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EFFECTS OF EXCLUSIVE BREASTFEEDING ON NEUROCOGNITIVE DEVELOPMENT DURING FIRST YEAR OF CHILDHOOD IN KAHAWA WEST WARD, NAIROBI, KENYA

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ABSTRACT

The effects of breastfeeding during infancy have been a major point of inquiry among scientists. Scientists link breastfeeding to child cognitive, educational, mental, behavioral and psychomotor development (Kramer, 2008; Oddy, 2006). The literature was sourced using the relevant research articles from Psych Net, PubMed and Google Scholar among others. This paper assessed the effect of exclusive breastfeeding on neurocognitive development during the first year of life. The research design was ex post facto in which the children who were exclusively breastfed for the first six months of birth were compared with their counterparts who were formula fed. Cognitive assessment was done for both groups using Bayley's Screening test for infant development between 1-42 months. Total number of children was 180, (Females=93, males= 87). The results showed that there was no significant difference in cognitive development between the exclusively breastfed and the formula fed ($M=1.444$, $SD=0.5$) and ($M=1.556$, $SD=0.5$) respectively. ANOVA comparing the two groups was [$F(1, 179) = 0.088$, $p = 0.767$]. The research concludes that there is no difference in cognitive functioning of exclusively breastfed compared to the formula fed.

Key words: cognitive development, low birthweight, exclusive breastfeeding, infants and toddlers and postnatal period.

1. INTRODUCTION

Breastfeeding is the biological norm for human infants (WHO, 2003) which is widely identified for promoting health and development among the infants. Health authorities consider optimal feeding for infants to be 6 months of exclusive breastfeeding (WHO, 2013) then later followed by introducing appropriate complementary foods, at the same time continuing breastfeeding until toddlerhood. (National Health and Medical Research Council, 2003)

The effects of breastfeeding during infancy have been a major point of inquiry among scientists. Scientists link breastfeeding to child cognitive, educational, mental, behavioral and psychomotor development (Kramer, 2008; Oddy, 2006). Much of these studies have been a consequence of a century-old study by Hoefler and Hardy that found breastfed babies have better cognitive abilities than artificially fed children (Hoefler & Hardy, 1929). The association between child cognitive development and breastfeeding has conflicting results as many studies report mixed outcomes. While some research show a positive association (Geoff & Dreary, 2006), others found no relationship between the two variables. In their desk review of studies on breastfeeding and cognitive development, Geoff and Dreary (2006) found that out of over 80 studies reviewed, the quality of positive and negative studies were even and so did not differ. They also noted that apart from higher quality studies, the remaining showed a decrease in effect of exclusive breastfeeding after analysis. Other factors such as the duration of breastfeeding, socioeconomic status, genetic reasons, and gender differences may

confound the relationship between breastfeeding and child cognitive development (Geoff et al., 2006). The present study seeks to investigate the impact of exclusive breastfeeding on cognitive development on early childhood.

According to Kramer et al. (2008), there is strong evidence of cognitive development effects of 3-6 IQ points for children who were exclusively breastfed for 4 months and more, compared to the ones who were breastfed for 3 months or less. Although the biological mechanism behind the effect of exclusive breastfeeding on cognitive development is not clear, biochemical components of human milk, such as fatty acids and hormones have been identified to play a great role in brain development (Oddy, 2006). Human breast milk contains components such as bioactive proteins that lack or are in lower quantities in other milk substitutes such as cow milk (Agostoni, et al., 2001). These components offer various benefits to the baby including enzyme activities, antimicrobial effects that enhances nutrient absorption and stimulates growth. (Agostoni et al., 2001). It also has milk fat globule membrane (MFGM) which can explain the difference in cognitive development between breastfed and formula fed children (International Congress of Nutrition (ICN), Granada Spain (2013).

It is well documented that cognitive development in childhood is vital for an individual's capacity to learn and take advantage of the opportunities available within a particular environment (Angelsen, 2001). Individuals scoring higher on intelligence tests in early childhood are usually more successful in professional careers and achieve a higher level of education and better socioeconomic status, which may in turn positively affect their health status (Kimani-Murage, Madise & Fotso, 2011).

2. SIGNIFICANCE OF THE STUDY

The findings of the proposed study would contribute to the knowledge on the numerous health benefits for breastfeeding as well as helping the mother and child bond. Greater intensity could be added on the various studies done which have attempted to establish the impact of breastfeeding on cognitive ability by testing children of various ages. Through this research, Kamae, Soweto and Kiwanja slums may provide some insight on issues of exclusive breastfeeding in the slum dwellings.

2.1 Research design

The study adopted a descriptive survey design where both qualitative and quantitative data were generated. Orodho (2009) defines a survey as a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The study used an ex post facto, design which is suitable for a study that investigates the effect of some treatment administered to the subjects as compared to the control group. However most of the data was collected from the mothers and children mobilized by community health workers.

2.2 Target population, sampling design and data collection technique

The research population comprised mothers and babies clustered into two categories. The first group consisted of mothers of children who were exclusively breastfed for at least 6 months and the second were mothers with children who were not exclusively breastfed or formula fed. The age range was between 10 to 14 months. The mothers and their babies were from the catchment area of Kahawa west comprising the slums of Soweto, Kamae and Kiwanja. The mothers were able to communicate in either English or Kiswahili as captured by their standard of education in the questionnaire.

The sample comprised 180 babies aged 10-14 months. Since the research was interested in the first year of life, this age range gave an average age of 12 months. This included 100 babies who were exclusively breastfed for at least six months and another 80 babies who were either formula fed or not exclusively breastfed. This gave us 90 % response rate. The sample size was arrived at after considering the design and scope of the study. Data was generated while interviewing the mothers and also administering the Bailey's screening test to their babies. A sample of 100 exclusively breastfed and 80 of those who were not exclusively breastfed was used.

2.2 Measurement and sampling techniques

We used the Bailey's scales of infant development (BSID) to assess the babies' cognitive development after the process of recruitment was over. We used purposive sampling method to obtain our sample population from the sampling frame. Purposive sampling is described as a random selection of sampling units within the segment of the population with the most information on the characteristic of interest (Bernard 2002, Lewis & Shephard, 2006).

2.3 Research Instruments; Questionnaire

The research instrument was a questionnaire (with open ended and close ended questions). It was administered to mothers in order to determine pattern of exclusive breastfeeding and formula feeding of the infants who were breastfed exclusively for six months and are between 10-14 months old.

2.4 Data analysis

The instrument generated both quantitative and qualitative data. The quantitative data was analyzed using the descriptive statistics, with the aid of SPSS version 20. That is, frequencies, means and standard deviation. To determine correlation, Pearson's coefficient of correlation method was used. The results were analyzed using frequency distribution tables. The BSID scores were analyzed using the BSID manual during the assessment. The abridged manual which covers the cognitive domain of children 1-42 months of age was used.

3. 3.0 FINDINGS

3.1 level of education

When participants were asked about their highest education level, 4% of the respondents had attained post-secondary school education and above (Table 1). A further 10% had attained primary level education and a vast majority (86%) had only secondary school level education.

Table 1: Level of Education

Level of Education	Frequency	Percent
Primary	18	10
Secondary	155	86
College and above.	7	4
Total	180	100

3.2 Neurocognitive outcomes of children

Children's cognitive functioning was measured using the Bayley's Scale. The mean cognitive functioning score for children between 7 and 12 months was $M= 2.59$ and standard deviation was $SD= 0.56$, while the mean cognitive score for children between 13 and 24 months was $M=4.00$ and $SD= 0.88$. These mean scores of $M= 2.59$ for the children aged 7-12 months and $M= 4.0$ for the ones who are between 13-14 months are above the average of $M= 1.5$ (for 7-12 months) and $M= 2.5$ (for 13-14 months) suggesting absence of mental retardation according to BSID classification. BSID has three risk categories in its scores. Children scoring below average are at risk of retardation unless appropriate interventions are put in place; average scores are considered as emerging and above average are considered as competent.

3.3 Effect of exclusive breastfeeding on neurocognitive development during the 1st year of life

The mean cognitive scores for children that were exclusively breastfed during the 1st year of life were ($M= 1.444$, $SD= 0.5$) compared to those who were not exclusively breastfed ($M=1.556$, $SD=0.5$). An analysis of variance (ANOVA) comparing these groups found that there was no significant difference in the cognitive functioning of the exclusively breastfed [$F(1, 179)= 0.088$, $p= 0.767$].

4. CONCLUSIONS

The study concludes that the cognitive functioning scores for the exclusively breastfed babies were not significant during the 1st year of life as compared to those who were formula fed.

5. FUTURE SCOPE

The current study on the effects of exclusive breastfeeding on cognitive development during early childhood was confined to Kahawa west ward, Nairobi, Kenya. It is important to undertake such studies in other wards within and outside Nairobi for better comparison.

References

- [1] Agostoni, C.; Marangoni, F.; Lammardo, A. M.; Giovannini, M.; Riva, E.; Galli, E. (2001). Breastfeeding duration, milk fat composition and developmental indices at 1 year of life among breastfed infants. *Prostag Leukotr Ess.* 64:105–109.
- [2] Angelsen, N. T. (2001). Breastfeeding and cognitive development at age 1 and 5 years. *Archives of disease in early childhood*, 183-188. Urbanization and nutrition in low income countries
- [3] Division of Reproductive Health; National Center for Chronic Disease Prevention and Health Promotion, 2016.
- [4] Elizabeth W Kimani-Murage, Nyovani J Madise, Jean-Christophe Fotso, et al. (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya
- [5] Gladstone M. J., Lancaster, A. P., Jones, K., Maleta, E., Mtitimila, P., Ashorn, R. L., Smyth. (2007) Can Western developmental screening tools be modified for use in a rural Malawian setting?
- [6] Geoff, H and Dreary, L (2006), Desk reviews on Studies on Breastfeeding and Cognitive Development.
- [7] Hoefler, C. and M. C. Hardy (1929). "Later development of breastfed and artificially fed infants." *Journal of the American Medical Association* 92: 615-619.
- [8] Orodho, J. A. (2009). Elements of education and social science research methods. *Nairobi/Maseno*, 126-133.
- [9] WHO. (2003). Infant and young child nutrition global strategy on infant and young child Feeding. Geneva. WHO.
- [10] World Health Organization. (2014). *WHO recommendations on postnatal care of the mother and newborn*. World Health Organization.