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Social and economic factors influencing intrahousehold food allocation and egg consumption of children in Kaduna State, Nigeria

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Abstract

Adequate intake of high-quality nutritious foods during infancy and early childhood is critical to achieving optimal growth, cognitive and behavioural development, and economic productivity later in life. Integrating high-quality and nutrient-dense animal source foods (ASFs), a major source of protein and micronutrients, into children's diets is increasingly considered essential to reducing the global burden of malnutrition in low- and middle-income countries. While eggs are an ASF that shows promise for mitigating child undernutrition, interventions promoting egg consumption among children have had mixed results in improving egg intake and child growth outcomes. As part of an evaluation of a demand creation campaign promoting egg consumption, qualitative research was carried out in September 2019 to assess sociocultural and household factors affecting egg intake among young children living in Kaduna State, Nigeria, where a thriving egg industry and childhood stunting rates of 50% exist. Methods included freelisting exercises (11), key informant interviews (11), in-depth interviews (25) and FGDs (4). Results illuminated cultural rules that restrict egg consumption among children living in low-income households. These rules and norms reflect social and economic valuations that foster male dominance in household decision-making and guide food purchasing and intrahousehold food allocation that allow men to consume eggs more regularly. Study results highlight sociocultural considerations when selecting food interventions to address child malnutrition in low-income contexts. Interventions encouraging increased consumption of ASFs, and specifically eggs in young children, should be informed by formative research to understand sociocultural norms and beliefs guiding egg consumption.

KEYWORDS
animal source foods, child nutrition, food rules and classifications, qualitative research, socioeconomic factors

1 | INTRODUCTION

Adequate intake of high-quality nutritious foods during infancy and early childhood is critical to achieving a wide range of outcomes, including optimal growth (Black et al., 2008, 2013), cognitive and behavioural developmental milestones (Victora et al., 2008), and economic productivity and human capital later in life (Victora et al., 2021). Moreover, insufficient consumption of diverse foods has consistently been shown to be a risk factor for both micronutrient deficiencies (MNDs) (Victora et al., 2021) and stunting, a measure that represents the effects of chronic malnutrition (Bhutta et al., 2013; Marriott et al., 2012). Undernutrition among children has been demonstrated to reflect both immediate determinants (i.e., lack of food affordability and accessibility) and broader sociocultural and environmental variables that impact dietary intake (Black et al., 2013). However, data on food access and affordability, often measured by macroeconomic indicators of household purchasing power, can mask underlying variations in food allocation within households, stratified by gender, age and social status (Fadare et al., 2019; Jones et al., 2013; Owoo, 2018).

Despite having the largest economy on the African continent, Nigeria has some of the highest rates of child malnutrition in the world (Black et al., 2013). Recent national data show stunting at 37% among children under 5 years of age (NPC & ICF, 2019). Prevalence of child malnutrition is far higher in the northwest zone states (Development Initiatives 2020a, 2020b) where stunting affects 50%–68% of children under 5 years old (NPC & ICF, 2019). The northwest states are home to a relatively poor population, with 32% and 9% of households in the lowest and highest wealth quintile, respectively. These states have Nigeria's highest share of people with no formal education—55% of women and 40% of men have had no formal schooling (NPC & ICF, 2014, 2019). Low levels of school attendance are driven by various factors, including economic barriers, sociocultural tenets and gender norms that discourage formal education, especially for girls (UNICEF, 2019).

Integrating high-quality and nutrient-dense animal source foods (ASFs), a major source of protein and micronutrients, into children's diets is increasingly considered essential to reducing the global burden of malnutrition in low- and middle-income countries (LMICs) (Dasi et al., 2019; de Bruyn et al., 2016). Given widespread poultry ownership, eggs show promise for improving child undernutrition in Sub-Saharan African countries (Headey & Alderman, 2019; Heidkamp et al., 2021). Compared with other ASFs, eggs have similar or higher concentrations of essential fatty acids, protein, vitamins A and B_{12} and other nutrients critical for children at risk for stunting or MNDs (Lutter et al., 2018; Morris et al., 2018) and are more affordable (Headey & Alderman, 2019; Iannotti et al., 2014). However, interventions carried out in different country settings promoting that children eat one egg per day have had mixed results in improving egg intake and child growth outcomes (Iannotti et al., 2017; McKune et al., 2020; Passarelli et al., 2020; Stewart et al., 2019). Explanations for the differing findings relate to contextual factors linked to routine food consumption of protein-rich and staple foods, access to clean water and sanitation, and maternal education which can impact egg access and consumption and absorption of nutrients (Stewart et al., 2019). Results from these and other trials highlight the need to consider a diverse range of contextual factors when designing strategies aimed to improve egg consumption in children (Lutter et al., 2018; McKune et al., 2020; Nordhagen & Klemm, 2018).

Key messages

- In food classification systems, eggs are considered a light, non-filling food associated with enjoyment, status and wealth, and in low-income households widespread consumption of eggs is reserved for special occasions.
- Cultural rules devised to regulate egg consumption according to age and gender in low-income households reflect differential social and economic valuations that favour men and discourage egg consumption in young children.
- Interventions encouraging increased egg intake in young children must consider economic constraints and related sociocultural norms and beliefs guiding egg consumption and identify contextually appropriate strategies to buffer the effects of gender and age bias.

To examine the intrahousehold allocation of ASFs, the study drew on a conceptual framework developed by Gittelsohn and Vastine (2003). The model explores broad levels of influences including national (food policy, political economy), community (food symbolism, cultural food rules), household (composition, economic status) and individual (gender, age, food preferences) factors that affect the availability, acquisition, intrahousehold distribution and individual intake of ASFs. Overarching themes hypothesized to guide household food selection, allocation and consumption of ASFs include food classifications, food proscriptions and prescriptions, household dynamics, and economic factors. The framework is unique due to its focus on sociocultural and household factors that constrain or enhance ASF consumption by household members. The framework guided our in-depth examination of how food meanings; cultural rules relating to food procurement, preparation, serving and eating; household members' roles and relations; and family economics influenced acquisition, perceptions, differential allocation and individual consumption of eggs, with a focus on egg intake of young children. The conceptual model was used to explain the way that economic contributions and social valuation affects accessibility to ASFs and egg intake among family members in a sociocultural setting where restricted household resources may limit consumption of ASFs.

Using the ASF conceptual framework, we followed a phenomenological approach to carry out qualitative research to assess factors affecting egg intake among young children from the perspective of

men and women living in Kaduna, a state in northwest Nigeria where a thriving egg industry exists together with childhood stunting rates of 50%. This research was part of the baseline evaluation of a demand creation campaign promoting egg consumption in children under 5 years of age.

2 | METHODS

2.1 | Study setting and population

We conducted qualitative research in September 2019, near the end of the rainy season, in peri-urban and urban communities in north and south local government areas (LGAs) in Kaduna State. Most people in Kaduna are from the Hausa ethnic group, a patrilineal society in which strict gender roles foster male social and economic dominance (Renne, 2004; Umaru & Van Der Horst, 2018). In Hausa culture, men are responsible for earning money and providing for basic household needs while women are principally responsible for caring for family members, maintaining the household and preparing and serving food. Hausa women may engage in an informal economic sector involving trade, but the income they generate is often limited. Islam is the predominant religion, and approximately a quarter of marriages are polygamous (Zakaria, 2001). Women's median age of marriage is 17 years (NPC & ICF, 2019). Though female seclusion is practiced, enforcement of female mobility restrictions varies. The combination of sharia law and socioeconomic factors fosters female dependence on male heads of households.

Data were collected in six noncontiguous low- to middle-income neighbourhoods of the intervention sites of Kaduna North and Kaduna South, based on the government's 2006 demarcation of borders (National Population Commission, 2006). Before data collection, research team members introduced the project and sought permission to collect data from community leaders in each neighbourhood. Following local protocol, community leaders assigned guides who were well-known community members to accompany researchers in obtaining consent and interviewing informants.

2.2 | Study design, sampling and methods of measurement

We employed a mix of qualitative methods including key informant interviews, freelisting exercises, in-depth interviews and focus group discussions (FGDs) to understand factors affecting egg consumption in young children in Kaduna State.

2.2.1 | Key informant interviews

Through key informants, we aimed to identify immediate and proximate factors affecting child malnutrition, understand the availability of eggs in the study areas, and explore the affordability and acceptability of egg consumption in young children living in low-income households. We purposively selected experts in child nutrition and commercial egg production, with an initial aim of interviewing 8–12 key informants.

2.2.2 | Freelisting exercises

To understand the importance of eggs in the broader context of child food consumption, we asked children's caregivers to list all the foods their children eat. Research assistants recorded the foods in the order by which they were mentioned by caregivers. Selection criteria included mothers of children under 5 years of age who permanently resided in three selected neighbourhoods in each study area and were willing to participate in the 30-min exercise. Interviewers identified a central location in selected neighbourhoods, generally the village head's household, and randomly identified a household. If the approached household did not have an eligible mother caregiver, the interviewer moved five households to the right to identify a potential respondent, continuing this approach until an eligible caregiver was identified. After completion of the exercise, the researcher approached another caregiver five households to the right. This process continued until five mother-respondents in each neighbourhood were interviewed. We anticipated administering 15 exercises in the Kaduna North and 15 exercises in the Kaduna South research sites.

2.2.3 | In-depth interviews

The research team administered in-depth interviews with parents of young children 6 months to 5 years of age to assess food purchasing responsibilities and decision making; the location, method and frequency by which eggs are obtained; motivators and barriers to egg consumption; and the frequency of egg consumption. Selection criteria with mothers and fathers included permanent residence in the study areas, availability for 75 min, and no participation in the freelisting exercises. Following the approach used to select freelisting respondents, potential informants living in three low- and middle-income neighbourhoods in each of the two study areas were identified, though communities already selected for freelisting were intentionally excluded. We anticipated administering 12–16 in-depth interviews with mothers and up to 12 in-depth interviews with fathers.

2.2.4 | Focus group discussions

Research assistants administered group discussions with separate groups of female and male caregivers of children 6 months to 5 years of age. During discussions, we examined the availability and

affordably of eggs, egg acquisition and preparation, egg consumption by family members including young children, and motivations for feeding children eggs. Selection criteria included experienced caregivers who were residents of the area, communicative, and had not participated in other research activities. The target was to carry out one FGD session with female caregivers and another with male caregivers in each research site.

2.3 | Data collection procedures

The research team involved in data collection comprised five experienced qualitative research assistants (three females and two males) and one supervisor, all with university degrees. Except for one team member, all the researchers were born and raised in Kaduna, and three researchers were from the Hausa ethnic group. All researchers were fluent in the Hausa language. The lead investigator has extensive research experience studying Hausa food culture.

A 5-day training workshop provided background information on child nutrition in Kaduna State, the research methodology and aspects of the eventual intervention, including the focus on eggs, and included study instrument field testing. Key informant and in-depth interviews and freelisting exercises occurred in respondents' places of work, household compounds, or an alternative setting of their preference, while FGDs were held in health facilities or a participant's household compound. All types of respondents agreed to participate in a study about child feeding practices; only the freelisting respondents were unaware of the focus on eggs. The team ensured privacy was maintained during data collection.

We administered key informant interviews in English. Hausa, the predominant language spoken in Kaduna, was used in most of the in-depth interviews, while the rest were carried out in either Pidgin or English, as preferred by respondents. All interviews were audio recorded, and interviewers also took handwritten notes to provide additional insights into the data.

2.4 | Data analysis

Freelisting exercises were analysed on Anthropac 4.983 software (Borgatti, 1996). Salience, which refers to the perceived importance, was derived using a salience index (Smith's S) which combines the frequency and rank by which food times are mentioned defined as follows: $S = ((L - Rj + 1)/L)/N$, where L is the length of each list, Rj is the rank of item J in the list, and N is the number of lists in the sample (Borgatti, 1999). Items with a higher salience score were considered to have greater significance in the local framework of children's foods (Bernard, 1988; Weller, 1984).

All audio recordings were transcribed and translated when needed into English. Based on the ASF conceptual framework, the lead investigator developed a coding scheme designed to examine the egg flow through informant households, with coding categories derived from main themes presented in the framework, as well as key concepts that emerged during data collection. Following the conceptual model, coding categories included food perceptions, food availability, household food acquisition behaviours, intrahousehold food distribution and individual consumption, with a focus on eggs. To understand sociocultural and household factors affecting eating behaviours, during data analysis we examined rules and norms influencing food classifications, food avoidances and prescriptions, household dynamics and preferential food allocation and gender and economic factors, all of which constitute main themes in the ASF framework. In accordance with the phenomenological approach, factors affecting egg consumption in children were collected from the perspective of community members experiencing the daily realities of food procurement and consumption in peri-urban and urban contexts in Kaduna State. Coding of the interview transcripts was done in ATLAS.ti 8, a text-organizing software (ATLAS.ti Scientific Software Development, 2013). We used content analysis to examine the presence, meanings and relationships of the ASF framework themes and to identify trends of main study concepts in and across individual codes and informant types. The combination of data, environmental and methodological triangulation allowed analysis across different research methods (e.g., key informant and in-depth interviews, freelisting exercises and FGDs) and sites, as well as across and between respondents. Data analysis focused on the viewpoints and perspectives of informants.

2.5 | Research ethics

The study protocol was reviewed, and ethical approval was granted by the Kaduna State Ministry of Health Ethical Review Committee, Kaduna, Nigeria. Before data collection, we obtained signed informed consent from all the key informants, in-depth interview informants, freelisting respondents and FGD participants.

3 | RESULTS

3.1 | Background of study respondents

We interviewed six male and five female key informants. The key informants included six Ministry of Health officials, three implementing partner staff working on child nutrition, one representative of the poultry industry, and one United Nations official. Key informants were engaged in policy-making, research, project development and implementation, community sensitization and monitoring and evaluation of child nutrition interventions.

The research team administered freelisting exercises to 31 mothers of children 6–11 months (5), 12–23 months (7), 24–35 months (6), 36–47 months (9) and 48–59 months (4). Subsequently, in-depth interviews were conducted with 13 parents (nine females, four males) in North Kaduna and 12 parents (seven females, five males) in South Kaduna (Table 1). On average, informants were in their mid-30s to early 40s, and the majority had attended high school. Most informants practiced Islam, and about a third of women lived in polygamous households.

TABLE 1 Background of in-depth interview informants

Variable	Informant residence			
	North Kaduna male (*N* = 4)	North Kaduna female (*N* = 9)	South Kaduna male (*N* = 5)	South Kaduna female (*N* = 7)
Religion				
Muslim	0	6	3	7
Christian	4	3	2	0
Age (years)				
Average	42	33	37	35
Range	39-45	25-41	27-40	28-43
Average years of education				
Schooling	13	11	10	10
No schooling	0	2	1	4
Occupation				
Housewife	N/A	3	N/A	4
Business/trade	2	5	2	3
Civil servant	1	1	1	0
Teacher	1	0	0	0
Secretary	0	0	1	0
No response	0	0	1	0
Marriage				
Married	3	9	5	7
Divorced	1	0	0	0
Household type				
Monogamous	4	5	5	5
Polygamous	0	3	0	2
No response	0	1	0	0
Average number of household members	5	5	7	6

Abbreviation: N/A, not applicable.

In each of the north and south LGA research sites, we conducted an FGD with separate groups of eight fathers and eight mothers of children aged 6–59 months.

3.2 | Food meanings in the Hausa context

In-depth interview informants reported that children require a balanced diet composed of nutritious foods, with many citing beans, fish, meat and eggs as critical to maintaining good health. Other food items commonly mentioned as promoting children's health included rice and *tuwo*, the staple food made of maize or millet flour and served in a paste. Many informants described *tuwo* as a 'heavy' food that stays in the stomach and appeases hunger as opposed to 'light', non-filling foods.

TABLE 2 Foods eaten regularly by children between the ages of 6 months and 5 years, according to freelisting respondents

No.	Item	Frequency (%)	Average rank	Salience
1	Rice	93.5	3.41	0.802
2	Beans	87.1	4.11	0.704
3	Noodles	90.3	6.14	0.671
4	Paste[a]	80.6	5.04	0.631
5	Yam	80.6	7.68	0.541
6	Pap	71.0	6.55	0.520
7	Tea	74.2	7.83	0.495
8	Spaghetti	71.0	9.50	0.416
9	Eggs	77.4	11.38	0.360
10	Biscuit	74.2	11.65	0.340
11	Bread	54.8	9.82	0.316
12	Bean cake	58.1	11.44	0.294
13	Juice	64.5	13.20	0.254
14	Orange	71.0	14.09	0.240
15	Potato	45.2	12.43	0.218
16	Watermelon	64.5	15.05	0.188
17	Banana	51.6	14.50	0.185
18	Milk drink	29.0	9.89	0.166
19	Bean pudding	38.7	13.83	0.160
20	Sweet potato	35.5	14.09	0.147
21	Doughnut	29.0	11.67	0.142
22	Rice pancake	19.4	6.33	0.138
23	Plantain	25.8	10.88	0.136
24	Yoghurt	35.5	13.45	0.125
25	Milk	19.4	8.50	0.111

[a]Paste made from maize, millet, sorghum, yam and other starchy flours.

In the freelisting exercises, mother-respondents reported a total of 77 different foods eaten by their youngest child. Typical of a cultural domain, procedures elicited a core set of important items and a wide range of less significant foods. The 25 most salient food items are listed in Table 2; at the top of the list are rice, beans, noodles, and *tuwo* and other kinds of paste. Eggs ranked ninth, and other protein-rich foods such as fish, chicken and meat ranked 35th, 73th and 74th, respectively.

3.3 | Perceptions of eggs

Key and in-depth interview informants described eggs as a non-essential, luxury food item signifying affluence and leisure.

Traditionally, eggs are considered adult foods, especially for men, with some key informants emphasizing that eggs are not for children. One key informant (3) reported,

> When you see someone with an egg, the first thing is that 'Ah, this is a big man', he's enjoying himself, just like I have said, it is a status thing. Yeah, 'Ah, this one is enjoying, this man got money o'. It is just a luxury.

Another key informant (10) said,

> People take it as a food for rich households, for the affluent; those considered poor are not expected to take eggs. People tend to think that eggs are for adults rather than children. In a household, you can find that five to six eggs are cooked for the male head, they see it as a sign of good living.

Almost all key informants described a belief that giving children eggs will introduce a craving or desire that will predispose children to steal, claiming that this guides families to give children eggs only in small quantities. This key informant (11) said,

> There is this perception or cultural belief that foods like eggs, when given to a child at a tender age, will encourage the child to steal… Some of these perceptions are changing, but the truth is that before people believed that giving eggs to children predisposes them to stealing and discontent, meaning they will covet or desire something that does not belong to them. Children are denied eggs to avoid such vices. Also, pregnant women are not supposed to eat eggs out of concern that the unborn child will end up stealing eggs. So, when eggs are available, it is for the male household head.

Key informants asserted that people have become aware that eggs hold special properties vital to the well-being of pregnant women and small children through sensitization. In-depth informants and FGD participants confirmed that eggs are beneficial to young children. Correspondingly, study participants associated eggs with a range of highly valued attributes including healthy, builds strength, gives energy, increases growth, increases blood, enhances the appetite and builds intelligence. Some fathers stressed the importance of feeding eggs to schoolchildren, so they are attentive in class, while other informants reported that eggs have medicinal properties. Many in-depth interview informants mentioned that eggs are protein rich and comparable in nutritional content to fish and beans.

3.4 | Food and egg acquisition

Key informants explained that Hausa tenets dictate that men provide the money to acquire food and guide decisions about household food procurement. This was particularly true for staple foods, with frequency of food purchases depending on men's work and payment schedules. Both male and female key informants said that men generally focus more on costs and their personal preferences, and less on variety and quality of foods. They also reported that women are more knowledgeable about children's dietary needs and concerned about improving the quality of foods eaten by children. One key informant (5) said,

> It is the father in most cases who decides what should be purchased with the amount of money available, maybe the mother will provide a list of foods items needed, but the father decides what to purchase… It affects the children negatively because the father will not get the foods that the children need. He will think mostly of rice, yam but the mother will think of meat. She will make the right choices.

In the in-depth interview sample, most male household heads controlled food acquisition, and only a few informants mentioned that men consulted their wives about what foods to obtain. When describing food purchasing, one woman (13) said,

> He is the husband, so he must buy foods. It is not every man that will allow his wife to go to the market to purchase foods, except for those women who are given a monthly allowance… Since he is the one that married me, he must provide for me.

Women typically obtained only sauce ingredients used for daily consumption (e.g., oil, vegetables and tomato paste), which they purchased in locations outside of the market with cash provided by their husbands. If the money was insufficient or their husbands were absent, they paid with their own money. This woman informant (4) reported,

> My husband is the one who buys food. He doesn't ask me what needs to be bought, he just goes and buys it. Sometimes I use my money to buy maggi (seasoning cubes) or salt, or he gives me money to buy these things.

Key informants reported that raw eggs are widely available in a variety of outlets, including local shops, markets, neighbouring households that raise poultry and poultry farms. Cooked eggs are sold in restaurants or hotels, by roadside food vendors and hawkers and in tea stalls called *mai shayi*, which are male social meeting places that offer tea with fried eggs and bread or egg dishes mixed with noodles or yams. Most in-depth interview informants indicated that men are in charge of purchasing eggs; one female informant was reluctant to ask her husband to buy eggs owing to the cost and the perception that eggs are a luxury food. The quantity purchased varied from several eggs to one or more

crates of 30 eggs, depending on household finances, with eggs obtained in bulk lasting several weeks. At the time of the study, one egg sold for 35–40 naira (0.10–0.11 USD), while a crate of 30 eggs cost from 850 to 1000 naira (2.38–2.80 USD). Informants reported that egg production increases from June to October, during the rainy season, leading to overabundance and lower prices. Egg prices rise from after the October harvest up to the December holiday season, when cash flow increases and there is greater demand for eggs.

3.5 | Food preparation and consumption

Key informants stated that economic constraints and food costs influence families to rely on foods high in carbohydrates (e.g., *tuwo* and rice) and that some families cannot afford to eat three meals daily. Household members either eat from separate plates or follow traditional Hausa customs whereby meals are served on a platter and shared with relatives of the same sex, which is believed to create unity. Children, who are typically assisted by a parent, most frequently the child's mother, until they can feed themselves, start to follow the household eating schedule between 1 and 2 years of age. Young boys often continue to eat with females until they reach 3 to 4 years of age, although this also depends on the household composition. Adult males generally consume meals apart from other household members. A key informant (6) reported,

> In many homes, what they have easy access to is what they eat. Household socioeconomics are a major determinant; people with more money are better educated and have more knowledge about nutrition and the possibility of buying diverse foods. During meals, young children are assisted by their mother, and depending on the size of the household older children sit together and eat from the same plate. The father who is treated as the head is allocated a space to eat separately.

In-depth interview informants reported that women decide on the meal composition, guided by existing foods in the household and money available for purchasing sauce ingredients. Most families ate three meals daily, and female informants reported trying to vary meal ingredients. This female informant (2) said,

> We eat three meals each day. The foods we eat at home depend on if we have money. The food we ate yesterday is not what we are supposed to eat today. I calculate what I will cook for my family to eat each day based on what is available and what we have recently eaten.

Breakfast meals are comprised of bread, tea, pap and chips, with bean cakes, noodles, *kunu* (a millet- or sorghum-based porridge), and eggs mentioned less frequently. Lunches and dinners centre around staple foods such as *tuwo*, rice, beans, *swallow* (other pastes made from starchy flours), yams and spaghetti accompanied by a vegetable-based sauce that contains leafy greens, okra, pumpkin or tomatoes, and occasionally meat or fish. Because men spend weekdays outside the household, they frequently miss breakfast and typically miss the lunchtime meal. Instead, they eat in *mai shayi*, in restaurants, or at the market. Informants reported that all family members consume the dinner meal at home, with male household heads receiving larger portions of high-quality, protein-rich foods (e.g., meat, chicken, eggs, or fish).

3.6 | Egg preparation and consumption

Key informants maintained that financial constraints prevent most Kaduna residents from routinely eating eggs, with families prioritizing foods that can satiate hunger. They affirmed that families of higher socioeconomic status eat eggs more often. Household egg consumption was influenced by the perception that eggs are a luxury to be consumed during leisure time. This key informant (1) stated,

> People don't have money to buy such items. When people are looking for a small portion of rice that will satisfy hunger, how would you expect them to buy egg? The most important thing is to address the immediate hunger before looking for foods high in nutrients. Others may have a little money, but they don't see eggs as important, as something that will improve their health status or well-being.

Another key informant (7) said, 'First food (staple foods) is required, because you must first eat enough food before you look for dessert'.

Because of their position as income earners, male household heads are served more frequently and given more eggs than other household members, according to key informants. This key informant (1) stated,

> The Hausa, they have this kind of attitude, when a husband brings meat home, high-quality foods, after the meal has been prepared, a significant portion of that meat goes to the husband, and the children are not given the meat. The same thing with eggs. If you bring a crate of eggs, maybe for a household of seven people, they cook 20 for the head, the wife, and five children. She gives five eggs to the husband, she will take three or four and divide the rest for the children. That's how Hausa people do. This creates an imbalance; the children have high requirements, they need such kind of food, but only a small share is given to them.

Key informants also explained that men eat more nutritious foods when away from the household compound. This includes eggs, which are purchased hard-boiled on the roadside or fried in the *mai shayi*. Key informant (1) reported,

> Most men eat in tea joints because they are poor, they cannot buy enough for the whole household, so they opt to go for a tea joint where eggs are prepared for them or to places where they can buy eggs from the seller and consume it directly… There are people selling the cooked ones on the roadside, by the street, you just call the seller and buy one or two and find a place to sit, crack it open, and consume it.

Key informant (8) added,

> Maybe the father goes out with a little money and decides to take mai shayi, eggs, and Indomie (instant noodles) outside, while the corn flour is being prepared in the house. He takes eggs and Indomie or eggs and tea outside the household. When he gets home, he is given eggs because he has been working for the money. He is not thinking of the children or the pregnant women at home. He believes he is the head of the house, the one providing all the resources; the average man does not believe in giving to everyone, he believes he has the right to enjoy himself.

In-depth interview informants reported eating eggs during household meals anywhere from several times a week to a couple of times a month; when eggs are served, they are most often consumed at breakfast, fried, and eaten with bread or mixed with yams or noodles. Eggs may also be served during lunch and dinner in a sauce poured over rice or yams, fried and mixed with rice or noodles, or hard-boiled and added to stew or sliced over foods. Most in-depth interview informants reported that all household members consume eggs—generally one egg is allocated per household member when fried for breakfast—but fewer eggs are included for lunch and dinner. Many informants mentioned that men, as the main wage earners, are served more eggs during meals.

In-depth interview informants mentioned several instances when eggs are served: to enhance the taste of certain meal foods, particularly noodles and yams; when visitors arrive; or to pregnant women. Female informants underscored the importance of egg consumption for both the pregnant woman and the fetus. In-depth interview informants explained that consumption increases during Ramadan, when people desire light and healthy foods to break the fast, and key informants reported that Ramadan is the only period when eggs are eaten regularly in low-income households. In-depth interview informants also mentioned that egg consumption increases during festive periods (e.g., Christmas or Eid) or celebrations (e.g., naming ceremonies or special meetings).

3.7 | Egg consumption in young children

In-depth interview informants introduced eggs to their children between 6 and 12 months of age in the form of the yolk of a hard-boiled egg or mixed in pap. Child egg consumption generally reflected household consumption patterns, though four mothers claimed to give their children eggs daily. Some FGD participants referred to social pressure to provide eggs in lunches for school-age children. They also reported that sick children are given eggs to increase appetite. Fathers may purchase eggs for their youngest children during festive periods, or they occasionally invite their children—both girls and boys under 5 years of age and mostly boys beyond 5 years—to accompany them to tea stalls or carry fried eggs home from eating joints. There was a consensus that children like the taste of eggs and get pleasure from them.

Although most in-depth informants and FGD participants wanted to increase their children's egg consumption, underscoring the health benefits, many insisted that children should not be given eggs frequently, and when children consume eggs, that they can only benefit from one egg at a time. Several study participants expressed concerns that children who become accustomed to eating eggs will manifest negative behaviours when eggs are not available. Many caregivers acknowledged that they cannot afford to provide eggs regularly. This FGD mother said,

> Honestly, it is because I don't want him to get used to it. Because if you give him (eggs) every day, the day you don't have (eggs) he will enter another house and feel like he has never been given (eggs), and he will go and carry or eat it there, and you see, that is not nice.

A father who intentionally restricted his child's egg intake stated,

> If a child gets used to eating it (eggs) all the time, anytime it's not available, he will cry and disturb us… When you allow a child to get used to something that you know can't continue, it can bring problems, the thing becomes like a problem to you. That is why you must avoid giving children some things sometimes.

This father, who was the only household member who regularly consumed eggs, claimed that other members avoided eggs because they upset their stomach. Another FGD participant refused to provide eggs for his children out of concern about overindulging them, which he believed would cause problems in the future. Several mothers highlighted the importance of teaching children patience and how to cope with hardship. One woman (6) said,

> I teach my children contentment, so that when I'm not around, they are used to the little I give them. You know the situation of life, tomorrow I may not be around, who will continue giving them eggs?

> Sometimes, you cannot have what you desire. Life's situation, even our religion, teaches contentment.

Another mother (2), who believed that egg consumption keeps children healthy, said,

> I consider their father's job, I do not want my kids to get used to eating things like eggs, they might want it, and I will not have money to buy eggs for them. To avoid that, I do not allow them to get used to eating eggs. Children do not know when a parent cannot afford something they want.

4 | DISCUSSION

We examined sociocultural and household factors that affect egg intake in a context where eggs are widely available, but rates of childhood stunting are alarmingly high. Study results illuminated cultural ideologies that regulate egg and other ASF consumption according to age and gender in low-income households. These rules and norms reflect broader sociocultural structures and economic factors that foster male dominance in household decision-making and guide food purchasing, allocation and consumption. Use of the ASF framework enhanced our understanding of social and economic systems that influence ASF access and consumption among certain sectors of the population. These systems affect household level constraints critical to the success of strategies promoting ASFs. It is important to take such systems into account when selecting food interventions aimed at addressing child malnutrition in contexts where marginalized populations live.

Study findings showed that in Hausa food classification systems, eggs are considered a light, non-filling food associated with enjoyment, status and wealth. In low-income households, widespread egg consumption is reserved for special occasions (e.g., ceremonies, holidays and rituals such as during Ramadan, when special foods are used to break daylong fasts). At the household level, the eggs' cultural properties appeared to influence acquisition, which often involved only small quantities and was controlled by men. Egg preparation also reflected the special qualities associated with eggs; results showed that a small number of eggs are often added as a taste enhancer to dishes. By contrast, households made bulk purchases of filling staple foods associated with low social status and prepared them in large quantities to satiate family members.

Food classifications also promoted intrahousehold differences in egg allocation and consumption during mealtimes, with adult males typically served larger portions of eggs and other ASFs, which they ate separately from other household members. Other research has reported that food categorization systems guide decisions about food selection, preparation, allocation and consumption (Gittelsohn et al., 1997; McNamara & Wood, 2019; Rodriguez-Oliveros et al., 2014). These concepts reflect broader cultural systems that guide the appropriateness of food intake by age and gender subgroups in specific cultural contexts.

Study results identified cultural rules in the form of food avoidances and prescriptions designed to regulate children's egg consumption. Many caregivers expressed concern that routine egg consumption would create cravings that predispose children to negative behaviours (e.g., crying, begging, or stealing). Research carried out in Nigeria has shown that food restrictions resulting from the perceived harmful effects of eggs are common in different ethnic groups (Babale et al., 2018; Maduforo, 2010; Meyer-Rochow, 2009; Ngwu et al., 2014), despite the lack of evidence that deviations from the rules result in negative consequences (Ekwochi et al., 2016). Parents in this study also emphasized the importance of teaching children to cope with hardship and food scarcity in preparation for life's challenges—a lesson that involved withholding luxury foods such as eggs in a context where unemployment is high, average incomes are low, and insecurity and violence are widespread. While food prescriptions discouraging egg intake in children seem to contradict local perceptions related to the positive attributes associated with eggs, these rules appeared to benefit adult males, who are also the primary wage earners and decision-makers. Other studies examining food consumption in Nigeria, including among Hausas, have shown that preferential intrahousehold food allocation reflects differential social and economic valuations that favour men, affording them larger and separate portions of meat and poultry (Blum, 1999; Ogbeide, 1974). To our knowledge, no other studies have explicitly examined how egg prescriptions benefit adult men.

In other contexts, research has revealed that unequal intrahousehold food allocation by age and gender is biased towards male household members, who are perceived to be more physically and economically active or to have greater economic potential (Blum et al., 2019; Gittelsohn, 1991; Messer, 1997). Preferential treatment of men and the corresponding consequences for other household members will likely persist in the absence of major transformations in household economic status and gender norms.

Research carried out in diverse contexts has identified similar ideologies and cultural rules intended to restrict the consumption of ASFs in certain segments of the population, often the most vulnerable, particularly during transitory states (e.g., menstruation, pregnancy, lactation and early childhood) (Chakona & Shackleton, 2019; Gittelsohn, 1991; Hartini et al., 2005; Messer, 1997; Miller, 1997). Researchers have noted that women of reproductive age often adapt innovative approaches to alleviate food restrictions by using rationalizations to break rules, consuming other foods to counteract the negative consequences of eating tabooed foods, altering food servings of household members, or snacking between meals (Bentley et al., 1999; Laderman, 1984; Messer, 1997) Children, however, have little opportunity to modify food restrictions, given their dependence on adult caregivers, who select, encourage and restrict foods given to them, as illustrated in our study (Savage et al., 2007; Vaughn et al., 2016).

Our study also illuminated gender norms and social structural factors that created differentials in opportunities to consume eggs

beyond the household. In Hausa culture, men's roles as primary household wage earners require that they spend the day outside the household compound, while female responsibilities involve food preparation and childcare. Further, rules related to sharia law require Muslim women to remain in the family compound. Men's economic control and social mobility allow them to eat in local communities and indulge in high-quality foods that are not regularly prepared for household meals and that, when they are served in the household, are partitioned among family members. *Mai shayi* provide settings where men can socialize and enjoy eating in a leisurely fashion, and these settings dovetail with how Hausa food classifications prescribe consumption of special foods such as eggs. The opportunity afforded to men to eat luxury foods in the company of adult men and away from the household symbolizes the group affiliation and status that men maintain in Hausa culture (Adamu, 1978; Blum, 1999).

The food systems that guide men's preferential treatment and access to higher-quality foods reflect the sociocultural dimensions underlying Hausa's patrilineal society, which is characterized by male economic and social dominance (Adamu, 1978). Historically, anthropologists have described the way that rules governing food systems represent broader social constructions representing household roles and status (Delormier et al., 2009; Douglas, 1966; Garine, 1972; Meigs, 1997). In Kaduna State, economic and social factors served to increase egg consumption among adult males unable to provide regular and large portions of eggs to all household members. Studies carried out in a variety of patrilineal societies have reported that a combination of cultural values and socioeconomic factors can contribute to intrahousehold gender or age-based discrimination that favours consumption of high status, protein- and micronutrient-rich foods among men while depriving consumption by segments of the population with the greatest nutritional needs (Gittelsohn, 1991; Messer, 1997; Miller, 1997).

Public health experts recognize the need to increase ASF consumption in settings where high rates of child stunting persist (Headey et al., 2018; Krebs et al., 2011). However, stunting occurs in low-income contexts where quality foods are often unaffordable to large sectors of the population. These areas frequently follow gendered divisions of labour and control of financial resources that have been shown to influence access to ASFs, as was the case in our study (Monterrosa et al., 2020). Discriminatory food systems will likely become more entrenched in fragile and conflict-ridden areas, such as states in northwest Nigeria, where rates of child malnutrition are high and where interventions are particularly challenging to implement owing to gender-based violence and disruptions in community stability (Heidkamp et al., 2021; Ziegler et al., 2020).

A variety of strategies have been employed to buffer the effect of gender and age bias on dietary inequalities (Richards et al., 2013). In some contexts, women with greater access to and control over economic finances purchase more nutritious foods and better ensure equitable intrahousehold distribution of food among women and children (Harris-Fry et al., 2018; Leroy et al., 2009; Thomas, 1997). Enhanced female standing and decision-making power have also been shown to positively affect children's nutritional status (Dancer & Rammohan, 2009; Richards et al., 2013; Shroff et al., 2009; Smith et al., 2003). Other research has illuminated that female bargaining power of men's earnings enhances women's ability to provide nutritious foods, including ASFs, to their children (Pfeiffer et al., 2001). Another strategy identified in low-income settings is maternal buffering, in which mothers modify their own diets to increase food intake by young children (Piperata et al., 2013). Gendered intrahousehold hierarchies related to income and household composition influence the strategies available to women to improve children's nutritional intake (Haddad et al., 1994; Pfeiffer et al., 2001; Richards et al., 2013).

In contrast, evidence related to male involvement in child nutrition is limited. Some studies have shown that men have limited participation in direct decision-making related to breastfeeding and complementary feeding, suggesting that gendered constructed norms obstruct men's involvement in child nutrition (Dewey & Begum, 2011; Kansiime et al., 2017). Studies from Nepal found that males are more inclined to get involved in child nutrition in cases when they participate in social networks (Kulkarni et al., 2021) or when children are sick (Cunningham et al., 2021).

Age and gender bias can influence food-centred marketing strategies promoting one or a small number of high-quality, relatively costly foods in low-income households. Discrimination may be heightened in resource-poor and conflict-ridden settings confronted with economic and social uncertainty. However, nutrition interventions often follow an 'equal outcome principal' that assumes women's access to food resources and decision-making power is comparable to men's and that vulnerable populations are treated fairly at the household level (Messer, 1997). This study highlights the importance of understanding context-specific factors that influence access to and control of food resources and considering intrahousehold dynamics, food allocation and female bargaining power when promoting ASFs in low-income societies.

5 | CONCLUSION

This study illuminates how communal food rules and classifications, social constructions related to food acquisition and intrahousehold food distribution, and intrahousehold power dynamics in Kaduna State influence differences in egg consumption based on gender and age. Findings suggest that cultural rules designed to decrease egg consumption among children can increase egg allocation to other household members—most importantly, adult men—in settings where finances are insufficient for all members to regularly consume large portions of eggs. Men's increased consumption of eggs and other ASFs serves as an expression of gender-related differences in skillsets and economic valuation in a culture where men govern. The influence of social and economic factors on food allocation and consumption among certain sectors of the population is often overlooked or not adequately considered in nutrition programming. Uncertainty about the future, which is heightened in low-resource and conflict-ridden contexts, may also affect coping mechanisms and eating behaviours. Interventions encouraging increased consumption

of ASFs, and specifically eggs, in young children must be informed by formative research to understand sociocultural norms and beliefs guiding egg consumption as well as effective strategies to buffer the effect of gender and age bias. Evidence demonstrating that women are more concerned about providing nutritious foods to young children underlines the importance of creating contextually appropriate opportunities for women to have more control over children's ASF intake.

AUTHOR CONTRIBUTIONS

Lauren S. Blum and Wendy Gonzalez designed the study. Gloria Olisenekwu supervised field operations. Lauren S. Blum carried out data analysis and interpretation. This paper was written by Lauren S. Blum, Wendy Gonzalez and Haley Swartz with substantial input from all other authors. All authors have reviewed and approved the submitted manuscript.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The study protocol was reviewed and ethical approval was granted by the Kaduna State Ministry of Health Ethical Review Committee, Kaduna, Nigeria. Before data collection, we obtained signed informed consent from all the key informants, in-depth interview informants, freelisting respondents and FGD participants.

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