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**RAPID REVIEW OF RESEARCH ON DIETARY ATTITUDES,
BELIEFS AND PRACTICES IN GHANA 1990-2020**

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ABSTRACT

Food-related beliefs and attitudes influence dietary behaviors and are important drivers of nutrition outcomes. Understanding beliefs and attitudes that drive dietary behaviors, as part of the process for developing Food-based Dietary Guidelines is critical for targeting messages to motivate healthy dietary diets. This rapid review was undertaken to summarize readily available local evidence on food-related beliefs, attitudes, and associated practices in Ghana. A rapid review of 39 peer-reviewed publications and graduate-level theses on the dietary behaviors of Ghanaians was conducted between November and December 2020. The study only included articles published between 1990 and 2020 involving apparently healthy populations living in Ghana. Documents were identified through a systematic literature search of Google Scholar and PubMed. Data on food-related knowledge, beliefs, attitudes, and practices were extracted into an excel template and analyzed using thematic content analysis. The sampled research included primarily cross-sectional studies of urban, rural, peri-urban and mixed localities throughout Ghana: one was a prospective research. A range of food-related taboos were identified and classified as taboos for the general population, pregnancy-related, or child-related. Although awareness of food-related taboos was common, they were not extensively practiced. Energy-giving and nutrient-dense foods are commonly promoted during pregnancy. Culturally prescribed pre-lacteal feeds and other infant and young child feeding (IYCF) behaviors reported in the studies were not aligned with IYCF recommendations. A 3-meals-a-day pattern was observed, commonly, across all age groups; most adult meals, particularly supper, was prepared at home. However, ready-to-eat meals were regularly purchased by adults and adolescents. Adolescents frequently reported snacking and skipping meals; breakfast was the most frequently skipped meal. Fruits and vegetables were the least consumed food groups across all age groups. Muslim faith was associated with consuming more diverse diets and greater fruit and vegetable consumption. The findings of this review provide an overview of food-related beliefs and practices of Ghanaians and can inform decisions on areas to emphasize in food-based dietary guidelines and associated nutrition education messages to promote healthy diets in the Ghanaian population. Effective nutrition education is needed to dispel harmful food beliefs and practices and promote healthy food choices across the life cycle. Dietary patterns in Ghana are linked with cultural and religious practices that are often unique to particular subgroups, although there are common strands of beliefs across ethnic groups. These beliefs can result in either adverse or beneficial outcomes, depending on what eating patterns it determines.

Key words: food prohibitions, dietary practices, dietary pattern, Nutrition, Ghana

INTRODUCTION

Dietary behaviors encompass the various processes associated with food choice, eating behaviors, and actual dietary intake, all of which are regulated by environmental, socioeconomic, and sociocultural influences [1,2]. It is often the result of a complex set of food-related actions influenced by a myriad of factors [2]. Sub-optimal dietary behaviors, involving inadequate or excessive intake of foods and nutrients lead to unhealthy physiologic outcomes linked with the high global burden of co-existing undernutrition and overnutrition across the lifecycle [3]. Current evidence, mostly from developed country settings demonstrates that, although learning to eat healthy diets is plastic and yields diet modification strategies, important aspects of dietary behavior are formed early in life [4].

Globally, there is evidence of declining rates of child undernutrition. Although similar declines have been observed in Ghana, current child undernutrition rates remain unacceptably high [5,6]. Women's overweight and obesity rate has increased sharply from 25% to 40% between 2003 and 2014, while anemia among women declined only modestly in the same period [5]. Ghana is, thus, confronted with a double burden of malnutrition. This situation has both short and long-term consequences on human capital and national development [7].

Nutrition communication is, therefore, necessary to promote optimal dietary behaviors and to address all forms of malnutrition in Ghana. In many countries, Food-Based Dietary Guidelines (FBDGs) have been used as a communication tool to promote healthy diets as well as to guide nutrition-sensitive policies and programs in sectors such as agriculture and social protection [8].

Food-Based Dietary Guidelines are designed to respond to specific nutrition and public health needs of a country and should be tailored to the peculiar socio-cultural and economic context [9]. Understanding the dietary behaviors of Ghanaians as part of the FBDGs development process enables a better understanding of optimal practices as well as those which are sub-optimal as a basis to target dietary messages. This current study aimed to synthesize available evidence on food-related knowledge, beliefs, attitudes and practices among persons living in Ghana across the entire life cycle. This study was intended to inform the development of FBDGs for Ghana.

METHODS

The review methodology was informed by the World Health Organization, Alliance for Health Policy and Systems Research practical guide on rapid reviews to strengthen health policy and systems [10].

Inclusion and exclusion criteria

Inclusion criteria for the review were studies of apparently healthy Ghanaians living in Ghana, published in the past 30 years (from 1990 to December 2020) and using either qualitative or quantitative data collection approaches. Included documents were

published peer-reviewed articles and theses (Masters and Ph.D.) available online and accessible through institutional repositories and published in the English language. Exclusion criteria included studies on unhealthy, or malnourished populations with atypical dietary behavior. In the situation where a study included healthy control participants whose usual dietary behaviors were described, relevant data on the control group were extracted.

Search strategy

Literature searches were guided by two *a priori* themes: i) Food-related beliefs (based on cultural knowledge or other influences) and attitudes with the potential to influence dietary behaviors and ii) dietary behaviours and practices. Key words and associated synonyms generated according to the PICO format were used to conduct searches in Google Scholar and PubMed electronic databases between November and December 2020. Additional publications were identified from the references of identified publications. Searches were completed by two members of the review team, each assigned to one of the two search engines used and papers identified by each were pooled into a single database in Mendeley reference management software and duplicates removed. The following keywords and associated synonyms were used: Ghanaians, sociocultural, attitudes, social, dietary, food, practice, behavior, nutritional status, nutrition, Ghana, Taboos, diets, attitude, nutritional, proscription, preference, and children.

Data abstraction

A screening checklist based on the stated inclusion criteria was developed and the full complement of documents identified from the literature searches was split between two members of the review team to independently complete title, abstract and full-text screening using the screening checklist. Following the screening, data were extracted from the final list of included papers using a data abstraction template by two reviewers, each working on 50% of the selected papers. Data were extracted on the title, authors, year, study design, sample population and size, setting (region of the country, urban/rural), outcome measures (knowledge, beliefs, attitudes, and practices), key primary and secondary findings, and conclusions, and facilitators and barriers to healthy eating. All discrepancies encountered in the screening, full-text review, and data abstraction processes were resolved through discussion.

Synthesis

The database of relevant extracted evidence was reviewed carefully and subjected to content analyses guided and organized by the two *a priori* themes. A narrative synthesis approach was used to summarize the information with quantitative information provided to inform on the saliency or magnitude of outcomes of interest. Facilitators and barriers to healthy eating relative to the sociocultural and dietary behaviors were drawn from the various studies as a cross-cutting theme across the various studies and a few unique studies and integrated into the discussion of the results.

RESULTS

The search yielded 2,429 records. After removal of duplicates, 2334 records were subjected to title and abstract screening, following which 73 documents were assessed eligible for full-text screening. Thirty-three records were excluded during full-text screening and the remaining 39 records met the inclusion criteria to be included in the review.

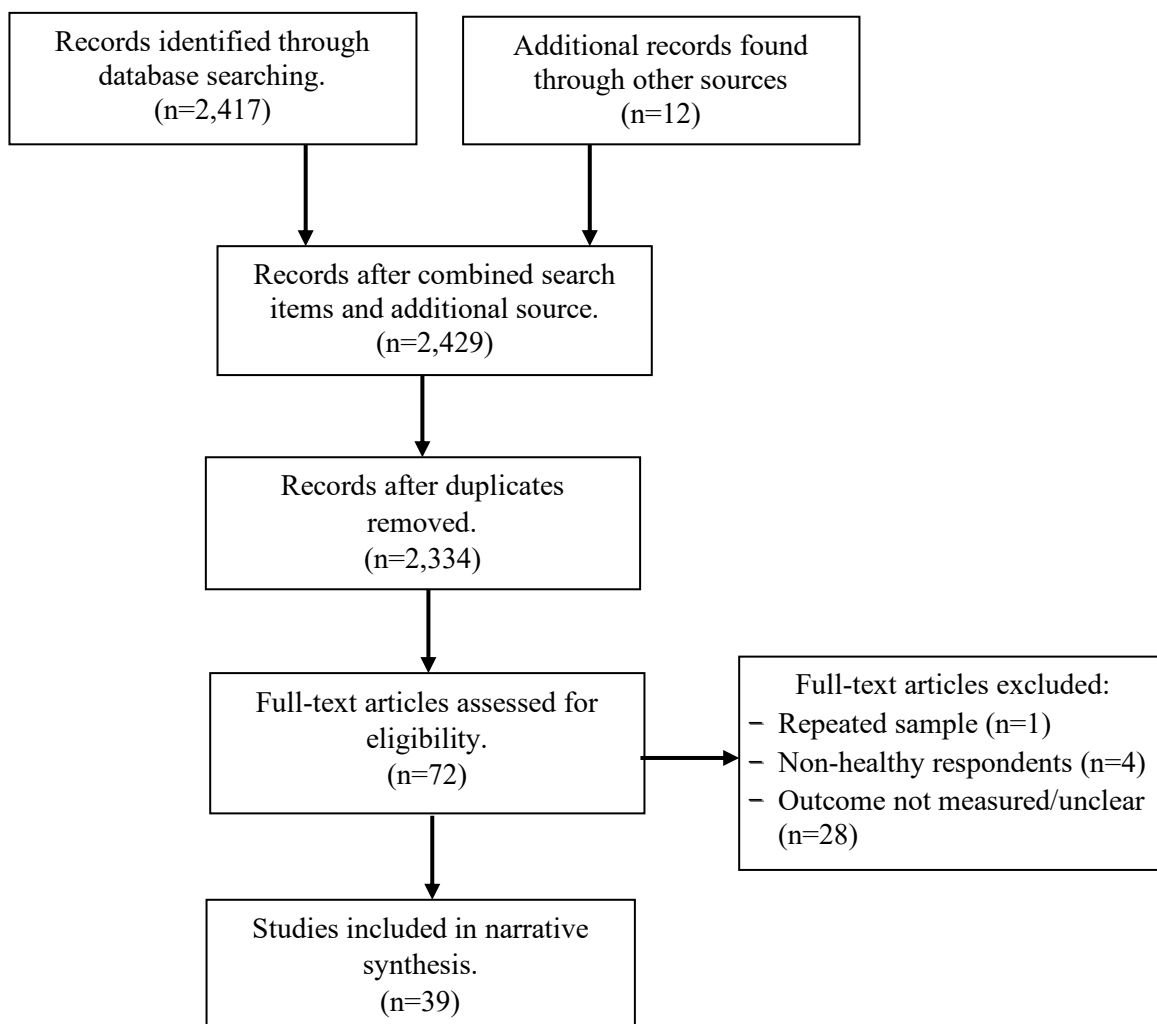


Figure 1: PRISMA flow-diagram for the selection of studies on food-related beliefs, attitudes, and usual dietary behaviours in Ghana

Characteristics of selected papers

General characteristics of the 39 papers included in the review are summarized according to the *a priori* review themes and emergent themes from the data synthesis in Table 1. Sixteen papers had content on food-related beliefs and attitudes with the potential to influence dietary behaviours covering two central themes: I) Papers describing the awareness and or practice of food-related prohibitions or taboos (n=8) either in a general population [11] or associated with pregnancy [12–16] or childhood [16,17], and II) papers describing food or diet-related attitudes or beliefs of study

participants (n=8). Papers identified under the second broad theme, dietary behaviours and practices included 21 papers describing studies based on adults (7 papers), school children (7 papers), and infants and young children (7 papers). Additionally, three papers had specific content on facilitators and barriers of identified sociocultural and dietary behaviours on healthy eating diets. The research papers presented analysis from cross-sectional quantitative (n=24), qualitative (n=8), mixed methods (n=3), ethnography (n=3) and prospective (n=1) studies. The studies were conducted in rural (15 papers), urban (16 papers), peri-urban (1 paper), and mixed (7) localities across 8 regions of Ghana. Only three of the studies were designed as nationally representative.

Food-related beliefs and attitudes influencing dietary behaviours

Fifteen papers provided evidence on participants' food-related beliefs and attitudes as described below, according to the two central themes that emerged from the thematic analysis.

Awareness and practice of food-related prohibitions or taboos. Food prohibitions, also called food taboos have been described as the exclusion of specific foods from the diet, typically based on cultural or other belief systems [1]. In an exploratory study on the awareness and practice of food taboos among 200 multi-ethnic residents of an urban suburb of Accra, it was reported that 60% of them were aware of a variety of food taboos, most of which were related to animal source foods (ASF) [11]. At least one-quarter of participants listed snails and meat from cats, dogs, pigs, or bush rats as prohibited foods, while up to 20% of participants perceived eggs, mudfish, fermented salted fish (local name: *Kobi*), crab, tortoise meat, parrot meat, and the meat of crawling animals as prohibited foods. Plant food sources considered taboo foods included starchy staples, such as yam, cocoyam and cassava; vegetables (okro, *Gboma* (eggplant leaves) and leaves of the Baobab tree); and fruits such as pineapple, guava, and banana. Food taboos were described as either permanent or temporary. Permanent food taboos are those that should never be consumed. An example of a permanently prohibited food is pork among Muslims [1]. Temporary food taboos are transitory prohibitions and typically apply to certain periods or physiological states. Ethnic differences were identified across categorizations of permanent or temporary food taboos [11]. For example, whereas prohibition of snail consumption is a permanent taboo among *Gas* and *Ewes*, snails are only temporarily prohibited during pregnancy among other ethnic groups. Temporary food taboos were mostly associated with pregnancy. Reasons behind the permanent and temporary food taboos included cultural, religious, health, and ethical considerations. Only one-third of respondents who were aware of food taboos reported adherence to them. However, in the urban population studied, ethnicity was not significantly associated with the practice of recognized food taboos but there was a significant association between practicing food taboos and level of formal education.

Among community key informants in the Upper East Region, hawk meat is forbidden as food for everyone, except undertakers [16]. In the same study, key informants reported a belief among community members that anyone who plants fruit trees indigenous to the area such as baobab, *Aaarrah* (blackberry tree), and *Sisibi* (local grapes) risks dying when the tree begins to bear fruit and so such fruit trees are not to

be intentionally cultivated. Additionally, some indigenous vegetables, *Vormati* and *Ba-owra*, are believed to cause blindness and so they are rarely consumed. They are especially forbidden during pregnancy to avoid having a blind child.

Pregnancy-related food taboos were well recognized among adult women and men [12,14–16,18]. Again, many of these taboos were ASF-based. Among rural study participants' prohibited ASF during pregnancy included rat, snail, snake, and animal lungs with some participants qualifying that snake is not a taboo per se because it is traditionally not consumed and the prohibition against animal lungs pertains only to pregnant women expecting a male child due to the belief that animal lungs are a health hazard, causing breathing problems in males [15]. Prohibition of snail consumption during pregnancy was also among ASF-based taboos identified by multi-ethnic urban participants in Greater Accra Region [12], and rural and urban study participants in the Western Region [14]. Other prohibited ASF during pregnancy included crab, various types of fish (especially snake fish and mudfish) and eggs [12,19]. Plant foods prohibited for pregnant women included red millet, legumes (groundnuts and Bambara beans), okro, starchy roots and tubers (cassava and sweet potatoes), ripe plantain and sweet fruits (banana, sugar cane, and pineapple). Prohibition against red millet during pregnancy was peculiar to study participants in the Upper East Region [16]. The belief that pregnant women should avoid sweet plant foods like sweet potatoes, ripe plantain, bananas, and other fruits was reported among rural and urban study participants in studies carried out in Accra and the Western Region [12,14,19]. Western region study participants also listed sweet beverages such as *Milo* (sweetened chocolate beverage) and *Malt* (sugar sweetened carbonated malt beverage) among foods to be avoided in pregnancy [14]. Prohibition of cassava products such as *gari* (grated fermented and roasted cassava grits) and *kokonte* (cassava) in pregnancy was mentioned by both Greater Accra and Western Region-based study participants [14,19]. Pregnancy-related prohibitions against consumption of groundnuts and Bambara beans were reported among Western and Eastern Region study participants, respectively. Pregnancy-related food prohibitions extended beyond individual food items to whole recipes or meal items. Some multi-ethnic study participants in Accra were aware of prohibitions against pregnant women consuming groundnut soup, and *fufu* (specifically pounded cassava and plantain), and fermented corn porridge [11,12].

Some reasons given for food prohibitions in pregnancy included i) perceived pregnancy and delivery challenges/difficulties associated with pregnancy (for example consuming sweet foods increases size of the fetus with associated difficult labor during delivery; red millet consumption as a cause of multiple miscarriages; and consuming groundnuts making women sleepy during labor); ii) undesirable characteristics of the baby (for example, consumption of snails and okra during pregnancy would result in excessive infant drooling, eating ripe plantain would result in having a soft and lethargic baby, and eating Bambara beans during pregnancy would result in child respiratory problems and skin disorders at birth); and iii) attribution of ill health to some foods: For example Accra based study participants identified Groundnut soup as a cause of heartburn while corn flour was implicated in heavy bleeding among Eastern Region based study participants [12,15].

Alternatives to prohibited foods or foods encouraged during pregnancy were described in some of the papers [12,18]. These included palm soup, *Kontomire* (Cocoyam or taro leaves) stew with *agushie* (melon seeds), and bean stew accompanied by typical staple preparations such as *Banku* (corn-based stiff porridge), and *Fufu* (made from pounded tubers) as well as a variety of fruits. Commonly encouraged foods consistently mentioned across the different studies were *Abeduro* (*Solanum torvum*), and *Keta School Boys* (smoked anchovies usually used pounded whole with entrails into a powder). Foods prohibited or encouraged during pregnancy identified across the various studies are listed in Table 2.

Child-based food taboos were described by study participants in communities in the Eastern and Upper East Regions [16,17]. In a qualitative assessment of health workers' perceptions about mothers' and grandmothers' misperceptions and sociocultural influences on child feeding, the health workers reported that cultural rituals surrounding infancy were important barriers to mothers practicing exclusive breastfeeding recommendations [17]. These included hiding the infant during the first few days and feeding with herbal or other preparations as part of initiation rites for the infant into the community. In the Upper East Region, focus group discussants indicated that child-based food taboos included withholding fish from children to prevent them from becoming thieves in the future as well as first-born children being prohibited from eating chicken. However, no information was provided on the basis for these taboos.

Food or diet-related attitudes or beliefs: Attitudes encompass people's beliefs and evaluations on whether something is bad or good [20]. Of eight studies identified in this category, one described attitudes and beliefs relative to healthy and unhealthy eating among adult residents of an urban slum [21], one explored the potential acceptability of incorporating palm weevil larvae in complementary feeding diets of children [22] and the remaining six studies centred on caregivers attitudes and beliefs regarding infant and young child feeding [23–26]. Urban Accra slum dwellers perceived healthy eating as a function of cooking method (boiling or roasting was believed to be healthier than frying), hygiene conditions, and eating time (late night eating was considered unhealthy) [21]. Furthermore, healthy eating was perceived as using fresh ingredients for cooking, consuming fruits and vegetables, and indigenous foods. High intake of fatty foods such as fried snacks, and fried rice, refined carbohydrates, instant noodles and fried pork were considered unhealthy dietary practices.

Laar *et al.* [22] explored perceptions about the nutritional value, health benefits, and acceptability of the palm weevil larvae (locally called *Akokono*) for complementary feeding among rural mothers and other adults in the Brong Ahafo Region. Some study participants were familiar with the palm weevil larvae and perceived it as a nutritious food source. Some of them had consumption experience from their childhood and could narrate culinary preparation methods for palm weevil larvae, including roasting, frying, or adding to soups and stews. There were mixed responses to the notion of incorporating the larvae into complementary foods. Those who had previous experience of consuming palm weevil larvae were more favorable to its use in complementary foods. Some of those who were averse to its use indicated that they would accept its

inclusion in complementary foods if it was recommended by health workers and if the larvae were processed into an unrecognizable form for example into powder or paste.

The studies by Appoh and Kirekling [24] and Otoo *et al.* [23] reported mothers' breastfeeding attitudes and beliefs. At least 50% of rural Central and Northern Region mothers gave appropriate responses to attitudes-based child feeding knowledge questions on the importance of colostrum, the timing of complementary feeding and beliefs about causes of kwashiorkor [24]. Conversely, Otoo *et al.* [23] reported discomfort about breastfeeding in public and fear of breast deformation (for example, saggy breasts) as attitudinal barriers to exclusive breastfeeding among peri-urban mothers in the Eastern Region [23]. There was a strong belief among Northern Region caregivers of young children that indigenous staple foods such as Tuo Zaafi (cereal-based stiff porridge), Fufu, and Banku should not be given to children before 12 months of age [25]. These foods were considered 'heavy' and if introduced too early would delay child motor development, especially walking.

Armar-Klemesu *et al.* [25] also observed that in both Southern and Northern Ghanaian communities, fruits were rarely included in young children's diets. These practices were partly attributed to caregivers perceiving fruits to be 'medicinal' for children. For example, oranges were believed to prevent illness, restore appetite, and aid digestion. Similarly, in the Upper East Region, mothers indicated that fruits were not given to children routinely as part of their diet. Instead, fruits are provided occasionally, when they are available in their season [16].

In the Central region, rural mothers of children 4 to 24 months participating in a focus group discussion expressed beliefs about potential negative health effects of including certain foods in complementary feeding diets of children [27]. Feeding young children spicy foods was perceived as a risk factor for adult hypertension. Feeding sugary or artificially sweetened foods were believed to cause childhood diabetes. Gari (cassava grits) was implicated as a cause of fever and therefore to be avoided in complementary feeding.

In selected communities across the three main ecological zones of Ghana, it was observed that children aged 2-5 years consumed family meals. Thus, their ASF consumption was influenced by the quantity available in the family pot. As a result, unequal household food distribution practices that favoured adults, based on their relative contribution to household expenses, limits children's dietary intake and quality [28]. In the same communities, and using a larger sample of 608 caregivers of children 2-5 years, Christian *et al.* [26] reported almost universal positive attitudes about ASF in children's diets but there were geographic differences in attitudes about which household members would be prioritized when ASF is limited. While at least two-thirds of caregivers residing in the Forest-Savannah Transitional and Coastal Savannah ecological zones communities said they would prioritize their children's diets, less than 50% of those in communities in the Guinea Savannah zone indicated that children would be prioritized.

Dietary behaviours and practices



Thirteen of the documents with content on dietary behaviours or practices explored dietary patterns of different population groups including adults [29–32], school children [33–39], and mixed-age population [40]. Dietary patterns are defined as the quantities, proportions, variety, or combinations of different foods and beverages in diets, and the frequency with which they are habitually consumed [41]. The studies on dietary patterns covered the following sub-themes i) overall dietary pattern; ii) eating frequency; iii) breakfast habits; iv) snacking and meal skipping habits; v) home and out-of-home food consumption, and vi) food groups consumed. Seven papers described infant and young children feeding (IYCF) practices of caregivers of preschool-age children [16,25,27,42–46].

Studies describing overall dietary patterns In these studies (n=2 papers), factor analysis was used to identify dietary factors that describe the overall diet pattern and associated factors of study participants [29]. Abubakari and Jahn [29] identified two distinct diet patterns, described as *Health Conscious* and *Non-Health-Conscious patterns*, among adult pregnant and lactating women [29]. The health-conscious dietary pattern was characterized by high factor loadings for traditional staples, fruits, and vegetables compared to the non-health-conscious pattern which had higher factor loadings for sweetened dairy products (such as frozen yogurt and ice cream), and sweet carbonated beverages. Out-of-home food consumption and breakfast skipping were inversely associated with the health-conscious pattern. The non-health-conscious pattern was positively associated with having higher wealth, and pica practice. However, these were inversely associated with being uneducated. Abizari and Ali [35] used factor analysis to determine composite dietary patterns among school children in the Northern Region. Two distinct dietary patterns namely *sweet tooth patterns* and *traditional patterns* were identified. The sweet tooth pattern had high factor loadings for sugar-sweetened snacks, soft drinks, tea and coffee, and milk and dairy products. The traditional pattern showed high factor loading for cereals, local beverages, nuts, seeds, vegetables, and fish and seafood.

Eating frequency: Eating frequency was described in three papers; one on elderly study participants [47], one on mothers of young children [40], and one with high school students in Accra [13]. Among the adult study participants, the majority (approximately 53% of elderly persons and 79% of mothers of young children) followed a three-meals-a-day pattern [40,48]. Among high school children in urban Accra, at least 80% of them reported eating three meals a day while about 10% and 2% reported eating twice and once a day, respectively [13].

Breakfast eating habits: Doku *et al.* [33] studied breakfast habits of Junior High School (JHS) pupils attending schools in Volta, Eastern and Greater Accra Regions and found that while the majority of pupils reported eating breakfast daily, about one-third of them indicated eating breakfast a maximum of three days in a week. Similarly, at least 70% of rural and urban school pupils studied in both the Northern and Eastern Region reported consuming breakfast daily [37,39]. Foods consumed for breakfast included indigenous cooked meals (starchy staple preparation accompanied with a sauce), cereal-based cooked porridge (*koko*) or hot beverage (chocolate or tea), as well as bread and other pastries which are typically served with the porridges or hot beverages.

Snacking habits and meal skipping: Snacking was universally reported among rural Northern school children in the study by Abiba *et al.* [39] More than two-thirds (69%) of pupils consumed one or two snacks a day and the remainder reported consumption of three or more snacks a day. Meal skipping was reported in the study of SHS students in Accra: About 42% of the students reported occasional meal skipping with breakfast being the most frequently skipped meal [13].

Home and out-of-home food consumption: Source and/or location of consumed foods was indicated in three of the adult-based studies [32,40,47] and one school-based study [36]. Approximately 66% of meals consumed by elderly study participants in Greater Accra Region were home prepared. Similarly, rural Eastern Region mothers reported that 63% of their daily meals were prepared at home with the remainder of their meals being purchased ready-to-eat foods [40]. Lunch was the most frequently purchased meal and only 5% meals for supper were purchased food among the mothers [40]. Hiamey *et al.* [32] assessed the types and frequency of consuming street foods among adults at a major marketplace in the Central Region. Indigenous Ghanaian dishes were the most frequently purchased (up to 24% of study participants) ready-to-eat foods. Minimal purchase of snacks (including roasted or fried tubers or ripe plantain), fruits and sugar sweetened beverages was infrequently (less than 3% of participants) reported. Rice-based dishes were predominant. There was wide variability in frequency of consuming street foods ranging from a low of about once a week to 21 times in a week; consumption frequency was significantly higher for males (approximately 8 times a week) than females (approximately 6 times a week). Participants with tertiary education had lower average consumption frequency of ready-to-eat foods (about four times a week) than those with lower than tertiary education (about seven times a week).

Ogum-Alangea *et al.* [36] explored mid-morning break time (between 9:30 am and 10:30 am) food purchases among adolescent children attending public and private schools in urban and peri-urban communities in Accra [49]. Food purchases were made from school canteens (private schools), table-top vendors (public schools) and privately operated shops. Complete meals were most frequently purchased, with public school children (41%) more likely than private school children (28%) to purchase complete meals during mid-morning break time. Sugar sweetened beverages, pastries and fried foods constituted about 16%, 12% and 6% of children's purchases, respectively.

Types of foods consumed: Prevalence of consumption of various foods and or food groups were reported in some studies. Agbozo *et al.* [47] used a food frequency questionnaire to assess usual intakes from seven food groups (cereals and grains; roots tubers and plantain; animal products; vegetables; fruits; legumes nuts and oily seeds; and fats and oils) by elderly study participants in Accra. Wheat bread was the most consumed cereal-based food (78% of participants indicated eating bread daily). Corn was the next most common cereal consumed with 67% reporting consuming corn-based foods daily. In contrast more than 90% of rural women reported consuming cassava and corn-based foods daily while about 62% reported consuming bread daily. In both studies consumption of tomatoes, onions and pepper was daily by at least 95% of the participants. Fish was the most predominant ASF in diets of the adult

respondents; eggplant (garden eggs) consumption was reported by most mothers in rural Eastern region [40]. About one fourth of elderly participants also reported avoidance of cassava, snails, okro and beans. In the study by Nti [40], some mothers indicated that they never consumed cocoyam (4.5%), sweet potato (4.3%), millet (19.7%), soybean (21.3%), bamabara beans (71.4), neri or melon seeds (90.0), and snails (61.4%).

Ghose *et al* [30] assessed fruits and vegetables consumption of non-pregnant women of reproductive age using the 2008 Ghana Demographic and Health Survey and reported that only about 5% and 3% of women consumed at least five servings of fruits and vegetables respectively on a typical day. Urban women who consumed less than five servings of fruits or vegetables were six times more likely to be moderately or severely anemic, compared to those who consumed at least 5 servings a day. However, a similar association was not observed for rural women in the analysis. Amoateng *et al.* [31] also analyzed the 2008 DHS to explore dietary behaviours specific to fruits and vegetables consumption for a nationally representative sub-sample of 6,319 males and females aged 15 to 34 years. The findings showed gender, regional, religious and educational differences in fruits and vegetable consumption. Both males and females reported consuming an average of about 7 servings of vegetables a week. However, females consumed significantly more servings of fruit than males (8.2 versus 6.2 servings/week). The Upper West, Volta and Central Region participants consumed fewer servings of fruits and vegetables than those from other regions; participants from the Brong Ahafo region reported the highest average consumption (about 23 servings per week). Muslims had the highest consumption levels while Traditionalists consumed the lowest weekly servings of fruits and vegetables. There was a trend toward higher consumption levels with age. Formal education level was not associated with fruits and vegetables consumption in the general study population. However, among female participants higher education was associated with greater fruits and vegetables consumption. Overall, only about 7% of females and 4% of males aged 15-34 years consumed the recommended five servings of fruits and vegetables daily. In a cross-sectional study among rural women of reproductive age in selected communities in the Northern Region, the average frequency of vegetable consumption was about eight times a week and the average quantity consumed per day was 324 grams [50]. Ali and Abizari [34] found that Muslim religious fasting (during Ramadan), was associated with increased frequency of fruits and vegetables consumption, greater dietary diversity and reduced fast food intake during the fasting period.

Infant and young child feeding practices of caregivers of preschool age children:

The most recent Ghana demographic and Health Survey report shows that nationally, almost all women in Ghana breastfeed but only about half (52%) of mothers exclusively breastfeed with wide variability across regions and sociodemographic characteristics [5]. The analyses presented by the papers identified with content on this sub-theme focused on exclusive breastfeeding and complementary feeding practices and their associated determinants in different regions of the country. Additionally, other studies have reported that the prevalence of caregivers practicing exclusive breastfeeding (EBF) for 6 months ranged from approximately 28% among caregivers in the Northern Region study [44] to 71% from data captured in a health surveillance

system between 2011 and 2013 [51]. Factors associated with higher likelihood of mothers practicing EBF included caregivers older than 20 years, caregiver being unemployed, normal delivery, larger household size and having a male infant [42,44,51]. Relatedly, early introduction of fluids and food was a commonly identified suboptimal complementary feeding practice across the studies. Complementary feeding frequency was highlighted in one study [27]. Among rural Central Region mothers, the majority fed their children (<24 months) three to four times a day while about 18% reportedly fed children less than three meals and 7% fed more than four times a day. Armar-Klemensu *et al.* [25] reported that among rural mothers from Southern and Northern Ghana, cereal-based porridges dominated young children's complementary feeding diets, with the porridges being consumed daily [25]. However, after 12 months of age, indigenous foods become more common in the diet. Gyampoh *et al.* [45] found that only 42% of the diets of preschool age children attending growth monitoring sessions in Accra achieved the recommended minimum dietary diversity [45]. Issaka *et al.* [52] analysis of the 2008 DHS showed that the prevalence of achieving the minimum dietary diversity was significantly higher for children 12-17 months compared to children 6 to 11 months. Despite the practice of child-based ASF related taboos, mothers in the Upper East Region reported often feeding animal protein to their children. However key informants indicated that due to cost, very little ASF (mostly herrings) is included in food preparation to serve as flavouring. They also elaborated that beyond 36 months, children are unlikely to be given milk [16].

DISCUSSION

This rapid review aimed to synthesize available evidence on socio-cultural and dietary behaviours in the Ghanaian population to inform development of FBDGs for Ghana. The 39 studies included were in general evenly split across the two broad review themes, food-related beliefs and attitudes and dietary behaviours and practices. Overall, the studies reviewed showed high awareness and existence of food-related taboos, as well as cultural and individual attitudes and beliefs surrounding foods. However, the extent of their practice appears low among urban dwellers [11]. While the rural based studies did not distinguish between awareness and practice of food taboos there may be greater likelihood of their practice in rural areas due to enforcement by significant others such as parents and grandparents and a more traditional social environment than would be expected for urban areas. Prohibitions of nutrient-rich animal and plant sourced foods are of particular concern when targeted at pregnant women and young children who have higher nutrient needs. Fortunately, several of the ASF prohibited in pregnancy such as dog, cat or snake meat are not a major part of diets in the communities where they are consumed and therefore may have limited impact on pregnant women's actual intakes.

Potential negative nutritional impacts of pregnancy-based food prohibitions may be partly mitigated by the practice of encouraging pregnant women to consume energy and nutrient-dense food options. Promotion of energy-dense dishes during pregnancy and probably lactation may, however, inadvertently lead to excess weight gain, increasing risk of overweight and obesity. Onyango *et al.* [53] observed that while there was a general trend of postpartum weight loss among women who participated in the

World Health Organization Multi Centre Growth Reference study, the Ghanaian women lost weight only marginally or gained weight. This difference in outcomes was believed to be the result of culturally defined mother-care practices [53]. The practice of individual and cultural beliefs as well as seasonality were also implicated in suboptimal breastfeeding and complementary feeding practices.

With respect to dietary patterns, the studies reviewed covered adult, school age children, and preschool age children. These studies suggest that in the absence of resource constraints, a 3-meals a day eating pattern is commonly followed. Meal-skipping was reported among adolescents and school children with breakfast being the most skipped meal, although prevalence of daily breakfast consumption was high. Lack of money was often cited as the main reason for meal skipping. However, snacking was substantial in one rural study with information on snacking among school children where snacking was sometimes used to compensate meal skipping. Among complementary feeding children, feeding frequency ranged from less than 3 up to 4 meals a day with the majority of children being fed three times a day and almost one out of five children in the study population were fed less than 3 times a day. Suboptimal young child feeding frequency was reported in the most recent Demographic Health Survey [5]. The studies reviewed showed that although ready-to-eat foods are purchased, the majority of meals consumed by adults were home-prepared. Ready-to-eat food purchases by school children were primarily indigenous dishes. However, energy-dense food items such as sugar sweetened beverages and fried foods were also purchased.

Across all population groups studied in the selected papers, starchy staples and ASF were the most predominant food groups consumed, although quantities of ASF in household meals may be quite small. Consumption of fruits was consistently low across the different age groups studied. Possibly for young children, this may be influenced by misperceptions and or lack of knowledge about the need to include fruits in young children's diets.

Several socioeconomic and socio-cultural facilitators to healthy eating were gleaned from the studies. The key socioeconomic facilitators identified included adult and mothers' formal education or nutrition knowledge, which were associated with better personal food choices (higher diversity, less purchase of street foods) and child feeding practices [26,32,33,54,55] and income. Insufficient income was a major barrier to healthy eating by fostering unhealthy practices such as meal skipping among school children, and suboptimal infant and young child feeding practices [27,55]. Socio-cultural facilitators encompassed positive individual, cultural, and/or religious beliefs and practices, that fresh foods, minimally processed, and indigenous dishes are components of healthy diets. Religious fasting (Ramadan) was associated with better fruit and vegetable consumption.

This review has several weaknesses. Potentially relevant publications from grey literature and other data bases may have been missed by limiting the literature searches to peer-reviewed publications available through two electronic databases. Furthermore, most of the studies included in the review were carried out on small non-representative

populations and therefore diminishes the generalizability of the findings of these studies. However, the strength of the review is that the selected publications comprised studies carried out in multiple regions of the country that represent the country's major agro-ecological zones with a balance of both rural and urban based study populations.

CONCLUSION

The findings of this review provided a general sense of the food-related beliefs and practices of Ghanaians and can inform decisions on areas to emphasize in FBDGs and associated nutrition education messages to promote healthy diets in the Ghanaian population. Given the finding that level of education was associated with the practice of taboos that could be potentially harmful, nutrition education is needed to dispel misperceptions and support behaviour change towards healthy food choices. More intensive education may be needed in rural areas where harmful food-related beliefs and attitudes are more likely to be practiced. With respect to practices, emphasis needs to be placed on enhancing fruits and vegetables consumption as the review showed low intakes across all age groups.

Table 1: Characteristics of studies on food-related beliefs, attitudes and usual dietary behaviours in Ghana included in the rapid review organized by the broad review theme

Broad review theme	Study identifier	Type of study	Region of country	Type of locality	[Sample size] Study population
Food related knowledge, attitudes and beliefs influencing dietary behaviors	<i>I. Awareness and or practice of food related prohibitions or taboos (n=8)</i>				
	Gadegbeku <i>et al.</i> (2013)	Cross-sectional survey	Greater Accra	Urban	[200] Adult males and females
	Nti <i>et al.</i> (2002)	Cross-sectional/ qualitative	Greater Accra	Urban/rural	[30] Pregnant women
	de-Graft Aikins A. (2014)	Cross-sectional/qualitative	Greater Accra	Urban	[35] Adult women
	Otoo, P. <i>et al.</i> (2015)	Cross-sectional/qualitative	Western	Rural/urban	[64] Pregnant women and mothers
	Yakubu (2019)	Cross-sectional survey	Central	Rural	[107] Pregnant women
	Arzoaquoi <i>et al.</i> (2015)	Cross-sectional/ qualitative	Eastern	Rural	[155] Adult/elderly women and men
	Akolaa (2019)	Cross-sectional/mixed methods	Upper East	Rural	[400] Mothers [9] community opinion leaders (key informants)
	Nsiah-Amoah <i>et al.</i> (2020)	Cross-sectional/qualitative	Eastern	Rural	[78] Health workers
	<i>Food or diet-related attitudes or beliefs (n=8)</i>				
	Boatemaa <i>et al.</i> (2018)	Cross-sectional/ qualitative	Greater Accra	Urban	[30] Adolescents and adults
	Laar <i>et al.</i> (2017)	Ethnography	Brong Ahafo	Rural	[48] Mothers of children 6-59 months
	Otoo <i>et al.</i> (2009)	Cross-sectional/qualitative	Eastern	Peri-urban	[35] Lactating women
	Appoh and Krekling (2005)	Cross-sectional survey	Volta	Rural	[110] Mothers of children 10-36 months
	Armar-Klemesu <i>et al.</i> (2018)	Ethnography	Northern and Central	Rural	[80] Caregivers of children 6-23 months
	Egyir <i>et al.</i> (2016)	Cross-sectional/mixed methods	Central	Rural	[99] Mothers with children 4-24 months
	Colecraft <i>et al.</i> (2006)	Cross-sectional/ qualitative	Upper East, Brong Ahafo, Central	Rural	[172] Caregivers of children 2-5 years
	Christian <i>et al.</i> (2016)	Cross-sectional/baseline quantitative analysis	Upper East, Brong Ahafo, Central	Rural	[608] Caregivers of children 2-5 years old

Broad review theme	Study identifier	Type of study	Region of country	Type of locality	[Sample size] Population group
Dietary behaviours and practices	<i>Studies based on adults and mixed population (n=7)</i>				
	Abubakari and Jahn (2016)	Cross-sectional survey	Northern	Rural, peri-urban, urban	[578] Pregnant and lactating mothers
	Nti C. A (2008)	Cross-sectional survey	Eastern	Rural	[400] Mothers of young children
	Agbozo <i>et al.</i> (2018)	Cross-sectional survey	Greater Accra	Urban	[120] Elderly (60 – 70 years) persons
	Hiamey <i>et al.</i> (2013)	Cross-sectional survey	Central	Urban	[220] Adult men and women
	Ghose <i>et al.</i> (2018)	Secondary analysis of national data (DHS)	National	Rural, peri-urban, urban	[4290] Non-pregnant women
	Amoateng <i>et al.</i> (2017)	Secondary analysis of national data (DHS)	National	Rural, peri-urban, urban	[6139] young people
	Azupogo <i>et al.</i> (2018)	Cross-sectional survey	Northern Region	Rural	[189] Women of reproductive age
	<i>Studies based on children and adolescents attending Junior High School (JHS) or Senior High School (n=7)</i>				
	Doku <i>et al.</i> (2013)	Cross-sectional survey	Eastern, Volta, Greater Accra	Rural, urban	[1195] Children in private and public JHS
	Ali and Abizari (2018)	Prospective	Northern	Urban	[366] Children in public JHS
	Abizari and Ali (2019)	Cross-sectional survey	Northern	Urban	[366] Children in public JHS
	Intiful and Lartey (2014)	Cross-sectional survey	Eastern	Rural	[359] Children in public JHS
	Nti <i>et al.</i> (2012)	Cross-sectional survey	Greater Accra	Urban	[313] Children in public and private SHS
	Abiba <i>et al.</i> (2012)	Cross-sectional survey	Northern	Urban	[100] Upper primary school children
	Ogum-Alangea <i>et al.</i> (2020)	Cross-sectional survey	Greater Accra	Urban	[644] Junior high school pupils
	<i>Studies based on Infant and young child feeding (n=7)</i>				
	Yeboah <i>et al.</i> (2019)	Cross-sectional survey	Ashanti	Urban	[170] Lactating mothers of children 6-24 mos
	Manyeh <i>et al.</i> (2020)	Secondary analysis of District Health Surveillance System	Greater Accra	Urban	[1870] Mothers

	Nukpezah <i>et al.</i> (2018)	Cross-sectional survey	Northern	Urban	[393] Lactating mothers with children 6 to 24mos
	Gyampoh <i>et al.</i> (2014)	Cross-sectional survey	Greater Accra	Urban	[199] Mothers with children < 5 years
	Issaka <i>et al.</i> 2015	Secondary analysis of national data (DHS)	National	Rural, urban	[822] Caregivers of children 6-23 months
	Armar-Klemesu <i>et al.</i> (2018)	Cross-sectional/ethnographic	Northern and Central	Rural	[80] Caregivers of children 6-23 months old
	Egyir <i>et al.</i> (2016)	Cross-sectional/mixed methods	Central	Rural	[99] Mothers with children 4-24 months
3. Facilitators and barriers to healthy eating	Amugsi <i>et al.</i> 2016	Secondary analysis of national data (DHS)	National	Rural. urban	[2262] Women 15-49 years
	Armar-Klemesu <i>et al.</i> 2000	Cross-Sectional survey	Accra	Urban	[479] Women
	Nyantakyi <i>et al.</i> 2015	Cross-sectional survey	Accra	Urban	[172] Women

Table 2: List of foods prohibited or encouraged during pregnancy across reviewed studies in Ghana

Foods prohibited	<i>Animal source foods</i>
	Snail
	Rat
	Snake
	Animal lungs
	Crab
	Snake fish
	Mud fish
	Eggs
	<i>Plant source foods</i>
	Red millet
	Bambara beans
	Groundnuts
	Okro
	Cassava
	Sweet potatoes
	Ripe plantain
	Banana
	Sugarcane
	Pineapple
	<i>Whole recipes</i>
	Groundnut soup
	Fufu
	Corn dough porridge
Foods prescribed or encouraged	Palm soup
	Kontomire stew with agushie
	Beans stew
	Banku
	Fufu
	Abeduru
	Keta school boys (anchovies)

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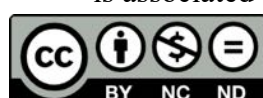
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