ORIGINAL ARTICLE

Maternal & Child Nutrition WILEY

Behavioural drivers of suboptimal maternal and child feeding practices in Rwanda: An anthropological study

Annet Birungi[1] | Youssouf Koita[1] | Terry Roopnaraine[2] | Eric Matsiko[3] | Maryse Umugwaneza[3]

[1]UNICEF Rwanda, Kigali, Rwanda

[2]Independent Consultant, Lusaka, Zambia

[3]College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda

Correspondence
Terry Roopnaraine, Independent Consultant, Lusaka, Zambia.
Email: terry@malocamedia.org

Abstract

At 33% of under-5s, stunting rates in Rwanda remain stubbornly high, as do figures for maternal (25% of pregnant women) and childhood anaemia (37%). Intensive communication and education campaigns have provided caregivers with high levels of knowledge about best practices in Maternal, Infant and Young Child Nutrition (MIYCN), but this is not translating into the improved diets which could contribute to reducing rates of stunting. Deploying an anthropological approach via multi-module Focused Ethnographic Studies carried out within household case studies, the research team sought to understand drivers of suboptimal feeding practices in a sample of 30 households across all of Rwanda's districts. The sample included households with pregnant women as well as children in the 6–60 month age range. Analysed against a framework of proximal and underlying causes of under-nutrition, our results reveal gaps in the knowledge-capability-practice chain resulting from decisions and prioritisations taken by caregivers and heads-of-household. Pregnant women and mothers of young children possess high levels of knowledge about feeding themselves and their young children, but this is not reflected in decision-making and prioritisation around the acquisition and feeding of animal source foods, whose consumption is low among both groups. This was found to be true even in households which own and raise livestock. Turning to policy and programmes, we argue for a move towards *incentivized human capital programming* focusing on the 'last mile' behaviour change which is needed to translate knowledge and capability into better dietary choices.

KEYWORDS
behaviour, child feeding, infant and child nutrition, infant feeding decisions, maternal nutrition, nutritional anthropology, Rwanda

1 | INTRODUCTION

There is a need for greater understanding of the underlying factors which continue to constrain the achievement of better nutrition outcomes in Rwanda. According to the 2019–2020 Rwanda Demographic and Health Survey (National Institute of Statistics of Rwanda, Ministry of Health, ICF-International, 2020), child under-nutrition presents as high rates (33% and 37%, respectively among under-5s) of stunting and anaemia. It is known that child under-nutrition is caused by multiple factors ranging from factors linked to inadequate dietary intake, factors linked to appropriate care, and factors related to childhood illnesses such as exposure to infectious diseases due to unclean water, unimproved sanitation, and inadequate hygiene practices (Black et al., 2008; Black et al., 2013; UNICEF, 2013, 2020). Patterns of chronic child undernutrition in Rwanda are at least partly linked to inadequate diets: according to the composite minimum acceptable diet indicator (capturing diversity and meal frequency), only 22% of Rwandese children aged 6–23 months are fed a minimum acceptable diet (National Institute of Statistics of Rwanda, Ministry of Health, ICF-International, 2020). The majority (62%) of children 6–23 months ate a diet that was below minimum dietary diversity, including less than four food groups (Uwiringiyimana et al., 2018). Only 18.6% of Rwandan children aged 6–23 months had consumed meat, poultry, or fish and 7.7% had consumed eggs in the day or night preceding the recall (National Institute of Statistics of Rwanda, Ministry of Health, ICF-International, 2020). Suboptimal nutrition was also reflected in inadequate nutrient intake which was below the age-specific recommendations (Uwiringiyimana et al., 2018). Besides child nutrition, maternal nutrition during pregnancy and lactation is important since inadequate amounts of essential nutrients can adversely affect both mother and child (Black et al., 2008, 2013; Lowensohn et al., 2016). In Rwanda, anaemia prevalence was found to be 25% among pregnant women and 12% among breastfeeding women (National Institute of Statistics of Rwanda, Ministry of Health, ICF-International, 2020).

Suboptimal feeding practices have multiple drivers, and in general they result from inadequate access to food, inadequate education, and poverty, all of which are grounded into the socioeconomic, cultural, and political context (UNICEF, 2013). Research in Rwanda concluded that children's consumption of important nutrients may be constrained by suboptimal feeding practices which are in turn informed by a range of cultural beliefs and taboos (Global Alliance for Improved Nutrition, 2016). Other research works in Rwanda also confirmed other factors such as poverty (Na et al., 2015), low maternal education and poverty (Murekatete, 2017), and unavailability of nutritious food (Ahishakiye et al., 2017). Nutritional knowledge is high in the context of Rwanda, however, nutritional practices remain limited (Iradukunda & Ngomi, 2020).

Based on recurrent suboptimal feeding practices in Rwanda while mothers are nutritionally knowledgeable, UNICEF proposed a study with deeper and broader scope, using an ethnographic approach to understand household-level drivers of suboptimal nutrition outcomes among pregnant and lactating women and young children, ultimately to better tailor social and behaviour change communication interventions designed to reduce malnutrition in these groups.

Key messages

- Results of this study point to a combination of behavioural drivers of under-nutrition, particularly in infants and young children. Results reveal gaps in the knowledge-capability-practice chain resulting from decisions and prioritizations taken by caregivers.
- We are seeking a shift towards greater diversity of micronutrient-rich foods including more animal source foods in the diets of pregnant and lactating women and young children. Household level behavioural change, reinforced by social norm change at the community level, is required to help caregivers make better decisions around both cultivar and market choices.
- In policy and programme terms, we argue for a move towards *incentivized human capital programming* focusing on the 'last mile' behaviour change which is needed to translate both knowledge and capability into better dietary choices and prioritisations.

2 | METHODS

2.1 | Ethnography

The overall methodological orientation of this study is ethnographic. Ethnographic approaches are highly suitable for data collection in fields where society and culture may play strongly determinant roles and are ideal for obtaining deeper insights into why people do the things they do, how decision-making is mediated by social and cultural processes, and how people engage with and interpret the worlds in which they live.

Ethnographic methods are time consuming, both to collect data and to analyse it. Generally, therefore, samples are small, and nonstatistical: statistical generalisability is exchanged for deeper phenomenological understanding. In this study, we selected a total of 30 households across Rwanda's districts. Taking account of the fact that a household case study typically involves more than one informant, we can say with confidence that the informant population here exceeds that proposed by Russell Bernard (2011), who notes: 'There is growing evidence that 10–20 knowledgeable people are enough to uncover and understand the core categories in any well-defined cultural domain or study of lived experience.' Bernard bases this claim on a range of studies which convincingly show that data saturation is typically reached within the first 20 in-depth interviews.

Ethnographic approaches seek to privilege the emic; that is, rather than imposing an external semiotic repertoire, ethnographers try to work within vernacular frameworks, in which the goal is to understand the given phenomena from the point of view of the people under study. Language is an important element of this approach, and ethnographic data is best collected in the first language of the research subjects. Interviews are conducted in an open manner which allows for exploration of topics raised by informants over the course of the dialogue. Interviewers working on this study were trained carefully in interviewing techniques and carried out all data collection in Kinyarwanda.

While it was impossible to deploy research teams in communities for the extended periods of time typically called for in more traditional anthropological fieldwork (generally reckoned in terms of months or years), our timelines allowed researchers to spend up to 5 days in continuous contact with each study household. To maximise the data collection benefits from this household contact time, we used an approach of Focused Ethnographic Studies (FES), applied at the household level.

The FES approach was originally developed by Gretel Pelto and colleagues as a tool for the World Health Organization (Gove & Pelto, 1993; Pelto, 2020). FES methods are ideal for situations where the benefits of ethnographic approaches are required, but time and resource constraints preclude the implementation of a long-term ethnographic study protocol. As applied here, FES packages often incorporate ranking or other participatory approaches as well as observations and traditional ethnographic interviewing.

The FES approach used here was initially based upon a four-module protocol, in which each module served to meet the data requirements of a different key research area; a fifth module was introduced when fieldwork was resumed in the wake of the Covid-19 lockdown. We should note that the full set of modules included components related to hygiene and sanitation as well as the MIYCN practices which are the focus of this paper; in the authors' opinion, it would have done neither justice to attempt to address both of these domains in a single paper Table 1.

2.2 | The household case study

The core unit of analysis in this study is the household case study. This means that the household is the conceptual and physical unit within which we carried out focused ethnographic data collection activities: interviews were conducted with household members, and observations were carried out, of the physical house and its facilities as well as of family members' activities. This approach was adopted because of the absolute centrality of the household unit to processes and activities of interest to this study. The household is where food is stored, prepared, and consumed by adults and children. It is where breastfeeding takes place, and where decisions are taken about feeding. It is a site of biological, cultural, and social reproduction: families live in households, but families are also made in households; importantly, households are where children first learn and where knowledge and tradition are passed from person to person, within or across generations. Intra-household social dynamics also mediate and refract engagements with the larger world of community, church, school, farm, and market.

Each of the six study field researchers spent between 4 and 5 days in close contact with one study household, arriving at the home at dawn, observing meal preparation and feeding, asking questions about observed practices, remaining with the family until nightfall. Over the course of this period, fieldworkers applied each module to a selection of household respondents; this set of respondents always included the primary caregiver (in all study households, this was a woman), as well as heads of household, in most cases a male coresident partner. In-depth interviews and recall exercises were carried out with 30 primary caregivers (recall exercises were carried out twice with each participant), while the ranking exercise in Module 3 was implemented with 60 participants in total: in each household, the primary caregiver and one other adult were invited to participate in this module. Observations were carried out more broadly and opportunistically both in the household and also in places where foods were acquired, farms and markets. Data was recorded by hand in notebooks and printed templates; where possible, interviews were digitally recorded to support transcription. Data collection processes were monitored by

TABLE 1 FES modules, themes, tools, and informants

Module	Theme	Approach	Informants selected from this list
1	Demographic and household information, WASH facility observation	Complete structured response and observation sheet	Heads of household or primary caregivers
2	Food selection, preparation, infant feeding and child-care beliefs and practices, household diet and food patterns. Handwashing and hygiene practices and beliefs.	24-hour recall to capture what has been fed, in-depth thematic interviews, observation of food preparation and feeding. Observation of handwashing and hygiene practices. Food grids.	Primary and/or secondary caregivers, other resident adults, adolescents
3	Exploration of barriers to and drivers of, behaviour change in nutrition practices	Free-listing and pairwise comparison technique, augmented with interview probes	Primary and/or secondary caregivers, other resident adults, adolescents
4	Exploration of barriers to and drivers of, behaviour change in handwashing practices	Free-listing and pairwise comparison technique, augmented with interview probes	Primary and/or secondary caregivers, other resident adults, adolescents

the study's two Rwandan co-PIs. Interview transcripts were analysed in NVivo 12. Data analysis was carried out by all three study co-PIs.

2.3 | Site and participant selection

Selection of sites for data collection, as well as study participants, was carried out in close consultation with the National Early Childhood Development Programme, NECDP (now reconfigured and renamed as the National Childhood Development Agency, NCDA). A selection protocol including random household selection within a purposively selected frame was developed and approved by all stakeholders. Applied in all 30 districts in Rwanda, the protocol was designed to ensure wide geographic coverage, while capturing a range of socioeconomic statuses through the use of the *ubudehe* poverty categorisation system: this is a Rwandan community-based poverty categorisation system whereby household poverty levels are assessed by peer residents; the assigned *ubudehe* categories are used to support targeting of social security and development programming. In total, case studies were carried out in 30 households, one per district, and including households from ubudehe categories 1, 2 and 3, although weighted towards the poorer categories (1 & 2). Selection was thus principally geographical and poverty-based, with a reproductive dimension for further nuancing household selection to ensure inclusion of households including pregnant and breastfeeding women as well as children in the 0–60 month age range. These sample features are presented in Table 2 below.

3 | LIMITATIONS

The authors recognise the following limitations:

1) The *ubudehe* 3 category has very limited representation in the sample. The authors took the decision to purposively bias the sample to *ubudehe* 1 & 2 households, but the overall sample size therefore limits the number of *ubudehe* 3 households.
2) The Covid-19 pandemic forced the study team to interrupt the field research from March until August 2020. Post-lockdown fieldwork, when it resumed, was limited in some ways: the ethnographic approach is by definition high-contact. Requirements such as masking and social distancing made this kind of fieldwork, often in small, enclosed houses, difficult.

4 | RESULTS

4.1 | What pregnant and lactating women should eat: Ideal models versus practice

Interview data reveals a significant consensus around what constitutes an ideal or appropriate diet for pregnant women. Respondents strongly emphasised the importance of fruits: papaya, mango, pineapple, bananas, tree tomato, passion fruit, avocado, among others. Tree tomatoes and cassava leaves in particular were singled out as valuable because they are said to increase blood or blood flow—this being desirable, and mentioned by several respondents. Women stressed the need for a balanced diet—and demonstrated a good understanding of what is meant by 'balanced', in terms of representation from a range of several different food groups. Fruits and leafy vegetables were the most commonly referenced foods, along with beans and peanuts. Other food items deemed important for pregnant women were porridge, in some cases made with sorghum, or with micronutrient fortified flour distributed from health centres (Shisha Kibondo), maize, potatoes, sweet potatoes, and soya.

In what is probably a reflection of their relative inaccessibility, animal source foods appear much less frequently in responses to this line of questioning. Across the sample of pregnant women, recall data collected at least twice in each household shows no egg consumption, cow's milk consumption in one recall, and meat in only one recall. Nonetheless, women noted the importance of 'eating well,' and understood the connection between their own consumption, and providing nutrients for their growing babies: as one pregnant informant noted, "What a woman eats and drinks during pregnancy is her baby's main source of nourishment." Across the sampled households in all three *ubudehe* categories, women demonstrated an excellent understanding of both the need to nourish themselves and their growing babies well, and of what would be required to construct such meals.

Several respondents proposed that pregnant women should ideally prepare and eat separate, more nutrient-dense meals than those consumed by other family members: as one pregnant respondent stated: "For instance, when a woman is pregnant, she has to start eating healthier food than a man." The implication of these ideas was clear: while women recognised the importance of healthy, balanced diets during pregnancy, the provision of such diets, if feasible at all, would only be perceived as economically viable for the pregnant woman in the household: no informant suggested that it would be achievable for everyone in the household to consume an equally balanced diet. Indeed, in many households, when recounting actual dietary practices during pregnancy (as opposed to ideal ones), women reported that they ate the same meals as everyone else.

In the Module 3 ranking exercise, respondents were asked to place possible barriers to nutritious diets in order of importance. *Poverty* and *poor harvests* were identified as the two most important constraints on providing nutritious diets. While knowledge of how to construct a nutritious meal is part of the cultural repertoire of most of the women we interviewed, having the economic freedom and broader capability to put this into practice independently of behaviourally-informed prioritisation and decision-making, is less common. This finding aligns with results of a recent study conducted in Rwanda which found that only slightly more than one in five pregnant and lactating mothers practised good nutrition, assessed across six variables (meal frequency, meal composition, alcohol consumption, fruit and vegetable consumption, supplement use, use of herbal preparations) (Iradukunda & Ngomi, 2020).

TABLE 2 Household case study sample characteristics

HH	Province	District	Sector	Cell	Village	HH ubudehe
	Households including pregnant woman					
1	Sud	Gisagara	Kigembe	Impinga	Akakijugujugu	1
2	Sud	Nyanza	Ntyazo	Cyotamakara	Bayi	1
3	Sud	Muhanga	Rugendabari	Mpinga	Buganda	1
4	East	Kayonza	Murama	Nyakanazi	Busasamana	2
5	Sud	Ruhango	Byimana	Kamusenyi	Gakurazo	2
6	West	Rusizi	Nyakabuye	Gaseke	Gatambamo	2
7	East	Nyagatare	Karangazi	Rwenyemera	Imishongi	3
	Households including 0–6 month index child					
1	East	Ngoma	Rukira	Nyaruvumu	Isangano	1
2	North	Rulindo	Masoro	Nyamyumba	Kabuga	1
3	North	Musanze	Kinigi	Bisoke	Kamata	1
4	Sud	Kamonyi	Gacurabwenge	Nkingo	Kamonyi	2
5	West	Nyamasheke	Karambi	Kabuga	Kamukiza	2
6	East	Bugesera	Mwogo	Kagasa	Karutabana	2
7	West	Karongi	Rugabano	Mubuga	Kavumu	3
	Households including 7–23 month index child					
1	North	Burera	Rwerere	Ruconsho	Kinkware	1
2	West	Rutsiro	Mushubati	Sure	Kivumu	1
3	East	Gatsibo	Ngarama	Ngarama	Kiyovu	1
4	West	Ngororero	Kabaya	Kabaya	Kiyovu	2
5	Sud	Huye	Maraba	Shyembe	Kizi	2
6	West	Rubavu	Rubavu	Burinda	Nyabantu	2
7	West	Nyabihu	Rugera	Marangara	Nyagasozi	3
	Households including 24–60 month index child					
1	North	Gakenke	Mataba	Buyange	Nyamiyaga	1
2	North	Gicumbi	Ruvune	Gashirira	Nyarubuye	1
3	Sud	Nyaruguru	Gakoma	Rurembo	Ramba	1
4	East	Kirehe	Nasho	Cyambwe	Rukono	2
5	Sud	Nyamagabe	Kitabi	Kagano	Uwintyabire	2
6	North	Gakenke	Mataba	Buyange	Nyamiyaga	2

	Kigali households					
HH	District	Sector	Cell	Village	Participant	Ubudehe
1	Gasabo	Rutunga	Indatemwa	Kamusengo	Pregnant	1
2	Kicukiro	Masaka	Rusheshe	Cyankongi	0–6 month child	1
3	Nyarugenge	Mageragere	Mataba	Mageragere	7–23 month child	2

Breastfeeding women should also ideally consume a particularly nutritious diet based on 'special meals.' As found in the data on pregnant women's diets, we note the explanation that economic constraints mean that a 'special' or 'improved' diet for lactating women would not be affordable for the whole household. These

points are also borne out in this interview carried out in Nyagatare District: "They eat different food, because if a mother is breastfeeding she requires food rich in nutrients, because they have to feed the baby for better growth, same as pregnant women. They should follow a different diet because they require food that can bring breast milk,

and food that have nutrients so that she can feed the baby. When I was breastfeeding I took milk and fruits and the rest of the household members couldn't take them because those food should be in a small quantity and you can be obliged to eat them alone," (mother of 24–60 month child). While most respondents who spoke to the issue felt that pregnant women needed different diets, dissenting opinions were also expressed. In Gicumbi, a breastfeeding respondent made an equity argument, the converse of the 'lowest common denominator' framing noted below: "Breastfeeding women should eat the same meal with other members. This is because other household members also need good diets to have a healthy life."

In many ways, the diets proposed by informants for lactating women are similar to those suggested for pregnant women: eat more frequently, in smaller quantities, although they may ultimately need to eat more, because they frequently experience hunger as a result of breastfeeding: "They have to eat many times per day; breastfeeding women eat more than a woman who doesn't breastfeed" (breastfeeding mother). Breastfeeding women should consume plenty of fruits such as oranges, passion fruit, mango, papaya, pineapple and ripe banana, and vegetables including leafy greens. Beans, soya, and small fish (*indagara*) are the most frequently cited protein sources, while animal source foods other than *indagara* appear far less frequently in responses, which, as for pregnant women's diets, may be a reflection of the fact that meat, dairy, and eggs are expensive and out of reach for many. Unaffordability of animal source foods was also reported by other studies (Cornelsen et al., 2016; Drewnowski et al., 2020; Milford et al., 2019). Across the sample of breastfeeding women, recall and observation data shows no egg consumption, cow's milk consumption in one recall, and no meat at all, even in households with a livestock holding. This strongly suggests that at least in these households, caregivers were exercising agency to choose whether or not to include animal source foods; the option to include animal source foods was available, but rarely chosen.

Energy-dense recommendations include Irish potatoes, sweet potatoes, and cassava—however, there are reservations around some of these starchy foods (discussed below). As is the case for pregnant women's diets, the diets proposed for breastfeeding women are well-informed nutritionally, and by no means far from recommended best practices; for example, a breastfeeding woman from Nyagatare noted: "They should eat proteins like milk, soya, sorghum, maize, meats, fish. They should eat food that gives strength like sweet potatoes, cassava, Irish potatoes. They should also eat vitamins like fruits which are mangoes, papaya, plums, avocado and pineapple and legumes like dodo (amaranth), carrots, beet, cabbage. They have to eat them so that those foods bring a healthy life to both the mother and the baby."

4.2 | Soft and hard foods

"Pregnant women should avoid eating cassava and sweet potatoes if they are eaten alone without other types of food included. The worst thing is to eat them without peeling them. All these types of food such as taro are solid (hard) foods, anyone who wants to eat them should mix them with vegetables to become soft and easy to eat. The reason why is that if we eat them alone they are not nutritious enough to help the breastfeeding woman to have breast milk." (pregnant respondent).

While food groups defined by nutritional contribution are an exogenous classification scheme, the grouping of foods into a soft-hard typology is of local origin, in other words, a folk classification, given that this is not a model which is congruent with systems of food classification promoted by the institutional nutrition and health community. In this system, starchy roots and tubers such as cassava, sweet potato, and taro are considered to be 'hard' or 'solid' (*ibiryo bikomeye*), while foods such as fruit, leafy vegetables, and legumes are 'soft' (*ibiryo byoroshye*). Hard foods are to a degree contra-indicated for pregnant and lactating women as well as young children. Responses to questions about appropriate foods for these categories do reveal some variation in this area: some respondents suggest that sweet potatoes and other hard foods should be included in diets for lactating women, in an effort to represent all food groups, while others feel that hard foods do not support the production of breast milk, and need to be mixed with vegetables to transform them into a 'softer' and more digestible form. Interestingly, there is a gender dimension to this: according to an informant from Huye, men prefer hard food because they give 'strength' which allows them to work. Which is not incorrect: these foods are carbohydrate-dense and provide the energy needed for tough physical labour.

While hard foods are not consistently contra-indicated, soft foods are, along with porridge, a more uniform recommendation, in that when mentioned, they are recommended for breastfeeding women. One informant suggested that lactating mothers should follow a transitional system, whereby for the first three months, they should eat only soft meals; at the 3 month point, 'usual meals made of solid things' as eaten by the rest of the family should be introduced, while maintaining the consumption of porridge in the diet.

4.3 | Young child feeding: Separate diets and low animal source food consumption

As found for pregnant and breastfeeding women's diets, it is suggested that young children should not eat hard foods (see above), such as green banana, taro, sweet potato, and hard cassava: "Because these foods are low in vitamins when prepared separately from other types of food they can cause stunting to the kid." (mother of 24–60 month child). While this is to some degree a folk taxonomy, it is undeniably grounded in some scientific truths, insofar as an excess of these foods may displace other foods, including those rich in micronutrients in the diet. Similar findings by Dusingizimana et al. (2021) indicate that starchy foods are viewed as inadequate for young children below 2 years because they are considered too 'hard' for them.

Another similarity lies in the idea that young child feeding calls for separate diets, because they should be more nutritious than

would be affordable to provide for the whole household, or in other words that they should include a greater diversity of foods than diets provided by other household members. Diets for complementary and young child feeding should ideally also be separate in terms of ingredients which are believed to be unsuitable for young children. This respondent from Rwamagana expressed it in this way: "You should give her fruits for 3 months and small quantity of food, you have to cook her own food, if you cooked Irish potatoes with legumes, you don't use a lot of oil, you put on small quantity of oil, oil for kids is not good… You cannot give her/him maize, because these are hard foods and the baby couldn't start to be familiar with these foods."

For feeding of young children, a further salient finding from recall data is that, with the exception of *indagara*, animal source foods are essentially non-existent in diets. Eggs feature twice (in the same household) in the child feeding recall. Cow's milk features once. Meat (beef, goat, chicken, or pork) appears once in the child feeding recall. Observational data supports this pattern: between one and four food acquisition and preparation observations were carried out in each of the 30 households. Eggs and milk do not appear in these. Meat appears once. Small fish are included in meals in only seven households. Low consumption of animal source foods is not surprising because other studies have also reported low rate of consumption for example National Institute of Statistics of Rwanda, Ministry of Health, ICF-International (2020) reported 6% for dairy products, 8.5% for eggs, and 25.6% for meat and fish and Uwiringiyimna et al. (2018) also found 2% for both eggs and dairy products and 8% for flesh foods.

5 | DISCUSSION

5.1 | Knowledge

Findings presented here support the results of several other studies conducted in Rwanda and elsewhere, which found very high levels of nutrition knowledge among caregivers of children under two (Ahishakiye et al., 2019; Nti et al., 2002; Rwanda Ministry of Health Rwanda Biomedical Centre, 2017; Umugwaneza et al., 2021). Knowledge about foods, feeding, and nutrition for complementary and young child feeding is important, in particular the dimension of dietary diversity. Informants reference key categories of nutritional benefits accruing through dietary diversity: foods that provide energy, those which support body growth, and those which protect and build resistance, while providing correct food examples of all three categories and mentioning the importance of animal source foods. Most caregivers have absorbed, taken ownership, and culturally assimilated an important body of nutrition knowledge and it is clear that respondents across the study have incorporated a significant amount of dietary and nutritional information into their overall knowledge repertoire. Based on the vocabulary and on the close alignment with institutional narratives about the physiological benefits of different food groups, we would argue that knowledge

about balanced diets and nutritional contributions of different food groups is an etic, or exogenous, classification scheme which has been assimilated into locally understood systems of knowledge about foods and feeding, presumably via training, behaviour change communication, and information provided by health centres and community health personnel. A good example of this alignment or narrative convergence relates to the heavy emphasis placed on the benefits of tree tomatoes and cassava leaves for pregnant women: tree tomatoes and dark green vegetables such as cassava leaves are rich in micronutrients, including iron, and their positive effect on haemoglobin levels is suggested by several studies (Bailon-Moscoso et al., 2020; Bhadra & Deb, 2020; Yaskolka Meir et al., 2019).

5.2 | Constraints: Economy and behaviour

Economic and productive constraints are two dimensions of the same problem: poverty limits people's capacity to purchase foodstuffs in the market; productive constraints such as poor harvests or limited land also constrain access to better, and to better-quality food. Tellingly, this limits purchase of almost all animal source foods and is supported by interview data, in which these foods feature promi-nently as 'difficult to obtain' because they are prohibitively expensive. Other studies have also reported household income as limitation to consumption of nutritious containing animal source foods (Cornelsen et al., 2016; Drewnowski et al., 2020; Milford et al., 2019; Pallegedara, 2019). Poor harvests, by contrast, relate to foods produced by the household. Taken together, these two constraints 'cover' the two main sources of food. Interview questions focusing on access to food elicited a range of specific examples, but the common narrative thread running through this material is that within these households there is a perception that they are unable to meet the dietary needs of young children and pregnant and lactating women, whether through subsistence farming, working in the waged economy, or a combination of the two. This is an even more acute problem in larger families with more people to feed. Large families and insufficient household food production expose households to food insecurity which is the main driver of suboptimal food consumption patterns in low-income countries (Drammeh et al., 2019). Overall, we observed a 'lowest common denominator' situation, in which, although women are aware of the need for a particularly good diet during pregnancy, they most often eat the same meals as other members of their households, because this is what is deemed to be economically possible, either in absolute terms, or with regard to a system of priorities. Other studies have also reported low income as factors that limit dietary practice changes during pregnancy (Nana & Zema, 2018; Yeneabat et al., 2019).

This raises the question of whether we are observing a one-dimensional problem of resource constraints, as contended by many respondents in our sample, or a multi-dimensional problem involving behaviour and decisions as well as economic constraints. A close reading of observational data reveals a number of 'decision-points' where decisions have been actively taken from a range of options, as
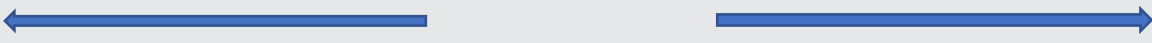
opposed to being unavoidable single economic choices. Examples of such decision-points include limited choices of cultivars, and choices of food purchases, in which quantity is emphasised over quality—a point made here: "When someone is poor he avoids buying good things. He buys things that can last many possible days. We consider some products when we cook them. They become more in terms of quantity." A clear example of this kind of decision-point relates to the consumption of animal source foods. These are frequently referenced with an aspirational inflection: foods which pregnant women should consume, but which are rarely included in narratives about foods *actually* consumed. This finding is consistent with other studies in which it was found that pregnant mothers who did not consume animal food had a low consumption score (Fite et al., 2022). The fact that very limited consumption of animal source foods is the norm even in households which possess some kind of livestock points to an important finding: *curating diets, whether for pregnant or lactating women, or for young children, is not defined solely by economic limitations, but by decisions taken in light of both nutrition knowledge (about 'ideal' diets) and perception of economic status*. In other words, decisions incorporate both behavioural and economic dimensions.

While economy and material explanations are relevant and important for both nutrition practices, they are by themselves insufficient. While economy may limit and constrain choices, it does not eliminate them; we would contend that in our sample, in all three *ubudehe* categories, people self-identify as poor. Poverty then becomes the central form of self-presentation: what the sociologist Erving Goffman (1959) referred to as the 'front stage.' Decision-making and choices which are driven by behaviour and priorities remain, in this model, 'backstage.' Extending the argument, this concept of poverty is 'owned': it is not hidden or stigmatised in interview responses, but openly discussed as the fundamental explanation for poor diets—which caregivers are fully conscious of. By contrast, 'behaviour', 'mentality', attitude' and related explanations are applied to others: *those people in the community (not us) who can't be bothered to give their families a proper diet*. Behaviour and mentality are both 'othering' (as opposed to owned) and morally labelled; by contrast with poverty, which the individual or family has no agency or ability to change, behaviour and mentality are open to criticism and censure because they are perceived as areas of life where the individual could exert control and agency. We would therefore frame *poverty* (or the domestic economy) as the *proximal or immediate cause* of poor MIYCN, and *behaviour* governing food choices and decisions to buy large quantities of less nutritious foodstuffs instead of smaller quantities of nutritious foods, as the *underlying cause* of poor diets and by extension suboptimal nutrition outcomes.

Knowledge and behaviour are not necessarily co-dependent: even if material requirements are met, and knowledge levels are high, a given behaviour may not have reached a point where it is

TABLE 3 Driving last-mile behaviour change

Activity	Target	Content	Output
All households			
Support, strengthen and where necessary, launch SBCC activities	Attitude-mentality (individual)	Counselling, dialogue, education for caregivers of young children with a focus not on more **knowledge** about nutrition but on **prioritisation and decisions**	Individual attitudes to prioritisation of nutritious foods are changed
Support, strengthen and where necessary, launch community and social mobilisation efforts	Culture and social norms (community)	Prioritisation of better MIYCN practices and the community adoption of these priorities as a social norm	Community norms around prioritisation of nutritious foods are changed
Economically More Constrained Households			
Support, strengthen and where necessary, launch economic empowerment activities	Economic capabilities	Nutrition-sensitive agricultural extension; social protection cash benefits	Increased and diversified agriculture, greater purchasing power

Cross-Cutting Assumption

Nutrition Knowledge is Already Established

Incentivization through economic and livelihoods policy. Consider approaches which use social protection/livelihoods to incentivize behaviour change
- **Such as adapted Latin American Conditional Cash Transfer models where social protection benefits are conditioned on growth monitoring and clinic attendance**
- **Promote production of nutritious foods through agricultural extension**
- **Support nutrition-sensitive livelihoods and local economy initiatives**

normative. In the case of this study's households, one interpretation is that sensitisation of the need for good MIYCN practices has been achieved, yet behaviour change has not. This is in fact a classic example of the 'educational model of social change', in which it is assumed that providing knowledge changes behaviour: according to anthropologist Russell Bernard (2011, p. 29), 'the model is mostly ineffective because behavioural change (the supposed dependent variable) doesn't usually depend on education (the supposed independent variable).'

6 | CONCLUSION

The policy question facing us is 'how can policy and programme solutions leverage high levels of existing knowledge and economic incentives to drive last-mile behaviour change?' By 'last-mile' we reference the fact that while much behaviour change has now been achieved, there remain some final challenges to translating good knowledge into better nutrition outcomes. In Rwanda, knowledge of nutrition is already excellent. We would argue that it would be advisable to look towards ways to mediate last-mile behaviour change through economic (social protection, livelihoods, economic development) *as well as* behavioural interventions focused on better decision-making around acquisition of foodstuffs.

Driving last-mile behaviour change requires knowledge, changes in attitude-mentality at individual (household) level, and social norms at cultural (community) level; strengthened economic capacity for poorer households.

We propose a three-pronged approach, illustrated in Table 3 below. This approach acknowledges that nutrition awareness and knowledge are already high, and focuses not on providing more knowledge, but on shifting behavioural norms towards better food-choice decision-making and stronger prioritisation of obtaining—through cultivation or purchase—the foodstuffs which are necessary to construct nutritious diets for pregnant and lactating women as well as young children.

We propose further that SBCC should be directed at both community and household level nationwide, and that these should be thematically focused on prioritisation of nutritious foods: in other words, the key behaviour which needs to be addressed is the current preference for *quantity over quality*. Behavioural and attitudinal change at the household level, reinforced by social norm change at the community level, is required to help caregivers make better decisions around both cultivar and market choices. In practice, we are seeking a shift in emphasis away from large quantities of starchy foods and toward greater diversity of micronutrient-rich foods including more animal source foods in the diets of pregnant and lactating women and young children.

In addition to the above SBCC intervention, we propose an additional intervention layer, to be targeted particularly at more resource-constrained households (identified either through the current ubedehe system, or via other targeting approaches). This is an *economic empowerment and incentivization* layer, designed to both increase caregivers' economic capability to pay for nutritious foods, and to incentivize this behaviour change economically.

AUTHOR CONTRIBUTIONS
Annet Birungi and Youssouf Koita conceived the study, managed the project and funding, and contributed to the drafting of protocols, reporting, and the current manuscript. Terry Roopnaraine, Eric Matsiko, and Maryse Umugwaneza were co-PIs, and carried out the research and data analysis. Terry Roopnaraine led the drafting of this manuscript with contributions from Eric Matsiko and Maryse Umugwaneza.

CONFLICTS OF INTEREST
The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICAL STATEMENT
Ethical clearance was obtained from the Rwanda National Ethics Committee.

ORCID
Terry Roopnaraine http://orcid.org/0000-0002-1100-2760
Eric Matsiko http://orcid.org/0000-0002-4374-7441
Maryse Umugwaneza http://orcid.org/0000-0002-8508-798X

REFERENCES

Ahishakiye, J., et al. (2017). Stressors and coping strategies of infant and young child feeding practices in Rwanda: Perceptions of mothers, fathers, grandmothers and community health workers. *IUNS 21st International Congress of Nutrition*.

Ahishakiye, J., Bouwman, L., Brouwer, I. D., Matsiko, E., Armar-Klemesu, M., & Koelen, M. (2019). Challenges and responses to infant and young child feeding in rural Rwanda: a qualitative study. *Journal of Health, Population, and Nutrition*, 38(1), 1–10.

Bailon-Moscoso, N., Ramírez-Orellana, M. I., Torres-Bailon, P., & Romero-Benavides, J. C. (2020). Phytochemistry and bioactivity of *Solanum betaceum* cav. *Bioactive Compounds in Underutilized Fruits and Nuts*, 157–174.

Bernard, H. R. (2011). *Research methods in anthropology: qualitative and quantitative approaches*. Altamira Press.

Bhadra, P., & Deb, A. (2020). A review on nutritional anemia. *Indian Journal of Natural Sciences*, 10(59), 18466–18474.

Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., de Onis, M., Ezzati, M., Mathers, C., & Rivera, J. (2008). Maternal and child undernutrition: Global and regional exposures and health consequences. *The Lancet*, 9608, 243–260.

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 9890, 427–451.

Cornelsen, L., Alarcon, P., Häsler, B., Amendah, D. D., Ferguson, E., Fèvre, E. M., Grace, D., Dominguez-Salas, P., & Rushton, J. (2016). Cross-sectional study of drivers of animal-source food consumption in low-income urban areas of Nairobi, Kenya. *BMC nutrition*, 2(1), 1–13.

Drammeh, W., Hamid, N. A., & Rohana, A. J. (2019). Determinants of household food insecurity and its association with child malnutrition in Sub-Saharan Africa: A review of the literature. *Current Research in Nutrition and Food Science Journal*, 7(3), 610–623.

Drewnowski, A., Mognard, E., Gupta, S., Ismail, M. N., Karim, N. A., Tibère, L., Laporte, C., Alem, Y., Khusun, H., Februhartanty, J., Anggraini, R., & Poulain, J. P. (2020). Socio-cultural and economic drivers of plant and animal protein consumption in Malaysia: the SCRiPT study. *Nutrients*, 12(5), 1530.

Dusingizimana, T., Weber, J. L., Ramilan, T., Iversen, P. O., & Brough, L. (2021). A qualitative analysis of infant and young child feeding practices in rural Rwanda. *Public Health Nutrition*, 24(12), 3592–3601.

Fite, M. B., Tura, A. K., Yadeta, T. A., Oljira, L., & Roba, K. T. (2022). Factors associated with food consumption score among pregnant women in Eastern Ethiopia: a community-based study. *Journal of Health, Population, and Nutrition*, 41(1), 1–9.

Global Alliance for Improved Nutrition. (2016). The marketplace for nutritious foods: Rwanda landscape report for improved nutrition.

Goffman, E. (1959). *The presentation of self in everyday life*. Anchor Books.

Gove, S., & Pelto, G. (1993). Focused ethnographic studies in the WHO programme for the control of acute respiratory infections. *Medical Anthropology*, 15, 409–424.

Iradukunda, D., & Ngomi, N. (2020). Knowledge, attitude and practices towards nutrition and influencing factors among pregnant and lactating women in Kigeme Refugee Camp, Rwanda. *Galore International Journal of Health Sciences and Research*, 5(2), 99–109.

Lowensohn, R. I., Stadler, D. D., & Naze, C. (2016). Current concepts of maternal nutrition. *Obstetrical & Gynecological Survey*, 71(7), 413–426.

Milford, A. B., Le Mouël, C., Bodirsky, B. L., & Rolinski, S. (2019). Drivers of meat consumption. *Appetite*, 141, 104313.

Murekatete, U. R. (2017). *Determinants of complementary feeding practices among care givers of children aged between 6-23 months: a secondary data analysis from Rwanda demographic and health survey 2014-2015*. University of Rwanda.

Na, M., Jennings, L., Talegawkar, S. A., & Ahmed, S. (2015). Association between women's empowerment and infant and child feeding practices in sub-Saharan Africa: an analysis of demographic and health surveys. *Public Health Nutrition*, 18(17), 3155–3165.

Nana, A., & Zema, T. (2018). Dietary practices and associated factors during pregnancy in northwestern Ethiopia. *BMC Pregnancy and Childbirth*, 18(1), 1–8.

National Institute of Statistics of Rwanda, Ministry of Health, ICF-International. (2020). Rwanda Demographic and Health Survey 2019-20. Rockville, Maryland, USA.

Nti, C. A., Larweh, P. M., & Gyemfua-Yeboah, Y. (2002). Food consumption patterns, dietary quality and health status of expectant mothers: Case studies in suburban and rural communities in Ghana. *International Journal of Consumer Studies*, 26(1), 7–14.

Pallegedara, A. (2019). Food consumption choice and demand by the Sri Lankan households: Trends, drivers and policy implications. *Journal of Agribusiness in Developing and Emerging Economies*, 9, 520–535.

Pelto, G. (2020). Applying focused ethnographic methods: examining implications of intracultural diversity for nutrition interventions. *Nutrition Reviews*, 78(S2), 71–79.

Rwanda Ministry of Health, Rwanda Biomedical Centre (2017). Rwanda 1000 Days Campaign Assessment Report.

Umugwaneza, M., Havemann-Nel, L., Vorster, H. H., & Wentzel-Viljoen, E. (2021). Factors influencing complementary feeding practices in rural and semi-urban Rwanda: a qualitative study. *Journal of Nutritional Science*, 10.

UNICEF. (2013). *Improving child nutrition: the achievable imperative for global progress*. UNICEF.

UNICEF. (2020). *UNICEF conceptual framework on maternal and child nutrition*. UNICEF.

Uwiringiyimana, V., Ocke, M. C., Amer, S., & Veldkamp, A. (2018). Predictors of stunting with particular focus on complementary feeding practices: A cross-sectional study in the Northern Province of Rwanda. *Nutrition*, 60, 11–18. https://doi.org/10.1016/j.nut.2018.07.016

Yaskolka Meir, A., Tsaban, G., Zelicha, H., Rinott, E., Kaplan, A., Youngster, I., Rudich, A., Shelef, I., Tirosh, A., Brikner, D., Pupkin, E., Sarusi, B., Blüher, M., Stümvoll, M., Thiery, J., Ceglarek, U., Stampfer, M. J., & Shai, I. (2019). A green-mediterranean diet, supplemented with mankai duckweed, preserves iron-homeostasis in humans and is efficient in reversal of anemia in rats. *The Journal of Nutrition*, 149(6), 1004–1011.

Yeneabat, T., Adugna, H., Asmamaw, T., Wubetu, M., Admas, M., Hailu, G., Bedaso, A., & Amare, T. (2019). Maternal dietary diversity and micronutrient adequacy during pregnancy and related factors in East Gojjam Zone, Northwest Ethiopia, 2016. *BMC Pregnancy and Childbirth*, 19(1), 1–9.