



ASSOCIATION OF INFANT FEEDING PRACTICES AND FOOD NEOPHOBIA AMONG PRE-SCHOOL CHILDREN IN OROGUN COMMUNITY, IBADAN

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ABSTRACT

This study determined food neophobia (FN) and the relationship of infant feeding practice (IFP) and (FN) among pre-school children in Orogun community, Ibadan. Three hundred and seventy mothers of pre-school children were selected using a systematic random sampling technique from a pre-survey house to house list of eligible children. A semi-structured questionnaire that included socio-demographic characteristics, retrospective breastfeeding practice, retrospective complementary feeding practice (CFP) and FN scales were used to collect information. Data were analyzed using descriptive and logistic regression. The exclusive breastfeeding (EBF) rate was 26.8% and 38% of the mothers had a good breastfeeding practice. Timely initiation of complementary feeding was 54%. The prevalence of FN was 35%. Logistic regression analysis showed that the odds for FN was higher among children who were initiated to breastfeeding late (OR = 1.45, 95% CI: 0.886 – 2.31), children that were not breastfed on demand (OR = 1.766, 95% CI: 0.925 – 3.372), those not exclusively breastfed for six months (OR = 1.366, 95% CI: 0.834 – 2.240) and children introduced to complementary food before 6 months (OR = 1.473, 95% CI: 0.787 – 2.760). Most rejected foods were from the fruits and vegetable group. There were suboptimal IFP in the study and prevalence of FN was high. Poor IFP were associated with FN. Community-based nutrition education programs should be encouraged to improve IFP.

Keywords: *breastfeeding, complementary feeding, breast milk, exclusive breastfeeding, food neophobia, infant feeding practice.*

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INTRODUCTION

Infant feeding recommendations (WHO 2018) such as exclusive breastfeeding (EBF) for six months, timely and adequate complementary feeding practices (CFP) and continued breastfeeding until a child is 24 months are important for normal physical growth and development. Adherence to recommended infant feeding practices (IFP) is not only associated with positive health outcomes among infants but also linked to desirable eating behaviour in the second year of life and beyond (Shim *et al.*, 2011). IFP employed by mothers may determine how well a child accepts family foods, this stems from the fact that infants can learn about the flavour of foods from breast milk before the first taste of food ((Mennella, 2007). Even with these many benefits of breastfeeding, substandard breastfeeding practices (BP), inadequate and inappropriate CF has been reported (Kelechi-Ebisike *et al.*, 2020).

The second year of life marks a transition from the consumption of breast milk and complementary food to family foods. At this stage nutrients' needs increase, accompanied by developmental changes as this group of children seek independence at mealtime and are easily distracted during feeding (Benjasuwantep, *et al.*, 2013). Aligning with these are the difficulties of accepting a variety of new foods with different tastes, textures, and colours and putting them at risk of feeding problems (Birch and Doub, 2014). The most documented feeding problems in the literature among this group include picky eating, limited intake of food and food neophobia (FN) (Kutbi 2020, Samuel and Ugochukwu 2016, Shim *et al.*, 2011).

FN has been described as the reluctance of eating or avoidance of new foods in early childhood (Pliner and Hobden 1992, Pliner 1994). FN is lesser in infancy, rises rapidly around the age of two, and gradually decreases thereafter (Dovey 2008). FN may be established by several factors such as; maternal feeding practice (Kutbi, 2020), parental feeding methods (Birch *et al.*, 2003), IFP, including when parents decide to introduce solids (Shim *et al.*, 2011), exposure and variety of foods (Birch *et al.*, 1998).

Heightened FN can affect children's dietary intake, adequacy and quality (Howard *et al.*, 2012). IFP employed have been proposed to predict dietary patterns at age two and beyond (Kutbi, 2020) and limited studies have reported the interrelation between IFP and feeding problems such as FN in this region. The study aimed to determine FN, find the association between past IFP and FN. Document new foods rejected by food neophobic in a sample of pre-school children living in Orogun community, Ibadan.

MATERIALS AND METHODS

The study was a descriptive cross-sectional study conducted between April and July 2017 in Orogun Community. It is one of the few urban communities in Akinyele Local Government, Ibadan, Oyo State. It is a medium residential area, it houses urban slums, several estates and gated residential areas. Orogun community was selected for this study as a result of the demographic diversity of the population.

SAMPLING PROCEDURE

Sample size was determined using Fischer's sample size formula, $(N) = \frac{w^2}{d^2} \times p \times q$. N= Minimum sample size, w = standard normal deviate corresponding to 95% confidence interval; proportion of an indicator measured (prevalence of FN); q = 1- p; d = desired precision (0.05). Taking prevalence of FN as 39% (Samuel and Ugochukwu 2016), where

w = 1.96 (constant), d = 0.05, p = 39%, q = 1-p (39%). Sample size (N) was 366 and was approximated to 370. A three-stage sampling procedure was applied in selecting the mothers. At first, Akinleye LGA was purposively selected. A random sampling of Orogun community and a pre-survey house-to-house visit was done to get the list of eligible children. At the third stage, systematic sampling technique was used to select 370 consenting mothers of children 24-36 months.

RESEARCH INSTRUMENT

A pre-tested semi-structured questionnaire consisting of closed and open-ended questions was employed to elicit responses from the study participants which included socio-demographic characteristics, retrospective BP, retrospective CF practice and FN.

RETROSPECTIVE BP

Information on retrospective BP was determined by asking questions using some key BP indicators as recommended by WHO/UNICEF (WHO/UNICEF, 2018). The following are the seven items: Timely initiation of breastfeeding (< 1 or >1 hour), any pre-lacteal feeding, colostrum feeding, bottle feeding, any liquid given (except medicine), formula given and any solid or semi-solid given from birth to 6 months of life. All inappropriate BP were scored zero while recommended BP were scored as 1. This was used to generate a seven-point score. The summed score was divided into two categories; scores of 0 - 4 as poor BP and scores of 5 - 7 as good BP.

RETROSPECTIVE CF PRACTICE

Retrospective CF practice was constructed in line with the current CF recommendations (UNICEF, WHO, 2018). This includes: Timely initiation of CF, continued breastfeeding, meal frequency in a day, Food frequency and continued breastfeeding. Food consumption in the past was obtained using the food frequency questionnaire (Mejía-Rodríguez *et al.*, 2014). The food groups were seven with 27 items and each food group was scored individually.

DETERMINATION OF CHILDREN'S FOOD NEOPHOBIA

The Child Food Neophobia Scale (CFNS) (Pliner & Hobden, 1992) is a validated 10 item tool that uses mothers reporting of child neophobia. But in this research, a six-item of CFNS commonly used for young children was adapted: "My child does not like new foods", "If my child does not know what is in a food he/she will not try it", "My child is afraid to eat things he/she has never had before", "My child is very particular about the food he/she will eat", "My child will eat almost everything(reverse score)", "My child is constantly sampling new and different foods (reverse score)" (Pliner & Hobden, 1994). Mothers completed the CFNS by rating their children's eating behaviours on a Likert scale of 1 (Disagree Strongly) to 4 (Agree strongly), where the total minimum score obtainable is 6 and the maximum score of 24 which indicate higher FN.

CFNS scores can be classified by showing the grade of FN. The respondents were grouped into three by the 33rd and 60th percentile as cut-off points. Those who scored 6-12 as food neophilic, scores 13-17 as average and scores 18-24 were grouped as food neophobic (Falciglia *et al.*, 2000) Foods rejected by food neophobic children were

obtained in an open-ended question asking mothers to list the new foods that the child has rejected and this was reported in food groups.

DATA ANALYSIS METHOD

Statistical interpretation of data collected was computed using SPSS (version 22). Categorical data were presented using frequency (and percentages), but continuous data were summarized using mean \pm standard deviation (SD). Logistic regression analysis was conducted to examine associations between child FN and IFP. FN was expressed as a dichotomous variable with category 1 for food Neophilia and 0 for FN. This variable was examined against some key infant feeding indicators.

ETHICAL APPROVAL

The Institution Review Board of the University of Ibadan/University College Hospital (UI/UCH) ethics committee approved the study (UI/EC/17/0194). All respondents gave verbal informed consent before participation

RESULTS AND DISCUSSION

Table 1 shows the socio-demographic data of the mothers and children. The mean age of surveyed children was 30.2 \pm 4.2 months and mean age of mothers was 31.9 \pm 5.86 years. Majority (87%) had secondary school education and tertiary education. The majority of mothers were employed.

Table 1: Socio-demographic characteristics of the study population

Variables	%
Mothers' Characteristics	
Mean age (in years) \pm standard deviation	31.9 \pm 5.86
Education level	
\leq Secondary education	87.1
Employment status	
Unemployed	78.9
Employed	78.9
No of children	
One child	21.9
Two children	34.1
\geq 3 children	44.0
Child's characteristics	
Age (in months), mean \pm standard deviation	30.2 \pm 4.2
Sex	
Females	50.3
Males	49.7

Table 2: Mothers' retrospective account of breastfeeding pattern

Indicator	Frequency (%)
Breastfeeding initiation	
Within 1 hour	46.2
After 1 hour	53.8
Colostrum feeding	
Yes	79.2
No	20.8
Pre-lacteal feed	
Not Given	37.3
Given	62.3
Interval of breastfeeding	
On-demand	80
As convenient for mothers	20
Liquid /formula given during the first 6 Months	
Given	73.2
Not given	26.8
Feeding bottle use	
Yes	46.8
No	53.2
Solid or semi-solid given in the first 6 months	
Yes	32.2
No	63.8
Mothers' level of BP	
Poor Practice	62
Good Practice	38

Table two shows mothers' retrospective accounts of BP. Findings from this study show that 38% of mothers had a good BP. This observation was less than the result of a study in Abuja Nigeria (Omuemu and Adamu 2018) and in contrast, slightly higher than that of Sanusi et al (2016) who reported 22% for good BP. Timely initiation of breastfeeding immediately after birth is necessary for profitable lactation. It was ascertained that the timing of breastfeeding initiation was not optimal as only half (54%) of mothers put their babies to the breast within the first one hour after delivery. Contrary to this, a higher percentage (74%) of breastfeeding initiation in the first one hour was reported (Kelchi-ebisike *et al.*, 2020) while a much lower percentage was reported in another study (Atimati and Adam 2020). Pre-lacteal feeding was noted to be high; more than half (63%) of infants received a pre-lacteal feed. This aligns with other studies (Atimati and Adam 2020, Pareek 2019). The habit of pre-lacteal feeding is not recommended because it delays breastfeeding initiation, hampers suckling and is the main constraint to EBF. Contrary to WHO recommendations, early commencement of liquid or formula before the six months was noted in 73% of the research population. Therefore in this study, EBF rate was 26.8%, this rate was slightly lower than the current EBF rate in Nigeria which is 29% it still did not meet the national goal of 50%. Higher prevalence of EBF has been reported in recent studies (Kelechi-Ebisike *et al.*, 2020, Manyeh *et al.*, 2020). Increased rates of EBF in these studies may be due to wider awareness of the many benefits of EBF.

Table 3: Mothers' retrospective report of complementary feeding practice

Indicator	Percentage
Initiation of CF	
Too early initiation	32.2
Timely initiation	54.1
Late initiation	13.8
Continued breastfeeding	
Yes	95.1
No	4.9
Meal frequency in a day	
0-2 times	16.5
3 times	27.8
4 times	39.2
≥ 5 times	16.5
Food group consumed in a day	
0-3 food groups	24.9
4 food groups	46.8
≥5 food groups	28.4
Food frequency (≥ 1 time in a week)	
Milk and milk products	73.8
Cereals	94.8
Roots and tubers	70
Legumes	40
Meat and poultry	14.9
Fish and fish products	72.9
Vitamin A-rich fruits and vegetables	35.9
Breastfeeding Cessation	
Before first birthday	7.6
Between 13 -18 months	73.6
19 – 23 months	11.9
Continue breastfeeding until second birthday and beyond	7.0
Mean breastfeeding Duration	
18.2± 5.78 months	

Table three shows mothers' retrospective reports of CF practice, about half of the children commenced CF at six months. It was reported that mothers/caregivers do not follow the WHO recommendation for commencement of CF at six months (Udoh and Amodu, 2016). Similarly, only 54% of infants were introduced to CF at six months this finding was consistent with a recent study (Sharma and Kafle 2020). Early initiation CF depicts poor nutrients consumption and could be the reason for the rate of feeding problems and under-nutrition in Nigeria among under-five children. Interestingly, almost all the mothers (95%) continued breastfeeding after commencement of CF and only 7% of the mothers breastfed their children until 24 months. This low prevalence of mothers who continued breastfeeding until 24 months was consistent with that of Atimati and Adams (2020). Retrospective food consumption showed that starchy foods from cereals were the major (94%) food group given to the studied children, a very few consumed foods from meats and vegetable groups. These results aligned with previously reported findings that the majority gave cereals while animal proteins, fruit and vegetable were the lowest food groups given (Forsido *et al.*, 2019, Olatona *et al.*, 2014).

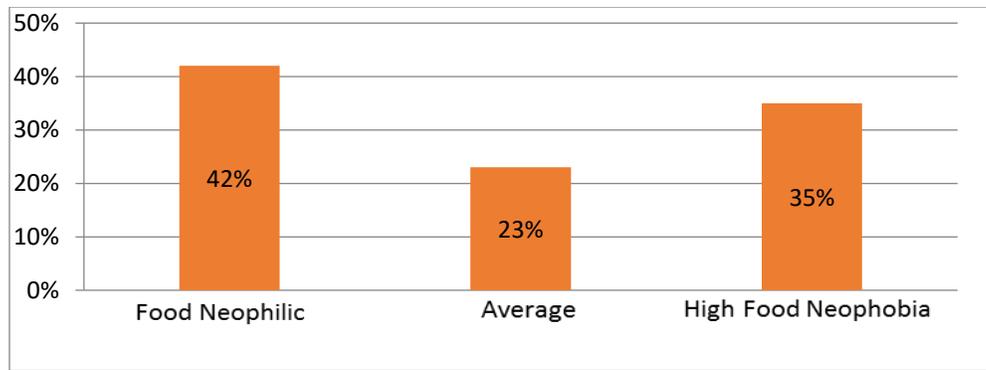


Figure 1: Prevalence of food neophobia

As shown in fig 1 the overall prevalence of FN among pre-school children studied was 35%. A recent report shows a lower prevalence (Koziol-kozakowsha *et al.*, 2018). These statistics, however, were slightly below the 39% reported by Samuel *et al* (2016) and in contrast to a higher prevalence of 65% reported by Shim *et al* (2011). The variation observed from this research may due to the differences in methods of measuring FN.

LOGISTIC REGRESSION FOR ASSOCIATION OF IFP WITH FN

The associations between IFP and FN were investigated as presented in table 4. Logistic regression analysis revealed a positive association between FN and breastfeeding initiation later than one hour after birth and breastfeeding on schedule. Higher odds for FN were observed among children not exclusively breastfed for six months (OR = 1.366, 95% CI: 0.834- 2.240). This observation aligns with that of Shim *et al* (2011), children not exclusively breastfed throughout the first six months had a lower odd ratio for FN by 75%. One explanation for this association is that dietary flavours are learned in utero since flavour can be transmitted through amniotic fluid and learning continues when infants are fed breast milk because mothers' dietary flavour can be transferred through breast milk (Mennella *et al.*, 2001, Mennella 2007). Higher odds (OR = 1.473, 95% CI: 0.787 – 2.760) for FN were observed among those that initiated CF late (after seven months) in comparison to those that were introduced at six months. Significant association between the commencement of CF and feeding problems later in life were reported in previous studies (Shim *et al.*, 2011, Coulthard *et al.*, 2009). The risk for FN was significantly higher among bottle-fed children and children not breastfed until 24 months.

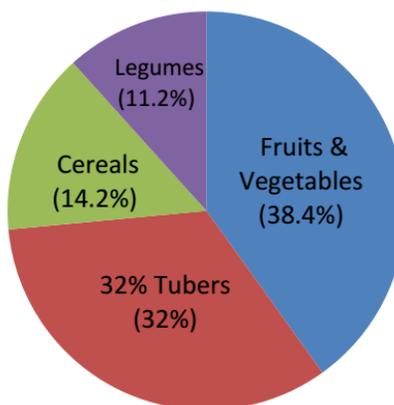


Figure 2: Food groups rejected by food Neophobic children (n=225)

Table 4: Logistic Regression for Association of IFP with FN

Indicators	Variables	Odd Ratio (95% CI)
Breastfeeding initiation	In the first one hour	Reference
	Later than first one hour	1.455 (0.886 – 2.891)
Pre-lacteal feed	No	Reference
	Yes	0.993(0.639 – 1.542)
Colostrum given	Yes	Reference
	No	0.981 (0.580 – 1.660)
Interval of breastfeeding	On-demand	Reference
	Every two hours	1.283 (0.598 – 2.750)
	Every three hours	1.766 (0.925 – 3.372)
Bottle feeding	No	Reference
	Yes	1.314 (0.857- 2.014)
Exclusive breastfeeding	Yes	Reference
	No	1.366 (0.834- 2.240)
Initiation of CF	Timely (at six months)	Reference
	Early (before six months)	1.020 (0.633 – 1.646)
	Late (after six months)	1.473 (0.787 – 2.760)
Continue breastfeeding after six months	Yes	Reference
	No	1.489 (0.873 – 3.871)

Reference: response for those performing the recommended IFP

As shown in fig 2, mothers of neophobic children in this study reported that their children rejected at least one new food which was majorly from the vegetables and fruits group. This observation is in line with previous reports where vegetables and fruits were the most rejected food (Koziol-kozakowsha *et al.*, 2018, Perry *et al.*, 2015). It should be noted, however, that the least food group consume during CF were vegetables and fruits group and meat group. FN may prevent children from eating varieties of healthy diet (Howard *et al.*, 2012). Repeated exposure is required for children of this age to accept novel foods.

CONCLUSIONS

The study shows that there are suboptimal infant IFP in the study area and prevalence of FN is high. It also found an association between IFP and FN. Early nutrition intervention programs should be planned and executed; this should include community-based approaches to promote adherence to recommended IFP.

The study was not devoid of limitations, IFP were measured retrospectively and this depended on the mothers' memory to recall, though the validity and reliability of maternal recall for BF and CF practices have been documented ((Mejía-Rodríguez *et al.*, 2014, Li *et al.*, 2005). Future research should consider other factors that trigger FN apart from IFP.

CONFLICT OF INTEREST

There was no conflict of Interest.

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