

Ghanaian Nurses' Nutrition and Young Child Feeding Education:
A Need for Further Education

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Authorization to Submit Thesis

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Abstract

Nurses often serve as nutrition and young child feeding (YCF) educators in Ghana. This study examined the education, training, and understanding of nurses in the Komenda-Edina-Eguafo-Abrem (KEEA) region's public health clinics, and how they served as educators for Ghanaian mothers and caregivers with children 0-5 years of age.

Nurses (n=41) from 12 clinics were purposefully recruited, and participated in interviews (n=21) following a structured questionnaire of closed-ended and open-ended questions with probes. Responses were audio recorded, transcribed, and content analyzed to identify major themes.

Nurses reported confidence (98%) providing iron deficiency anemia, hygiene, and infant and YCF education, and correct basic nutrition and YCF knowledge. Perceived barriers in disseminating information were identified, and education effectiveness evaluated through children's health status. Education and knowledge of YCF beyond complementary feeding was generally absent. Nurses' desire for in-depth nutrition knowledge and YCF practices was reported, indicating a need for further education.

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Dedication

To my father, for his unwavering support and dedication to me and all my life's paths.

Your quiet love and loyalty to the people and places you care for and protect are the foundation on which I was built. I am grateful for the solid footing.

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List of Abbreviations

AAP	Academy of Pediatrics
BMI	Body Mass Index
CDC	Centers for Disease Control
CF	Complementary Feeding
CFs	Complementary Foods
CWC	Child Welfare Clinic
FAO	Food and Agriculture Organization
GDHS	Ghana Demographic and Health Survey
GSS	Ghana Statistical Service
IYCF	Infant and Young Child Feeding
KEEA	Komenda-Edina-Eguafo-Abrem
MDGs	Millennium Development Goals
WHO	World Health Organization
YCF	Young Child Feeding

Chapter One

Introduction

Malnutrition is a global concern (UNICEF, 2013). Malnutrition includes conditions of both undernutrition, such as stunting and wasting, and overnutrition, such as overweight and obesity (UNICEF, 2015). The UNICEF-WHO-World Bank Group *Malnutrition Report* estimated that 667 million children under five years of age resided in the world, and of that population, 159 million (24%) were stunted, 50 million (7%) were wasted, and 41 million (6%) were overweight (UNICEF, 2015). Africa has seen slow progress to reduce stunting, with the majority of the world's stunted children living in Sub-Saharan Africa (UNICEF, 2013). Furthermore, the rise of overweight children has continued to climb, globally and in Sub-Saharan Africa (UNICEF, 2015). Currently in Ghana, an estimated 11% of children under five years of age are underweight, 19% are stunted, 5% are wasted (GSS, 2015), and approximately 3% are considered overweight (WHO, 2015b). Ghana also is off track to meet the 2025 WHO Global Nutrition Targets and the UN Millennium Development Goals (UN, 2015; WHO, 2014).

Malnutrition is influenced by a variety of factors including nutrition, child feeding practices, economics, and environment, such as sanitation and clean water (GSS, 2015; Wuehler, Hess, & Brown, 2011). Poor nutrition and improper infant and young child feeding practices, such as brief durations of breastfeeding (or lack thereof) and early initiation of complementary feeding, have been linked to child mortality and morbidity in Sub-Saharan Africa, and in Ghana (GSS, 2015; WHO, 2003a; WHO, 2003b; Wuehler, Hess, & Brown, 2011).

Starting at conception and continuing throughout life, nutrition impacts growth and development (Savage, Fisher, & Birch, 2007). Exclusive breastfeeding to six months of age, introduction of complementary foods at six months of age, access to and adequate intake of a variety of safe and nutritious foods, and supportive child feeding practices reduce malnutrition (Anzman, Rollins, & Birch, 2007; WHO, 2003b; Wuehler, Hess, & Brown, 2011). As parents and caregivers have lifelong influences on children's understanding of nutrition, selection of healthy food, and establishment of healthy eating habits (Branen & Fletcher, 1999), it is important parents and caregivers receive adequate nutrition and young child feeding information from knowledgeable educators. Negative health outcomes can precipitate from food and nutrition misinformation (Ayoob, Duyff, & Quagliani, 2002; Kris-Etherton, et al., 2014).

In Ghana, public health nurses often serve as nutrition and child feeding educators (Aidam, Perez-Escamilla, Lartey, & Aidam, 2005; Egyir, Ramsay, Bilderback, & Safaii, 2016). However, many nurses do not have the nutrition and young child feeding knowledge needed for this role (Alles, et al., 2013; Kgaphola, Garrison, & Wodarski, 1997; Kris-Etherton, et al., 2014). This lack of knowledge can lead to poor nutrition and young child feeding practices (Alles, et al., 2013; Kris-Etherton, et al., 2014; Kruger & Gericke, 2003). Furthermore, nutrition and child feeding practices suffer when mothers and caregivers are not provided with adequate and accurate nutrition and young child feeding information (Alles, et al., 2013; Lartey, 2008).

Increased training of health care workers enhances the knowledge of both the health care workers and of their patients (Pedersen, Tewes, & Merete Bjerrum, 2011). Additionally, improved nutrition training of nurses not only increases their knowledge and awareness of

malnutrition, but also positively changes their attitudes towards the children and families who suffer from this condition (Puoane, Sanders, Ashworth, & Ngumbela, 2006).

As nurses are often in key positions to provide health-supportive nutrition and child feeding education (Ilmonen, Isolauri, & Laitinen, 2012; Wuehler, Hess, & Brown, 2011), they must maintain current nutrition and young child feeding knowledge to effectively and accurately convey information to patients (Kris-Etherton, et al., 2014). Also, nurses must have the resources to educate their patients in a manner that takes cultural influences, levels of learning, and economics into account (Lartey, 2008).

A paucity of research exists investigating how to educate Ghanaian mothers to successfully offer healthy food to their children, and how to encourage young children to eat as part of a positive feeding relationship. A lack of research also exists in how to continually educate nurses in developing countries in the area of nutrition and young child feeding. Nurses need education on how to effectively communicate nutrition and young child feeding information in a manner the population can understand and implement with limited resources. Finally, while global organizations and local surveying agencies gather health indicator data on children 0-5 years of age, such as underweight, stunting, wasting, and overweight (GSS, 2015; UN, 2015; WHO, 2015b), most currently published research on nutrition and young child feeding practices focuses on children 0-2 years of age, and not the formative years of two to five (Gyampoh, Otoo, & Aryeetey, 2014; Nti & Lartey, 2007a; Nti & Lartey, 2007b; Pelto & Armara-Klemesu, 2011; Wuehler, Hess, & Brown, 2011). Further research is needed to explore the nutrition and young child feeding knowledge of international health care workers, such as nurses, who provide education to caregivers of children 2-5 years of age.

Problem Statement

As nurses serve as the primary source of nutrition and young child feeding information in many health care settings throughout the world, and particularly in the public health clinics in the KEEA region of Ghana, a greater understanding of their past education and current knowledge levels of nutrition and young child feeding may provide insight to improve factors influencing malnutrition, as well as give insight on how best to provide accurate and implementable nutrition and young child feeding information to combat it. Rates of malnutrition and its influencing factors have been documented, however, additional research is needed to understand how populations are obtaining their nutrition and young child feeding information and the impact those sources have on health outcomes.

Statement of Purpose

The purpose of this qualitative study was to examine the nutrition and young child feeding knowledge and education of Ghanaian nurses and how they served as educators to provide Ghanaian mothers and caregivers information on nutrition and young child feeding. To further define the purpose, six objectives were identified: 1) whether the nurses received education in nutrition and young child feeding practices; 2) the amount and type of education received; 3) if the nurses maintained their nutrition and young child feeding knowledge; 4) whether they educated patients about nutrition and young child feeding; 5) their confidence in providing nutrition and young child feeding education; and 6) the limitations and challenges to providing nutrition and young child feeding education.

Research Question

What is the level of knowledge and amount of education regarding nutrition and young child feeding practices among nurses in public health clinics of the Komenda-Edina-

Eguafo-Abrem (KEEA) region in Ghana, Africa, and how are the nurses serving as educators to the clinics' patients with children 0 to 5 years of age?

Significance of Study

Previous research on the nutrition and young child feeding education of Ghanaian health care workers, particularly nurses, identified health care workers as the primary sources of nutrition and young child feeding information (Aidam, Pérez-Escamilla, & Lartey, 2005; Egyir, et al., 2016). Additionally, previous research identified that many health care workers reported they do not receive adequate nutrition and young child feeding education while in school, or in continuing education (Ilmonen, et al., 2012). As nutrition and young child feeding practices influence health outcomes (Anzman, et al., 2007; Birch & Dietz, 2008), a greater understanding of the relationship among nutrition and young child feeding education and how it is disseminated and imparted to patients at the KEEA region health clinics provides valuable information for public health campaigns and future nutrition-related interventions in this region. Understanding the source and foundation of health knowledge can help global organizations target funding and resources to improve the health and well-being of the population.

Definition of Terms

Authoritarian feeding style:

Using the restriction of food, force, and coercion to persuade a child to eat (Fletcher, Branen, & Lawrence, 1997).

Authoritative feeding style:

A cooperative feeding environment whereby adults choose when to eat and what foods will be offered, while children decide how much to eat based on internal satiety cues (Fletcher, et al., 1997; Satter, 1987).

Complementary feeding:

The introduction of solid foods, typically around 4-6 months of age (AAP, 2012).

Exclusive breastfeeding:

Feeding an infant only breast milk, i.e. no additional food or water, typically recommended until an infant is 6 months of age to achieve optimal growth and development (WHO, 2003b).

Feeding style:

Parent-child interactions during mealtimes ranging from responsiveness to demandingness that indicate the distribution of control of feeding practices (Fletcher, et al., 1997).

Focal person:

The individual who serves as the point of contact in the visiting country. The focal person is in frequent communication with the primary researcher, and identifies the resources and participants needed to successfully complete the research.

Health care worker:

Any person involved with promoting and enhancing the health of a community (WHO, 2006).

Malnutrition:

Poor diet quality leading to both undernutrition and overnutrition due to deficiencies and/or excesses in macro- and micronutrients (UNICEF, 2015).

Overnutrition:

An excessive consumption of nutrients often leading to conditions of overweight and obesity (UNICEF, 2015).

Parenting style:

A set of attitudes and expressed beliefs towards the child that creates an emotional environment (Darling & Steinberg, 1993).

Permissive/indulgent feeding style:

The neglecting of children during mealtimes, and/or allowing children to determine the feeding environment, i.e. when and where to eat (Fletcher, et al., 1997; Satter, 1987).

Responsive feeding:

The interaction between infants, young children, and caregivers during mealtimes that focuses a caregiver's attention and interest on child feeding, allows the child to communicate his/her needs, and allows the child to progress towards independent feeding (Black & Aboud, 2011).

Undernutrition:

A lack of consumption of nutrients often leading to conditions of stunting, wasting, and sometimes death (WHO, 2014).

Limitations

Use of interviews inherently presents a limitation, as the participants' responses are their recollections of prior nutrition and young child feeding education and how it is imparted to caregivers of young children. However, previous research in nurses' recollections of nutrition education has been reported (Johansson, Nyirenda, Johansson & Lorefalt, 2011).

The participant sample was a purposive sample of Ghanaian nurses employed at twelve public health clinics in the KEEA region of Ghana. While the sample of nurses was selected to build on a previous study (Eygir, 2015), they remain a convenience sample, and thus, the results of this study cannot be inferred to nurses in other regions of Ghana, or nurses in other countries. Furthermore, 75% of participants were of the Akan tribe, which may limit the generalizability of the results to other ethnic groups, i.e. Ewe, Nzema, Ga, etc., within Ghana. It should be noted, however, that the Akan tribe is the primary tribe of the Cape Coast region of Ghana (GSS, 2015).

A further limitation is that the interviews were conducted in English and not in the primary language of many of the nurses, which may have inhibited some nurses from fully expressing themselves due to limited language abilities. Additionally, some nurses did not understand all interview questions and/or probes, which was evident in non sequitur responses. Other nurses present during the interviews often clarified misunderstandings in the native dialect, however, the primary investigator was unable to confirm the accuracy of any dialectal translations. If a question or probe was not understood after two to three repetitions, the primary investigator proceeded to the next interview question.

Finally, the study was originally intended to be conducted as one-on-one interviews; however, due to time constraints and the comfort level of some nurses, it became necessary to

conduct many interviews in group settings of 2-4 nurses. The group interview atmosphere could have limited some nurses' opportunity to express opinions or knowledge of nutrition and young child feeding, and also could mask some nutrition and young child feeding beliefs.

Summary

Nurses often serve as the primary educators in health care settings (Ilmonen, et al., 2012); however, many nurses report they do not receive adequate nutrition and young child feeding education (Ilmonen, et al., 2012; Johansson, et al., 2011; Touger-Decker, Barracato, & O'Sullivan, 2001). A lack of research exists regarding how nurses can best serve as nutrition and young child feeding educators, particularly in developing countries. The purpose of this study was to examine the nutrition and young child feeding knowledge and education of Ghanaian nurses and how the information is disseminated to patients and caregivers of young children. The first chapter provides an introduction, problem statement, purpose statement, research question, significance of study, definition of terms, and limitations of the study. The second chapter reviews the available literature on global malnutrition, how it is influenced by breastfeeding, complementary feeding, iron deficiency, sanitation practices, and young child feeding practices, as well as how nurses are currently serving as nutrition and young child feeding educators. The third chapter is written in journal-style format and includes an introduction, the methodology, the results, the discussion, and implications from this research.

Chapter Two

Literature Review

Many dietary patterns are adopted in childhood (Anzman, Rollins, & Birch, 2010; Savage, Fisher, & Birch, 2007). Parents and caregivers have lifelong influences on children's understanding of nutrition, selection of healthy food, and establishment of healthy eating habits by modeling good nutrition and using appropriate feeding practices (Branen & Fletcher, 1999). Negative health outcomes can precipitate from food and nutrition misinformation (Ayoob, Duyff, & Quagliani, 2002; Kris-Etherton, et al., 2014).

Fautsch Macías and Glasauer (2014) posit that merely having access to healthy food, both geographically and economically, is not enough. Identifying the knowledge, access, and factors influencing eating habits are important for the well-being of the individual, the family, and community, and can provide answers to bettering the global malnutrition condition (Fautsch Macías & Glasauer, 2014). Health care workers are prominent and important sources of nutrition and feeding information (De Almeida, 1997), and must remain current on nutrition education in order to effectively and accurately convey information to patients (Kris-Etherton, et al., 2014).

In Ghana, the major source of health information is the health care worker (Gyampoh, Otoo, & Aryeetey, 2014; Nti, Hagan, Bagina, & Seglah, 2011; Peltó & Armar-Klemesu, 2011). In the Komenda-Edina-Eguafo-Abrem (KEEA) region of Ghana, most mothers, who are the caregivers preparing the family's food (Nti, et al., 2011), receive their education about nutrition and young child feeding from the nurses of the local health clinics (Egyir, Ramsay, Bilderback, & Safaii, 2016).

This study aims to understand the nutrition and young child feeding education, training, and understanding of the nurses in the health clinics of the KEEA region of Ghana, and how they served as educators to provide health information to Ghanaian mothers and caregivers on nutrition and young child feeding. With this information, a greater understanding of the education of Ghanaian nurses and its impact on nutrition and young child feeding can be established to support optimal growth and development of young children.

This literature review begins with an overview of the factors influencing malnutrition in Ghana, including undernutrition, overnutrition, breastfeeding and complementary feeding, iron deficiency anemia, and sanitation practices. This discussion is followed by information on parent feeding styles, their influences, and the impacts on nutrition and young child feeding education. Specifically, an explanation of parental feeding models will be provided, along with an explanation of how culture, food insecurity, and the nutrition status and knowledge of primary caregivers influences child feeding practices. Lastly, the need for nutrition and young child feeding knowledge among health care workers, as well as how they are serving as health educators, will be presented.

Factors Influencing Malnutrition in Ghana

Malnutrition is a global nutrition epidemic that results in conditions of both underweight and overweight. The World Health Organization (WHO) aims to progress both developed and developing countries towards more sustainable societies through prioritizing various health-related goals (WHO, 2014). WHO developed Global Nutrition Targets 2025 as objectives for necessary actions countries must take to combat malnutrition (WHO, 2014). The six targets include reducing under-five stunting by 40%, reducing iron deficiency anemia

in women of reproductive age by 50%, reducing low birth rates by 30%, preventing increases in child overweight, a 50% increase in rates of exclusive breastfeeding, and reducing or maintaining childhood wasting to less than 5% (WHO, 2014). Progress to meet these goals is off-track both globally and in Ghana (WHO, 2014; WHO 2015a).

Additionally, the United Nations Millennium Development Goals (MDGS) have been internationally instigated to track progress on a number of health, social, and climate-related priorities (UN, 2015). In total, eight goals were identified. Millennium Development Goal 4 called for reducing by two-thirds the infant and under-five mortality rate by 2015 (UN, 2015). While infant mortality rates have been decreasing in Ghana, the country did not meet this MDG (GSS, 2013). Millennium Development Goal 5 called for reducing the maternal mortality ratio by three-quarters by 2015 (UN, 2015); Ghana also did not meet this goal (GSS, 2013). However, Ghana did achieve Millennium Development Goal 7 as half the population has access to improved water sources, though this does not necessarily signify the water sources provide clean water (GSS, 2013).

The World Health Organization uses a number of indicators to evaluate the overall nutrition and health-related aspects of a country and track progress towards the 2025 goals (WHO, 2015a). These indicators include the initiation and duration of exclusive breastfeeding, appropriate complementary feeding practices including an acceptable and diverse diet, iron deficiency anemia prevalence in both women of reproductive age and children, rates of stunting, wasting, undernutrition, and overnutrition in both mothers and children, and access to clean water to prevent diarrhea and other communicable diseases (WHO, 2015a). The following sections will summarize Ghanaian current rates in the above-

mentioned topics, as well as how these health indicators influence nutrition status and child feeding practices, and the impact of health workers and education on health outcomes.

The prevalence of overnutrition in Ghana. Approximately 3% of Ghanaian children under five years of age are considered overweight (WHO, 2015b). While this is a decrease from 2008 rates (WHO, 2015b), female adult rates of overweight and obesity continue to rise. As of 2014, forty percent of Ghanaian adult females aged 18-49 years were reported to be overweight or obese, compared to 30% in 2008 (GSS, 2009; GSS, 2015).

Rates of noncommunicable diseases, such as obesity, in developing countries, are rising partly due to Western influences of globalization and urbanization (Popkin, 2001; Scott, Ejikeme, Clottey, & Thomas, 2013). Changes in diet and lifestyle due to large populations moving to urban areas with greater access to food are having negative effects on the health of developing countries, such as sedentary lifestyles and poor eating habits (WHO, 2002).

An increasingly common occurrence is for overweight adults, particularly mothers, to coexist in the same household with stunted children (Lee, Houser, Must, Palma de Fulladolsa, & Bermudez, 2010; Popkin, 1994; Tebekaw, Teller, & Colón-Ramos, 2014). This coexistence has been termed the “Double Burden” (Popkin, 1994). Whereas in the past, developing countries have been preoccupied with mortality rates of infectious diseases and undernutrition (Chopra & Darnton-Hill, 2006), now, greater attention is focused on preventing overnutrition (WHO, 2014). A shift in nutrition education is taking place in order to prepare health care workers to prevent and treat conditions of both over- and undernutrition (Chopra & Darnton-Hill, 2006; Chopra, Galbraith, & Darnton-Hill, 2002). Promoting good nutrition and supportive child feeding practices is needed for children to attain optimal growth and development, without excessively increasing waistlines (UNICEF, 2013).

The prevalence of undernutrition in Ghana. Sub-Saharan Africa is one of the few regions with the highest incidence of undernutrition in the world. An estimated 40% of children under five years of age in multiple sub-Saharan countries show degrees of stunting and 10% are wasted (UNICEF, 2013). In Ghana, an estimated 11% of children under five years of age are underweight, 19% are stunted, and 5% are wasted (GSS, 2015). Poor nutrition in infancy and early childhood can have lifelong health impacts (Hoddinott, et al., 2013). Improper infant and young child feeding practices, such as brief durations of breastfeeding (or lack thereof) and early initiation of complementary feeding, have been linked to child mortality and morbidity in Sub-Saharan Africa, and in Ghana (GSS, 2015; WHO, 2003a; WHO, 2003b; Wuehler, Hess, & Brown, 2011).

Feeding practices during infancy and early childhood. Starting at conception and continuing throughout life, nutrition impacts growth and development (Savage, et al., 2007). As eating behaviors and feeding patterns are developed in childhood (Savage, et al., 2007), caregivers must cultivate healthy feeding relationships with their children (Black & Aboud, 2011). *In utero*, the nutrients available via the maternal diet shape fetal growth (Anzman, et al., 2010), and poor maternal nutritional status during pregnancy has been associated with malnutrition later in life (Anzman, et al., 2010). Breastfeeding and complementary feeding are ideal opportunities to begin appropriate young child feeding practices (Savage, et al., 2007), develop food preferences (Sullivan & Birch, 1994), increase exposure to a variety of foods (Birch, Gunder, Grimm-Thomas, & Laing, 1998), and ultimately create healthy eating habits among children and caregivers alike (Black & Aboud, 2011).

Breastfeeding. In Ghana, public health nurses are the primary breastfeeding educators (Aidam, et al., 2005). Accessible and informed nurses are important resources to teach

exclusive breastfeeding to Ghanaian mothers of all socioeconomic backgrounds (Aidam, et al., 2005). Ghanaian mothers who receive lactation education by trained counselors, such as nurses and nutritionists, are more likely to exclusively breastfeed (Aidam, Perez-Escamilla, & Lartey, 2005). The advice of healthcare professionals is why some mothers choose to discontinue breastfeeding (Alles, et al., 2013).

Breastfeeding rates. The World Health Organization and the American Academy of Pediatrics recommend exclusive breastfeeding for the first six months of life (AAP, 2012; WHO, 2015a). However, worldwide only 40% of infants are fed in accordance with this guideline (WHO, 2015a). Breastfeeding rates in Ghana surpass those of the United States (CDC, 2014; GSS, 2015). Ninety-eight percent of infants are breastfed at some point in the first two years of life in Ghana (GSS, 2015), compared to 79.2% in the United States (CDC, 2014). Fifty-six percent of Ghanaian infants are breastfed within an hour of birth and 87% are breastfed within the first day of life (GSS, 2015). Fifty-two percent of all infants under six months are exclusively breastfed, 95% of infants continue breastfeeding, alongside complementary feeding, to one year of age, and 50% continue to breastfeed at two years of age (GSS, 2015). In the United States, 27% percent of children are still breastfeeding at one year (CDC, 2014).

Benefits of breastfeeding. The initiation and duration of breastfeeding is fundamental to improving health outcomes of infants and young children (WHO, 2003b). Breastfeeding provides infants with essential nutrients (AAP, 2012; WHO, 2003b) and immunological support (Fields, 2005). Infants who are breastfed, and particularly those that are breastfed for at least six months, experience illnesses less frequently and in shorter durations than non-breastfed infants (AAP, 2012), have a lower risk of infant morbidity and mortality (WHO,

2003b), and have less risk of malnourishment (WHO, 2003b). Breastfed infants in developing countries experience diarrhea less frequently than non-breastfed infants, which is attributed to less exposure to non-treated water typically used in formula preparation and in the washing of feeding utensils (i.e. bottles) (WHO, 2003b). In Ghana, the majority of children experiencing diarrhea do so after being weaned from the breast (GSS, 2015). Additionally, breastfed infants tend to have a lesser risk of obesity and overweight (CDC, 2011), exemplified by lower BMIs as older children and adults (Parikh, et al., 2009).

Breastfeeding practices. Region of residence, place of birth, and size of infant predict exclusive breastfeeding practices in Ghana (Tampah-Haah & Kumi-Kyereme, 2013). Mothers residing in the Volta region of Ghana, mothers who give birth in government health facilities, and mothers who give birth to average-sized infants were more likely to exclusively breastfeed than mothers residing in other regions of Ghana, birthing at home, or birthing small or large-sized infants (Tampah-Haah & Kumi-Kyereme, 2013). Interestingly, the authors posit that in many areas of Ghana, not including the Volta region, it is cultural practice to give infants water when perceived as dehydrated or “as a sign of welcoming them into the world” (Tampah-Haah & Kumi-Kyereme, 2013, p. 3), which may contribute to the country’s lower rates of exclusive breastfeeding to six months of age.

Breastfeeding and influences on child feeding practices. Breastfeeding is both a method of food discovery for infants, and marks the beginning of child feeding practices (Savage, et al., 2007). The maternal diet during pregnancy and breastfeeding influences infant food preferences, as flavors are absorbed through amniotic fluid and breast milk (Savage, et al., 2007). This passage of flavor profiles through breast milk helps breastfed infants more readily accept new foods than non-breastfed infants (Sullivan and Birch, 1994).

Thus, culturally preferred flavors that are commonly present in breast milk can predispose infants to consume a culturally-influenced diet (Savage, et al., 2007).

Breastfeeding also allows infants to learn on-demand feeding (Black and Aboud, 2011). Mothers who practice responsive feeding, that is responding to infants' needs promptly and in a supportive manner, tend to have infants who are more attentive and interested in feeding, are more able to respond to their initial hunger and satiety cues, and communicate their feeding needs successively with caregivers (Black and Aboud, 2011). The early learning of self-regulation by both caregivers and infants has been linked to healthier eating practices and a more successful transition to complementary feeding (Black and Aboud, 2011).

Complementary feeding. The World Health Organization prioritizes healthy feeding as one of the most important factors in optimum health (WHO, 2003a), and prioritizes appropriate complementary feeding practices as necessary to maintain optimal nutrition status (WHO, 2003b). In developing countries with high rates of stunting and wasting, proper complementary feeding practices help ensure child survival, as children who are not appropriately fed experience higher morbidity and mortality (WHO, 2003b). Ghana implemented the World Health Organization's Global Strategy for Infant and Young Child Feeding, which recommends the introduction of solid foods at six months of age (complementary feeding), and to continue alongside breastfeeding up to two years of age (GSS, 2015). Improper complementary feeding has been found to increase incidence of stunting and wasting in developing countries (Kumar, Goel, Mittal, & Misra, 2006), as well as increase the risk of childhood obesity when children are introduced to solid foods prior to four months of age (Huh, Rifas-Shiman, Taveras, Oken, & Gillman, 2011).

Complementary feeding rates. An average of 73% of breastfed Ghanaian infants have begun a diet of complementary foods by six to nine months of age (GSS, 2015). Thirteen percent of Ghanaian children between six and twenty-three months of age are fed the minimum acceptable complementary foods, and less than half (43%) are fed the minimum number of times per day (4-5 meals and 1-2 snacks) (GSS, 2015). Children living in urban, wealthy households have the highest rates of minimum acceptable foods, diet diversity, and are more commonly fed the minimum number of times per day (GSS, 2015).

Initiation of complementary feeding. As the nutrients in breast milk become insufficient to meet a growing child's needs and a child is developmentally ready, complementary feeding is necessary (Butte, et al., 2005). Feeding cues, such as a child's interest in family foods, and physical signs such as sitting up independently and a child's ability to hold his/her mouth open when a spoon or other feeding utensil approaches, indicate that a child may be ready for complementary feeding (Butte, et al., 2005). These signs typically occur between four and six months of age (AAP, 2012). Children whose caregivers practice responsive feeding are often more able to develop healthy relationships with food and feeding, such as acquiring appropriate and safe feeding skills, independently eating, and being aware of the feeding environment (Butte, et al., 2004). Also, with the development of a healthy feeding relationship, caregivers and children are able to experience and implement the Division of Responsibility: caregivers decide what foods to offer children and at what time, and children decide how much of the offered food to eat (Satter, 1987).

Complementary foods. Complementary feeding is a chance to expose children to a variety of foods, flavors, and textures, as well as meet their nutrient needs (Butte, et al, 2005). It also is an opportunity for greater diet diversity and further development of food preferences

(Anzman, et al., 2010). The variety of foods found in diverse African diets can provide adequate nutrition (Onayango, 2003). Exposing children to multiple foods has been shown to increase their liking and intake of a variety of foods, which enhances their chances of meeting the minimum nutrient requirements in the diet (Arimond, & Ruel, 2004).

Culture influences what and how complementary foods are introduced (Savage, et al., 2007). In Ghana, the most commonly introduced complementary foods are grains (GSS, 2015), generally in the form of infant cereal (Pelto & Armar-Klemesu, 2011). The infant cereal is either a ready-prepared brand such as Nestlé's Cere-lac, or a local recipe such as *koko*, a ground porridge made of millet, maize, or cassava (Pelto & Armar-Klemesu, 2011).

Complementary feeding influences. Qualitative studies of the knowledge systems and beliefs of Ghanaian mothers surrounding complementary feeding revealed influential determinants as nurturance, cost, and time (Egyir, et al., 2016; Pelto & Armar-Klemesu, 2011). Ghanaian mothers prefer feeding healthy foods to their children, however, the nurturance of children with healthy foods is difficult due to the constraints of time and cost (Egyir, et al., 2016; Pelto & Armar-Klemesu, 2011).

Health care workers and infant and young child feeding. The role of health care workers in the promotion of breastfeeding and intakes of nutritious complementary foods through appropriate feeding practices is important to adequately support nutrition and health in infants and young children (AAP, 2012; Anzman, et al., 2010; WHO, 2003b; WHO, 2014). To achieve this in developing countries such as Ghana, health care workers must have accurate and current infant and young child feeding information (WHO, 2003b). As nurses are the most common sources of infant and young child feeding information in Ghana (Egyir,

et al., 2016), it is necessary that nurses receive and impart both the knowledge and skills necessary to support caregivers in attaining healthy children.

Iron deficiency anemia. By WHO estimates, roughly 2 billion people worldwide suffer from anemia. In developing countries, approximately 50% of pregnant women and 46% of preschool children are anemic (WHO, 2015c). Sixty-six percent of children under five years of age are anemic in Ghana (GSS, 2015), and Ghana is not meeting WHO 2025 targets of reducing iron deficiency anemia in women of reproductive age (WHO, 2015b), as 42% of women of reproductive age are anemic (GSS, 2015).

Causes and consequences of iron deficiency anemia. The foremost causes of anemia in developing countries are low dietary iron intakes, malaria, worm infections, and infectious diseases (WHO, 2015c). The main consequences of iron deficiency anemia are mental and cognitive impairments, child morbidity, and adult reduced ability to work (WHO, 2015c). While the Ghana Demographic Survey found that approximately 70% of children under 5 consumed an iron-rich food in the 24 hours preceding the survey (GSS, 2015), data on quantity of iron-rich foods was not measured, nor was dietary intake measured over time.

Combating iron deficiency anemia. The World Health Organization recommends combating anemia with a multi-faceted approach. WHO data indicates that increasing intakes of iron-rich foods and iron-absorption-enhancing foods, preventing other micronutrient deficiencies such as Vitamin A, folate, and B12, iron food fortification and supplementation, and controlling infections such as hookworm and malaria, are the most effective approaches to preventing iron deficiency anemia in developing countries (WHO, 2015c). Currently in Ghana, health care workers receive education on how to prevent and treat iron deficiency anemia in children and women of reproductive age (GSS, 2015).

Sanitation practices. Drinking or using water from contaminated water sources is the leading cause of diarrhea in developing countries (WHO, 2015b). Diarrhea is a major concern in Ghana as it is the leading cause of child morbidity and mortality (GSS, 2015). Studies show that suffering from chronic enteric infections, which cause diarrhea, causes chronic malabsorption of nutrients (DeBoer, et al, 2012). Malabsorption of nutrients can lead to a state of chronic malnutrition, such as stunting and wasting (Guerrant, Oria, Moore, & Lima, 2008). The following sections will discuss Ghanaian access to clean water and toilet facilities, as well as barriers to proper hand washing.

Water and toilet facilities. Access to safe and clean drinking water and sanitation facilities continues to be limited in Ghana (GSS, 2009; GSS, 2015). Sixty percent of Ghanaian households access water from an improved source such as a community tap, well, or piped-in water to private dwellings; 30% of Ghanaian households depend on sachets or bottled water; and 10% of Ghanaian households are reliant upon unimproved water sources (GSS, 2015). Poor access to clean water leads to a large percentage of the population regularly using unsafe water sources (WHO, 2015b). The majority of Ghanaians are able to access water in 0-30 minutes; however, a reported 6% of Ghanaians with access to unimproved water sources treat their water, either by boiling it or straining it through a cloth. When not drinking from sachets, ninety-three percent of Ghanaians are drinking untreated water (GSS, 2015).

Access to sanitary toilet facilities is important in preventing the spread of communicable diseases such as diarrhea, typhoid, polio, hepatitis A, cholera, and dysentery (WHO, 2015b). Fourteen percent of Ghanaian households use an improved toilet facility, which is an unshared toilet that separates waste from human contact. The remainder of the

population shares a public improved or unimproved toilet facility, or defecates in the bush, i.e. an open field (GSS, 2015). Eleven percent of the population cannot access a toilet facility in less than 30 minutes (GSS, 2015).

Hand washing. The Ghana Demographic Survey (2015) found that 53% of Ghanaian households have a designated place for hand washing. Of this population, 39% have access to soap and water, 19% have water only, 4% have soap only, 1% have water and a cleansing agent other than soap, and 37% of households have a designated place for hand washing, but no water or cleansing agents (GSS, 2015). As the World Health Organization suggests, decreased access to clean water, or water in general, leads to poor hand washing habits (WHO, 2015b). This in turn leads to the spread of communicable diseases (WHO, 2015b) and affects the nutrition status of the population (DeBoer, et al., 2012; Guerrant, et al., 2008).

Health care workers and sanitation practices. As diarrhea is the leading cause of child morbidity and mortality in Ghana (GSS, 2015), health care workers disproportionately treat the effects of poor sanitation practices. Child survival rates in Ghana rise when health care services are received, and when water quality and sanitation services improve (Lavy, Strauss, Thomas, & de Vreyer, 1996). Numerous global organizations support the promotion of clean water and improved hygiene as a malnutrition preventive measure (WHO, 2015b; Wuehler, Hess, & Brown, 2011).

Parent Feeding Styles and the Impact on Nutrition and Young Child Feeding Education

Feeding styles play an important role in the growth and development of children as it influences a child's food intake and the development of a child's ability to self-regulate (Johnson & Birch, 1994). A parent's feeding style can be defined as parent-child interactions during mealtimes, ranging from responsiveness to demandingness, that indicate the

distribution of control of feeding practices (Fletcher, Branen, & Lawrence, 1997). Proper feeding styles and responsive feeding techniques can lay a foundation for a lifetime of healthy eating habits (Johnson & Birch, 1994), while improper feeding styles can contribute to poor health outcomes, such as overweight and obesity (Anzman, et al., 2010), and disordered eating habits (Branen & Fletcher, 1999; Birch & Fisher, 2000).

Parental feeding practices. Historically, feeding practices have focused on feeding children in the face of threats and food scarcity, such as famine or disease (Levine, 1998; Savage, et al., 2007). In distress, parents tend to force or coerce children to quickly eat any available food (Savage, et al., 2007). As food patterns shift to greater populations living in urban settings with less threats of food scarcity (Popkin, 2001), parental feeding patterns also must shift from pressured, compulsory eating to attending to feeding cues and satiety signals in order to promote a healthier relationship with food (Savage, et al., 2007).

Feeding models. Three parental feeding styles exemplify how child feeding patterns develop: permissive/indulgent, authoritarian, and authoritative (Baumrind, 1966; Branen & Fletcher, 1999; Fletcher, et al., 1997; Johnson & Birch, 1994). Parents exhibiting a permissive/indulgent style tend to neglect children during mealtimes (Fletcher, et al., 1997; Savage, et al., 2007) and/or allow children to determine the feeding environment, including when and where to eat (Satter, 1987). The authoritarian feeding style involves the restricting of food, forcing, and coercion to persuade a child to eat (Fletcher, et al., 1997; Savage, et al., 2007). Feeding patterns that are responsive and cooperative, whereby adults choose when to eat and what foods will be offered while children decide how much to eat based on internal satiety cues, are known as the authoritative feeding style (Fletcher, et al., 1997; Johnson &

Birch, 1994; Satter, 1987). Caregiver's responsiveness and a child's nutrient intake are related (Faith, Scanlon, Birch, Francis, & Sherry, 2004).

Parental feeding styles of permissiveness and authoritarian have negative effects on children's food consumption and relationship with food (Savage, et al., 2007). These feeding practices also can increase the risk of the child becoming overweight and obese (Birch & Fisher, 2000; Birch & Dietz, 2008; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006). In Ghana, children who were more at risk of negative growth and development also experienced negative parental feeding practices, such as ignoring the child during meals or forcing the child to eat (Nti & Lartey, 2007a). Conversely, children can thrive living in impoverished environments with caregivers practicing good child feeding practices, such as being responsive and interactive during meals (Nti & Lartey, 2007b). Children should have positive experiences with food and feeding, regardless of food availability or insecurity, in order to have healthful nutritional outcomes (Nti & Lartey, 2007b; Savage, et al., 2007).

The influence of culture. Feeding behaviors are nurtured by a variety of factors in a variety of environments (Johnson, Ramsay, Armstrong Schultz, Branen, & Fletcher, 2013). Cultural traditions impact feeding behaviors (Caprio, et al., 2008), from feeding children at certain times of day (Idris, Popoola-Zakariyya, Sambo, Sufyan, & Abubakar, 2013), giving water to infants "to welcome them into the world" (Tampah-Haah & Kumi-Kyereme, 2013, p. 3), to choosing which foods a child can or cannot eat (Nti, 2008; Pelto & Armar-Klemesu, 2011). Cultural food habits often dictate food preferences (Birch, 1998). For example, the foods eaten by mothers during the pre- and postnatal period are typically common cultural foods, allowing children to begin early associations of cultural foods with preferred foods (Birch, 1998). Additionally, feeding styles are passed down through generations, with adults

often employing the same feeding techniques used by their parents or caregivers (Fletcher, et al., 1997). Thus, culture is a key factor in determining child feeding practices and nutrition status (Birch & Dietz, 2008).

Culture in nutrition education. Numerous studies indicate the value of culturally appropriate nutrition and young child feeding education (Birch & Dietz, 2008; Evans, et al., 2011; Gerchow, et al., 2014; Kruger & Gericke, 2002). It is important that health care workers assess and understand caregivers' cultural barriers to adhere to nutrition and young child feeding education and interventions in order for the education and interventions to be effective (Alles, et al., 2013; Kris-Etherton, et al., 2014). As prominent sources of nutrition and feeding information (De Almeida, 1997), health care workers are in an ideal cross-cultural position to accurately and appropriately convey information to patients (Ilmonen, Isolauri, & Laitinen, 2012; Kris-Etherton, et al., 2014).

The influence of food insecurity. Food insecurity impacts children's food intake (Fram, Ritchie, Rosen, & Frongillo; 2014; Kaiser, et al., 2003; Intiful & Lartey, 2014; Sarlio-Lähteenkorva & Lahelma, E, 2001), children's weight (Ravelli, van Der Meulen, Osmond, Barker, & Bleker, 1999; Yang, et al., 2008), and child feeding practices (Savage, et al., 2007). Children experiencing food insecurity consume more calories per day, primarily from sugar, fat, and fiber (Faber, Smuts, & Benade, 1999; Fram, et al., 2014; Oldewage-Theron, Dicks, & Napier, 2006) are more likely to be obese as adults (Ravelli, et al., 1999; Yang, et al., 2008), and tend to be preoccupied with food (Fram, et al., 2014). All of which impact feeding behaviors (Feinberg, Kavanagh, Young, & Prudent, 2008; Nti & Lartey, 2007b; Pelto & Armar-Klemesu, 2011; Savage, et al., 2007). Food insecure households are more likely to employ restrictive or indulgent/neglectful feeding practices (Feinberg, et al., 2008). Counter-

intuitively, forcing children to eat has resulted in greater likelihood of food refusal, even in food insecure homes (Nti & Lartey, 2007b).

Nutrition education and dietary diversity. Food insecurity also is associated with decreased dietary variety (Kaiser, et al., 2003) and can lead to decreased nutritional status (Holben, 2006). Nutrition education has been recommended as combative measure for improving food insecurity in the United States (Holben, 2006). In developing countries, nutrition education can improve diet diversity and nutrition status (Arimond & Ruel, 2004; Majamanda, Maureen, Munkhondia, & Carrier, 2014), indicating a valuable role of nutrition education in feeding practices.

The influence of the nutrition status of primary caregivers. A woman's nutritional status can affect her ability to care for her children (McCullough, 1990). As the most common primary caregivers in Ghana, mothers determine the eating patterns of their families by preparing and serving food (Nti, 2008). Mothers in the Eastern Region of Ghana tend to have low levels of calcium, B6, animal sources of iron, and protein (Nti, 2008). The study further explained that while the mothers consumed an appropriate amount of calories each day, nutrient deficiencies were primarily due to a mainly carbohydrate-based diet. In a separate study in the Eastern Region of Ghana, diets of mothers and children aged 0 to 18 years were analyzed for nutritional quality (Nti & Lartey, 2007a). Children had deficiencies in calcium, iron, and B-vitamins, suggesting caregivers' food intake impacted the intake of their children (Nti & Lartey, 2007a). Studies in both Egypt and Kenya report that caregivers have a lower capacity for caring for themselves and their families, resulting in decreased nutritional status (McCullough, 1990).

Mothers' knowledge of nutrition can help them make informed choices in food selection and feeding practices to maintain a healthy family (Gibson, Wardle, & Watts, 1998). As many dietary patterns are adopted in childhood (Anzman, et al., 2010; Savage, et al., 2007), mothers must receive the nutritional knowledge necessary to make healthy food choices and utilize healthy feeding practices for themselves and their families.

The influence of nutrition knowledge of primary caregivers. Over the past decade, Ghana has shown improvements in accessible and affordable education (GSS, 2015). Currently, all elementary education is free and encouraged by the Free Compulsory Universal Basic Education program (GSS, 2015). Though education rates are rising, approximately 29% of household females have no education. Additionally, females in the upper socioeconomic class tend to have more education than those of the lower socioeconomic class (GSS, 2015). These socioeconomic education rates are comparable for males (GSS, 2015). After analyzing the 2003 and 2008 Ghana Demographic and Health Surveys, Dake, Tawiah, and Badasu (2010) found that individuals in the upper income bracket and with a higher level of education had greater incidence of overweight and obesity.

Education level is related to nutrition knowledge level (Dake, Tawiah, and Badasu, 2010; Gibson, et al., 1998; Lartey, 2008; Nti & Lartey, 2007b; Ruel, et al., 1999). In developing countries, where the majority of the population does not have extensive education, it is recommended that nutrition education be provided at a level that can be understood by low- to middle-income adults (Alles, et al., 2013; Kruger & Gericke, 2003; Lartey, 2008; Majamanda, et al., 2014). One study in Accra, the capital of Ghana, found that mothers with low levels of education and in low-income brackets had children of normal height-for-age ratios if they followed good caregiving practices, that is good child feeding practices and good

use of preventative health services (Raul, et al., 1999). Higher incidences of stunting and underweight were seen in households exhibiting lesser caregiving practices, regardless of level of education (Raul, et al., 1999). These results demonstrate the association between child nutrition outcomes and caregiver feeding behaviors.

Nutrition education focused on healthy eating habits, such as fruit and vegetable consumption, is important as a positive correlation was found between education and higher intakes of fruits and vegetables (Asenso-Okyere, Nube, & Asante, 1997; Gibson, et al., 1998; Nti, et al., 2011). However, nutrition knowledge alone is not necessarily equated with healthier eating habits (Gyampoh, et al., 2014; Lartey, 2008; Nti, et al., 2011). Ongoing and culturally appropriate nutrition education of mothers and caregivers of young children by trained health care workers has been recommended to improve child feeding habits and nutrition status (Gyampoh, et al., 2014; Lartey, 2008; Majamanda, et al., 2014).

The Need for Nutrition and Young Child Feeding Knowledge Among Health Care Workers

A lack of nutrition professionals, particularly in developing countries, often leads to clinical or community nurses providing the majority of nutrition and young child feeding education (Alles, et al., 2013; Kgaphola, Garrison, & Wodarski, 1997; Majamanda, et al., 2014). However, many nurses do not have the nutrition and young child feeding knowledge needed for this role (Alles, et al., 2013; Kgaphola, et al., 1997; Kris-Etherton, et al., 2014). This lack of knowledge can lead to poor nutrition and young child feeding standards of care (Alles, et al., 2013; Kris-Etherton, et al., 2014; Kruger & Gericke, 2003). Furthermore, nutrition and child feeding practices suffer when mothers and caregivers are not provided with

adequate and accurate nutrition and child feeding information (Alles, et al., 2013; Lartey, 2008).

Nurses across the globe state that their nutrition and young child feeding knowledge is lacking, and would like to enhance their education in order to better counsel their patients (Ilmonen, et al., 2012; Parry Strong, Lyon, Vavasour, & Milne, 2013; Puoane, Sanders, Ashworth, & Ngumbela, 2006). Improving the nutrition training of nurses not only increases their knowledge, but also positively changes their attitudes towards malnutrition, and the children and families who suffer from this disease (Puoane, et al., 2006). A study conducted in South Africa addressed the stigmas associated with malnutrition, such as laziness and ignorance, and showed that with training and education, nurses were able to gather the knowledge necessary to not only treat malnutrition illnesses, but also better understand their patients (Puoane, et al., 2006).

Barriers to receiving and imparting nutrition and young child feeding knowledge. Studies indicate that individuals residing in sub-Saharan Africa understand the importance of nutrition education and seek it out from their health care workers (Parker, Steyn, Levitt, & Lombard, 2012; Pelto & Armar-Klemesu, 2011). However, significant barriers to nutrition education from both the health care workers and the patients have been identified. For health care workers, some barriers include: time, space, available equipment, staff turnover rate, education and literacy level of the patient, and patient non-compliance (Parker, et al., 2012). A phenomenological study of nutrition education in South Africa revealed the major barriers for patients to adhere to the advice of providers are the cost of healthy foods, food insecurity, and the social context of meal times, i.e. the family member preparing the food was not preparing healthy food (Muchiri, Gericke, & Rheeder, 2012).

A 2008 report by the International Food Policy Research Institute (Benson, 2008) found that while Ghana produces an adequate number of trained nutritionists each year (approximately 150), nutrition education and implementation seem to be hampered at the societal and governmental level. The report suggests a lack of funding and resources, as well as a lack of awareness by the country's political leaders, are detrimental to the ability to properly educate Ghanaian health care workers and the general Ghanaian population. Related research also calls for an increased awareness of the nutrition status of Ghana in order for the country to progress towards optimal health (Lartey, 2008). Inadequate funding has been reported to be a significant limitation in the proliferation of international nutrition and child feeding education (Wuehler, Hess, & Brown, 2011).

Health Care Workers as Nutrition and Young Child Feeding Educators

When health care workers receive nutrition knowledge and training, they must then disseminate the pertinent information in order to educate their clients and patients on key nutrition concepts (Ettienne-Gittens, et al., 2012). While the role of the nutrition educator falls on the health care professional, nurses have the primary contact with patient, and thus are often in key positions to be posed initial nutrition questions by patients (Ettienne-Gittens, et al., 2012; Ilmonen, et al., 2012).

Many health care workers, including nurses, do not receive enough initial or ongoing nutrition education to accurately advise patients on nutritional needs (Ilmonen, et al., 2012; Touger-Decker, Barracato, & O'Sullivan, 2001). Over time and without continuing nutrition education, nurses lose confidence in their abilities to provide dietary advice (Parry Strong, et al., 2013). Increased training of health care workers has been shown to increase the

knowledge levels of both the health care workers and of their patients (Pedersen, Tewes, & Merete Bjerrum, 2011).

Additionally, nurses solicit further education on techniques to effectively impart nutrition knowledge to their patients (Ilmonen, et al., 2012). Research suggests health care workers simply adhering to current best practices in nutrition and young child feeding is not enough; and consistent acquisition and training in emerging nutrition and child feeding knowledge is necessary to effectively provide high standards of nutrition and child feeding care (Kris-Etherton, 2014; Wuehler, Hess, & Brown, 2011).

Conclusion

Many environmental, cultural, behavioral, economic, and diet-related factors contribute to the ongoing problem of malnutrition in Ghana. As nurses are the primary health educators in Ghana (Aidam, Pérez-Escamilla, & Lartey, 2005; Egyir, et al., 2016), they are in a position to provide preventative education to mothers and caregivers of young children. Therefore, nurses must have the necessary nutrition and child feeding knowledge to provide this education. Nurses have stated that while nutrition and nutrition education is important, they do not often feel adequately prepared to be the primary nutrition educators without enhanced or ongoing education (Ilmonen, et al., 2012).

Mothers in Ghana reported three important factors determining how they feed their children: nurturance, cost, and time (Egyir, et al., 2016; Peltó & Armara-Klemesú, 2011), however, there is a paucity of research investigating how to educate Ghanaian mothers to effectively offer healthy food to children, and how to encourage young children to eat as part of a positive feeding relationship. A lack of research also exists in how nurses in developing countries are providing nutrition and young child feeding education to mothers and caregivers

of young children, and how effective the education is for populations with limited literacy and limited resources. Finally, while global organizations and local surveying agencies gather health indicator data on children ages 0-5, such as underweight, stunting, wasting, and overweight (GSS, 2015; UN, 2015; WHO, 2015b), and acknowledge the health risks associated with poor nutrition and feeding practices for children under 5 years of age (WHO, 2016a), the focus of most research on nutrition and young child feeding practices is on children ages 0-2 (Gyampoh, et al., 2014; Nti & Larrey, 2007a; Nti & Larrey, 2007b; Pelto & Armara-Klemesu, 2011; Wuehler, Hess, & Brown, 2011). In particular, child feeding practices to prevent malnutrition in children 2-5 years of age are missing in WHO guidelines (WHO, 2003b; WHO, 2016b).

As the primary source of nutrition and young child feeding information in the KEEA region of Ghana, nurses are essential to discovering and implementing interventions that may help this population slow the rates of overweight and obesity, and continue to combat stunting and wasting. Therefore, the purpose of this study was to examine the level of nutrition and young child feeding knowledge and education among nurses in public health clinics of the KEEA region in Ghana, and how the nurses served as educators to the clinic's patients with children 0 to 5 years of age.

Chapter Three

Ghanaian Nurses' Nutrition and Young Child Feeding Education:

A Need for Further Education

Introduction

Children's growth, development, and feeding patterns begin at conception and continue throughout life impacting lifelong health (Birch & Dietz, 2008; Savage, Fisher, & Birch, 2007; Sullivan & Birch, 1994). Nutrition education can help form the foundation of children's healthy eating practices, and support the prevention of malnutrition, including conditions of both underweight and overweight (Holli & Beto, 2014). Caregivers' knowledge, attitudes, and beliefs about food and feeding practices profoundly affect children's food intake, preferences, and health status (Anzman, Rollins, & Birch, 2010; Fautsch Macías & Glasauer, 2014). Providing caregivers accurate nutrition and young child feeding information is important to establish healthy nutrition and child feeding practices (WHO, 2003b).

In Ghana, the major source of health information is the health care worker (Gyampoh, Otoo, & Aryeetey, 2014; Nti, Hagan, Bagina, & Seglah, 2011; Peltó & Armar-Klemesu, 2011). In the Komenda-Edina-Eguafo-Abrem (KEEA) region of Ghana, most mothers, who are the caregivers preparing the family's food (Nti, et al., 2011), receive their education about nutrition and young child feeding from the nurses of the local health clinics (Egyir, Ramsay, Bilderback, & Safaii, 2016).

Currently in Ghana, an estimated 11% of children under five years of age are underweight, 19% are stunted, 5% are wasted (GSS, 2015), and approximately 3% are considered overweight (WHO, 2015b). Poor nutrition and improper infant and young child

feeding practices, such as brief durations of breastfeeding (or lack thereof) and early initiation of complementary feeding, have been linked to child morbidity and mortality in Sub-Saharan Africa, and in Ghana (GSS, 2015; WHO, 2003a; WHO, 2003b; Wuehler, Hess, & Brown, 2011).

Many nurses who serve as health educators do not have the nutrition and young child feeding knowledge needed for this role (Alles, et al., 2013; Kgaphola, Garrison, & Wodarski, 1997). Furthermore, nutrition and child feeding practices suffer when mothers and caregivers are not provided with adequate and accurate nutrition and child feeding information (Lartey, 2008).

As nurses are often in key positions to provide health-supportive nutrition and child feeding education (Ilmonen, Isolauro, & Laitinen, 2012; Wuehler, Hess, & Brown, 2011), they must maintain current nutrition and young child feeding knowledge to effectively and accurately convey information to patients (Kris-Etherton, et al., 2014). However, a lack of research exists exploring the nutrition and young child feeding knowledge of international health care workers, such as nurses, and how they provide education to caregivers of young children (Alles, et al., 2013). Furthermore, while global organizations and local surveying agencies gather health indicator data on children 0-5 years of age, such as underweight, stunting, wasting, and overweight (GSS, 2015; UN, 2015; WHO, 2015b), most currently published research on nutrition and young child feeding practices focuses on children 0-2 years of age, and not the formative years of two to five (Gyampoh, et al., 2014; Nti & Lartey, 2007a; Nti & Lartey, 2007b; Pelto & Armara-Klemesu, 2011; Wuehler, Hess, & Brown, 2011).

The purpose of this qualitative study was to examine the nutrition and young child feeding knowledge and education of Ghanaian nurses in the KEEA region, and how they served as educators to provide Ghanaian mothers and caregivers information on nutrition and young child feeding. This research is needed to understand how populations are obtaining and disseminating their nutrition and young child feeding information, which is likely to impact adult feeding practices and child health outcomes.

Methods

This study used a qualitative approach of one-on-one and group interviews guided by a structured questionnaire with categorical and free response questions. The questionnaire was administered to nurses employed at twelve public health clinics in the Komenda-Edina-Eguafo-Abrem (KEEA) region of Ghana. The questionnaire was comprised of both close-ended and open-ended free-response questions that captured the nurse's level of nutrition and young child feeding knowledge, amount of education regarding nutrition and young child feeding, and how this information was imparted to caregivers of young children, birth to 5 years of age. The study was approved as exempt by the University of Idaho Institutional Review Board (see Appendix A), and approval was obtained by the KEEA regional clinic director (see Appendix B).

Interviews administered in a naturalistic environment, such as the location of the health clinics, are needed to provide a framework and perspective to best understand the participant's responses and investigator's observations (Monsen & Van Horn, 2008). Additionally, as a qualitative research tool, questionnaires are used to gather information about knowledge, attitudes, and beliefs as related to nutrition and health outcomes (Monsen & Van Horn, 2008).

Participant sample and setting. A purposive sample of nurses employed at twelve public health clinics in the KEEA region of Ghana was recruited to participate in the study from a total population of approximately 75 nurses. The sample of clinics and nurses were intentionally selected to build on previous research conducted with Ghanaian mothers to identify the factors influencing the introduction of complementary foods (Egyir, et al., 2016). The study's results are reported elsewhere (Egyir, et al., 2016); however, the unique role of nurses in serving as the main source of nutrition and young child feeding information merited further study.

Jonathan Kissi Prabeng, the KEEA Region Disease Control Officer, was recruited to serve as the focal person for the research study due to his professional connections with the regional health clinics, and his respected rapport with the clinics' nurses. A focal person is an individual who serves as the point of contact in the visiting country. A focal person is in frequent communication with the primary researcher, and identifies the resources and participants needed to successfully complete the research. Mr. Kissi facilitated contact with the regional clinic director to confirm accessibility to the clinics and nurses for the study, and served as a cultural liaison while the research was performed. He also notified the nurses in advance of the primary researcher's arrival, and asked the charge nurse of each clinic to make time for the nurses to be interviewed.

Research instruments. The population of interest was interviewed using a structured questionnaire to elicit descriptive educational background information on nutrition and young child feeding, and how the education was applied in their work with the clinics' patient population of caregivers with young children 0 to 5 years of age. The questionnaire included

nineteen categorical close-ended questions, thirteen open-ended free response questions, and five demographic questions. See Appendix C for the full questionnaire.

Development the close-ended questions on the questionnaire. Close-ended questions were asked regarding where the nurses received their nursing education, the number of nutrition and young child feeding classes taken during and after nursing school (such as through continuing education), and how often the nurses were asked nutrition and young child feeding questions during clinical appointments. Responses to the latter questions were categorized using a Likert scale of “Every,” “A Few,” and “Never.”

Close-ended questions also were asked regarding nurses’ self-efficacy in educating mothers and caregivers about nutrition and young child feeding practices, and their current nutrition and child feeding knowledge about breastfeeding, complementary feeding, iron-deficiency anemia, child feeding practices, and food safety/sanitation. Questions that gathered current nutrition knowledge and self-efficacy were created using validated questions from the *Guidelines for Assessing Nutrition-Related Knowledge, Attitudes and Practices* (KAP manual) produced by the Food and Agricultural Organization of the United Nations (Fautsch Macías & Glasauer, 2014). Responses to self-efficacy questions followed a Likert scale of “Very Confident,” “Confident,” “Somewhat Confident,” “Not Confident,” and “Not Confident At All.” The questions were modified to be applicable to Ghana, and specifically to the KEEA regional health clinics. For example, a validated question regarding sanitation practices that originally read: “How confident do you feel in washing your hands properly?” was changed to: “How confident do you feel in providing education to mothers and caregivers about washing their hands properly?” Responses to nutrition and child feeding knowledge

questions were chosen from pre-determined categories derived from the *KAP* manual (2014), or based on recommendations from a child feeding expert.

The close-ended questions concluded with demographic questions of gender, age, ethnicity, and self-reported height and weight. Demographic questions were taken from a questionnaire previously used for a study at the health clinics in the KEEA region of Ghana and tested for content and face validity (Egyir, et al., 2016).

Development of the open-ended free response questions on the questionnaire. The open-ended free response questions included questions that asked the nurses to describe the nutrition and young child feeding education received during nursing school and how they were currently educating mothers and caregivers of young children about breastfeeding, complementary feeding, iron deficiency anemia, child feeding practices, including food refusal, and food safety and sanitation. The nurses were asked to describe the barriers they encountered educating mothers and caregivers of young children about nutrition and young child feeding, what additional nutrition and young child feeding information they would like to know more about, and the nurses' recommendation on how their clinics could better educate their nurses. Relevant probes accompanied each free-response question. For example, a question asking nurses to describe how they provide complementary feeding education to mothers and caregivers included the probes: what signs do caregivers look for indicating it is time to begin complementary feeding, what foods should mothers start with, what foods should mothers avoid, and what nutrients are recommended in the complementary foods offered to young children? Questions and probes regarding nutrition and young child feeding attitudes and beliefs were developed and reviewed by a nutrition and young child feeding expert.

Questionnaire pilot tests. The questionnaire was pilot tested three times to provide interview training for the primary investigator, and to confirm the questions' accuracy, relevancy, and cultural appropriateness. The questionnaire was first pilot tested with a Ghanaian student and nutrition and young child feeding specialist at the University of Idaho who assessed the questions for understanding and cultural competency. Following the pilot, changes were made to the questionnaire. Self-efficacy Likert scale questions from the *KAP* manual of validated questions listed as "Very Confident," "Confident," "So-So," "Not Confident," and "Not Confident At All" were changed to read "Very Confident," "Confident," "Somewhat Confident," "Not Confident," and "Not Confident At All." The Ghanaian nutrition and young child feeding specialist recommended the verbiage "Somewhat Confident" would be better received than "So-So." Additionally, the Ghanaian nutrition and young child feeding specialist did not believe the terms "picky eating" and "picky eater" would be readily recognized. Thus, the term "food refusal" and "a child who refuses food" was added to each question in order to describe a picky eater and picky eating. Finally, all terminology that referred to introducing "solid foods" to infants was changed to "complementary feeding" as this terminology is used in Ghana.

The questionnaire was then piloted with one registered nurse and one pediatric nurse practitioner to assess clinical relevancy and comprehension. Two questions were clarified after piloting with a registered nurse: 1) "Did your nursing education provide information about nutrition/young child feeding?" was changed to: "Did your nursing education provide you with classes about nutrition/young child feeding?" and 2) "What makes it difficult to talk to mothers and caregivers about nutrition/young child feeding?" was changed to: "What are the barriers or challenges to talking to mothers and caregivers about nutrition/young child

feeding?” The registered nurse described her nursing education as emphasizing the use of the word and concept “barriers,” and suggested Ghanaian nurses may have received a similar emphasis in their education. The use of the word “barrier” was confirmed with the Ghanaian nutrition and young child feeding specialist, who also reported it would be well understood.

No changes were made after pilot testing with the pediatric nurse practitioner. She reported the questions were clear, and emphasized important areas of pediatric care in the United States (i.e. breast feeding, complementary feeding, iron-deficiency anemia, child feeding practices, and food safety and sanitation), which also are important international pediatric health concerns.

Finally, the child feeding questions were developed with the guidance of a specialist in the field of nutrition and young child feeding. No changes were made after piloting with this same specialist.

Procedure for administering the questionnaire. The primary investigator performed one-on-one and group interviews in English following the structured questionnaire with close-ended and open-ended free-response questions. The questionnaire was administered to both individual nurses and to groups of two to four nurses at twelve public health clinics in the KEEA region of Ghana. The entire interview was audio-recorded to capture each participant’s reaction and response to all questions, and for later transcription and analysis of responses to open-ended free response questions.

Participants signed an informed consent (see Appendix D) that explained the nature of the research, that all information would be kept confidential, that participation was voluntary, that the interview would be audio-recorded, and that they could stop participation at any time without consequences. Participants also could choose to sign a photo consent giving

permission for photographs to be taken throughout the interview. Participants were given an incentive pen upon completion of the interview and thanked for their time.

Data analysis. Descriptive statistics were gathered from close-ended categorical questions. Frequency data such as age, height, and weight was analyzed using Microsoft Excel for Mac 2011 version 14.6.0 (151221). Means, standard deviations, frequencies, and percentages were determined from demographic variables. Body mass index (BMI) was calculated for each participant using self-reported height and weight.

The administration of the questionnaire was audio recorded, transcribed, and analyzed for pertinent themes (Strauss & Corbin, 1990). After listening to and transcribing the recordings, the primary investigator employed an open coding process to review, examine, compare, conceptualize, and categorize responses to the open-ended questions (Strauss & Corbin, 1990). As Strauss & Corbin's theory of qualitative data analysis does not require an external auditor (Strauss & Corbin, 1990), the primary researcher independently coded the transcriptions, then discussed findings with a child nutrition expert to reach a consensus regarding conclusions. Method triangulation of the transcriptions, observations, and field notes was used to gain a comprehensive understanding of the data (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Code notes were made and categories assigned for analysis (Strauss & Corbin, 1990). The text was read multiple times, and field notes were used to confirm participant responses and record observations made by the primary investigator (Strauss & Corbin, 1990). From the coded text, connections among codes were identified, meta-themes created, and theories were generated among themes related to nurses' nutrition and child feeding knowledge and education. See Appendix E for an example of the coded transcription.

Results

Sociodemographic information of participants. Twenty-one interviews were conducted in English using the structured questionnaire with public health nurses (n=41) in the KEEA region of Ghana. Forty nurses were female and one was male. Ages ranged from 24-50 years. Body mass index (BMI) data analysis revealed the majority of the nurses were of normal weight (n=17, 45%), with the remainder overweight (n=10, 26%), and obese (n=11, 29%). The majority of nurses were of the Akan (n=31, 76%) or Ewe (n=4, 10%) tribes. The sociodemographic information of the nurses is summarized in Table 3.1.

Table 3.1 Summary of Nurses' Sociodemographic Information

		N	%
Gender			
	Female	40	99%
	Male	1	1%
	Total	41	100%
Age			
	24-30	29	71%
	31-40	8	19%
	41-50	4	10%
	Total	41	100%
Tribes			
	Akan	31	76%
	Ewe	4	10%
	Ga	1	2%
	Nzema	1	2%
	Other*	4	10%
	Total	41	100%
BMI**			
		Mean (SD)	N
	Normal	22±1	17
	Overweight	27±2	10
	Obese	34±4	11
	Total		38
			100%

*“Other” included one participant each from Akan and Ga, Kasem, Krobo, Sefwi.

**Excludes pregnant participants (n=1) and participants (n=2) who self-reported a weight that is physically impossible.

Location of nurses' training and amount of nutrition and young child feeding education during nursing school. All but one participant (n=40, 98%) held a two-year

nursing training certificate; one nurse held a 4-year nursing degree; two midwives were included in the study, each of whom held a two-year training certificate. For the majority of the participants (n=32, 78%), nursing education was completed at Winneba Community Nurse Training College, the nearest nurse training school in KEEA region of Ghana. See Table 3.2 for further nursing education details.

Table 3.2 Nurses' Nutrition and Young Child Feeding Education During Nursing School

	N	%
Community Nurse Training School (2 year certificate)		
Winneba	32	78%
Akim Oda	1	2.4%
Ho	1	2.4%
Koferdua	1	2.4%
Nanyiba	1	2.4%
Tamale	1	2.4%
Twifu Praso	1	2.4%
Catholic University of Ghana (4 year degree)	1	2.4%
Midwifery Training School (2 year certificate)	2	5%
Total	41	100%
Semesters of Nutrition Education During Nursing School		
1 semester of nutrition	35	85%
2 semesters of nutrition	2	5%
3 semesters of nutrition	2	5%
4 semesters of nutrition	2	5%
Total	41	100%
Semesters of Child Feeding Education During Nursing School		
1 semester of child feeding	35	85%
2 semesters of child feeding	3	7%
4 semesters of child feeding	2	5%
Total	40	97%

Nutrition and young child feeding education received during nursing school was delivered as part of the same class and in the same semester for the majority of nurses (n=35, 85%). One nurse did not believe she had received any young child feeding education during nursing school, but did receive nutrition education.

Nurses' reported nutrition and young child feeding information learned in nursing school. Nurses' free-responses to the open-ended question about what they learned in nursing school regarding nutrition and young child feeding included learning about the definition of nutrition (n=6, 15%), types of nutrients (macro- and micronutrients) (n=27, 66%), nutrition recommendations for different ages (n=30, 73%), breastfeeding (n=34, 83%), complementary feeding (n=32, 78%), and conditions of malnutrition (n=36, 88%). Without probing, nurses described their nutrition and young child feeding education during nursing school as mainly comprised of breastfeeding and complementary feeding recommendations, as well as general information about macronutrients. With probing, many nurses recalled learning about nutrition recommendations for different ages, such as toddlers and adults, and conditions of malnutrition such as kwashiorkor, marasmus, rickets, and beriberi. Some nurses recalled learning about obesity, diabetes, and heart disease: "Kwashiorkor...malnutrition. Obesity...They also talk about diabetes," as one nurse stated.

Calcium, iron, and vitamin A were among the micronutrients mentioned, as well as deficiencies in these micronutrients. Macronutrients were most often referred to as the "energy-giving foods" (carbohydrates), "protective foods" (fats), and "body-building foods" (protein). As one nurse explained:

Nutrition is what we were taught, is that nutrition is what we take in and what the body derives from what we take in...Like the nutrients the body needs. We have them in many forms. Well, we have the body building, the protective, and the energy-giving foods....And then the need for all this, what it does in the body.

Nurses who spoke of breastfeeding within their education during nursing school recounted being taught the importance of exclusive breastfeeding up to six months, and further defined *exclusive* to mean without food or water. A few nurses addressed the use of formula, and when it may be necessary, such as when a mother has HIV. Feeding

recommendations recalled from nursing school education included not waiting to breastfeed until the child is crying and advice on positioning.

Young child feeding practices were primarily recalled as complementary feeding practices, meaning the introduction of solid foods at six months of age. Nurses mentioned the types of foods to offer, the preparation of the food, and the time-intervals at which to offer complementary foods. They also spoke of being taught to offer food in colorful bowls and sing to children when introducing complementary foods. One nurse provided this explanation:

When the child is 6 months, after 6 months, we are introducing complementary feeding...you have to make sure that the child's articles that you use to feed her should be colorful so attracts the baby each time you bring his or her food for him or her to eat.

Post-nursing school nutrition and young child feeding education. After completing nursing school, workshops formed the most common method of continuing education for new nutrition and young child feeding information. Post-nursing school, 78% (n=32) of nurses had attended a nutrition workshop and 66% (n=27) had attended a young child feeding workshop. The most common workshops attended were entitled, "Infant and Young Child Feeding," and "Community Management of Malnutrition." Nine nurses (22%) had not yet attended a nutrition workshop and fourteen nurses (41%) had not yet attended a young child feeding workshop. The most common reasons for not attending a workshop were not having the opportunity to go, and that superiors had priority. Some nurses stated a desire for their colleagues to inform them of new nutrition and young child feeding information upon returning from the workshops as a way of gaining new knowledge, as demonstrated by one nurse's response:

We, we need our heads, nutritional heads. They can come to us and gather us and teach us more about nutrition and its...but we don't get that chance. If we had it, we would learn and know more about nutrition and young infant feeding.

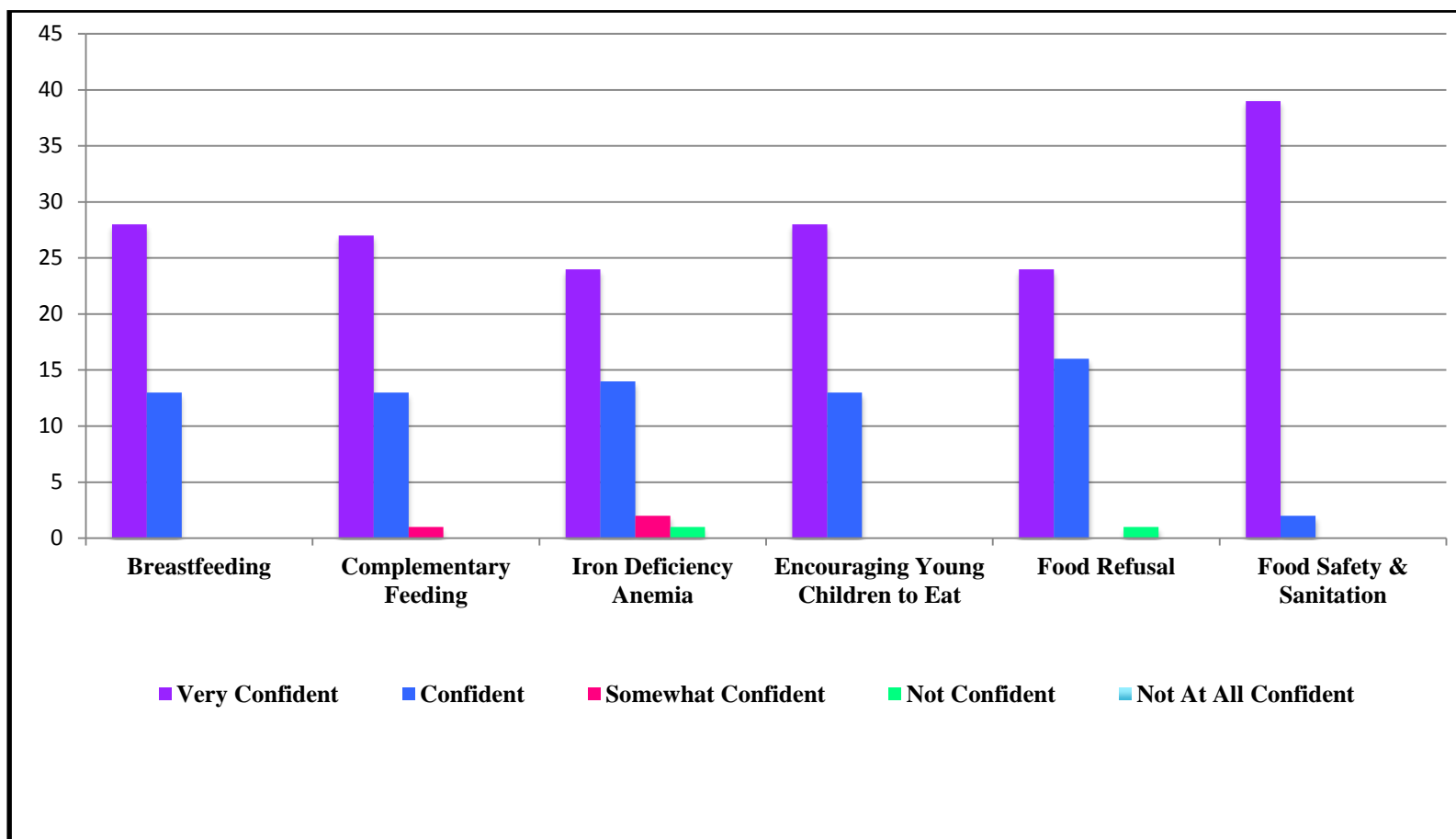
Nurses' dissemination of nutrition and young child feeding education at the clinics. In the public health clinics of the KEEA region, children are brought to the Child Welfare Clinic (CWC) for regular appointments during set periods of time. Nurses recommend children attend these clinics until they are five years of age, but nurses reported most mothers primarily bring their children in to the CWC during the first two years, and thereafter only when the child is ill. At the CWC, the nurses weigh and measure the child and assess their health status. It is common for the CWC nurses to begin with a health talk whereby the nurses relay information about nutrition during pregnancy, breastfeeding, complementary feeding, and immunizations. As one nurse explained:

I normally give a health talk before we start the the work...so I give a health talk on nutrition. Sometimes talking about how to keep yourself clean, the environment, the nutrition, the types of, when we are starting the complementary feeding. Yeah...how to, eh, clean their utensils. And I recommend how to not get disease.

Nurses were asked the close-ended question of how often mothers and caregivers inquire about nutrition and young child feeding during CWC. Thirty-two percent (n=13) and sixty-eight percent (n=28) of nurses stated they were asked about nutrition at every or a few appointments, respectively; 46% (n=19) and 22% (n=22) said they were asked about young child feeding at every or a few appointments, respectively. The nurses explained that while they talk about nutrition and young child feeding education at every appointment, the mothers and caregivers did not specifically ask a question about nutrition or young child feeding at every appointment. Nurses reported that only when mothers or caregivers had difficulties with the child's health did they ask questions.

Nurses' reported confidence at providing nutrition and young child feeding education. Confidence levels to educate mothers and caregivers about six specific nutrition and child feeding areas were assessed with close-ended questions using a five-point Likert scale (see Figure 3.1). Nurses' responses were categorized as "Very Confident," "Confident," "Somewhat Confident," "Not Confident," or "Not Confident At All." Ninety-eight percent of participants reported being "Very Confident" or "Confident" in their ability to provide education to mothers and caregivers about breastfeeding, complementary feeding, iron deficiency anemia, encouraging young children to eat, food refusal, and food safety and sanitation. Two percent (n=1) reported being "Somewhat Confident" educating mothers and caregivers about complementary feeding. Five percent (n=2) reported being "Somewhat Confident" and 2% (n=1) reported being "Not Confident" regarding educating mothers and caregivers about iron deficiency anemia. Two percent (n=1) reported being "Not Confident" educating mothers and caregivers about feeding children who refuse to eat.

Figure 3.1 Nurses' (n=41) Confidence at Providing Education to Mothers and Caregivers of Young Children 0-5 Years of Age



Nurses' reported knowledge of nutrition and young child feeding. As part of the semi-structured questionnaire, nurses were asked closed-ended questions regarding their knowledge of specific nutrition and young child feeding topics. Topics included breastfeeding, complementary feeding, iron deficiency anemia, child feeding practices (including picky-eating or food refusal), and food safety and sanitation. The nurses' responses were individually counted based on a selection of answers adapted from the *KAP Manual* (Fautsch Macías & Glasauer, 2014) and answers were reviewed by an expert in young child feeding (see Table 3.3).

Table 3.3 Nurses' Reported Knowledge of Nutrition and Young Child Feeding Education

Main Categories		N (%)*
Breastfeeding	Until what age should an infant be fed nothing but breast milk?	
	Until 6 months**	41 (100%)
Complementary Feeding	At what age should babies start eating complementary foods in addition to breast milk?	
	At 6 months**	41 (100%)
Iron Deficiency Anemia	How can iron deficiency anemia be prevented in children?	
	Eat/feed iron-rich foods	32 (78%)
	Eat/give vitamin C during meals	3 (7%)
	Take/give iron supplements	2 (5%)
	Treat other causes	11 (27%)
	Continue BF	5 (12%)
	Other***	11 (27%)
Child Feeding	In what ways should you encourage young children to eat?	
	Give the child attention	16 (39%)
	Play with the child	23 (56%)
	Modeling	7 (17%)
	Say encouraging words	1 (2%)
	Draw child's attention to food (colorful bowls)	26 (63%)
	Other***	27 (66%)
Food Safety & Sanitation	How can you prevent chronic diarrhea in children?	
	Use clean water for cooking/washing	12 (29%)
	Wash hands before eating	33 (80%)
	Other***	25 (61%)

*Answers categorized as individual responses reported by individual nurses.

**No other response given.

***A full description of responses categorized as "Other" is available in Appendix E.

Breastfeeding and complementary feeding knowledge. The nurses reported being the most knowledgeable when asked about breastfeeding and complementary feeding. As was previously reported, both topics were included in their nursing school education, and many nurses received post-nursing school education on infant and young child feeding, that is nutrition and feeding education from birth to two years. One hundred percent of nurses (n=41) reported that infants should be exclusively breastfed to six months of age. One hundred percent of nurses (n=41) also reported that six months is the age at which complementary feeding should begin. Many firmly stated that complementary feeding should begin at *exactly* six months. For example, one nurse stated, “So when you check with the child is 6 months, then you tell the mother to start complementary feeding.”

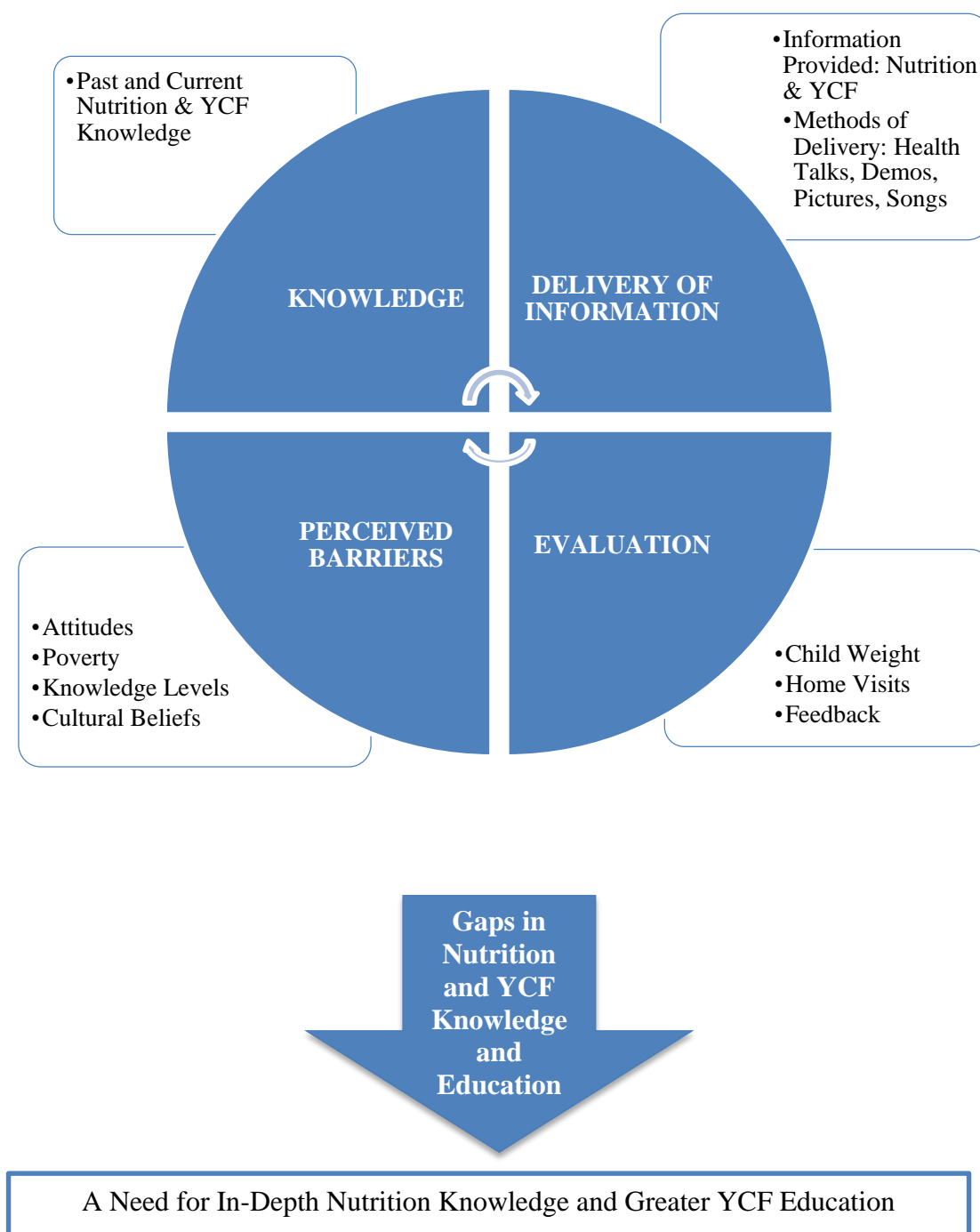
Iron deficiency anemia and hygiene knowledge. Prevention of iron deficiency anemia in children was mainly attributed to eating/feeding the child iron-rich foods and treating other causes of the disease (such as malaria or worms). Hygiene presented as a reason to breastfeed, a necessity in complementary feeding, and a way of preventing iron-deficiency anemia. When asked specifically about food safety and sanitation, and particularly about how to prevent chronic diarrhea in children, 80% (n=33) of nurses stated that hand washing was the primary preventative method, further explaining that hand washing included washing both mother and child’s hands after all activities (i.e. using the toilet, changing a diaper, returning from the market), and before feeding.

Child feeding knowledge. Child feeding practices included how to encourage a young child to eat and how to support a child who refuses to eat, or who is a picky-eater. The most common child feeding practice mentioned by nurses (n=26, 63%) was to attract a child’s attention to food by serving it in a colorful bowl. Additionally, having time for the child and

preparing preferred foods in a nutritious manner were reported as important ways to both encourage children to eat and to aid a child who is refusing food. Some nurses (n=5, 12%) reported it was important to look at the reason a child may be refusing to eat, referring to the potential presence of illness or other health conditions.

Qualitative analysis of open-ended responses: A model to capture Ghanaian nurses' nutrition and young child feeding education of caregivers with children birth to 5 years of age. A model to capture the nurses' nutrition and young child feeding education of caregivers with children birth to five years of age emerged from the open-ended free response questions. Five themes were identified: 1) the adequacy of nurses' basic nutrition and young child feeding knowledge; 2) the nurses' delivery of nutrition and young child feeding information to mothers and caregivers of young children; 3) the nurses' evaluation of children's health status as a measure of nutrition and young child feeding education effectiveness; 4) the nurses' perceived barriers of mothers' and caregivers' ability to implement nutrition and young child feeding education to support children's health; and 5) the gaps in nurses' nutrition and young child feeding knowledge and education (see Figure 3.2). The discussion to follow will include detailed descriptions of each theme in the model.

Figure 3.2 Model to Capture Ghanaian Nurses' Nutrition and Young Child Feeding (YCF) Education of Caregivers with Children 0-5 Years of Age



First theme: Nurses' have adequate basic nutrition and young child feeding

knowledge. Based on categorical responses to close-ended questions and analysis of free-responses to open-ended questions, nurses demonstrated adequate basic nutrition and young child feeding knowledge. The responses reflected how the nurses obtained their nutrition and young child feeding knowledge, both from their past education and their current educational opportunities (see Figure 3.2).

All nurses who participated in this study reported receiving past education of at least one semester of nutrition and/or young child feeding education in nursing school, and the majority of nurses had received some continuing education in nutrition and/or young child feeding (see Table 3.2). Nurses correctly answered knowledge questions regarding best practices in breastfeeding, complementary feeding, iron deficiency anemia, young child feeding practices, and food safety and sanitation (see Table 3.3). Iron deficiency anemia knowledge misperceptions were reported, such as preventing iron deficiency anemia by increasing intakes of Vitamin A and iodine. However, rather than classifying these responses as misperceptions, they could be categorized as methods to reduce the risk of iron deficiency anemia by preventing and/or treating other illnesses such as Vitamin A deficiency and goiter.

Second theme: Nurses' delivery of nutrition and young child feeding information to mothers and caregivers of young children. Open-ended free response questions asked the nurses to describe what and how nutrition and young child feeding educational information was delivered to mothers and caregivers of young children. This captured how the nurses served as nutrition and young child feeding educators (see Figure 3.2). The nutrition and young child feeding information provided included: breastfeeding, complementary feeding, iron deficiency anemia, food safety and sanitation, and young child feeding practices.

Methods of delivery included health talks, demonstrations, visual aids, and songs. Each focus area will be discussed below. For a summary of the nurses' categorical responses, see Appendix G.

Nutrition and young child feeding information: Breastfeeding. The nurses explained that breastfeeding education provided information on proper positioning and attachment, benefits, and the promotion of exclusive breastfeeding. One nurse recounted how she educates mothers on proper positioning to allow for mother-child bonding:

They have to position the baby well on the breast. So that the baby will feel comfortable and enjoy feeding on the breast. Uh huh. So that when the baby is enjoying the breast milk, there will be a bond of love between the baby and the mother.

A second nurse explained how she educates mothers on the link between breastfeeding and brain development, which she then linked to Ghana's progress as a country:

[Breastfeeding] helps in the brain development of the child. So if it happens like that, then in the near future, the future leaders will be brilliant. That will help develop the country because everybody is going to school and everything. So, let me put it this way: unemployment will reduce because the children will be intelligent for that education.

Finally, exclusive breastfeeding education included dispelling cultural myths that impacted mothers' choices to breastfeed. One nurse explained how she informs mothers of the importance of colostrum in order to promote the initiation of breastfeeding:

With the uhh, with the mother giving the breast milk to the baby within the first thirty minutes we have this yellowish thing called colostrum. And with our community mothers, they think it's something that that it's it's it's it's not supposed to be given to the baby. So we tell them that it's the best immunity that the baby gets. That it will bring the meconium past, the meconium out of the baby, so it's really, that's it. That that yellowish thing should be given to the baby first.

Nutrition and young child feeding information: Complementary feeding. Nurses' complementary feeding education primarily focused on how to offer complementary foods to

children, such as which foods to offer and methods of preparation, i.e. a thick consistency and preparing food without spicy peppers. Nurses also informed caregivers about the nutrients that should be present in complementary foods, including protein, which could be added in the form of fish or groundnut (peanut) paste, to feed children available family foods, and discouraged the use of expensive ready-prepared foods. A nurse provided this description:

We tell the mothers that...when the child gets 6 months, exactly 6 months, the mother should introduce all available food to the child. So, you tell the mother preparation, how to prepare the food. That from 6 months, at least 6 months, should be a little liquid form, like *minimix* [porridge] pre- prepared at home to the child. Then you start giving the child foods that you, the family, is also taking in order to know the type of food that the child will eat. So preparation is very important. You tell them to add more nutrients, that is, eh, to get protein for the child. Iron...[v]itamins, *all* the necessary nutrients that is needed. We educate the mother to provide it for the child.

Nutrition and young child feeding information: Iron deficiency anemia. Nurses' described their education to mothers for the prevention of iron deficiency anemia in children: feeding children iron-rich foods, particularly local foods such as *kotomire* (the green leaves of the taro, or cocoyam, root used in many Ghanaian dishes), meats, and fish. Nurses also reported providing education on non-diet related causes of iron deficiency anemia, such as malaria and hookworm. Serious side effects of iron deficiency anemia were emphasized by some nurses, including stunted mental growth. One nurse elucidated:

We tell them that if they shouldn't then feed their children with, eh, foods that contain iron, ehh, the child will fall sick. Sometimes their brain will not even function well, when you go to school. Because when they are sick they cannot learn.

Nutrition and young child feeding information: Food safety and sanitation. Food safety and sanitation education highlighted proper hygiene with breastfeeding, complementary feeding, iron deficiency anemia, and child feeding practices. While only 26 nurses (63%) specifically stated they educate mothers and caregivers about hand washing related to food safety and sanitation, the majority of nurses mentioned either hand washing or

using clean water in at least one of their descriptions of delivering nutrition and young child feeding information. The use of clean eating utensils that are kept covered when not in use, and maintaining a clean home and eating environment also were important sanitation educational points based on the frequency of nurses' reported responses. As one nurse explained:

Oh okay, they should keep their environment clean. That is the first one. And then after, eh, when they are coming to feed the child, they should wash their hands with soap and water. And after, eh, maybe the child has soiled himself and you must change the napkins or the diaper, you have to wash his hands with soap and water. And then after he has finished feeding the children, the child, they have to wash the bowls, the child's bowl, the cup, everything that he used with soap and water.

Sanitizing fruits and vegetables with salted water was one reported cultural practice nurses (n=11, 27%) recommended to caregivers to prevent disease. A nurses described how she provides this information: "Also wash the fruits with salty water before eating....So that it will kill the germs."

Nutrition and young child feeding information: Young child feeding practices.

Nurses' reports of delivering child feeding information to mothers and caregivers primarily focused on how to breastfeed and how to prepare and offer complementary foods.

Recommendations were provided on how to encourage young children to eat, including children who are refusing to eat. Nurses reported that mothers and caregivers who had time and patience during mealtimes would be the most successful at child feeding. A nurse expanded on this point:

[T]hey will come and take one [spoonful] and then the mother will say, Oh, my child does not want it. You have to get time and then you, you give it, the food. To the baby. Maybe the baby will run and come and you have to give him one spoon and then the baby have to go and play. You have to get time for the feeding.

Various permissive/indulgent feeding practices were recommended by the nurses to encourage children to eat. Nurses stated that mothers should not force children to eat, but should allow children to determine when and where to eat, as is exemplified by this nurse's statement:

Well we were taught that you shouldn't force them to eat. We can sing...Because a child might play a little bit before he or she will come and eat so you have to be following the child and making sure that the child eats enough.

Many nurses suggested mothers and caregivers study the child to determine the child's preferred foods, and subsequently offer those foods. Also, singing, playing, and clapping were recommended to attract children to food and encourage them to eat. As one nurse stated: "I have to sing, play with the child. And, the food that will be given to the child must be delicious. Otherwise the child will not take it." As was previously reported, offering children food in colorful bowls also was recommended. One nurse illustrated:

We tell them that they should, eh, feed the child with colored bowls, spoons, and the food should be colorful, like palm oil, uh huh. You should use palm, palm oil. When they see that the food is colored something like that, flowers, like, something, it will encourage them to eat it.

Finally, increasing the variety of foods offered to young children was recommended to create more interest in the offered foods. Nurses recommended that mothers and caregivers not feed children "one-way foods," meaning to not feed children the same food every day. A nurse clarified this point:

As time goes on she can, if she can afford it a lot, she should just add it to it, just to let the child have that different taste in all of the food. This will tell the child it's not only one [way] food every day. Ah ah ah, so as you bring differentiation between the food, the child will be used to it, not only, not always one type of food.

Methods of delivery of nutrition and young child feeding information. The nurses' free responses to providing nutrition and child feeding information also captured the methods

commonly used for delivering this information (see Figure 3.2). As was previously mentioned, nurses delivered nutrition and young child feeding information via health talks at the beginning of Child Welfare Clinics to emphasize key nutrition and child feeding messages. Additionally, nurses used visual aids and songs to communicate nutrition and feeding information, and food demonstrations are used to exhibit how to prepare complementary foods that are both nutritious and hygienic. Two nurses explained how they provided education on preventing iron deficiency anemia using a flipchart with pictures of iron-containing foods. The first nurse explained: “We tell them they should give food which contains iron. Don’t have to wait for the baby to be anemic before we educate them, no.” A second nurse stated:

We have types of food. So I educate the mother on maybe, its groups. Food groups. So when they come, and if they baby is more than 6 months...start feeding. I’ll be explaining to them what do they see. And they will mention the food that they see here [nurse points to a flipchart with pictures of food].

A lack of access to visual aids also was seen as a limiting factor to providing education to mothers and caregivers. A nurse clarified that having access to more resources would help her better deliver nutrition information:

By providing us with, uh uh uh, the logistics we need, like the flipcharts. As in these charts here. It is colorful and the pictures are there. They’ll see it and then they’ll know what they need to know. You know when they see pictures, it sticks. They are able to see it.

A nurse at one clinic explained how she teaches caregivers to memorize a song about young child feeding. The song was described as a tool used to answer breastfeeding or complementary feeding questions when caregivers cannot make it to the clinic:

We have this song that we should teach them. So we tell them that, oh, if you think that you don’t know how to start, then you just, you just listen to this song...but it’s all about when you’ve give birth, you should give breast, uh, breast milk to six months. And after six months you start with, uh, *Weanimix* and *koko* [types of porridge]. And

after that you add those foods to it. That's all about the song... So if the person, the person have to just memorize their song in the mind....

Another nurse illustrated how she demonstrated the preparation of porridge, a commonly offered complementary food, to mothers and caregivers:

Some don't know how to prepare it well. So, so when we go, we do demonstrations, we do everything, we tell them how to make this food, how to, especially the eh eh eh eh, the *Tombrown* [porridge], and uh, the *minimix* [porridge] and other things. We train them, we tell them how to prepare it so that they will know how to do it. And if you are able to explain everything to them, they they try it and then they accept it.

Third theme: Evaluation of children's health status as a tool to evaluate education effectiveness. Free-response open-ended questions elicited information about how the nurses determined if mothers and caregivers were following their nutrition and child feeding recommendations. The nurses explained the use of evaluation tools such as measuring children's weight at the clinic, conducting home visits, and receiving feedback from the mothers and caregivers to evaluate children's health status, and establish how well their recommendations were being followed (see Figure 3.2).

Measuring a child's weight was most frequently reported as the evaluation marker for determining education effectiveness with mothers and caregivers (n=19, 46%). A nurse described how she used this information in her health status evaluation: "When they are telling us that they are practicing it. And then when you weigh the children, too. You can see that the weight is on-going."

Nurses reported conducting home visits (n=14; 34%), which were not only necessary, as some clients could not make it to the clinic, but also allowed them to see first-hand how the recommendations were put in to practice. Some nurses stated that during home visits they performed, or asked the mothers and caregivers to perform, in-home food preparation demonstrations, as one nurse explained:

Sometimes, when we go and visit them, we ask them how they prepare their food. How they feed their children. We just sit them and watch them and they go about and if things are going all right. They have to try it.

Receiving feedback from mothers and caregivers also was identified as a method to evaluate a child's health status and determine if nutrition and child feeding recommendations were being followed (n=7; 17%). From this feedback, nurses and caregivers learned from each other to support the children's health. As one nurse described:

We ask the mothers, eh, for their opinion about the food that they give to the children. You probe. You ask them questions so you, you get the information from her. They learn from us and we also learn from them.

Fourth theme: Nurses' perceptions of mothers' and caregivers' ability to put nutrition and young child feeding education into practice. Nurses' free-responses to open-ended questions exemplified barriers to educating mothers and caregivers about nutrition and young child feeding (see Figure 3.2). The most commonly perceived barriers were mothers' and caregivers' attitudes, poverty, which affected food availability and/or insecurity, knowledge levels, and cultural beliefs that led to improper nutrition and child feeding habits.

Perceived barriers: Attitudes. Nurses described how they perceived themselves as effectively delivering the information mothers and caregivers needed, but mothers and caregivers failed to adhere to their recommendations. As one nurse stated, "Like I said we don't have challenges in, eh... giving the information about the, uh, feeding. Yeah, but the mothers. Their attitude. Mother's attitude. And their knowledge level." Another nurse further illustrated this point:

I will impart the knowledge that I have to the mother. If only the mother will apply it. Then, I too, will feel very comfortable. If the mother doesn't apply it, I will never feel confident because always if the mother will come I will tell the mother to come with a child for me to take the baby's weight to see whether the development is, eh...going high or coming down. Then I will feel comfortable that what's the knowledge that I am imparting has been achieved.

Perceived barriers: Poverty. Nurses consistently reported poverty as a reason mothers and caregivers could not follow their nutrition recommendations: “Some will tell you...they cannot afford it. Some will tell you they can’t prepare the child’s food separately, that they can’t do that.” Additionally, nurses reported that poverty prevented proper food preparation, as one nurse clarified:

And...sometimes they don’t cook the child’s food separately because most of them are not all that financially stable, so they give them some of the family food which will be spicy and could be a little bit... eh heh. So the child refuses to eat.

Poverty also affected which foods caregivers could prepare for children. One nurse empathized: “Because...you can’t tell them to go get cabbage, carrot, because she will tell you she doesn’t have money. And it’s not available at the village. So, she uses what she gets around her in preparing the food.”

Perceived barriers: Knowledge levels. Low knowledge levels were perceived as an education barrier. Nurses described their perception that mothers and caregivers were ignorant of best nutrition and child feeding practices, which led to poor implementation of their recommendations. As one nurse described:

Also they need to be talked to all the time. So that they will understand it better and then believe that what we are saying is true. Because they are ignor...ignorant around it. So when you are telling them, they will not take it seriously.

Another nurse explained:

So I can’t just tell you that they they can provide. Some can, some can’t. So we can’t just go up to others, you know, as in those who have money to tell them to feed...you have to come to their level. That will teach them things to do. If you tell them to buy, to buy that they don’t have, the baby will not get plenty of the nutrients because we didn’t tell them, we didn’t allow them to talk about their needs. We have to come down to their level and teach them what they can afford.

Due to low knowledge levels, most education was provided verbally. Nurses expressed how this became a barrier when caregivers did not pay attention, for example during the health talks given before the Child Welfare Clinics. One nurse summarized this barrier when she stated that she would like to know “...how to convince mothers to accept what we are telling them to do.”

Perceived barriers: Cultural beliefs. Nurses recounted that cultural beliefs prevented mothers and caregivers from following the nurses’ nutrition and child feeding recommendations, as many mothers and caregivers chose to follow traditions or inaccurate information from family members or friends. A nurse elucidated this point:

Sometimes, when you are educating them, because of... they are...they have a certain perception that some foods are no good for their children. So sometimes they don’t like to give it to the children, but we have...we know that we are learning that some of the foods contains um, the nutrients, the carbohydrates, the protein that will help the child grow well. But sometimes, because of the perception, it’s hard to change or to... educate them...

Another nurse described a common cultural belief that led to decreases in exclusive breastfeeding and the improper child feeding practice of giving water to infants:

[M]ostly in our locality, they be...eh, the others are been telling them that one breast is for the milk and one breast is always for the food. Then when we go out, we teach them that it’s not like that. One breast contains its own breast...eh, its own water and then food as well....

Fifth theme: Gaps in nutrition and young child feeding knowledge and education.

By capturing the nurses’ knowledge of nutrition and young child feeding information, what and how the information was delivered, how nurses evaluated whether their recommendations were being followed, and the perceived barriers preventing caregivers from implementing the recommendations, gaps in the nurses’ nutrition and child feeding knowledge and education were revealed (see Figure 3.2). When asked what nutrition and young child feeding

information the nurses would like to know more about, nurses expressed a need for in-depth nutrition knowledge (n=16, 39%) and further education in infant and young child feeding (n=20, 49%). Specifically, the nurses' expressed the need for more knowledge and education (see Table 3.4). The discussion on knowledge and education gaps and how the nurses described ways they would like to receive more knowledge and education was reported.

Table 3.4 Summary of Nutrition and YCF Information Nurses Expressed a Need for Further Knowledge and Education

Main Categories	N (%)*
Nutrition	16 (39%)
Children's Nutrient Needs	4 (25%)
Foods That Provide Children's Nutrient Needs	5 (31%)
Conditions of Malnutrition	6 (38%)
Iron Deficiency Anemia	1 (6%)
YCF Practices	20 (49%)
All Child Feeding Practices	17 (85%)
Food Refusal	3 (15%)
Other	9 (22%)
Any New Information	4 (10%)
"I know everything."	2 (5%)
No Response	2 (5%)
Counseling Techniques	1 (2%)

*Each answer categorized as a response reported by individual nurses.

Need for more in-depth nutrition knowledge. Nurses who stated a need for more in-depth nutrition knowledge spoke specifically about needing more information about the nutrients needs of children, and what foods could be recommended to meet those nutrient needs. Some nurses (n=2, 5%) described the need for more information on malnutrition and needing further knowledge of conditions such as kwashiorkor and marasmus. One nurse (6%) declared she needed more information on iron deficiency anemia. While the nurses have been trained in the prevention of iron deficiency anemia, vitamin A deficiencies, and protein energy malnutrition, their responses implied a desire for more in-depth knowledge of nutrition and its implications on children's health.

Need for greater infant and young child feeding education. Nurses reported a desire for greater infant and young child feeding education. The nurses wanted additional breastfeeding and complementary feeding information, as well as additional food preparation knowledge, methods to encourage young children to eat, and techniques to employ with children who refuse food. As was previously reported, nurses received young child feeding education in nursing school and continuing education, however, due to the prevalence of this topic in clinics and in children's health, most nurses reported a need for further education.

While the nurses who were interviewed reported foundational knowledge in basic nutrition and child feeding knowledge, particularly related to breastfeeding and complementary feeding, in-depth knowledge of nutrition and young child feeding practices was lacking. Furthermore, when asked about young child feeding, not one nurse spoke of feeding older children, that is children 2 years of age and older. When asked if their nursing or continuing education contained information on feeding this age group, they reported that the education was "not that specific." A nurse further explained: "They only taught us exclusive and complementary feeding. They didn't specify that you start from 6 or 10 years old or 8 or...." This indicates that young child feeding education for children past the age of 2 was not extensively included in the nurses' nursing education, or in continuing education. However, children 2-5 years of age attend the Community Welfare Clinics and are seen and treated by the nurses, thus, a gap exists in the knowledge and education specific to this age group.

How to receive further nutrition and young child feeding knowledge and education. In their free-responses, the nurses also stated that in order to receive more and current nutrition and young child feeding knowledge, they needed more opportunities to attend regional

workshops, and to be updated when new nutrition and young child feeding knowledge emerged. It became evident that once the nurses left nursing school, their access to new or current information on nutrition and young child feeding was limited, as expressed by one nurse: “Well...if, if they don’t organize workshops, mostly you don’t hear anything about it, so they should organize the workshops more often.”

As resources to expand their nutrition and young child feeding knowledge is limited, particularly in the remote rural health clinics without internet access, most nurses described their dependency on the knowledge of their superiors to supplement knowledge gaps. Nurses (n=28, 68%) stated if they did not know the answer to a nutrition or child feeding question they would ask their superiors. Very few (n=5, 12%) stated they would search for the information themselves, using resources such as books and the Internet. Seven nurses (17%) stated they are never asked questions to which they do not know the answer.

Discussion

Capturing how nurses’ of the KEEA region obtained education and served as nutrition and young child feeding educators for caregivers with young children identified both a need for nutrition support and gaps in nutrition and young child feeding knowledge and education. The nurses in the present study demonstrated adequate knowledge of basic nutrition and young child feeding practices, appropriate methods of delivery of health information to their local populations, and common barriers to educating populations in developing countries, as previously reported (Alles, et al., 2013; Ilmonen, et al., 2012; Wuehler, Hess, & Brown, 2011). The nurses adhered to infant and young child feeding guidelines put forth by the World Health Organization, particularly for children 0-2 years of age (Jones, et al., 2014; WHO, 2003b).

Published research exists on the inclusion of child feeding practices for children up to 7 years of age when evaluating adherence to nutrition guidelines, particularly in African countries (Bowley, Pentz-Kluyts, Bourne, & Marino, 2007); however, a paucity of research is available in international child feeding guidelines for children past the age of 2 years. While the World Health Organization tracks health indicators for children up to 5 years of age (WHO, 2006), and promotes the use of proper child feeding practices as a method to improve child health outcomes for children past the age of 23 months (WHO, 2008), feeding recommendations for children past 24 months are not tracked or widely reported. Perhaps because of this, the knowledge and education of young child feeding practices past the introduction of complementary foods did not form a part of the present study's nurses' young child feeding knowledge and education.

The nurses' stated lack of nutrition and child feeding information, particularly their lack of in-depth nutrition knowledge and need for further education in infant and young child feeding practices, has been identified in other research analyzing the implementation of international nutrition and child feeding guidelines (Wuehler, Hess, & Brown, 2011). Literature suggests that tracking WHO child health indicators is a necessary tool to evaluate and track child health (Jones, et al., 2014). Nurses' reported measuring of children's weight as the most common method to evaluate children's health status and determine the presence of malnutrition is in line with global recommendations (Jones, et al., 2014). Measuring and tracking children's anthropometrics was a useful tool in previous research (GSS, 2015; Jones, et al., 2013; WHO, 2003b).

This study confirmed prior research indicating the role of nurses of the KEEA region as the primary health educators for mothers and caregivers of young children (Egyir, et al.,

2016). The responsibility of nurses to serve as the principle source of health education is common, as is the finding that many nurses and/or health care workers are not properly trained in nutrition and young child feeding practices (Alles, et al., 2013; Ilmonen, et al., 2012; Kris-Etherton, et al., 2014; Johansson, Nyirenda, Johansson & Lorefalt, 2011; Majamanda, Maureen, Munkhondia, & Carrier, 2014). While a few nurses in this study did not feel they needed further nutrition or young child feeding knowledge to act as health educators, the majority of the nurses reported a desire to be better informed. This is reflected in international literature evaluating the nutrition and young child feeding knowledge of nurses who serve as health educators (Ilmonen, et al., 2012; Kim & Choue, 2009).

Poverty and low knowledge levels were barriers perceived by the nurses in this study both influencing how nutrition and young child feeding education was provided to caregivers of young children, and also preventing caregivers from implementing their recommendations. Nurses consistently reported that mothers and caregivers complained of being unable to afford the food the nurses suggested for their children, though the use of locally available foods was emphasized, and the purchase of pre-prepared foods discouraged. Research suggests that food insecurity can alter and/or impact child feeding practices, including increased use of restrictive and permissive parent feeding practices (Feinberg, Kavanagh, Young, & Prudent, 2008). However, research also indicates that children living in impoverished households can thrive when caregivers employ proper child feeding techniques, such as responsive feeding (Nti & Lartey, 2007b).

Access to basic education has improved in Ghana; however, low literacy rates persist (GSS, 2015). In rural areas, such as the KEEA region, literacy rates for women are 54% (GSS, 2015). While literature commonly reports low education levels as a barrier to nutrition

education (Parker, Steyn, Levitt, & Lombard, 2012; Parmenter, Waller, & Wardle, 2000), use of effective, culturally appropriate education methods targeting low-education level populations has been reported (Parker, et al., 2012). Cultural practices are necessary components of effective nutrition and young child feeding education (Kruger & Gericke, 2003). Many nurses in this study used innovative techniques to educate local populations, including songs, pictorial aids, and cooking demonstrations. Cooking demonstrations in particular, both at the clinics and in the clients' homes, were preferred methods to avoid and ameliorate improper complementary feeding practices. However, nurses also identified a lack of resources to perform cooking demonstrations.

Nurses reported a perception that mothers and caregivers chose to not heed their nutrition and child feeding advice, which prevented mothers and caregivers from implementing the nurses' recommendations. Health care workers' perceptions have been found to negatively influence how malnourished patients are evaluated and treated (Johansson, et al., 2011; Puoane, Sanders, Ashworth, & Ngumbela, 2006). However, these studies also indicated that negative perceptions improved with increased awareness through targeted nutrition and young child feeding education (Johansson, et al., 2011; Puoane, et al., 2006).

Nurses in this study did not report knowledge of or providing education on the feeding practices of children past 2 years of age. While the nurses reported providing education on responsive feeding, it is likely this education was restricted to breastfeeding and complementary feeding, as indicated by the nurses' responses to both the closed and open-ended responses. Thus, by not receiving child feeding education from the nurses, the KEEA region's mothers and caregivers of children 2-5 years of age may be at a disadvantage to

employ appropriate feeding practices that promote adequate growth and development of older children. Inferior feeding practices have been linked to poor child health outcomes (Birch & Fisher, 2000; WHO, 2003b), and the ages of 2-5 years is a time when children develop feeding autonomy and self-regulation, (Savage, et al., 2007), which can impact nutrient intake (Birch & Dietz, 2008). Thus, education on proper feeding practices for children 2-5 years of age is important (Birch & Dietz, 2008).

Enhancing the nutrition and child feeding training of nurses is not only a desire of those that participated in this study, but also a need expressed by nurses and researchers throughout the literature (Alles, et al., 2013; Ilmonen, et al., 2012; Kris-Etherton, et al., 2014; Johansson, et al., 2011; Kim & Choue, 2009; Majamanda, et al., 2014). Nutritionists may have a role in adequately training health care workers, particularly in remote areas where specialized nutrition care is difficult to access (Fautsch Macías & Glasauer, 2014; GSS, 2015). While one study reported that increased training of health care workers did not improve nutritional status of at-risk populations (Charlton, Kawana, & Hendricks, 2009), the health care workers in this study also were found to have inadequate motivation, supervision, and care practices (Charlton, et al., 2009). The majority of nurses who participated in the current study reported being motivated to improve their ability to care for their clients through enhanced education.

In-depth nutrition education and further information on child feeding practices for children past the age of two is necessary for health care workers to further promote the health and development of the children in the KEEA region of Ghana. At a minimum, teaching nurses simple nutrition evaluation techniques, such as evaluating a child's diet for diversity of foods, has been proposed to be an adequate substitute for specialized dietary advice

(Onyango, 2003). Finally, teaching parents proper child feeding techniques, such as following an authoritative feeding style of providing healthy food at consistent mealtimes, but allowing the child to determine how much to eat, has been shown to improve both a child's relationship to food and future health status (Birch & Dietz, 2008). As the current educational literature produced by global health organizations, such as WHO, is lacking in child feeding recommendations and educational materials for children past the age of 2, the addition of this information may provide international health care workers the necessary tools to promote healthy child feeding practices and positive child health outcomes for children 2-5 years of age.

Implications for Future Studies

This study identified a need for further nutrition and young child feeding knowledge and education, particularly for children 2-5 years of age, among public health nurses in the KEEA region of Ghana. This study also identified a gap in child feeding educational literature provided by global organizations. The influence of the health care worker and other health care professionals (i.e. nurses, doctors, nutritionists, and community health educators), can enhance or diminish nutrition and young child feeding knowledge and practices among mothers and caregivers of young children (Alles, et al., 2013; Charlton, et al., 2009; Kim & Choue, 2009). This research highlights the importance of understanding the relationship between those that deliver health information and those that receive it. Among international health care workers there exists an ultimate need for information beyond breastfeeding and complementary feeding that includes enhanced, in-depth nutrition and young child feeding education, particularly for children 2-5 years of age.

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Appendix A: International Review Board Approval Letter

To: Samantha Ramsay

From: Jennifer Walker
Chair, University of Idaho Institutional Review Board
University Research Office
Moscow, ID 83844-3010

Date: 4/24/2015 4:38:40 PM

Title: Ghanaian nurses as educators: Examining nutrition and young child feeding education through Ghanaian health clinics

Project: 15-740

Certified: Certified as exempt under category 2 at 45 CFR 46.101(b)(2).

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for the above-named research project has been certified as exempt under category 2 at 45 CFR 46.101(b)(2).

This study may be conducted according to the protocol described in the Application without further review by the IRB. As specific instruments are developed, modify the protocol and upload the instruments in the portal. Every effort should be made to ensure that the project is conducted in a manner consistent with the three fundamental principles identified in the Belmont Report: respect for persons; beneficence; and justice.

It is important to note that certification of exemption is NOT approval by the IRB. Do not include the statement that the UI IRB has reviewed and approved the study for human subject participation. Remove all statements of IRB Approval and IRB contact information from study materials that will be disseminated to participants. Instead please indicate, 'The University of Idaho Institutional Review Board has Certified this project as Exempt.'

Certification of exemption is not to be construed as authorization to recruit participants or conduct research in schools or other institutions, including on Native Reserved lands or within Native Institutions, which have their own policies that require approvals before Human Subjects Research Projects can begin. This authorization must be obtained from the appropriate Tribal Government (or equivalent) and/or Institutional Administration. This may include independent review by a tribal or institutional IRB or equivalent. It is the investigator's responsibility to obtain all such necessary approvals and provide copies of these approvals to ORA, in order to allow the IRB to maintain current records.

As Principal Investigator, you are responsible for ensuring compliance with all applicable FERPA regulations, University of Idaho policies, state and federal regulations.

This certification is valid only for the study protocol as it was submitted to the ORA. Studies certified as Exempt are not subject to continuing review (this Certification does not expire). If any changes are made to the study protocol, you must submit the changes to the ORA for determination that the study remains Exempt before implementing the changes. Should there be significant changes in the protocol for this project, it will be necessary for you to submit an amendment to this protocol for review by the Committee using the Portal. If you have any additional questions about this process, please contact me through the portal's messaging system by clicking the 'Reply' button at either the top or bottom of this message.

Jennifer Walker

Appendix B: Email Confirmation of Approval to Proceed with Study in Ghana

From: jonathan Kissi [mailto:kissijonathan@yahoo.com]
Sent: Friday, May 1, 2015 10:03 PM
To: Ramsay, Samantha (sramsay@uidaho.edu) <sramsay@uidaho.edu>
Subject: Re: Alberta's place

Least I forget, our director has accepted your request

[Sent from Yahoo Mail on Android](#)

Appendix C: Structured Interview Questionnaire

INTERVIEW QUESTIONNAIRE

Nutrition and Young Child Feeding Education from Nurses at Ghanaian Health Clinics

First, I would like to ask you a few questions about your nursing education.

1. Please provide the following information about your nursing certificate/diploma.

- Name of School/Training College/University:

- Type and level of certificate/diploma:

- Title of certificate/diploma:

Now, I would like to ask you some questions about your education in nutrition and young child feeding. Nutrition refers to education about healthy eating to live healthier lives. Young child feeding education refers to how, when, and what kind of foods are offered to children 0-5 years of age to promote growth and development.

2. Did your nursing education provide with classes about **nutrition**, such as education about nutrients in food and how those nutrients affect our bodies and an individual's health?

No

Yes

- Number of individual nutrition classes

3. During nursing school, tell me specifically what you were taught about **nutrition**.

- *Types of classes*

- *Macronutrients, micronutrients, diseases, recommendations for different ages*

4. Did your nursing education provide you with classes about **young child feeding practices**, which include how, when, and what kind of foods are offered to children?

No

Yes

- Number of individual young child feeding classes

5. During nursing school, tell me specifically what you were taught about **young child feeding**.

- *Probes: Types of classes*

- *Breastfeeding, complementary feeding, food refusal, problems with malnutrition*

6. After **finishing** your nursing diploma, what type and how many classes have you taken about **nutrition**?

I have not taken any nutrition classes since finishing my nursing diploma

Nutrition classes offered at a health facility:

- Number of classes

- Title or name of class

Nutrition classes at a college/training school/university:

- Number of classes

- Title or name of class

Other (*please specify*):

7. After **finishing** your nursing diploma, what type and how many classes have you taken about **young child feeding**?

I have not taken any young child feeding classes since finishing my nursing diploma.

Young child feeding classes offered at a health facility:

- Number of classes

- Title or name of class

Young child feeding classes at a college/training school/university:

- Number of classes

- Title or name of class

Other (*please specify*):

8. At this clinic, how often do the mothers or caregivers with children 0-5 years of age ask you questions about **nutrition**, *such as what types of foods should be given to a child*:

At every child welfare clinic appointment

At a few child welfare clinic appointments

Never

9. At this clinic, how often do the mothers or caregivers of young children ask you questions about **how to feed their children**, *such as how to offer foods to children*:

At every child welfare clinic appointment

- At a few child welfare clinic appointments
- Never

Next, I would like to ask you some specific questions about nutrition and young child feeding.

10. How confident do you feel in providing education to mothers and caregivers about **breastfeeding**? (*Choose one*).

- Very confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

11. Until what age is it recommended that a mother feed nothing more than breast milk?

- Birth to 6 mos
 - Don't know
 - Other

12. Describe how you educate mothers about **breastfeeding**.

- *Probes: Verbal, exclusive breastfeeding, stopping, mastitis, difficult latch, low milk, poor growth?*

13. How confident do you feel in providing education to mothers and caregivers about **complementary feeding**? (*Choose one*).

- Very confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

14. At what age should babies start eating complementary foods in addition to breast milk?

- At 6 months
- Don't know
- Other

15. Describe how you educate mothers and caregivers about **complementary feeding** (giving babies solid foods)?

- *Probes: signs to start, foods to start with, foods to avoid, nutrients in complementary foods?*

16. How confident do you feel in providing education to mothers and caregivers about how to prevent **iron-deficiency anemia** in children 0-5 years of age? (*Choose one*).

- Very confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

17. How can iron-deficiency anemia be prevented?

- Don't know
- Eat/feed iron-rich foods/diet
- Eat/give vitamin-C foods during/after meals
- Take/give iron supplements
- Treat other causes (diseases and infections)
- Continue breastfeeding (for 6–23 months old)
- Other

18. Describe how you educate mothers and caregivers about children with **iron-deficiency anemia**?

- *Probes: Verbal education, signs/symptoms, diet, affects growth?*

19. How confident do you feel in providing education to mothers and caregivers about how to **encourage young children to eat?** (*Choose one*).

- Very confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

20. In what ways should you encourage young children to eat?

- Don't know
- Giving them attention
- Clap hands
- Make funny faces/play/laugh
- Modeling
- Say encouraging words
- Draw the child's attention
- Other

21. Describe how you educate mothers and caregivers about encouraging young children to eat.

- *Probes: What about with new foods? Repeated exposure, pressure, forcing, monitoring, pairing with a familiar food, modeling*

22. How confident do you feel in providing education to mothers and caregivers about feeding children who **refuse food**, or are **picky eaters?** (*Choose one*).

- Very confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

23. In what ways should you feed children who are refusing to eat, or are picky-eaters?

- Offer new foods multiple times
- Offer a variety of foods
- Pair a new food with a familiar food
- Model eating new foods
- Feed only the foods he/she will eat
- Force the child to eat new foods

24. Describe how you educate mothers and caregivers about **food refusal**?

- *Probes: child won't eat, selective eating or eats only one food, repeated exposure*

25. How confident do you feel in providing education to mothers and caregivers about **washing their hands properly**? (*Choose one*).

- Very Confident
- Confident
- Somewhat confident
- Not confident
- Not confident at all

26. In what ways can you prevent chronic diarrhea in children?

27. Describe how you educate mothers and caregivers about **food safety and sanitation**?

- *Probes: verbal/demonstrate, hand-washing, clean water, cooking/preserving food, illness preventions*

- Use clean water for cooking/washing
- Explain importance of washing hands before eating.
- Don't know
- Other

28. What are the barriers or challenges to talking to mothers and caregivers about **nutrition**?

- *How do mothers/caregivers follow your recommendation?*
- *What happens when you don't know the answer?*

29. What are the barriers or challenges to talking to mothers and caregivers about **young child feeding**?

- *How do mothers/caregivers follow your recommendation?*
- *What happens when you don't know the answer?*

30. What nutrition and young child feeding information do you **wish you knew more about**?

- *Probes: How does this influence what you say to mothers/caregivers?*

31. How could your **clinic better educate its nurses** about nutrition and young child feeding?

- *Probes: How do you like to learn new information?*

32. Do you have anything else you'd like to add?

Finally, I would like to ask you a few questions about yourself.

1. Which of the following tribes do you belong to? (*Choose all that apply.*)

Akan

Ewe

Nzema

Ga

Other

2. What is your gender?

Male

Female

3. What is your age?

- Years old

4. How tall are you?

- Centimeters

5. How much do you weigh?

- Kilograms

THANK YOU!!!!

Appendix D: Informed Consent

UNIVERSITY OF IDAHO

INFORMED CONSENT FORM

“Ghanaian nurses as educators: Examining nutrition and young child feeding education through Ghanaian health clinics.”

You are being asked to participate in a research study about the amount and type of nutrition and young child feeding education of nurses, and how nurses are using this education in health clinics with mothers and caregivers of young children. This consent form will give you the information you need to decide to be in the study or not. You may ask questions at any time about the research and anything on this form that is not clear. We will give you a copy of this form for your records. The University of Idaho Institutional Review Board has certified this study as Exempt.

PURPOSE AND BENEFITS: The purpose of this study is to understand the education and knowledge of nurses in Ghana and how they are educating mothers and caregivers with young children about nutrition and young child feeding. This study will help health care clinics and organizations recognize gaps in nutrition and young child feeding education, and increase understanding about how to educate mothers and caregivers with young children about nutrition and young child feeding.

PROCEDURE: If you choose to participate, you will take part in an interview that last approximately 30 minutes. You will be asked to answer questions about your education in nutrition and young child feeding practices and personal characteristic questions such as gender, age, height, and weight. 10 questions will be audio-recorded. Following the interview you will receive an incentive pen.

VOLUNTARY NATURE OF THE STUDY: You do not have to answer any question in the questionnaire or during the interview if you do not wish to. No one will treat you indifferently if you decide not to be in the study. If you decide to join the study now, you can still change your mind during the study. If you feel stressed during the study you may stop at any time.

CONFIDENTIALITY: Your responses will be manually recorded on a questionnaire and/or audio-recorded; however, your name will not be recorded on the tape. You will not be required to write your name in any part of the written report of the research. All of your information and interview responses will be kept confidential. The researcher will not share your responses with anyone other than the research supervisor.

PHOTOGRAPHS: You are being asked for permission to take your picture. The photo will be used in future presentations, exhibitions, and education related to this research. Your name will not be connected to your picture; however, there is a chance that someone might recognize you. You may decline having your picture taken at any time without consequences.

PARTICIPANT'S STATEMENT

I acknowledge that I have been informed of the type and purpose of this research study and that I have read and understood the information presented above, and that I have received a copy of this form for my records. If I have any questions or concerns regarding the study or my participation in the study, I can contact Samantha Ramsay, Assistant Professor and Director of the CPD, School of Family & Consumer Sciences, and University of Idaho- Phone: 208-885-6026 and Jennie Davis, Phone: 541-408-0790.

Printed name of Participant

Signature

Date

PHOTO CONSENT STATEMENT

I authorize that my picture be taken for use in future presentations, exhibitions, and education related to this research.

Printed name of Participant

Signature

Date

RESEARCHER

Printed name of Researcher

Signature

Date

Jennie Davis, Graduate Student, School of Family and Consumer Science, University of Idaho

Samantha Ramsay, PhD, RDN, LD, Assistant Professor of Foods and Nutrition and Director of the CPD, School of Family & Consumer Sciences, University of Idaho

Appendix E: Example of Coded Transcription

	170	- N3: A. Yeah. You know foods...[pause].
	171	- PI: Perfect. Ok.
	172	18. Describe how you educate mothers and caregivers about children
	173	with iron-deficiency anemia ?
173-175: causes (low blood)	174	- [11:12] N3: Okay. Iron deficiency anemia is about the child
	175	having low blood...or... the person is becoming, becoming
175-178: effects of anemia (weak, can't do anything, pale)	176	anemic, the person is very weak. The person can't do
	177	anything. So the mother should be very observant of the
	178	child. And if she see any signs...first the child will become
179-183: treatments (send child to hospital or health center; don't sit at home)	179	pale, become weak. So the mother, if the mother doesn't
	180	have anything, she should send the child to hospital for
	181	treatment. Or... if she see any health worker around she
183: effects (death)	182	should come and tell them so that the health worker can
	183	help. She shouldn't sit at home and say they are going to
	184	treat it themselves. It's the worst thing. The child can die,
	185	there at the house, so for them to call out any time they see
	186	sign of iron deficiency...eh....
	187	- PI: They should tell somebody.
	188	- N3: Yeah....
	189	
	190	19. How confident do you feel in providing education to mothers and
	191	caregivers about how to encourage young children to eat ?
	192	- Very confident.
	193	20. In what ways should you encourage young children to eat?
193: Draw their attention (colorful bowls)	194	- [12:27] N3: Okay, like, uh, servicing in a colorful bowl. Eh,
194: Play/laugh (sing)	195	sometimes you, sometimes you have to sing for them. When
	196	they are eating, some children when they, when you give
196: Other (patience)	197	them then they go and play. When they are going, leave
198-199: Say encouraging words	198	them to go and play. When they come, then you give. You
199: Other (gradually)	199	be singing. Oh, there, there it is. Oh, that's my boy. That's
	200	my baby. Time for food. Little by little. That is how it goes.
	201	You can't give it to them just like that. They won't eat. So
	202	it's little by little.
	203	- PI: Okay, thank you.

APPENDIX F:
Nurses' Responses to Close-Ended Knowledge and Education Questions
Categorized as "Other"

Main Categories	N (%)*
Iron Deficiency Anemia	11 (27%)
How can iron deficiency anemia be prevented in children?	
Other: <ul style="list-style-type: none"> Vitamin A Adequate quantity/intake of food Iodine Prevent worms Prevent blood loss through injury Hygiene/sanitation 	
Child Feeding	27 (66%)
In what ways should you encourage young children to eat?	
Other: <ul style="list-style-type: none"> Feed gradually Have time Variety Force Don't force Hygienic preparation of food Clean appearance of mother Small quantities Feed in the presence of other children Feed food child likes Proper nutrients Follow the child to assure the child eats 	
Food Refusal	30 (73%)
Describe how you educate about feeding a child who is refusing to eat.	
Other: <ul style="list-style-type: none"> Give child attention Make child comfortable Look at other causes/illnesses Colorful bowls Sing Have time Feed frequently Mother's nutrition health Nutrient dense foods Small quantities Responsive feeding Have others feed child 	

Food Safety & Sanitation	How can you prevent chronic diarrhea in children?	25 (61%)
	Other: <ul style="list-style-type: none">Clean utensilsCover foodsAvoid allowing child to put anything in his/her mouthVaccinateClean environmentGo to clinicBF to 6 monthsAvoid pacifiersServe warm foodMosquito nets/covers for bedsHand washing after toilet/all activitiesHygienic food preparation	

*Each answer categorized as a response reported by individual nurses.

APPENDIX G:
**Nurses' Categorized Responses to What Information They Provide in Nutrition and
 Young Child Feeding Education**

Main Categories	N (%)*	
Breastfeeding	Describe how you educate about breastfeeding?	
	How nutrition effects BF	1 (2%)
	Baby to breast immediately after birth	7 (17%)
	Positioning	27 (66%)
	Difficulties	23 (56%)
	Exclusive BF	17 (41%)
	Reasons to BF	21 (51%)
	On demand BF	11 (27%)
	Formula	6 (15%)
Complementary Feeding	Describe how you educate about complementary feeding.	
	When to start	18 (44%)
	Why do CF	4 (10%)
	Nutrients in CFs	32 (78%)
	How to offer CFs	35 (85%)
	Hygiene/Food Safety	12 (29%)
Iron Deficiency Anemia	Describe how you educate about preventing iron deficiency in children.	
	Causes	17 (41%)
	Effects	20 (49%)
	Treatments	16 (39%)
	Food/Nutrients	27 (66%)
Child Feeding	Describe how you educate about encouraging young children to eat.	
	Variety/try multiple foods	9 (22%)
	Finances/affordability	3 (7%)
	Preparation	19 (46%)
	Feed gradually/have patience	30 (73%)
	Good nutrition	4 (10%)
	Verbal cues	4 (10%)
	Multiple exposures	6 (15%)
Food Refusal	Describe how you educate about feeding a child who is refusing to eat.	
	Offer new foods multiple times	11 (27%)
	Offer variety	19 (46%)
	Pair new foods with a familiar food	3 (7%)
	Model eating behaviors	4 (10%)
	Feed only foods the child likes	13 (32%)
	Force	5 (12%)
	Other**	30 (73%)

Food Safety & Sanitation	Describe how you educate about food safety and sanitation?	
	Wash hands of both child and mother	26 (63%)
	Seek medical help for diarrhea	3 (7%)
	Hot food/keep covered	12 (29%)
	Clean and covered eating utensils	18 (44%)
	Use salted water for washing fruits/vegetables	11 (27%)
	Keep house/environment clean	17 (41%)
	Don't leave food/utensils out	16 (39)
	Keep child's utensils separated from family's	2 (5%)

*Each answer categorized as a response reported by individual nurses.

**A full description of answers categorized as "Other" is available in Appendix F.