



DEVELOPMENTAL DELAY AND ITS RELATIONSHIP WITH FEEDING PRACTICES AMONG CHILDREN BELOW 24 MONTHS OF AGE IN TRIBAL TEA GARDEN AREAS OF DARJEELING DISTRICT, INDIA

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ARTICLE INFO

Article History:

Received 4th August, 2019

Received in revised form 25th

September, 2019

Accepted 23rd October, 2019

Published online 28th November, 2019

Key words:

Developmental delay, feeding practice, tea garden

ABSTRACT

Introduction: Developmentally delayed children are likely to be less productive adults and it may hinder their full and effective participation in society on an equal basis with others, which may lead to social discrimination. Screening of children for developmental delays and early interventions thus has been a priority issue and concern worldwide as well as in India. In this context the present study was conducted with the following objectives:

Objectives: To assess the extent of developmental delays and to identify its relation with feeding practices among tribal tea garden children of a district of West Bengal.

Materials and Methods: A cross-sectional study was conducted in tea garden areas of a subdivision in Darjeeling District, West Bengal, India from May 2015 to April 2016. The collected data was analyzed using SPSS software and binary logistic regression was applied to test association between developmental delay and other epidemiological correlates. Trivandrum developmental screening chart (TDSC) was used to assess developmental delay.

Results: Developmental delay was noted among 42 out of 286 children (14.7%). It was found statistically significant with some of the feeding practices, like- history of pre-lacteal feeding, decreased frequency, mixed feeding, exclusive breast feeding, inadequate quantity etc.

Conclusion: There was higher proportion of developmental delay in the studied area and it was found to be associated with feeding practices during childhood.

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INTRODUCTION

Development is related to the maturation and myelination of the nervous system and indicates acquisition of variety of skills for optimal functioning of the individual [1]. The normal development of a child is usually described under five domains: gross motor development; fine motor development; personal and social development & general understanding; language; vision and hearing [1]. Development in each domain proceeds through a series of milestones or steps and typically involves mastering simple skills before more complex skills can be achieved [2]. Developmental delay is a condition whereby children experience significant variation in the achievement of expected milestones for their actual or adjusted age [2]. The first few years of life are particularly important because of vital development in all these domains [3].

Development of a child is influenced by variety of intrinsic and extrinsic factors, including feeding practices. Adequate feeding practices during infancy like exclusive breast feeding, timely complementary feeding have been shown to have favorable effects on various developmental outcomes in childhood [4].

Likewise, some studies have presented that increased duration and exclusivity of breastfeeding may have beneficial effects on language and motor development of the child [5, 6].

Various scientifically approved scales have been used in different parts of India and the world for assessing developmental delay. The TDSC is a globally accepted and widely used screening tool for assessing development of infants and young children (aged 0–24 months) in five domains: Communication, Gross Motor, Fine Motor, Problem Solving and Personal Social. The TDSC has also been validated among the Indian children and it was reported to have 66.7% overall sensitivity and 78.8% specificity for detecting developmental delay [7].

Tribes constitute a special socio-economic vulnerable group with distinct culture, tradition and taboos. They are often plagued by ignorance and social barriers preventing effective health service utilization [8]. Thus the magnitude and predictors of the problem need to be explored and understood in context of the tribal population. The generated epidemiological data will help policy makers in developing appropriate strategies and interventions.

In this context, the present study was conducted in some of the tribal tea garden areas of Darjeeling district, West Bengal with

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following objectives- to determine the proportion of developmental delay and to ascertain the relation between developmental delays with the feeding practices among children below 24 months of age.

METHODOLOGY

A descriptive cross-sectional study was conducted among tribal children below 24 months of age over a period of 1 year from May 2016 to April 2016 in tea gardens of Siliguri subdivision of Darjeeling District, West Bengal. The inhabitants of these tea gardens specially the children commonly suffer from nutritional deficiencies and are exposed to environmental dynamics of poor housing, water supply and sanitation.

Sample size was calculated by assuming the prevalence of developmental delay as 9.5% among children less than 2 years, as published by Vora *et al* [9]. Considering 5% absolute precision, 95% confidence limit and design effect of 2 (to account for cluster sampling), the final sample size was calculated as 264. After adding 10% as non response, the sample size was 290, which were rounded off to 300 to get an equal sub-sample of 10 from each cluster. Cluster sampling technique was used to select study subjects, wherein among all the tea-gardens (clusters) of Siliguri subdivision, 30 were selected through probability proportional to size (PPS) sampling technique. From each cluster, the preferred number of study subjects were selected using simple random sampling.

After getting permission from the Institutional ethics committee and tea-garden officials, pilot testing of the questionnaire was done among a small sub-sample of children, to check for consistency. Data collection was done at the household level using a predesigned and pre tested questionnaire which also included TDSC scale to assess the developmental delay; mothers being the respondents. If any selected eligible study subject was found absent on the day of data collection, the household was revisited up to 2 times. Subjects not available even after those three visits were considered as non-responder. Unwilling parents and severely ill children were excluded.

The mothers were briefed about the purpose of the study and informed consent was obtained from them after assuring confidentiality and anonymity. They were interviewed about socio-demographic variables (age of child, socioeconomic status, literacy level of mother) birth weight, recent and past feeding history of their child. Assessment of developmental delay was done using TDSC scale which consists of 17 items is. The items are represented as horizontal bars; the left side represent 3% and the right side represent 97% of the population who should have achieved the milestone. Delay in any one of the 5 domains is considered as presence of developmental delay for that child.

Collected data was checked for consistency and entered in Microsoft Excel data sheet. Data was analyzed by IBM Statistical Package for Social Sciences (SPSS) version 20. It was organized and presented using the principles of descriptive statistics. Binary logistic regression was applied to test association between developmental delay and other epidemiological correlates. In this analysis, developmental delay was used as the dependent variable. The predictor variables used for the analysis include: age, gender,

socioeconomic status, mother's education, birth weight and feeding practices.

The child's age was categorized into < 6 months and ≥ 6 months; gender as boy and girl; and mother's education were grouped as illiterate and literate. A relative indicator of household wealth was calculated from the per capita monthly income of the family and categorized as per recommendations of Tendulkar Committee's recommendation [10] into two classes – Above poverty line (≥ Rs. 673) and below poverty line (<Rs. 673).

RESULTS

A total of 286 children were examined and their care givers were interviewed during the fixed data collection period; the mean age of the children was 9.05 ± 5.87 months and majority of the children were boys. Majority of the children belonged to families living below poverty line [Table 1]. Overall developmental delays were seen among 42 children (14.7%). Proportion of developmental delays was seen much higher among children more than 6 months of age, having low birth weight and odds of having developmental delays were also significantly higher among this group. There was slightly higher proportion of developmental delays among girl child, children having literate mothers and belonging to APL families. Though there was no statistical significant association seen among these socio-demographic variables and developmental delays [Table 1].

Table 1 Association of developmental delay with socio-demographic variables (n= 286)

Socio-demographic Variables	Developmental Delay		Total	Statistical test AOR (95% CI)
	Present	Absent		
Age group				
Below 6 months	10 (8.8)	104 (91.2)	114	1
≥ 6 months	32 (18.6)	140 (81.4)	172	0.020* (1.15- 5.49)
Gender				
Boys	24 (14)	147 (86)	171	1
Girls	18 (15.7)	97 (84.3)	115	0.87 (0.53- 2.12)
Educational status				
Illiterate	8 (14.3)	48 (85.7)	56	1
Literate	34 (14.8)	196 (85.2)	230	0.96 (0.40- 2.34)
Socio-economic status				
APL	11 (16.4)	56 (83.6)	67	1
BPL	31 (14.2)	188 (85.8)	219	0.83 (0.41- 2.02)
Birth Weight				
< 2.5 kg	9 (45)	11 (55)	20	1
≥ 2.5 kg	33 (12.4)	233 (87.6)	266	0.00* (0.06- 0.44)
Total	42 (14.7)	244 (85.3)	286	

Binary logistic regression analysis also suggests that the odds of having developmental delays were significantly higher among following important feeding practices, like- history of providing pre-lacteal feeding to the newborn baby, feeding less than 8 times in 24 hours, mixed feeding among the children below six months and not doing exclusive breast feeding, inadequate quantity of food as per IMNCI guidelines among the children above six months of age [Table 2& Table 3].

Table 2 Association of developmental delay with variables related to feeding practices below 6 months of age (n= 114)

Variables related to feeding practices	Developmental Delay		Total	Statistical test AOR (95% CI)
	Present	Absent		
Pre-lacteal feeding				
Done	4 (36.4)	7 (63.6)	11	1
Not done	6 (5.8)	97 (94.2)	103	0.036* (0.01- 0.86)
Frequency of BF in 24 hrs				
On demand or ≥ 8 times	3(3.2)	92 (96.8)	95	1

< 8 times	7 (36.8)	12 (63.2)	19	0.004*(2.57- 132.39)
Amount of food during illness				
Decreased	7 (21.2)	26 (78.8)	33	1
Remained same	2 (7.1)	26 (92.9)	28	0.16 (0.02- 1.97)
Increased	1 (1.9)	52 (98.1)	53	0.34 (0.12- 3.91)
Mixed feeding				
Yes	1 (40)	6 (60)	10	1
No	6 (5.8)	98 (94.2)	104	0.032* (0.008- 0.81)
Total	7 (6.1)	104 (93.9)	114	

Table 3 Association of developmental delay with variables related to feeding practices above 6 months age (n= 172)

Variables related to feeding practices	Developmental Delay		Total	Statistical test AOR (95% CI)
	Present	Absent		
Exclusive breast feeding				
Done	23 (15)	130 (85)	153	1
Not done	8 (42.1)	11 (57.9)	19	0.01* (1.39- 11.83)
Timely initiation of complementary feeding				
Yes	22(18.3)	98 (81.7)	120	1
No	9 (17.3)	43 (82.7)	52	0.47(0.28- 1.79)
Frequency of major meals as per age				
Proper	24 (17.4)	114 (82.6)	138	1
Improper	7 (20.6)	27 (79.4)	34	0.84 (0.4- 3.04)
Quantity of food taken as per age				
Appropriate	8 (9.1)	80 (90.9)	88	1
Inappropriate	23 (27.4)	61 (72.6)	84	0.003* (1.57- 9.46)
Total	31 (18.0)	141 (82.0)	172	

DISCUSSION

Identification of developmental delay is very crucial for early management of a child and making him/ her more productive in future life through early interventions. In absence of timely diagnosis and treatment, developmental delay not only leads to various disabilities in the field of educational, occupational and financial aspects, this may lead to limitations in activities of daily living and/or restrictions in social participation. Here lies the significance of early and appropriate assessment of delays in early stages of life to prevent further progression to harmful consequences. Accordingly specific programme guidelines and strategies have been developed in the country. The protection against developmental delays was significant for those children who were exclusively breast-fed for more than 6 months and had given adequate quantity of food (Table 2 & Table 3). This finding is similar with the findings of a lot of other studies [11- 13]. Higher proportion of developmental delay found among the tribal children may be due to improper knowledge of importance of exclusive breast feeding, good quality and quantity of food items by their guardians, whereas some of the previous institution based studies had shown developmental delay less than 10% [9, 14].

This study has revealed one interesting finding that, proportion of developmental delay was much higher among the children who had undergone mixed feeding than their counterpart, which was also found statistically significant (Table 2). This may be due to impaired metabolism, nutritional deficiencies or increased infections due to bottle feeding.

Present study showed higher proportion of developmental delay among females than males, which corroborates with the findings of a study conducted by Jacob K *et al* [14]. Educational status of mother was not found to be statistically significant with developmental delay in the present study ($p>0.05$). This finding is consistent with the reports of the study by Lanka *et al* [15].

The major limitation of the study was its design; being a cross sectional one, factors of developmental delay which was observed here, denotes merely the association and not the causal one. So, to reach a definite inference, it needs large scale analytical study or longitudinal study design as developmental is a chronic process. It depends upon both on nature as well as the nurture [16,17].

CONCLUSION

Developmental delay was found to be quite high among the tribal children living in tea garden areas. Age group, birth weight, pre lacteal feeding, frequency of breast feeding in 24 hours, mixed feeding, exclusive breast feeding, quantity of food taken as per age etc were some of the identified predictors associated with developmental delay. The findings of the present study may have important implications for policy-makers and planners seeking to meet national and international development targets.

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How to cite this article:

Saumik Chakraborty *et al* (2019) 'Developmental Delay And Its Relationship With Feeding Practices Among Children Below 24 Months of Age In Tribal Tea Garden Areas of Darjeeling District, India', *International Journal of Current Advanced Research*, 08(11), pp. 20384-20387. DOI: <http://dx.doi.org/10.24327/ijcar.2019.20387.3980>
