

## Complementary Feeding Pattern of Infants attending the University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu

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### Abstract

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**Background:** The transition from exclusive breastfeeding to family foods is a very vulnerable period in every child's life. Its success depends on the available foods and the practices of caregivers.

**Objective:** To determine the complementary feeding pattern for children under one year of age.

**Methods:** Data was obtained by interviewer administered questionnaire from caregivers who brought their children to the Children Outpatients Clinic (CHOP) and Institute of Child Health (ICH) at the University of Nigeria Teaching Hospital (UNTH), Enugu.

**Results:** A total of 332 respondents were studied. Those who commenced complementary feeding before four months of age constituted 38.8 percent (CHOP) and 23.4 percent in ICH, ( $p=0.003$ ). Fortytwo point eight percent (CHOP) and 61.2 percent (ICH) used homemade food items in complementary feeding, while 60 percent (CHOP) and 48.8 percent (ICH) ( $p=0.0001$ ) fed their children more than five times per day. Those who stopped breastfeeding before one year constituted 23.3 percent (CHOP) and 11.2 percent (ICH). The percentages that used cup/plate and spoon for feeding were 82.8 percent (CHOP) and 94.0 percent (ICH). Mothers were usually responsible for feeding their babies in 91.1 percent (CHOP) and 87.5 percent (ICH) cases, respectively.

**Conclusion:** Complementary feeding practice among caregivers was still suboptimal. Early cessation of breast feeding, and that of commencement of complementary feeding were common. However there was generally adequate frequency of feeding and good usage of cup/plate and spoon. There were significant differences in the findings between respondents who attended CHOP and those from ICH. There is need for the provision of standard module for health talk to effect uniform knowledge and practice of complementary breastfeeding.

### Introduction

BREASTFEEDING is an unequalled process of providing ideal food for the healthy growth and development of infants.<sup>1,2</sup> In 1992, the World Health Organization (WHO) and UNICEF launched the Baby Friendly Hospital Initiative (BFHI) to

strengthen maternal practices in supporting breastfeeding.<sup>3</sup> Under this initiative, some hospitals are designated Baby Friendly Hospital (BFH) on the premise that such hospitals adhere to the ten steps to successful breastfeeding which include education of mothers on exclusive breast feeding. However, it was realized that after six months, breast milk alone is no longer sufficient, both in quantity and quality, to meet the nutritional requirements of the child.<sup>4,5</sup> In view of this, the World Health Organization (WHO) recommended that for every infant that is more than six months old, it is necessary to supplement the breast milk with other foods,<sup>6,7</sup> which start as liquid foods and slowly progress to solid

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foods. This is complementary feeding and for it to be successful, it needs to be timely, adequate, safe and appropriate, and the caregiver/mother should be aware of this fact. However, in developing countries, this transition from exclusive breastfeeding to family foods is still a very vulnerable period in the child's life. This is often accompanied by stress and ill health for the infants, mostly because the foods are not properly tailored to their needs.<sup>8,9</sup>

It has been shown that many traditional complementary foods in Africa are only a slight modification of adult foods,<sup>9,10</sup> involving mainly mashing and dilution without taking into consideration, the special nutritional requirements of young children. Apart from the problem of composition of complementary foods, there are also issues with when, how, and what to use for complementary feeding.

It has been reported that majority of children in Nigeria and many other countries in sub-Saharan Africa are already on complementary foods by the sixth month of life, although breastfeeding continues well into the second year for most children.<sup>11</sup> The traditional complementary foods and feeding practices in these areas are reported to be inadequate.<sup>12,13</sup> Consequently, most young children are fed complementary foods that are inadequate in both quantity and quality, resulting in malnutrition and an increase in infant morbidity and mortality.<sup>14,15</sup>

Over the past decades, the global concern on how to improve infant nutrition, compliance with recommended feeding practices and identifying other factors impeding appropriate feeding, has grown steadily.<sup>7</sup> Despite these developments, there is a dearth of studies on complementary feeds and practices in Nigeria. We therefore report the results of a study undertaken to assess the complementary feeding practices of mothers in a part of Southeast Nigeria. This study set out to determine the complementary feeding pattern for children less than one year of age and also assess any spatial differences between practices of mothers seen at the Institute of Child Health (ICH) and Children Out-Patient (CHOP) Clinic at the University of Nigeria Teaching Hospital (UNTH), Enugu. It is hoped that the result would help in focusing attention on area(s) that require(s) upgrading in feeding practices for children.

### Patients and Methods

The study was carried out in CHOP and ICH both in UNTH, Enugu State, South east Nigeria from January to October 2007. CHOP caters for children who present with any form of childhood illness as a first contact with the hospital (curative centre), while ICH runs child welfare clinics for well children (preventive centre).

The study was a descriptive cross-sectional study to determine mother's complementary feeding practices and to compare the practices of mothers attending the two clinics. These two places were deliberately chosen for this study because, apart from the fact that they are areas where mothers with children present in sizeable numbers, it was presumed believed that there might be a difference in the quality of health talk with regards to infant feeding received in the two places.

The EPI-info software version 6.04<sup>16</sup> was used to calculate the sample size, with the input of prevalence (p) of complementary feeding practice in Nigeria of 64 percent<sup>17</sup> and a minimum sample size of 354 subjects were obtained. The mothers/caregivers were randomly selected from both places (CHOP and CHER) until the required sample size was obtained.

Using pre-tested interviewer-administered questionnaires, information was collected by trained interviewers (doctors and nurses) from mothers that presented with their children aged under one year to UNTH and who also gave consent to be part of the study. A convenient sample method was used to administer questionnaires to mothers; a total of 385 questionnaires were so administered. The information collected included mother's age, duration of exclusive breastfeeding, predominant breastfeeding and mixed feeding, age of commencement of complementary feeding, type of food used, frequency of feeding, whether still breastfeeding, age when breastfeeding was stopped, complementary feeding method, who usually fed the child, and the educational status of the parents. Fifty three questionnaires were not analyzed further due to incomplete data.

### Data analysis

The data were checked for inaccuracies and inconsistencies by the authors, before entry using Epi-info version 6.04.<sup>16</sup> Associations between CHOP and ICH mothers' complementary feeding patterns were analyzed using Pearson's chi-square and Fisher's exact tests for categorical variables. A p-value less than 0.05 was considered to be statistically significant.

### Ethical consideration

Ethical approval was obtained from the Ethical Committee, UNTH, Enugu, while verbal and written consents were obtained from the participating respondents. Mothers were interviewed as they presented to the clinics. Participation was voluntary. Confidentiality of all information obtained from participants was maintained by not allowing information to be accessible to non-members of the research team.

## Results

*Socio-demographic characteristics of respondents*

A total of 332 questionnaires were retrieved from 180 respondents from CHOP and 152 from ICH. As shown in table I, the mean (SD) ages of the CHOP and ICH respondents were 30 (4.7) and 30 (5.4) years respectively, with a majority of the CHOP respondents falling within the age range 25-30 years (47.2 percent) while majority (51 percent) of ICH respondents were older than 30 years. A greater

percentage of the respondents in both CHOP (90 percent) and ICH (87.5 percent) had either secondary or tertiary education while only 2.0 percent (CHOP) and 0.0 percent (ICH) had no formal education.

*Age of commencement of complementary feeding*

Table II shows that the respondents from CHOP and ICH that commenced complementary feeding before four months of age were 38.8 percent CHOP and 23.4 percent ICH, respectively. This difference was statistically significant ( $p = 0.003$ ). More mothers

Table I

*Socio-demographic Characteristics of Respondents*

Variables	CHOP	ICH
	<i>n</i> = 180 <i>N</i> (%)	<i>n</i> = 152 <i>N</i> (%)
<i>Mother's Age (yrs)</i>		
≤ 25	35 (19.4)	31 (20.4)
25-30	85 (47.2)	44 (28.9)
> 30	60 (33.3)	77 (50.7)
Mean (SD)	30 (4.7)	30 (5.4)
<i>Mother's Level of Education</i>		
No formal education	3 (1.7)	0 (0.0)
Primary school	14 (7.8)	19 (12.5)
Secondary school	86 (47.8)	52 (34.2)
Tertiary education	76 (42.2)	81 (53.3)

CHOP = Children's Outpatients

ICH = Institute of Child Health

Table II

*Age at Commencement of Complementary Feeding and Cessation of Breastfeeding before One Year*

Variables	CHOP	ICH	$X^2$	<i>P</i> -value
	<i>n</i> = 180 <i>N</i> (%)	<i>n</i> = 152 <i>N</i> (%)		
<i>Age at Commencement</i>				
< 4 months	69 (38.3)	35 (23.0)	0.98	0.003†
4-6 months	97 (53.9)	113 (74.34)	14.83	0.0001†
> 6 months	14 (7.8)	4 (2.63)	11.7	0.04 †
<i>Stopped Breastfeeding Before One Year</i>				
	42 (23.3)	14 (9.2)	11.7	0.0006*†

\*Fisher exact.

†Statistically significant

from CHOP had the tendency of starting complementary feed before four months. The percentages of those who started complementary feeding after six months of age were low at 6.3 percent in CHOP and 1.3 percent in ICH; this difference was also significant ( $p=0.04$ ). Forty two (23.3 percent) of the 180 respondents from CHOP and 14 (11.2 percent) of 152 from ICH had stopped breastfeeding their children before the age of one year ( $p=0.0006$ ).

#### *Reasons for stopping breastfeeding*

Table III shows that the mother being positive for HIV (CHOP 52.4 percent vs ICH 21.4 percent,  $p=0.04$ ) and poor lactation (CHOP 14.3 percent vs ICH 50.0 percent,  $p=0.006$ ) were among the main reasons for stopping breastfeeding.

#### *Type of complementary food and frequency of feeding*

Respondents from CHOP and ICH that used homemade food items for complementary feeding constituted 42.8 percent and 61.2 percent, respectively ( $p=0.0008$ ; Table IV) of the respondents. The percentages of respondents from CHOP and

ICH that fed their children five times or more per day were 60 percent and 48.8 percent respectively, a difference that was statistically significant ( $p=0.0001$ ).

#### *Foods used for complementary feeding*

A majority (93.5 percent each) of both CHOP and ICH respondents used pap (local porridge made from fermented maize (Table V). None of the respondents added any form of lipid (vegetable oil or palm oil) to fortify their homemade complementary food, and none used any sweetener (sugar/glucose) in the complementary feeds.

#### *Complementary feeding methods and who feeds*

Table VI shows that 82.8 percent and 94.0 percent from CHOP and ICH respectively, fed their children using cup/plate and spoon ( $p=0.002$ ). Mothers were the principal feeders (CHOP 91.1 percent vs ICH 87.5 percent). Others (CHOP 13.4 percent vs ICH 46.8 percent) that participated in feeding the children included the fathers (CHOP 1.1 percent vs ICH 5.3 percent), grandmothers (CHOP 3.9 percent vs ICH 6.6 percent), and daycare attendants (CHOP 0.6 percent vs ICH 0.7 percent).

**Table III**

*Reasons for Stopping Breastfeeding before One Year of Age*

<i>Reasons</i>	<i>CHOP</i>	<i>ICH</i>	<i>X<sup>2</sup></i>	<i>p-value</i>
	<i>n=42</i>	<i>n=14</i>		
	<i>N (%)</i>	<i>N (%)</i>		
Mother HIV positive	22 (52.4)	3 (21.4)	4.07	0.04†
Poor lactation	6 (14.3)	7 (50.0)	7.51	0.006†
Mother died	3 (7.1)	1 (7.2)		0.74*
Working mother	1 (2.4)	3 (21.4)		0.04*†
Lack of time	4 (9.5)	0		NA
Baby stopped	3 (7.1)	0		NA
Mother is a student	2 (4.8)	0		NA
Baby too old for breast milk	1 (2.4)	0		NA

\*Fisher's exact, †statistically significant, NA = Not applicable. Note: some gave more than one reason.

Table IV

*Type of Complementary Food and Frequency of Feeding*

Variables	CHOP (n=180) N (%)	ICH (n=152) N (%)	X <sup>2</sup>	pvalue
<i>Type of Complementary Food</i>				
Homemade	77 (42.8)	93 (61.2)	11.2	0.0008†
Processed	24 (13.3)	1 (0.6)	17.24	0.0003*†
Mixed	79 (43.9)	58 (38.2)	1.12	0.3
<i>Frequency of Feeding</i>				
2-4times	73 (40.6)	93(61.2)	14.0	0.0002†
≥5times	107 (59.4)	59(58.8)	14.0	0.0002†

\*Fisher's exact, † statistically significant

Table V

*Homemade Foods used for Complementary Feeding*

Foods	CHOP n=77 N (%)	ICH n=93 N (%)	X <sup>2</sup>	pvalue
Pap	72 (93.5)	87 (93.5)	0.00	0.99
Soyabean	17 (22.1)	13 (14.0)	1.9	0.17
Crayfish	13 (16.9)	3 (3.2)	7.68	0.006†
Milk	6 (7.8)	11 (11.8)	0.76	0.38
Dawa	3 (3.9)	9 (9.7)	1.36	0.24
Rice	3 (3.9)	2 (2.2)		0.66*
Yam	3 (3.9)	1 (1.1)		0.(33)*
Millet	0	3 (3.2)		NA
Beans	2 (2.6)	1 (1.1)		0.59*
Soup	2 (2.6)	0		NA
Agidi	0	2 (2.2)		NA
Groundnut	2 (2.6)	0		NA
Egg	1 (1.3)	0		NA
Custard	1 (1.3)	0		NA
Gari	1 (1.3)	0		NA
Honey	0	1 (1.1)		NA
Wheat	0	1 (1.1)		NA
Indomie	0	1 (1.1)		NA

NA= Not Applicable, \* Fisher exact, † statistically significant, **Note:** some respondent used more than one item

Table VI

*Complementary Feeding Methods and Persons that usually feed the Child*

Variables	CHOP n=180 N (%)	ICH n=152 N (%)	X <sup>2</sup>	p-value
<i>Feeding Method</i>				
Cup/Plate & Spoon	149 (82.8)	143 (94.1)	9.93	0.002†
Bottle feeding	31 (17.2)	9 (5.9)	9.93	0.002†
<i>Child usually fed by</i>				
Mother	164 (91.1)	133 (87.5)	1.14	0.29
Aunt	9 (5.0)	20 (13.2)	6.89	0.08†
Sib	5 (2.8)	12 (7.9)	4.50	0.03†
Grandmother	7 (3.9)	10 (6.6)	1.26	0.26
'Househelp'	0 (0.0)	12 (7.9)		NA
Dad	2 (1.1)	8 (5.3)		0.04**†
Nanny	0 (0.0)	6 (3.9)		NA
Cousin	0 (0.0)	2 (1.3)		NA
Daycare Attendant	1 (0.6)	1 (0.7)		1.00*

\*Fisher's Exact, †statistically significant. Note: In some cases, more than one person fed the child.

### Discussion

The results of this study offer some insight into the complementary feeding practices of mothers seen at CHOP and ICH of UNTH. A good number of the respondents in both places introduced their children to complementary feeds before they were four months of age. A similar finding was reported by Onayade *et al*<sup>11</sup> and Haggerty *et al*<sup>18</sup> who found that 75 percent and 76.5 percent of infants respectively, had received water, porridge or other natural drinks by the time they were three months old. Such age is too early for complementary feeding, as the child's alimentary system is not yet ready for the highly starchy foods commonly used for complementary feeding in developing countries.<sup>19</sup> Although there might be a small proportion of children who might need infant formula feeding at 2-3 months,<sup>20</sup> caution is needed when introducing food to an infant earlier than four months, especially under unhygienic conditions that prevail in many developing countries. Furthermore, it is not only that complementary feeds are introduced early and often at excessive frequency, but the rate of breastfeeding and breast milk intake decline substantially afterwards.<sup>21</sup> Although African women seldom practise exclusive breastfeeding, most infants are breastfed well into their second year of life. This is in keeping with the finding in this study, where few

of the respondents had stopped breastfeeding by one year of age. A similar result has been reported in other places.<sup>11,22</sup> In the present series, mothers seen at ICH had a lower tendency of stopping breastfeeding before one year than those seen in CHOP. The negative practice of starting the complementary process late (introducing complementary foods later than seven months), common in many African cultures,<sup>23</sup> and which has been found to be associated with childhood malnutrition, was found to be negligible in this study (CHOP 6.3 percent vs ICH 1.3 percent). The age and experience of respondents in ICH who were more elderly than the CHOP respondents could have contributed to that. Another possible reason could be the impact of specialized public health nurses who undergo frequent training and provide systematic health care.

The use of homemade food was high in both groups. However, a greater number of CHOP respondents used processed food when compared with the ICH respondents. A similar result was obtained in a study in Uganda.<sup>24</sup> A possible explanation could be that efforts by the health instructors in ICH to promote the use of homemade foods via health talks, demonstrations, posters etc influenced mothers' choice of food options.

Furthermore, health talks given at these two places differ in content based on differences in the cadre of nurses working in these clinics. In both places, health education dwells more on childhood illnesses, but ICH lays a greater emphasis on infant feeding and immunization, this contrasts with what is obtainable in CHOP, where more diverse topics are handled and often by trainee nurses.

The high frequency of complementary feeds per day found in this study constituted poor practice. A remarkable percentage of respondents gave complementary feeds more than four times in 24 hours. Breastfeeding on demand is a good practice and on average, an infant can breastfeed up to 8-12 times or more in a day.<sup>25</sup> For an average healthy breastfeeding infant, complementary foods should be provided 2-3 times/day at six-eight months and 3-4 times/day at 9-11 months. At 12-24 months, complementary meals should still be 3-4 times/day with the introduction of snacks.<sup>21</sup> It has been reported that the total daily energy intake (kilojoule/Kg body weight) increases significantly with more concentrated diets ( $p=0.001$ ) and varies positively in relation to the feeding frequency ( $p=0.001$ ), although there is marginal reduction in the percentage gain with each increase in frequency.<sup>26</sup> However, more (51.2 percent) of ICH respondents tended towards better complementary feeding practice of 2-4 times/24 hours. The reverse was the case with CHOP respondents, where majority (60.0 percent) fed 5 times/24 hours. The high frequency of complementary meals given may be attributed to a lack of clarity on the appropriate feeding modalities between breast milk which should be given on demand and complementary meals which should be regimental. This confusion may be traced to the deficit in the knowledge of health instructors on complementary feeding practices and calls for further research.

The use of "pap" (a local porridge made from fermented maize) was very high (93.5 percent) by both groups. The reasons for its use included the following: being cheap and easy to prepare, and being one of the staple foods in this locality and a common finding in any household.<sup>12</sup> The "pap" was not adequately fortified with energy- and nutrient-rich supplements such as milk, groundnut and eggs. About 49.0 percent and 30.0 percent of CHOP and ICH respondents respectively, fortified their complementary feeds. The commonly used items were soya bean, crayfish, milk, groundnut and honey. None of the respondents used sugar or glucose to sweeten and improve the caloric content of the complementary meals. These findings raise a lot of questions on the palatability of these homemade meals which influences its acceptability by the infants

as well as its adequacy. a very low energy density, Apart from the use of groundnut (CHOP 2.6 percent vs ICH 0.0 percent), none of the respondents used any form of lipid-based supplements (groundnut oil, palm oil) as additives that could have boosted a very low energy density associated with pap. In addition, the source of vitamin A and E was deficient. Surprisingly, these deficits in practice were observed in both groups.

The negative practice of feeding with bottles with nipples which is associated with high infant mortality<sup>27</sup> was negligible in this study. High percentages of respondents (CHOP 82.8 percent vs ICH 94.0 percent) used cup/plate and spoon for complementary meals. Although the respondents from ICH were more likely to adhere to this good practice of cup/plate and spoon feeding than those from CHOP, the overall adoption of cup/plate and spoon practice is encouraging. Mothers' participation in the complementary feeding of their infants was high. This is similar to the finding in other studies.<sup>24</sup> Regardless of the fact that the participation of fathers in the complementary feeding of their children was low (CHOP 1.1 percent vs ICH 5.3 percent), it is an important finding. Efforts should be geared towards finding ways to improve fathers' participation; this will take the whole burden of complementary feeding off the mothers. It will also allow mothers more time to breastfeed and cater for other household members. It will give fathers insight into the cost involvement of complementary feeding and encourage an improvement in their financial contribution. Another revealing finding is the involvement of daycare in the complementary feeding. Although the percentage being fed by daycare attendants was insignificant in both CHOP (0.6 percent) and ICH (0.7 percent), it is nevertheless worrisome to find that a child of less than one year was already receiving care outside the household. This raises question on the psychological balance of the child and the hygienic standard of such feeds when such attendants have many other children to tend to, at the same time.

### Conclusion

Complementary feeding practices among caregivers were suboptimal. Complementary meals were commenced at early age of less than four months in a good proportion of cases. Most caregivers still gave complementary feeds at a much higher frequency with the notion that more meals would offer extra benefits. Studies have shown that excessive meal frequency reduces breastfeeding frequency and breast milk intake.<sup>22</sup> There was early cessation of breastfeeding. There was predominant use of plant

based diet (pap, soya bean) which provides insufficient amount of key nutrients as complementary diet and lack of fortification with lipid-based supplements. Majority adopted the practice of using cup/plate and spoon for feeding complementary meals. There were significant differences in many of these practices between respondents at CHOP and ICH.

Therefore since there is no single universal best package of components in complementary feeding interventions, educational approach is more likely to have impact if there is an emphasis on counseling in the spheres of maintaining breastfeeding, and responsive feeding frequency not more than four times/day. There is need to shift emphasis in health advice away from just calories, towards enriching the nutrient content by adding nutrient-rich animal source foods like meat, fish powder, milk products, use of lipid-based feeds, vitamins, vegetables, pulses and other fortified foods. Above all, health workers should be empowered to provide effective feeding counseling by attending regular training. In many situations, a greater impact may be seen when food or food supplements are provided for the mothers.

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