கப்பட்டது.
2. தாய்ப்பால் தருவது 4 மாதத்திற்குப் பிறகு ஆரம்பிக்கப்பட்டது
3. தேவைப்பட்டால் மட்டும் தாய்ப்பால் தரப்பட்டது
4. பால் மறப்பித்தல் 5ம் மாத்திலிருந்து ஆரம்பிக்கப்பட்டது
5. வீட்டிலிருந்தபடியே பால்மறப்பித்தல் குழந்தைக்கு செய்யப்பட்டது
6. அரை அல்லது இரண்டு ஆண்டுகள் வரை தாய்ப்பால் தரப்பட்டது

பகுதிநேர தாய்ப்பால் தரும் அமைப்பை மதிப்பீடு செய்வதற்கான வழிகள்

1. தாய்ப்பால் ஊட்டல் பிரசவத்திற்குப் பின்பு ஆரம்பிக்கப்படவில்லை
2. நான்கு மாத தாய்ப்பால் ஊட்டல் குழந்தைக்குத் தரப்படவில்லை
3. தாய்ப்பால் ஊட்டல் திட்டமிட்ட நேரத்தில் தரப்பட்டது
4. பால்மறப்பித்தல் 10ம் மாதத்திலிருந்து ஆரம்பிக்கப்பட்டது
5. வீட்டிலிருந்தபடியே பால்மறப்பித்தல் குழந்தைக்கு செய்யப்படவில்லை
6. ஆவின் பால், பசும்பால் குழந்தைக்கு கொடுக்கப்பட்டது.

ELIZ HEALTH PATH

Plot height on x-axis and weight on y-axis and read the BMI from the right margin. Readings in the shaded area in the normal range.



SCORING SHEET

Items to Assess Exclusively Breastfed

Items No	Yes	No
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	1	0

Items to Assess Partially Breastfed

Items No	Yes	No
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	1	0

PART-III

DEALS WITH THE ASSESSMENT OF PHYSICAL DEVELOPMENT

S.No.	Variable	Interpretation	Score	Coding
1.	BMI	>20kg	Obesity	0
		18.6-20kg	Overweight	1
		15-18.5kg	Normal	2
		<15kg	underweight	3
2.	MAC	13.6-16cms	Normal	1
		12.5-13.5cms	Malnourished	2
		<12.5cms	Severely Malnourished	3

பகுதி - III

உடல் வளர்ச்சி பற்றிய மதிப்பீடு

பொருண்மை குறியீடு

>20	கொழுப்புமிக்கதன்மை
18.6- 20	எடைமிகைப்பு
15-18.5	இயல்பான
<15	குறை எடை

கையின் மையப்பகுதியின் சுற்றளவு

13.6 - 16	இயல்பான
12.5 – 13.5	போதிய உணவில்லாத காரணத்தால் குறைவளர்ச்சி
< 12.5	மிகவும் வளர்ச்சி குறைந்த

PART - IV

DEALS WITH THE ASSESSMENT OF COGNITIVE DEVELOPMENT

OBSERVATIONAL CHECKLIST:

S.NO	ITEMS	CONSTANTLY DEMONSTRATED	SOMETIMES DEMONSTRATED	NEVER DEMONSTRATED
1.	OBJECT CONSTANCY While the child is playing with a ball, it rolls underneath a cupboard. -The child will move in the direction of the ball to retrieve it.			
2.	TRIAL AND ERROR The child is trying to arrange the rings in ring stand in a progressive order. -The child will keep on			

	trying until he succeeds.			
3.	SPACIAL PERSPECTIVE OF HEIGHT There is a chair in front of the child. -The child sees first the legs of the chair.			
4.	SPACIAL PERSPECTIVE OF OBJECT The child is playing with the nesting board. The child tries fitting boxes into each other. -The child will fit an object into a hole on each time.			
5.	EGO CENTRICITY The child is playing with a sharp object. The caretaker explains to the child that the object will injure and replace it with another toy. But the child refuses and			

6.	cries. -The child loves to play with that object IMAGINATION AND REALITY The child is looking the teacher with stick. -The child cries every time on seeing the teacher with stick.			

பகுதி-IV

உற்றுநோக்கும் பட்டியல்

வ. எண்	பொருள்	ஒரேமாதிரியாக வெளிப்படுத்தியது	சிலசமயங்களில் மட்டும் வெளிப்படுத்தியது	ஒருபோதும் வெளிப்படுத்துவது இல்லை
1.	பொருள் காலப்பகுதி குழந்தை பந்துடன் விளையாடும் போது பந்து அலமாரியின் கீழ் உருண்டு சென்றுவிடுகிறது. -குழந்தை பந்து சென்ற திசையை நோக்கி அதை எடுக்கசெல்லும்.			
2.	ஒத்திகையும் தவறுதலும் குழந்தை முன்னோகிச்செல்லும் வரிசையில் வளையங்களை வைக்க முயற்சி செய்கிறது. -குழந்தை வெற்றியடையும் வரையில் விடாமல் முயற்சிசெய்துகொண்டே இருக்கும்.			

3. 4. 5.	உயரத்தின் இட-பரப்பார்வை குழந்தையின் முன்னே நாற்காலி இருக்கிறது. -குழந்தை முதலில் நாற்காலியின் கால்களை பார்க்கிறது. பொருட்களின் இட-பரப்பார்வை நெஸ்டிங் பலகையை வைத்து குழந்தை விளையாடுகிறது. அப்பலகையில் உள்ள பெட்டிகளை ஒன்றன்மேல் ஒன்றாக வைக்க முயற்சிக்கிறது. -குழந்தை ஒவ்வொறுமுறையும் துவாரத்தினுள் பொருளை சரியாகமாட்டுகிறது. சுயநலத்தன்மை/பிடிவாதத் தன்மை கூர்மையான பொருளுடன் விளையடுகிறது. குழந்தையை			

	கவனித்துக்கொள்பவர் கூர்மையான பொருளை வைத்து விளையாடுவது ஊறுவிளைவிக்கும் என விளக்கி வேறு பொம்மையைத்தந்து விளையாடுமாறு சொல்கிறார். ஆனால் குழந்தை அதை ஏற்றுக்கொள்ளாமல் அழுகிறது. -குழந்தை அப்பொருளுடன் விளையாடுவதையே விரும்புகிறது.			
6.	கற்பனையும் யதார்த்தமும் குழந்தை ஆசிரியர் கம்பு வைத்திருப்பதை பார்க்கிறது. -கம்பு வைத்திருக்கும் ஆசிரியரைப் பார்க்கும் போதெல்லாம்குழந்தை அழுகிறது.			

SCORING KEY FOR COGNITIVE DEVELOPMENT

Item. No	Constantly Demonstrated	Sometimes Demonstrated	Never Demonstrated
1	2	1	0
2	2	1	0
3	2	1	0
4	2	1	0
5	2	1	0
6	2	1	0

SCORING

9-12	Excellent	76%-100%
5-8	Good	51%-75%
0-4	Poor	0%-50%

LIST OF ABBREVIATION USED IN THIS PROJECT

WHO	World Health Organization
BMI	Body Mass Index
MAC	Mid Arm Circumference
UNICEF	United Nations International Children Emergency Fund.
DHA	Docosahexaenoic Acid
ARA	Aracidonic Acid
GST	General System Theory
FADS	Fatty Acid Desaturase
LC-PUFA	Long Chain Poly Unsaturated Fatty Acid

APPENDIX – D

LETTER SEEKING PERMISSION TO CONDUCT THE RESEARCH STUDY

From

P. Kalyani,
II Year M.Sc (N),
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

To

The Principal,
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

Respected Madam,

Sub: *Letter seeking permission to conduct the study.*

I am Mrs. P. Kalyani final year M.Sc., Nursing student of Dr. G. Sakunthala College of Nursing. I would like to conduct a study as a part of partial fulfillment for the degree of masters in Nursing. The statement of the problem is "A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy". Kindly grant me permission to conduct the study.

Thanking you in anticipation.

Your's faithfully,
P.Kalyani

LETTER SEEKING PERMISSION TO CONDUCT STUDY

From

P. Kalyani,
II Year M.Sc (N),
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

To

The Child Development Programme Officer,
Thiruverumbur,
Trichy.

Through

The Principal,
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

Respected Sir,

Sub: *Letter requesting permission to conduct study.*

I am P. Kalyani M.Sc. Nursing student of Dr. G. Sakunthala College of Nursing, Thiruvanaikovil, Trichy-5. As part of my course, I am doing study on the topic mentioned below.

'A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy'.

I would like to do my research study at balwadi, hence I request you to kindly consider my request and grant me permission to do my research study for toddlers. Kindly do the needful. I assure you that I will abide by the institutions policies.

Thanking you,

Your's sincerely,
P. Kalyani,
II Year M.Sc (N) Student

LETTER SEEKING PERMISSION TO CONDUCT PILOT STUDY

From

P. Kalyani,
II Year M.Sc (N),
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

To

The Child Development Programme Officer,
Thiruverumbur,
Trichy.

Through

The Principal,
Dr. G. Sakunthala College of Nursing,
Thiruvanaikovil,
Trichy – 5.

Respected Sir,

Sub: *Letter requesting permission to conduct pilot study.*

I am P. Kalyani M.Sc. Nursing student of Dr. G. Sakunthala College of Nursing, Thiruvanaikovil, Trichy-5. As part of my course, I am doing study on the topic mentioned below.

'A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy'.

I would like to do my pilot study of my research at Balwadi, hence I request you to kindly consider my request and grant me permission to do my pilot study for six toddlers. Kindly do the needful. I assure you that I will abide by the institutions policies.

Thanking you,

Your's sincerely,
P. Kalyani,
II Year M.Sc (N) Student

LETTER GRANTING PERMISSION TO CONDUCT RESEARCH STUDY

From

The Child Development Programme Officer,
Thiruverumbur,
Trichy.

To

The Principal,
Dr. G. Sakunthala College of Nursing,
Thiruvanaikoil,
Trichy-5.

Respected Madam,

Sub: *Permission to conduct study in Balwadi.*

P. Kalyani, M.Sc., Nursing student of Dr. G. Sakunthala College of Nursing, Trichy-5, is granted permission to do her project "A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy".

Thanking you.

Date :

Place:

Yours Sincerely,

The child development programme officer,
Thiruverumbur,
Trichy.

REQUISITION LETTER TO MEDICAL GUIDE

From

Mrs. P. KALYANI,
II yr. M.Sc.(N),
Dr. G. Sakunthala College of Nursing,
Trichy.

To

Dr. V. Kanagaraj, M.D., DCH., D.L.O.,
Dr. G.V.N. Hospital,
Trichy.

Respected Sir,

Sub: *Requesting permission for the guidance to conduct the study, regarding .....*

I am studying in II yr. M.Sc. (N) at Dr. G. Sakunthala College of Nursing, Trichy. I would like to conduct a study as a partial fulfillment for the degree of M.Sc.(N)., the statement of the problem is : "A study to correlate the breastfeeding pattern and its effect on cognitive and physical development among toddlers at selected balwadis in Trichy".

I humbly request you to guide me and kindly give suggestions for conducting the study, I will be thankful sir.

Thanking you in anticipation

Place: Yours sincerely,

Date:

(Mrs. P. Kalyani)