Effect of Parent Nutritional Knowledge and Healthy-Eating Attitudes on Preschooler's Characteristics in the Peri-urban area of Kolkata, West Bengal: A Cross-sectional Study.

***Nilita Das[1], Arnab Ghosh[2]**

[1,2]Biomedical Research Laboratory, Department of Anthropology, Visva-Bharati, Santiniketan, West Bengal, India

***Corresponding author E-mail ID: nilita022@gmail.com**

Introduction

The eating pattern and preferences of children are an outcome of the interaction of innate and learned factors embedded in the context of parentchild interactions. Eating habits formed in preschool years are likely to persist into later life such that early unhealthy food patterns could have implications throughout life like type II diabetes, obesity, CVDs [1, 2] etc. Links between child eating habits and parental feeding practices, especially maternal, therefore, have been the focus of several research studies [3-6]; however, the clinical implications of these links remain unclear. It is important to determine maternal knowledge and behaviour as eating behaviour of mother is affected by factors such as socioeconomic status, education, working status and knowledge [7-9].

Parents use different strategies to influence when, what, and how much their children eat, and these may have maximal impact when children are young, and in constant contact with their parents [10]. Therefore, preschool age is a crucial time in which parents develop communication about food with their children [3]; indeed, previous studies have shown that obesity interventions may be most effective in the preschool age range [11, 12]. Increasing incidence of childhood obesity in developing countries such as India where national surveys show an increase by two folds in the present decade, with the dual challenge of undernutrition (36%) and child obesity, we are still wrestling with 48% of under-five

children as malnourished [13]. Knowledge and Eating attitudes are complex schemes of beliefs, information, emotion that influence the behaviour or practice of an individual [14,15].

Keywords: Nutrition Knowledge, Eating behaviour, Preschool children, Parent feeding practices.

Objective: The present study, therefore, aimed to test associations between multiple parental feeding practices and diverse parent and child characteristics in a large sample of preschoolers enrolled. As parental feeding practices have been associated with a number of parent characteristics such as education [16], socioeconomic status [10], and child characteristics such as gender [17], child age [16,17], weight status [1], daily screen time [17] and food intake [17,18], we included each of these factors as independent variables.

Materials and Methods

Study design

This research was conducted as part of a broader cross-sectional study which aimed to adapt and validate the Nutrition Knowledge Practices Questionnaire (NKPQ) for a sample, as well as to investigate the relationships with child physical characteristics and intelligence development in early years. The study was conducted according to the guidelines laid down in the ICMR and all procedures involving human subjects were approved by the Research Board & Human Ethical Committee of Visva Bharati University.

Participants

A total of n = 190 parents of 3 to 6 years old children (of whom 104 were girls, 86 boys) participated in the study. These are the participants from middle to low-socio economic group recruited during September 2018 to January 2019, completed all the required tests and questionnaires. Children were purposely selected from this age group cohort (Mage=4.8±1.1) because the mentioned age group purposely significant for examining the process of trans-generational transmission of health-related practices. In order to understand the potential importance of socioeconomic status (SES) and familial factors for parental feeding practices and child food-related experiences, the area of residence of the participants were controlled in towns with 20,000100,000 inhabitants.

Procedure

The first phase of the study involved validation (paper under accepted state) of the NKPQ in preschoolers from randomly (purposive) selected peri-urban areas of Kolkata Metropolitan Area. This resulted in a slightly modified, reduced instrument, with a new factor structure (52 items), that was used for the current study. The validated instrument showed good validity and reliability (α=0.87). Before participating in the survey, each parent gave written consent and

instructions requesting completion of the questionnaire within one week from date of distribution. In some schools, the questionnaires were administered & completed on the same day before the parent-teacher meeting. Height and weight of the children were measured using standard measurement techniques and z-score of Body Mass Index (BMI) was obtained using WHO child growth standard indicators. 12 points and lower is considered low, and higher scores of 12 points are considered higher nutritional knowledge. Also, mothers replied to the other questions related to child eating and behaviours through face-to-face interviews. Additionally, we asked parents to provide information about the child's daily screen time during meal time using the following response options: 1 = yes, 2 = no.

Statistical analysis

The data were evaluated using SPSS version 21.0. In order to test the significance of differences between high and low nutrition knowledge among parents as well as eating attitudes, we performed ANOVA (analysis of variance). To assess comparison between factors by presenting association, we chose logistic regression. We then ran a series of bivariate logistic regression analyses examining associations between each independent variable and each parental feeding practice. Next, to establish which variables were associated with parental feeding practices, independently of other confounders, we ran multiple logistic regression models for each parental feeding practice. Pearson correlation coefficient (p=0.01) was performed to obtain relation between different variables.

Results

From the total of 7 schools and 12 ICDS centers contacted, 5 schools and all ICDS centers agreed to participate in the present study. We distributed 216 questionnaires, 26 did not return, so the final sample size became 190.

Descriptive analysis (Table 2) revealed that the majority of mothers completed high school education, with only 6% of the respondents classifying their education as graduate. The vast majority of questionnaires were completed by the mother of the child (72.6%). Multiple logistic regression models for each NKPQ factor, adjusted for child sex shows Greater use of screen devices was associated with lower Mother's education (OR 1.50, CI 95% 1.01- 2.22, p=0.037). In analyses of negative feeding practices such as not having breakfast regularly was associated with lower maternal education (OR 1.28, CI 95% 0.31- 5.0, p= <0.001). Less education in mothers shows significant positive relation with children with higher BMI z-score (+1 to + 2 SD) (OR 2.81, CI 95% 1.41-2.91, p = <0.001). Children were 17 times more likely to be overweight from mothers who did not complete school education. Mothers completed high school education were 2.2 times more likely to make their children to have breakfast regularly (OR 0.49, CI 95% 0.102.32, p=0.001).

Pearson correlation coefficient shows

children frequently taking outside foods were having higher BMI z-score (p=0.008); and many of the mothers who had higher nutrition knowledge had high educational qualification (p=<0.001). Mothers with greater nutrition knowledge served small frequent meals; preferred egg and fresh fruits & vegetables for their children (Table 3).

Discussion

This study of parental feeding practices in a sample of peri-urban preschoolers revealed that a number of both positive and negative/non-nutritive feeding behaviours, were significantly associated with selected mother and child characteristics, partially confirming our hypotheses. Some factors such as working status, income, age, educational level and nutrition knowledge of mothers are effective in feeding behaviour of their children [19].

Low nutrition knowledge would be associated with lower parental educational levels, less healthy eating habits and higher child weight status. The results were partly consistent, specifically, these practices were used more often by mothers with low educational qualification. Association of greater restriction with lower parental education is also established in a longitudinal study in the US [20] and a cross-sectional study in the UK [21], and suggests that educational interventions promoting effective feeding practices may benefit from targeting mothers with lower education levels. Less educated parents also had a greater tendency to use food to regulate emotions or as reward, as has been found in studies (food as reward: [22, 23]; emotional feeding [24]).Wealthier mothers in this representative sample with a higher educational level and monthly income may have more access to information and care of their children. Daily intake of fruits was negatively associated with nutrition knowledge of the mother. In our study, we also observed that children whose parents answered positively to the questions in the healthy-eating attitudes index consumed more fruit, vegetables, and fish and less outside foods.

On the contrary, there was no significant difference between children's physical activity level and mother's nutrition knowledge. Child BMI z-score did not show an association with healthy eating behaviour. This may have been because the preschoolers in our sample had not been exposed to beneficial strategies for long, to have an impact on their weight status. Further, longitudinal studies are necessary to test such associations. We did not find any association between gender and frequency of outside food intake.

Our use of a validated tool to assess parental feeding practices in a relatively large sample of preschoolers is a strength of this study. Our study also had limitations on the data which is cross-sectional where causal relations cannot be inferred, so interpretation of the results should be made with caution. The lack of variability in education could also have limited our ability to determine significant education related differences in positive

feeding practices. Our findings may not be the representative of higher educated families. Participants could have answered in a more socially desirable manner to the questions regarding their child's food intake and eating behaviours a disadvantage common to all parent-report survey research. Assessment of food habits in young children is challenging and relies on information provided by the parents which is prone to error.

Table 1: Means and standard deviation for age and anthropometric measurements of children (n= 190)

Variables	Child Mean±SD
Age (years)	4.8±1.1
Weight (kg)	17.6±4.2
Height (cm)	109.3±9.3
BMI (kg/m^2)	14.6±2.2

Table 2: Demographic and anthropometric characteristics of the children (n= 190)

	n (%)
Respondent	
Mother	138 (72.6)
Father	52 (27.4)
Mother's Education	
< Intermediate	50 (26)
Intermediate	63 (33.2)
+ 2	51 (26.8)
Graduate	12 (6.3)
Mother's responsibility for cooking	
Always/ most of the time	165 (86.8)
Never/seldom	7 (3.7)
Child characteristics	
Sex	
Male	86 (45.3)
Female	104 (54.7)
BMI z-score[a]	
Overweight/obese	**22 (11.58)**
Normal weight/ underweight/ Extremely underweight	168 (88.42)
Outside food intake	
Frequent consumption	74 (39)
Infrequent consumption	94 (49.5)
Breakfast intake	
Yes	45 (25.9)
No	129 (74.1)
Meal time is screen time	
Yes	**127 (66.8)**
No	42 (22.1)

Bold indicates the risk category; a BMI z-score cut-off ≥ + 1 z-score for overweight/obese/extremely obese

Table 3: Attitudes and behaviours of mothers according to their nutrition knowledge on child nutrition

Attitudes and behaviours	Nutrition Knowledge levels				*p*
	Low (%)		High (%)		
	Rarely	Always	Rarely	Always	
I make my child to have breakfast	88.6	11.3	51.2	48.8	.043*
I make my child to have four meals in a day	50	50	25	75	.005**
I make my child to drink at least a glass of milk everyday	50	50	41.7	58.3	.073
I make my child to take at least one fruit everyday	85.8	14.2	66.7	33.3	.009*
I make my child to eat green vegetable everyday	48.1	51.9	23.8	76.2	.024*
I do not prefer fast foods for my child	57.5	42.5	33.3	66.7	.388
I make my child to eat egg three times in a week	62.3	37.8	22.6	77.4	.028*
I make my child to eat fish two times in a week	59.4	40.6	67.3	32.7	.387
I prefer outdoor activity for two or more hours for my child	66.0	34.0	48.8	51.2	.075
I prefer fresh fruits and vegetables for vitamin-mineral sources for my child	44.3	55.7	6.0	94.0	.000***

*p<0.05, **p<0.005, ***p<0.001

Conclusion

Study results suggest that lower maternal nutrition knowledge is associated with child characteristics such as unhealthy food intake and screen device use during meal time, and parental lack of responsibility about child feeding. Since preschool children undergo rapid evolution in their eating habits and emotional relationships with food, an increase in maternal/parental childcare knowledge through nutrition/health education may contribute significantly to a child's nutritional status and weight outcomes.

Acknowledgements

The authors thank the university staff members, concerned department, participating schools, parents and children for their valuable contribution. The Fellowship and funding received by Ms. Nilita Das from the University Grants Commission, Government of India, is hereby acknowledged.

Reference:

1.Jansen PW, Roza SJ, Jaddoe VW, Mackenbach JD, Raat H, Hofman A, et al. Children's eating behaviour, feeding practices of parents and weight problems in early childhood: results from the population-based generation R study. Int J Behav Nutr Phys Act. 2012; 9:130.

2.Skinner JD, Carruth BR, Bounds W, Ziegler PJ. Children's food preferences: a longitudinal analysis. J Am Diet Assoc. 2002; 102:163847.

3.Ventura AK, Birch LL. Does parenting affect children's eating and weight status? Int J Behav Nutr Phys Act. 2008; 5:15. Epub 2008/03/19. doi: 10.1186/1479-5868-5-15.

4.Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-child feeding strategies and

their relationships to child eating and weight status. Obes Res. 2004; 12(11):171122. Epub 2004/12/17. doi: 10.1038/oby.2004.212.

5.Webber L, Cooke L, Hill C, Wardle J. Associations between children's appetitive traits and maternal feeding practices. J Am Diet Assoc. 2010; 110(11):171822. Epub 2010/11/03. doi: 10.1016/j.jada.2010.08.007.

6.Harris H, Mallan KM, Nambiar S, Daniels LA. The relationship between controlling feeding practices and boys' and girls' eating in the absence of hunger. Eat Behav. 2014; 15(4):51922. Epub 2014/08/05. doi: 10.1016/j.eatbeh.2014.07.003.

7.McLeod ER, Campbell KJ, Hesketh KD. Nutrition knowledge: A mediator between socioeconomic position and diet quality in Australian first-time mothers. J Am Diet Assoc. 2011; 111: 696-704.

8.Variyam JN, Blaylock J, Lin BH, Ralston K, Smallwood D. Mother's nutrition knowledge and children's dietary intakes. Am Agri Eco Assoc. 1999; 81: 373-384.

9.Kröller K, Warschburger P. Associations between maternal feeding style and food intake of children with a higher risk for overweight. Appetite. 2008; 51:16672.

10.Kröller K, Warschburger P. Maternal feeding strategies and child's food intake: considering weight and demographic influences using structural equation modeling. Int J Behav Nutr Phys Act. 2009; 6:78.

11.Danielsson P, Svensson V, Kowalski J, Nyberg G, Ekblom O, Marcus C. Importance of age for 3-year continuous behavioral obesity treatment success and dropout rate. Obes Facts. 2012; 5(1):3444. Epub 2012/03/22. doi: 10.1159/000336060.

12.Reinehr T, Kleber M, Lass N, Toschke AM. Body mass index patterns over 5 y in obese children motivated to participate in a 1-y lifestyle intervention: age as a predictor of long-term success. Am J Clin Nutr. 2010; 91(5):116571. Epub 2010/03/12. doi: 10.3945/ajcn.2009.28705 PMID: 20219965.

13.International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS. December 2017. http://rchiips.org/nfhs/NFHS-4Reports/India.pdf. Accessed on August 12, 2019.

14.Zarnowiecki, D.; Sinn, N.; Petkov, J.; Dollman, J. Parental nutrition knowledge and attitudes as predictors of 56-year-old children's healthy food knowledge. Public Health Nutr. 2012, 15, 12841290.

15.Marias, Y.F.; Glasauer, P. Guidelines for Assessing Nutrition-Related Knowledge, Attitudes and Practices; Food and Agriculture Organization of the United Nations: Roma, Italy, 2014.

16.Gevers DWM, Raaijmakers LGM, Bessems KMHH, Teuscher D, Kremers SPJ, van Assema P. Restrictive rules of Dutch mothers regarding their children's dietary intake between meals. Eat Behav. 2015;18:625.

17.Bost KK, Wiley AR, Fiese B, Hammons A, McBride B. Associations between adult attachment style, emotion regulation, and

preschool Children's food consumption. J Dev Behav Pediatr. 2014;35:5061.

18.Warkentin S, Mais LA, Latorre MRDO, Carnell S, Taddei JAAC. Validation of the comprehensive feeding practices questionnaire in parents of preschool children in Brazil. BMC Public Health. 2016;16:603.

19.Ozdogan Y, Ucar A, Akan LS, Yilmaz MV, Surucuoglu MS, Cakiroglu FP, Ozcelik AO. Nutritional knowledge of mothers with children aged 0-24 months. J Food Agri Environ. 2012;10:173-175

20.Rifas-Shiman S, Sherry B, Scanlon K, Birch L, Gillman M, Taveras E. Does maternal feeding restriction lead to childhood obesity in a prospective cohort study? Arch Dis Child. 2011; 96:265269.

21.Blissett J, Haycraft E. Are parenting style and controlling feeding practices related? Appetite. 2008; 50:477485.

22.Musher-Eizenman DR, de Lauzon-Guillain B, Holub SC, Leporc E, Charles MA. Child and parent characteristics related to parental feeding practices. A cross-cultural examination in the US and France. Appetite. 2009; 52:8995.

23.Adnan N, Muniandy ND. The relationship between mothers' educational level and feeding practices among children in selected kindergartens in Selangor, Malaysia: a cross-sectional study. Asian J Clin Nutr. 2012; 4:3952.

24.Saxton J, Carnell S, van Jaarsveld CHM, Wardle J. Maternal education is associated with feeding style. J Am Diet Assoc. 2009; 109: 894898.

Correlations			
		Frequency of eating of the child any outside food	Zscore(BMI)
Frequency of eating of the child any outside food	Pearson Correlation	1	.204**
	Sig. (2-tailed)		.008
	N	168	168
Zscore(BMI)	Pearson Correlation	.204**	1
	Sig. (2-tailed)	.008	
	N	168	190
**. Correlation is significant at the 0.01 level (2-tailed).			

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Mother_edu	.409	.200	4.189	1	.037	1.505	1.017	2.226
	Constant	-2.030	.501	16.427	1	.000	.131		
a. Variable(s) entered on step 1: Mother_edu.									

Parameter Estimates									
Mother_edu[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
<intermediate	Intercept	1.204	.380	10.035	1	.002			
	[Q27Breakfast=1.00]	.405	.738	.302	1	.000	1.500	.353	6.370
	[Q27Breakfast=2.00]	0[b]	.	.	0	.	.	.	.
intermediate	Intercept	1.540	.367	17.588	1	.000			
	[Q27Breakfast=1.00]	.251	.724	.121	1	.000	1.286	.311	5.311
	[Q27Breakfast=2.00]	0[b]	.	.	0	.	.	.	.
2.00	Intercept	1.540	.367	17.588	1	.000			
	[Q27Breakfast=1.00]	-.560	.770	.528	1	.467	.571	.126	2.586
	[Q27Breakfast=2.00]	0[b]	.	.	0	.	.	.	.
a. The reference category is: Graduate.									
b. This parameter is set to zero because it is redundant.									