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Infant and Young Child-Feeding Practices, Indicators and Index, and Role of Socio-economic Status

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Abstract The present cross-sectional descriptive study was conducted at the paediatric OPD of a government and a private clinic to assess the indicators of Infant-and Young Child-feeding (IYCF) practices and compare them among lower middle and upper middle socioeconomic groups. The study enrolled 200 mother-child pairs with children aged 18-36 months, classified using Modified Kuppuswamy scale into Lower Middle Socioeconomic Group (LMSEG) (score: 11-15) and Upper Middle Socioeconomic Group (UMSEG) (score:16-25). IYCF indicators formed the basis of the questionnaire used to interview the mothers. This calculated the children's dietary diversity score, meal frequency and IYCF index. Statistical analyses were performed using SPSS software (version 16.0) to determine the effect on socio-economic status on IYCF practices. P-value <0.05 was considered to be statistically significant. Only 52.5% (n=105) infant were exclusively breastfed for the first six months of life with significant difference between the two socioeconomic strata, with 64% (n=64) from LMSEG and 41% (n=41) from UMSEG (p=0.01). 67% (n=67) infants from LMSEG received breast milk till two years in contrast to 44% (n=44) infants from UMSEG (p=0.01). However, a higher frequency of food intake (p=0.03) and higher minimum dietary diversity score (p=0.012) was observed among UMSEG as compared to LMSEG. UMSEG mothers had greater prevalence of using bottles to feed their children as compared to LMSEG (n=51 vs n=27). Besides, it was found that educational qualification of the mothers had a positive impact on IYCF practices (p=0.015) but the mother's employment or the child's birth order had no significant effect. IYCF practices differed significantly among the two socioeconomic groups. LMSEG have better qualitative practices and UMSEG showed better quantitative factors. Health education as well as digital media may serve as important intervention programs to spread awareness to protect, promote and sustain optimal IYCF practices in Indian context.

Keywords *Breastfeeding; Complementary Feeding; Dietary Diversity; Meal Frequency*

1. Introduction

An appropriate diet is critical in the growth and development of children, especially in the first two years of life [1]. The World Health Organisation (WHO) and United Nations Children Fund (UNICEF) have articulated a global strategy for infant- and young child-feeding which recommends exclusive breastfeeding for the first six months of life with early initiation and continuation of breastfeeding for two years or more together with nutritionally-adequate, safe, age-appropriate complementary feeding starting at six months [2]. These optimal infant- and young child-feeding (IYCF) practices are crucial for nutritional status, growth, development, health, and ultimately the survival of infants and young children [3, 4].

There have been various indicators used to assess IYCF practices, the major ones being early initiation of breastfeeding, exclusive breastfeeding under 6 months, continued breastfeeding at 1 year, introduction of solid, semi-solid or soft foods, minimum dietary diversity, minimum meal frequency, minimum acceptable diet, bottle feeding and consumption of iron-rich or iron-fortified foods [5]. Some of these indicators construct the Infant and Young Child Feeding Index (IYCI), which is an age-specific scoring system that gives points for positive practices such as breastfeeding, avoiding use of bottle for feeding, meal frequency and dietary diversity [6]. Therefore, the study aimed to assess and quantify the IYCF practices for children enrolled in the study.

IYCF practices have been significantly associated with standard of living index (SLI) and per-capita income, indicating poor CF practices in low socioeconomic group compared to high socioeconomic group [7]. Therefore, the study also aimed to determine the association of IYCF practices with socioeconomic status of the mothers by comparing the indicators among Upper Middle and Lower Middle socio-economic groups classified as per the Kuppuswamy Scale [8].

2. Methodology

A cross-sectional descriptive study was conducted in two hospitals- Lokmanya Tilak Municipal Government Hospital (L.T.M.G.H.), Sion (a government hospital) and Kashyap Nursing Home, Dadar (a private paediatric clinic) among children aged 18-36 months during November-December 2015. With the help of Kuppuswamy scale, mother-children pairs were classified into Lower Middle Socioeconomic Group (LMSEG) (score: 11-15) and Upper Middle Socioeconomic Group (UMSEG) (score: 16-25) of 100 pairs each using purposive sampling.

Institutional Ethics clearance was taken before the commencement of the study and prior permission was obtained from Internal Ethics Committee of Lokmanya Tilak Municipal Medical College to interview the mothers (21.08.2015). Written informed consent were also taken from the mothers after briefing them the objectives of the study in their own language and only those willing to participate were interviewed for the data collection.

The interviews were conducted with the help of a questionnaire based on the 10 key indicators of IYCF [5]. Retrospective data was taken on breastfeeding practices and introduction of complementary food while current information was taken about the child's diet which included the food items and the number of times they were consumed. The food items selected from various groups for the child in the last 24 hours calculated the dietary diversity score of the child and the number of food groups given in the entire week to the child added up to the "weekly food group frequency." These scores were added along with breastfeeding and bottle feeding scores to evaluate IYCF index (IYCI) as shown in Table 1 [6]. The maximum score that could be obtained from the index was 9. Therefore, scores lesser than 9 were compared to selected mother-child factors like mother's education, employment and child's birth order to study the association between them (if any).

Analyses were performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data were presented as Mean ± SD or frequency (percentage). The frequency distributions were tabulated according to socioeconomic groups and were compared using cross tabulations and chi-square test. Independent sample T Test was used to analyse the difference in various parameters according to income groups. Correlation of IYCF with various parameters like education, working status and birth order were determined using Spearman Correlation & Kendall Tau b Correlation respectively. P-value <0.05 was considered to be statistically significant.

Table 1: *Variables and scoring system used to construct IYCF index*

Variables	IYCF Score 12-24 months
Breastfeeding	Yes-1 No- 0
Bottle feeding	Yes- 0 No- 1
Dietary diversity score (24-h recall)	0-2 food group- 0 3 food group- 1 ≥4 food groups- 2
Food group frequency score (past 7d-food frequency questionnaire)	0-3 food groups- 0 4 food groups- 1 ≥5 food groups-2
Feeding frequency	0-2 times- 0 3 times- 1 4 times- 2 ≥5 times- 3

Source: Lohia and Udipi, 2014

3. Results and Discussion

The mean age of the mothers enrolled for the study was 29.3±4.9 years. Most of them were literate, 72% being graduate or postgraduate. This is similar to the Mumbai Census Report [9] which shows female literacy as 86.45%. However, educational qualification was observed to be significantly associated with socioeconomic status as 62% (n=62) mothers from UMSEG had graduation or post-graduation certificates in contrast to 16% (n=16) of LMSEG who were found to be illiterate. Similarly, greater number of mothers from UMSEG (n=32) were involved in full time employment as compared to 88% mothers from LMSEG who reported staying back at home for looking after their family.

The average age of children enrolled in the study was 27.8±6.71 months. More than half of them (n=129) were males, depicting a high child sex ratio, similar to the Mumbai Census Report [9] which reported child sex ratio to be 914. A majority of children (n=109) were of first birth order.

Almost all the mothers (n=200), irrespective of the socio-economic status, had visited antenatal clinics for pre-natal check-ups. However, their frequency of visits ranged from less than 3 to more than 9 times during pregnancy. However, most of them (n=160) had check-ups more than 6 times, as recommended to be ideal [10].

It was observed that with respect to the IYCF practices, only 31.5% (n=63) mothers had started with initial breastfeeding within the first half an hour of delivery. However, no significant difference was found with respect to the socio-economic status (p=0.101). This was very low as compared to another study in Mumbai which reported 82.3% rate of initial breastfeeding [11]. Although some mothers (n=9) preferred breast bank milk during this time, but others went for formula milk as a substitute to initial breastfeeding, in the study.

Table 2: *Frequency of EBF Practice up to 6 months in LMSEG and UMSEG (n=200)*

Characteristic	LMSEG (n=100)	UMSEG (n=100)	χ2	P value
Exclusive Breastfeeding	64 (64)	41 (41)	10.607	0.001

*Figures in parenthesis indicate percentages

In the study, only 52.5% (n=105) mothers followed exclusive breastfeeding for six months of age. This was higher in comparison to a study in urban slums of Kolkata which observed EBF being practised at the rate of 33% [12] and similar to a study in south coastal India where 57.9% of mothers had exclusively breast fed their child up to six months [13]. More mothers from LMSEG followed EBF as compared to UMSEG (Table 2). Mothers when asked for reasons of not breastfeeding exclusively gave reasons like the child was hungry (n=60) or other things would make the child healthy (n=76).

Only 7.5% of the mothers enrolled in the study continued breastfeeding till one year, 40.5% continued till two years of age and 15% continued for longer which shows a lower practice than a study carried out in West Bengal which reported 55.7% rate of continued breastfeeding (12-15 months) [14]. This figure also differed significantly between the two groups with LMSEG continuing for longer periods as compared to UMSEG (p=0.01).

The mothers participating in the study reported different ages for the introduction of complementary foods. Out of 200 mothers, most of them (n=154) started at 6-12 months, i.e. the recommended age, however, there were cases for early as well as late initiation of complementary foods too. 0.5% of mothers (n=1) started with complementary feeding at 0-1 months, 4% (n=8) started at 1-3 months and 15% (n=30) at 3-6 months. This was better than the NFHS-4 Maharashtra report which stated timely introduction of complementary food in only 43.3% children [15].

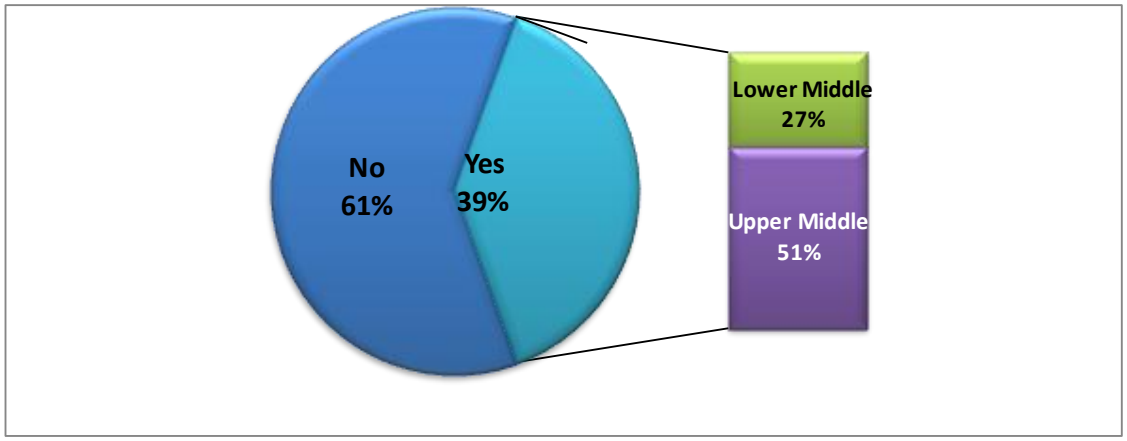

Figure 1: *Frequency of Bottle Feeding among LMSEG and UMSEG (n=200)*

Bottle feeding was found to be a common practice in the present study with about 39% (n=78) of mothers following it, which is much greater than an earlier study which stated bottle feeding to be practised by only 22% children in India [12]. This prevalence of bottle feeding was also observed to be dependent on their socioeconomic status, with 27% cases (n=27) from LMSEG versus 51% (n=51) from UMSEG, showing a significant difference between the groups (p value= 0.001) (Figure 1).

Table 3: *Age-wise Dietary Diversity Score, Weekly Food Group Score and IYCF Score of LMSEG and UMSEG (n=200)*

Characteristic	Age Groups	LMSEG (n=100)	UMSEG (n=100)	p-value
Dietary Diversity Score	18-24 months	4.37±0.99	4.84±1.14	0.012
	24-30 months	4.21±1.16	4.81±1.01	
	30-36 months	4.71±1.16	4.78±0.76	
Weekly Food Group Frequency Score	18-24 months	2.71±0.46	2.84±0.37	0.04
	24-30 months	2.92±0.28	2.78±0.43	
	30-36 months	2.76±0.49	2.91±0.28	
IYCF Score	18-24 months	6.03±1.73	6.34±1.38	0.06

Dietary Diversity Score, which is the sum total of number of food groups consumed by the child the previous day, out of (i) Milk and Milk Products; (ii) Eggs; (iii) Flesh Foods (Meat, Fish, etc.); (iv) Vitamin-A Rich Fruits and Vegetables; (v) Other Fruits and Vegetables; (vi) Grains; and (vii) Nuts and Legumes [5], was found to have a mean of 4.64±0.99, as compared to ideal score of 5-6. There was a significant difference in DDS between the 2 groups, with UMSEG having better scores due to better availability of resources, as seen in Table 3. This was in line to another study which reported that minimum dietary diversity was achieved by 54.75% in urban population and only 19.47% in rural areas [16]. Weekly food group frequency score also showed similar findings where UMSEG had an upper hand (Table 3).

According to existing studies, about 39.3% of mothers give three or more feeds per day to their children [1]. However, in the present study, it was observed that 71% (n=142) children were fed more than 3 times a day. This data was significantly different for the two socioeconomic groups with p=0.03, demonstrating that UMSEG families had more feeding frequency as compared to the LMSEG families.

Mothers enrolled in the study were enquired when they give meals to the child and when do they stop it. Most of the mothers gave food at some scheduled time (n=168) and stopped feeding when the baby refrained to eat (n=116). However, there were cases of force eating also seen in the interviews where mothers said that they fed their children till the complete food was fed (n=76). This finding was found to be similar in both the socioeconomic groups (p=0.312). Most parents also reported feeding to be accompanied by activities like watching television, playing toys or using phones, which when removed, affected the intake. However, this habit was more seen in UMSEG as compared LMSEG (p=0.000). Similarly, 91% mothers (n=182) gave outside food to their children, which consisted mostly of biscuits, wafers, chocolates, bread, farsans, noodles, paw bhaji, cake, etc.

The mothers enrolled in the study were enquired if they gave any iron, calcium or multivitamin supplements to their children in lines to the WHO recommendations [2]. However, the trends of supplementation was seen to be moderate in UMSEG and low among the LMSEG (p=0.000).

Based on these indicators, IYCF index (IYCI) was calculated for children below 24 months (as per table 1), which although did not show any significant difference between the two groups (Table 3) but had values greater than a previous study in Mumbai [6] which reported mean IYCI value 5.9 ± 1.9, showing better practices. This index was also found to be significantly associated with educational qualification of the mothers (p=0.015), however did not have any significant relation with the working status of the mothers (p=0.7) or the birth order of the child (p=0.07).

4. Conclusion

The study reveals areas of both similarities and few distinct differences in IYCF practices in relation to the indicators between the two socioeconomic groups. LMSEG had better practices with respect to

early initiation of breastfeeding, exclusive breastfeeding till 6 months and continued breastfeeding till 2 years, but UMSEG had sub-optimal practices. On the other hand, UMSEG had better dietary diversity and frequency than the LMSEG, but lagged behind in the avoidance of bottle feeding. Therefore, unlike the earlier studies which indicated poor complementary feeding practices in low socioeconomic group compared to high socioeconomic group [7], the present study reports sub-optimal IYCF practices for both the lower middle as well as the upper middle socioeconomic groups.

The study also shows a positive correlation between education and IYCF practices, and since the coverage of digital media is increasing, health education as well as digital media may serve as important intervention programs to spread awareness to protect, promote and sustain optimal IYCF practices in both the socioeconomic groups.

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