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Perception and Practices of Complementary Feeding among Infants' Mothers in Southwestern Nigeria: A Qualitative Study

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ABSTRACT

Background: Malnutrition resulting from inappropriate and ineffective childhood feeding remains a significant public health concern especially in developing countries, where poor child feeding practices exert serious negative impact on health outcomes. This qualitative study explored mothers' perception about complementary feeding, mothers' hygiene and food safety measures, food storage, and preparation and food handling practices. **Methods:** This study was a descriptive cross-sectional survey, conducted in selected Local Government Areas (LGAs), Southwestern Nigeria in November, 2019. Four sessions of Focus Group Discussion (FGD) were conducted in each of four selected LGAs giving a total of sixteen sessions with eight discussants selected for each session of FGD giving a total of 128 discussants. The discussants were selected by multistage sampling technique. FGD guide was used to explore mothers' perception about complementary feeding, complementary feeding practices, and associated factors. Responses were recorded, transcribed, and thematically analyzed using Nvivo 11 software. **Results:** Five themes were developed from FGD responses, including mothers' perception about complementary feeding, hygiene practices, food storage, safety, food preparation, and food handling. Mothers' age, parity, educational status, employment status, family income, and food availability and affordability affected mothers' perception about complementary feeding and complementary feeding practices. **Conclusion:** Advocacy on infants' feeding must take cognizance of the finding factors towards appropriate, effective childhood feeding in addition to reduction in malnutrition and related burden.

Keywords: *Mothers' perception; Complementary foods; Complementary feeding; Nigeria*

Introduction

Adequate nutrition in infancy and early childhood is significant towards ensuring overall healthy growth and development of a child (UNICEF/WHO/World Bank Group, 2017). An estimated half of all deaths among children under five globally are attributed to nutrition related issues and majority of these deaths occurred in Asia and Africa (UNICEF, 2018). Global statistics

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on malnutrition in children also estimated that about 22.9% of the world under five children are stunted; while Central Africa accounted for 32.5%, Southern Africa 28.1%, Northern Africa 17.6%, and Western Africa accounted for 31.4% (UNICEF, 2018, World Health Organization, 2020).

The data from the Nigeria Demographic and Health Survey (National Population Commission, 2018) showed that 37% of children are stunted and 19% are severely stunted. The breakdown of these figures varies across the six geopolitical zones of the country with the Northwest and Northeast regions recording the highest for stunting, wasting, and under-weight; while the Southeast and South recorded the lowest prevalence. Higher proportion of children in rural areas were also recorded to be malnourished than those in urban areas (National Population Commission, 2018).

Complementary foods, however, are foods given to infants from six months of age when breast milk alone can no longer be sufficient in quantity and quality for the infants. The period of exclusive breastfeeding should be followed by complementary foods rich in high nutrient density especially from the 6th month when breast milk alone cannot supply the required nutrients (Dewey, 2013).

In order to ensure effective feeding practices for infants globally, the World Health Organization (World Health Organization, 2008) recommends the following eight core indicators to assess the appropriateness and optimal combination of complementary foods for infants and young children: early initiation of breastfeeding; exclusive breastfeeding up till the 6th months; continued breastfeeding till two years of age; introduction of solid, semi-solid or soft foods; ensuring minimum dietary diversity; minimum meal frequency; and minimum acceptable diet. They are in addition to other optional indicators, including intake of iron-fortified or iron rich foods; continued breastfeeding till two years of age; age-related breastfeeding; milk feeding frequency, especially for non-breastfed children.

Therefore, appropriate complementary feeding is recommended to start from 6th month when only breast milk cannot meet the dietary needs of infants (World Health Organization, 2008, 2017, 2020). Similarly, the Nigeria National Policy on Infant and Young Child feeding (IYCF) (Federal Ministry of Health, 2010) recommended exclusive breastfeeding for the first six months of life followed by the commencement of complementary foods that are safe and appropriate using locally available and nutritionally adequate food in addition to continuation of breastfeeding for up to two years of age or beyond.

Studies have shown that ineffective feeding practices are responsible for over 41% of the mortalities that occur yearly (approximately 2.3 million) among children aged 6 to 24 months in developing countries. One-third of such deaths are due to nutrition and inappropriate feeding practices which occur during the first year of life (Olatona *et al.*, 2014).

Studies have investigated predisposing factors to high incidence of ineffective and inappropriate feeding practices among under five children especially in middle and low income countries. For instance, (Hs *et al.*, 2011) observed that maternal characteristics, such as age, level of education, employment status, parity and monthly income significantly affected infant feeding practices. Similarly, (Balogun *et al.*, 2017, Danjin and Dawud, 2015, Kuchenbecker *et al.*, 2017) identified mothers' knowledge and perception about infants' feeding as determinants of childhood feeding practices. However, (Adeomi *et al.*, 2015, Hs *et al.*, 2011) reported that place of residence was associated with childhood feeding pattern. In addition, it was found that mothers' socio-cultural factors have a significant effect on childhood feeding practices (Karigi *et al.*, 2016).

A review of complementary feeding practices across countries in West Africa sub-region (Mitchodigni *et al.*, 2018) also identified social and cultural myths about childhood feeding as determinants of infant and young child feeding practices in most traditional African setting. Similarly, a study conducted on socio-cultural

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practices affecting infant and young child feeding in Kenya concluded that cultural beliefs and taboos as well as certain food restriction have a strong effect on breastfeeding and complementary feeding practices (Karigi *et al.*, 2016). Similar finding was observed in a study in Zaria, Nigeria, conducted on socio-cultural factors affecting Nigerian mothers' weaning practice (Karigi *et al.*, 2016). In their study, a significant association was observed between socio-cultural factors and mothers' perception about weaning practices. There is, however, a dearth of information regarding the relationship between mothers' perception about infants' feeding practices and various forms of misconceptions about childhood feeding which have been observed in most African communities. Therefore, this study aimed to explore mothers' perception about complementary feeding, mothers' hygiene and food safety measures, food storage, preparation and food handling practices among infants' mothers in Osun state, Southwestern Nigeria. This study was carried out to make appropriate recommendations towards addressing various misconceptions related to infants' feeding practices.

Materials and Methods

Study setting and participants: The study was conducted in selected Local Government Areas (LGAs) in Osun state, Southwestern Nigeria between November and December, 2019. Osun state was established on the 27th of August 1991 and covers total landmass of about 12,820 square kilometers. The state is located within the interior of the Cocoa Belt of southwest Nigeria. The 2006 Nigeria National Population Census, published that Osun state has an estimated population of about 3,423,535 residents, comprising 1,740,619 males and 1,682,916 females.

Osun state has 30 LGAs and one area office distributed according to the three Federal Senatorial districts, namely Osun East Senatorial district, Osun Central Senatorial district, and Osun West Senatorial district. Out of the 30 LGAs, 19 are designated as rural and 11 as urban LGAs. A rural LGA has only one or two small towns as the principal settlements; while the remaining settlements are rural communities.

This study was a descriptive cross-sectional study in which sixteen sessions of focus group discussions (FGD) were held for infants' mothers. The study involved infants' mothers in selected LGAs, Southwestern Nigeria. The selected LGAs are: Ife Central, Ife East, Oriade and Atakunmosa West LGAs, Osun state, southwestern Nigeria.

An infants' mother in this study refers to a woman who undertakes primary care of an infant while an infant refers to a baby up the age of one. Mothers or primary care givers whose infants were six-month old were included in this study.

The participants were selected through multistage sampling technique. In stage one, Osun East Senatorial district was selected out of the three Senatorial districts in Osun state by simple random sampling technique (balloting). Stage two involved selection of two rural and two urban LGAs, namely Ife Central, Ife East, Oriade and Atakunmosa West LGAs of rural and urban LGAs within the Senatorial district by simple random sampling technique (balloting) giving a total of four LGAs. In stage three, eight discussants who were purposively selected participated in each session of the FGD giving a total of 128 discussants. Discussants were selected based on the highest level of education, so that there were two sessions of FGD among mothers with tertiary education and two sessions among mothers with secondary education in each of the two rural and urban LGAs. This is to ensure an appropriate comparison of responses and opinions among homogenous groups. Four sessions of FGD were conducted in each of the four selected LGAs giving a total of sixteen sessions.

Measurements: FGD guide with ten open ended questions was used for qualitative data collection. The FGD guide had two sections, including section 1 with five questions exploring mothers' perception about complementary feeding and complementary feeding practices, and section 2 with five questions exploring mothers' food hygiene practices, food safety, food storage, and food preparation. The FGD guide also included

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free listing approaches to explore mothers' perception about complementary feeding and complementary feeding practices in accordance with the WHO guidelines about infants and young child feeding (Mitchodigni *et al.*, 2018).

The FGD guide was translated into Yoruba language and was used to examine mothers' perception about complementary feeding, complementary feeding practices, and factors affecting these practices. Each session of FGD was conducted in Yoruba language and lasted between 35 to 40 minutes in a designated Primary Health Centre. FGD responses were transcribed back to English language. The investigator moderated the discussion at each FGD session. The objectives of the discussion were explained to participants and informed consent was taken from each participant for the discussion to be recorded using audio recordings. Hand written notes were also taken during the discussion, which were used to complement the audio recordings.

Ethical approval and consent to participate: Ethical approval was obtained from the Ethics and Research Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Osun state (Health Research Ethics Committee number IPH/OAU/12/1138). Permission to collect data was also obtained from the authorities of Ife Central, Ife East, Atakunmosa West and Oriade LGAs of Osun State. Informed consent was also obtained from mothers prior to data collection.

Data analysis: The FGD explored complementary feeding practices and associated factors among mothers. Field notes were taken during each FGD. Each participant for FGD was given a number based on seating arrangement by the note taker for identifying voice when transcribing and referencing quotations. The audio recordings were carefully listened to and edited, relevant details were also extracted from field notes. Responses from the FGD were analyzed using Nvivo 11 software. Similarities and differences in views regarding mothers' perception about complementary feeding, complementary feeding practices, and associated factors among infant' mothers were identified and reported.

Results

Socio-demographic characteristics of FGD participants: Eight participants took part in each of the 16 sessions of FGD giving a total of 128 participants. Participants' ages ranged between 20-34 years with about 48% within age group 20-24 years, 39% were within age group 25-29 years, and 12.5% were within age group 30-34 years. About two-thirds were Christians while one-third of the participants practiced Islamic religion. A quarter of the FGD participants with tertiary education were employed in Government establishment; while others were self-employed. Similar proportion with secondary education was also self-employed. All discussants with tertiary education were in monogamous setting; while about a third of the discussants with secondary education were married in polygamous setting. About two-third of the FGD with secondary education earned less than 18,000 naira (45 US dollar) as monthly income; while other participants earned at least 18,000 naira monthly. Five themes and fifteen sub-themes were developed from the FGD responses. The themes included mothers' perception about complementary feeding, feeding and hygiene practices, food storage, safety, preparation and handling and factors affecting complementary feeding practices. The main theme, the themes and sub-themes are presented in **Table 1.**

Participants' perception about complementary feeding: Participants at the FGD generally perceived that complementary feeding involves giving infants other foods in addition to breastfeeding, especially when breastfeeding alone could not satisfy baby. FGD participants accepted that complementary foods should be commenced from six months of age, but they opined that complementary foods could be commenced earlier than six months of age, especially when the breast milk is insufficient and baby cries for additional food after being breastfed. The participants generally opined that water should be given to infants during the first 6 months to satisfy thirst. In expressing their opinion about this general opinion, a participant with secondary education explained that:

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"... Complementary feeding involves giving additional food to infants when breast milk alone can no longer satisfy the baby, irrespective of baby's age. My baby still cries after being breastfed and I had to commence pap (milled corn meal) for her from the 4th month. I used to give boiled water to my baby also because she may be thirsty".

The above expression was, however, different from the view of another participant with tertiary education who responded that:

"...Complementary feeding should commence from 6th month of age. I used to wait till the 6th month before commencing additional food to my babies. We received this advice from the nurses in the clinic. I've not started additional food for my baby yet."

Responses on infants feeding practices: Breastfeeding was generally initiated between 1 hour and 24 hours after delivery while in some cases, initiation of breastfeeding was delayed till the second day. Reasons given by the participants included inability to lactate early and inadequate lactation after delivery. Mothers, therefore, gave water or other forms of infant foods before breastfeeding in such cases. Giving water, milk, juice, herbs was also common during the first six months; since mothers believe babies could be thirsty or because of cultural belief and family tradition that new born babies must be given herbs regularly according to family norms. The proportion of participants who practiced exclusive breastfeeding in the first six months was low among FGD participants. In expressing their views about initiation of breast feeding and giving water, a participant with tertiary education in an urban LGA responded that:

"...I started giving my baby water with glucose later in the day after I delivered because I could not produce breast milk throughout the morning and afternoon after I delivered"

Similarly, reason was given by another participant with tertiary education in the Urban LGA who commented that:

"...I commenced breastfeeding the second day, there was no enough breast milk the first day of delivery, my baby was given water with glucose before I started producing breast milk".

The above response was similar to the submission of another participant with secondary education, in a Primary Health Centre in an urban LGA who responded that:

"...I could not produce breast milk early after delivery; I was advised to feed my baby with infant formula."

Responses from the FGD also showed that FGD participants were aware that babies should be fed with breast milk only for the first six months, the duration for exclusive breastfeeding among mothers, however, varied between 3 to 4 months, though there were few instances when mothers exclusively breastfed for up till the 6th month which was observed mostly among participants with tertiary education. Reasons given for mixed feeding in the first months included cultural reasons, family traditions pressure from mother-in-laws and cultural belief.

In supporting this practice, a participant with tertiary education in an urban LGA stated that:

"...I gave my baby water in addition to breastfeeding, because I felt the baby need water. I usually boil the water and allowed it to cool down before giving to my baby. I also give water to my baby because my mother-in- law insisted that I must give water and herbs according to family tradition."

Commencement of complementary feeding: Responses from the FGD revealed that the average age for commencing complementary feeding among FGD participants was between the 3rd and 4th months, though mothers were aware that appropriate age for commencing complementary feed was 6 months. Reasons given for early introduction of complementary food included resumption of work after maternity leave especially among government-employed mothers, perceived need to commence complementary food for baby at about this age; because breast feeding alone may not be adequate in addition to pressure from in-laws to give additional food. A participant with tertiary education, in an urban LGA gave reason for commencing complementary feeding at the 4th month:

"...I started giving pap to my baby by the 4th month; because the breast milk was no longer sufficient and my baby used to cry".

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To further support the above opinion, another participant with tertiary education in a rural LGA responded that:

"... My baby still cried after sucking breast, I thought the breast milk was no longer sufficient. So, I commenced pap (milled corn) with milk from the 4th month. I am aware that babies should be fed with only breast milk for the first six months but I started infant formula and custard powder (corn flour) for my baby after the 4th month because I have to resume work."

Feeding frequency and feeding style: The participants at the FGD were asked to give their opinion about daily feeding frequency for infants; responses revealed that infants were generally fed with complementary foods at an average of 3 times daily in addition to breast milk. This was further explained by a participant with tertiary education in an urban LGA who responded that:

"...I feed my baby with pap and milk in the morning before leaving home. I also prepare pap, kept inside flask for crèche where she will be fed twice or three times. I also feed with amala and ewedu with marched fish or rice with fish in the evening. I breastfeed only when I'm at home".

Responding to the average frequency of feeding per day; another participant with tertiary education, in an urban LGA commented that:

"...I fed my baby morning, afternoon, and night with solid food. This is addition to breastfeeding which I cannot count the number of time particularly when I'm at home."

Regarding feeding styles, responses showed that mothers were responsible for feeding infants although husbands occasionally fed their infants whenever husbands are available at home. Some participants also responded that an older child or house help fed infants especially when mothers are not available at home during feeding time. To support the above submission, a participant with secondary education in an urban LGA retorted that:

",..I always feed my baby at home except in the crèche, the father rarely feed him. I don't have house help."

Dietary varieties and combination: FGD participants were asked to express their opinion regarding food varieties and combinations for infants. Responses showed that the most common food items and food combinations for infants in the study area included commonly available food items, such as noodles, pap prepared from corn, sorghum, as well as other cereals like rice and bread. Others food items are beans, mashed yam, and banana. In describing the food combination given to infants, a participant with secondary education in an urban Primary Health Centre (PHC) responded that:

"...I prepare a mixture of dried corn, soya bean, wheat with crayfish (milled together) and cooked for my baby from the 6th month. This was in addition to breastfeeding"

Other food items commonly prepared for infants' feeding are amala (cooked yam flour) with ewedu (a type of vegetable) and fish, cooked mashed yam, beans, and moimoin (made from beans). The participants were asked to give their opinion on availability of food items in this environment. It was also generally believed that availability of these food items depend on the financial capability of individual household, family income especially those of mothers and existing market price. Common food items commonly fed to infants included rice and stew and mashed yam with stew in the afternoon were very common among the participants. Other food items were amala, ewedu with mashed fish in the evening. Water is often given to infants based on mother's discretion during and after feeding infants with in-between meals.

Dietary adequacy and utilization: FGD participants were asked to describe how they would know if their baby has taken enough food during feeding. A participant with secondary education in a rural LGA responded that:

"....my baby simply turns away from the food when he's satisfied or he refuses to swallow the food when he's already satisfied or when his tommy increases to a certain level."

Personal hygiene practices: FGDs generally opined that washing hands with water before food preparation prevents food contamination. Some participants, however, added that washing hands with soap and water after using toilet and before feeding infants prevents diarrhea diseases. To

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further support the above, a participant with tertiary education in an urban PHC opined that:

"...if a mother washes her hand properly with soap and water especially after using toilet prevents contamination of baby's food; such a child will not have diarrhea or any form of infections."

Food hygiene practices: FGD participants opined that washing cooking utensils, washing feeding items, such as cups, spoons are necessary to prevent contamination of such items. In expressing her view, a participant with tertiary education explained that:

"...Feeding items used for feeding babies need to be regularly washed before serving food and immediately after feeding infants in addition to washing cooking utensils. This will prevent contamination of these items by flies".

A similar opinion was given by another participant with secondary education who explained that:

"...I belief food must be covered after preparation especially if the baby is not going to be fed immediately and raw food items should also be kept away from flies to prevent contamination. I also think fruits should be washed before giving them to infants to eat."

Challenges of hygiene practices: The participants identified inadequate access to regular source of water as one of the major challenges facing hygiene practices in this environment. Sources of water were majorly from wells, rain (during raining season), and occasionally boreholes from houses in the neighborhood. Commenting on these challenges, a participant with secondary education in an urban LGA responded that:

"...We fetch water from our neighbor's house who has borehole, the well in our house is not drinkable and get dried during dry season. I personally take care of the items used for feeding my baby before leaving home in the morning and after returning from work to prevent contamination."

A participant with secondary education in one of the rural LGA also responded that:

"...the well in our house is not deep and usually get dried up especially during dry season. We get water from our neighbor during this period making it a little difficult to use water as much as I would want."

Responses on food storage and food safety: The most common method of storing raw food items like rice and beans was storage inside nylon kept inside cupboard or shelves. Storage of such food and raw grains inside containers with tight cover were common among few of the FGD participants. It was generally opined that storing such food items inside containers with tight cover prevents access by pests, such as rats, cockroaches. Frying of fish and meat was also a common practice among FGD participants. Such fried fish and meat are kept until time of cooking to prevent such fresh food items from spoiling. To support the above view, a participant with tertiary education in an urban LGA commented that:

"...I store raw food items inside plastic containers with cover to prevent access by rats and cockroaches. I also keep fresh fish or meat wrapped inside nylon bags to prevent flies before they are fried. I put my vegetables on the roof of our house overnight to keep it fresh till the following morning."

Precautions before food preparation: Regarding food preparation, it was a common opinion among the FGD participants that hands and cooking utensils must be washed with soap and water before cooking foods. Responses from FGD also showed that mothers occasionally give foods especially pap kept inside flasks which are often given to infants in small amounts. For instance, a participant with secondary education in a rural LGA supported this observation:

"...I kept my baby's pap inside food flask out of which I gradually give the baby. I could keep the pap for a whole day or sometimes till the following morning. This saves a lot of time spent if every meal has to be prepared freshly."

Precautions during food preparation: Responses from FGD showed that food are cooked until mothers perceived that the food has been adequately cooked and no extra precautions are observed when preparing vegetables and Okro. Such food items are expected to be prepared with caution, so that such foods are not overcooked. In expressing her views about special precautions during food preparation, a participant in a rural LGA responded that:

"...I prepare my vegetables until I feel it's properly done. I also ensure that vegetables are initially per-

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boiled before adding to the stew. I do not observe any special precautions during food preparation."

Precautions during infant feeding: Responses from the FGD showed that force feeding is common among participants especially when mothers perceived their babies have not taken enough meal. Some participants, however, agreed that this practice is dangerous and should therefore be avoided. Some views are expressed as follows:

"...I sometimes force-feed my baby with pap in the morning especially if she refuses to take the food. I sometimes have to rush out to work in the morning and I have to ensure she takes enough pap before dropping her in the crèche."

Another participant, however, responded that she knows that force-feeding is discouraged, but she sometimes needs to ensure her baby takes adequate food:

"...I sometimes had to force-feed her, though I learnt babies should not be force-fed to avoid choking. She does not want to take pap especially in the morning; she only wants to take fruits juice. I had to force her to ensure she takes adequate quantity."

Responses on factors affecting infants' feeding practice: FGD participants identified mothers' age, number of children (parity), culture, family size, family income, employment status, availability and affordability of food items as factors that could affect infants' feeding practices.

The participants opined that mothers' age is essential in determining feeding practices. Below are some excerpts from participants: A participant with tertiary education in an urban LGA opined that:

"...A mother who is mature in age will have enough knowledge about child's feeding practices which she may have learnt over the years, she will likely feed her baby better and take care of her baby more than younger mothers."

The participants also opined that the number of children is an important factor that could affect mothers' feeding practices, for instance, a participant with secondary education in a rural LGA opined that:

"...A mother who has had children before is likely to take care and feed her baby properly because of her previous experience. A mother who just has her first child may not have much experience about child care."

However, another participant with secondary education in an urban LGA stated:

"...number of previous children may not affect feeding practices especially if the family has a good source of income. She only needs to learn and practice how to take care of her child."

Similar responses were recorded regarding employment status, mothers' income and level of education. A participant with tertiary education in an urban LGA explained that:

"...mothers who are employed will have enough income to take care and feed her baby more than an un-employed mothers, she will support her husband financially to take care of the family"

Similar opinion was given by another participant with secondary education in an urban LGA who responded that:

"...employed mothers will have money to feed their babies more than mothers who are not employed. Such mothers will depend on the husband for money and this may not be sufficient."

Participants similarly opined that mothers' income is another factor that could affect feeding practices, for instance, a participant with tertiary education in an urban LGA responded that:

"...mothers who earn more as monthly income will feed their babies with nutritious food. Babies of such mothers will also grow better than those mothers who receive less income or are not working at all."

In explaining the importance of culture in infant feeding, a participant with secondary education, in a rural LGA responded that:

"...I gave water to my baby in the first six months because Yoruba culture requires that water and herbal concussion must be given to infants. I also bathed my baby with herbs and give little to my baby as our family/culture demand. My mother-in-law insists that giving babies herbs is according to tradition of the family."

To further explain her view on the effect of family size on infants' feeding practices, another participant with secondary education in a rural LGA responded that:

"... babies born in large families with might not be able to feed well because available food may not be adequately sufficient for members of the family. The larger the family size, the less the amount of food available for an infant and other child."

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The participants generally opined that some food items like maize, sorghum, yam, banana, and some fruits are usually in abundance and are cheap to purchase during their season. Such food items become more expensive during the off season posing a challenge to mothers during these periods. Children either consume less or mothers have to spend more to support their children. In line with the above response, a participant with secondary education in an urban LGA responded that:

"...I spend less on maize and sorghum during the raining season because the prices usually come down. I have to spend more to buy the same quantity during the dry seasons. Fruits and some vegetables are also expensive during the dry season."

Another participant with secondary education in a rural LGA also responded that:

"...Some food items and fruits are cheaper and readily available during the planting season and it's easier to access vegetables, yam, and fruits to give my baby during these periods."

Table 1. Themes and sub-themes from the FGD on perception about complementary feeding practices.

Themes	Sub-themes
Perception about complementary feeding	Mothers' perception about complementary feeding. Initiation of breastfeeding, Commencement of complementary feeding, Feeding frequency and feeding style, Dietary varieties and combination, Dietary adequacy and utilization.
Hygiene practices and food safety	Personal hygiene practices, Food hygiene practices and food safety ,Challenges of hygiene practice.
Food storage, preparation, and food handling	Storage of raw food items, Storage of perishable food items, Precautions before food preparation, Precautions during food preparation, Precautions during food preparation, Precautions during infant feeding.
Factors affecting complementary feeding practices	Cultural and religious factors, mother's educational status, age, family type, employment status, socio-economic status, monthly income, availability, and affordability of food

Discussion

This study explored mothers' perception about complementary feeding and complementary feeding practices, examined mothers' hygiene and food safety measures, and explored food storage, preparation, and food handling.

Perception about complementary feeding: The participants generally perceived that complementary feeding involves giving infants other foods items in addition to breastfeeding at any time whenever it is perceived that breastfeeding alone could no longer satisfy the baby, though mothers were aware that complementary foods should be commenced from six months of age. The Nigeria Federal Ministry of Health and WHO (Federal Ministry of Health, 2010, World Health Organization, 2008, 2020) recommended exclusive breastfeeding for the first six months of life followed by the commencement of complementary foods that are safe and appropriate using locally available and nutritionally adequate food in addition to continuation of breastfeeding for up to two years or beyond.

Infants' feeding practices: Initiation of breastfeeding: The participants generally opined that breastfeeding should be initiated within 24 hours after delivery, though in most cases, initiation of breastfeeding was delayed till the second day due to inadequate lactation. Most mothers, therefore, fed their babies with infant formula feed before adequate lactation was established. The findings also revealed low compliance with exclusive breastfeeding in the first six months among FGD participants. Boiled water, bottled water, herbs, fruit juice were generally given to infants in addition to breast milk during the first six months. It could be due to

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cultural belief that new born babies must be given herbs according to cultural family norms. Low compliance with exclusive breastfeeding in the first six months among FGD participants was consistent with Baker (Baker *et al.*, 2016). They found that the proportion of infants exclusively breastfed worldwide has declined and is estimated at 37%. This assertion corroborates the findings by Elyas (Elyas *et al.*, 2017) who observed that the proportion of exclusively breastfed infants in Sub-Sahara Africa was 35%; while Balogun (Balogun *et al.*, 2017)reported 29% among women in urban communities of Lagos state, Nigeria.

This study also revealed that about one-third of mothers had completely stopped breastfeeding at the time of this study. This was mostly observed among government-employed mothers. It could be due to pressure and high demand from work and in few cases, refusal to continue breastfeeding by the baby. This observation was similar to the finding by Olatona (Olatona *et al.*, 2014) who found that about 50% of mothers completely discontinued breastfeeding before the twelfth month post-delivery.

Feeding from the 6th month: This study also found that the average period for the commencement of complementary feeding among FGD participants was between the 3rd and the 4th month. It could be due to perceived belief that the breast milk alone could not be sufficient, need to resume work, and giving herbs as a result of family tradition and culture. Early introduction of complementary food generally observed in this study confirms the observation from a study on complementary feeding conducted in Iraq and United Arab Emirates. It indicates that 78.6% of infants in Iraq as well as 70% of infants in United Arab Emirates commenced complementary foods between the 4th and the 6th months (Caroli *et al.*, 2012). This also corroborate the findings from a multi-center study involving Belgium, Italy, Germany, Poland, and Spain which found that 25% of the studied infants had already commenced complementary food before the 4th month and by the 6th months about 90% of the infants had been fed with solid foods (Alvisi *et al.*, 2015). Similarly, a study by Anigo (Anigo *et al.*, 2010) in North-Western Nigeria showed that complementary foods are introduced to 41.2% of infants as early as the 3rd month; while 17.8% commenced complementary food between 1st and 2nd months. Early introduction of complementary foods (before the 6th month) is associated with health risks; such infants are more likely to be exposed to food-borne infectious diseases (Tang *et al.*, 2015).

Complementary feeding frequency: Responses from the FGD also revealed that average daily frequency for complementary food was 3 times per day in addition to breastfeeding; while snacks such as biscuits, fruit juice were given as in-between meals. This average daily frequency for complementary food was similar to a study conducted in Delta state, Nigeria, revealing that approximately 54.0% of mothers fed their infants 3 times daily in addition to breastfeeding (Oyibo *et al.*, 2011).

Complementary food diversity and varieties: The most common food given to infants was pap made from corn and sorghum. In some cases, mixture of corn, soya bean, crayfish milled together was also common; while amala (yam powder) with ewedu (vegetable) and fish; rice with fish stew; and marched yam with fish stew was common. The availability, quantity, and quality of these food items depend on financial status of the family especially the mother. The most common food items given to infants as observed in this study confirms the study by Ogbo (Ogbo *et al.*, 2015) who asserted that cereals, grains, and in few cases, legumes are among food items commonly fed to infants and children in Nigeria. It was generally observed that water was often given to infants based on mother's discretion during feeding and after feeding infants with in-between meals. Multivitamins were only given to babies during febrile illnesses.

Hygiene practices: Washing of hands with soap and water before food preparation, after using toilet and before feeding infants was generally observed among mothers. Mothers generally stated

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that this prevents contamination of food and diarrhea diseases. Sources of water were majorly from wells, rain (during raining season,) and occasionally boreholes from the neighborhood. Mothers who are working may not have sufficient time to wash or clean or supervise washing of cooking utensils by house helps. Awoyemi *et al.* identified poor hygiene and sanitation as significant factors affecting nutritional status among infants in Oyo state, Nigeria (Awoyemi *et al.*, 2012).

Food storage, food safety, food preparation, and food handling: Discussants retorted that raw food items like rice and beans were sometimes stored inside nylon bags; while perishable food items, such as fresh fish, meats, and vegetables were either stored inside fridge especially when electricity is available or fried and kept till cooking time. This type of storage is used to prevent access and contamination by cockroaches, rats, and other pests. Responses from the FGD also showed that duration of cooking were at the discretion of the mothers. This practice may result in over cooking and loss of essential vitamins during cooking. Mothers occasionally give left over foods to their infants especially pap (milled corn) kept inside food flask which are often given to infants. This could predispose infants to food contamination and diarrhea diseases.

Factors affecting infants' feeding practices: Participants at the FGD identified mothers' age, number of children (parity), culture, family size, family income, employment status, availability and affordability of food items as affecting infants feeding practices. The above observations were similar to findings by the others study findings (Balogun *et al.*, 2017, Danjin and Dawud, 2015, Hs *et al.*, 2011, Kuchenbecker *et al.*, 2017) who observed that maternal characteristics, such as age, level of education, employment status, parity, monthly income, and mothers' knowledge about infants' diet affected infants feeding practices. Some of the studies, also identified place of residence as a factor affecting infants' feeding practices (Adeomi *et al.*, 2015, Hs *et al.*, 2011).

Conclusions

Mothers' age, parity, educational status, employment status, availability and affordability of food items affected mothers' perception about complementary feeding and complementary feeding practices. Advocacy must target these variables in order to improve household and mothers' socio-economic empowerment towards reducing malnutrition and related burden. Nutritional education intervention programs for mothers should also take cognizance of socio-cultural context of mothers to address various myths and misconceptions about childhood feeding practices.

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Conflicts of interest

Authors declare that there is no conflict of interest.

Authors' contribution

Kolade Afolayan A was responsible for conceptualizing this study, original draft, design, methodology, data curation, data analysis, data interpretation, and writing the final manuscript. Adebukunola Olajumoke A was responsible for obtaining ethical clearance, permission and final approval of the original draft, transcription and validation of research instruments.

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