

**Brenda F. McGadney-Douglass, Richard L. Douglass,
Nana Araba Apt and Phyllis Antwi**

Ghanaian Mothers Helping Adult Daughters *The Survival of Malnourished Grandchildren*

Childhood malnutrition in its various forms continues to be a major factor in high rates of infant and child mortality and challenged child development in emerging nations such as Ghana. Although considerable investments have been made by governments and private agencies to address this problem, many programs have failed. Efforts that promote nutrition education, or dietary intervention, such as food supplements and vitamins have often failed. A major barrier to the success of these formal approaches to reduce malnutrition is the reliance on imported western solutions and non-indigenous personnel. Thus, it is the belief of the authors that informal, indigenous support provided by Ghanaian mothers (grandmothers) to daughters of malnourished children, leads to the survival of malnourished children, independent of the formal health care services that may be available in the community. The long-term well-being and children's compliance in nutritional rehabilitation programs is directly related to primary caregiving provided by the grandmothers and other senior women within the family structure.

Childhood malnutrition in its various forms continues to be a major factor in high rates of infant and child mortality and challenged child development in emerging nations such as Ghana. This is generally, but not exclusively, true among the poor. For decades, although considerable investments have been made by governments and private agencies to address this problem, many programs have failed. Efforts that promote nutrition education, or dietary intervention, such as food supplements and vitamins have often failed. A major barrier to the success of these formal approaches to reduce malnutrition is the reliance on imported western solutions and non-indigenous personnel. Thus, it is the belief of the authors that informal, indigenous support, provided by Ghanaian mothers (grandmothers) to daughters of malnourished

children, leads to the survival of malnourished children, independent of the formal health care services that may, or may not, be available in the community. The authors believe that long-term well-being and children's compliance in nutritional rehabilitation programs is directly related to primary caregiving provided by the grandmothers and other senior women within the family structure. Furthermore, without such extended familial support, the challenges faced by, for instance, a single mother with malnourished children, are nearly insurmountable.

The purpose of this paper is to present findings from field studies conducted (1999 and 2001-02) by the authors on the role of Ghanaian grandmothers in the survival of adolescent/young adults inflicted with childhood *kwashiorkor*. Also, included in the paper will be a discussion of implications of study findings for reforms and new initiatives for public policy, clinical practice, and research.

Background

In July and August 1999, our research team collected pilot data from several families on the 15-17 year survival experiences of young adults with histories of *Kwashiorkor* as toddlers in Accra, Ghana (McGadney-Douglass *et al.*, 1999, 2000, 2001). The authors examined the role and psycho-social characteristics of these families. The hypothesis for the original study (McGadney-Douglass *et al.*, 1999) was that children who received sustained support from families, namely mothers, while participating in the nutritional rehabilitation program would probably not have a long-term negative impact (psycho-social development) or consequence of early trauma related to experiences with *kwashiorkor*.

Preliminary findings suggested that one explanation for the success of the *kwashiorkor* survivors investigated might stem from the presence and active supportive intervention of the grandmothers living in the household. Moreover, family structures and the availability of a multigenerational support system may be critical to the welfare of babies and toddlers (Oppong, 1999). Specifically, the roles of grandmothers appears to be essential to support daughters caring for malnourished children while adhering to a rigorous weekly twenty-four month *kwashiorkor* rehab program (Agarwal *et al.*, 1997, Oppong, 1999; Stanton, 2001).

Rationale for study

The relationship between informal social supports provided by Ghanaian grandmothers to the survival of their daughter's children inflicted with childhood *Kwashiorkor* has not been studied. Although several small studies in the region (Chad and Nigeria) have documented positive impacts on children's nutritional status if help and support from kin and others of various kinds (assistance with cooking, water fetching, etc.) are given to their mothers, none focus on the role played by grandmothers (Oppong, 1999). As contributors to

the growing economy of Ghana, the viability of potentially large numbers of adults with childhood histories of *kwashiorkor* is a question of both clinical, social, and policy significance. Each year over 15,000 cases of *Kwashiorkor* are identified in the hospitals of Accra (Ayettey, 2001). According to Oppong,

by now the long term consequences of such early, prolonged suffering are clear ... with potentially devastating impacts for the large numbers of individuals involved and the economies of their nation states. (1999: 36)

Literature review

*Kwashiorkor*¹ is one of the severest forms of childhood malnutrition caused by a lack of protein and caloric content in the diet.² The name is from the language of the Ga people in coastal Ghana (Stanton, 2001). It was first coined and described in Ghana by British physician Cicely Williams in 1928 (Ashitey, 1994; Stanton, 2001). Jennifer Stanton (2001) noted that Dr. Williams often listened to the Ga people, mainly mothers and grandmothers of the infants that she treated, gaining great insight into their illness.

This nutritional disorder normally afflicts toddlers and frequently leads to death of young children. Chief signs include oedema (watery swelling) leading to distended or swollen bellies, sometimes accompanied by reddish coloration or orange-tinted of the hair/skin, a darkening and peeling of the skin at points of flexion and pressure, and changes in the liver.

Today, *kwashiorkor* is endemic in Ghana (see Table 1). The prevalence of severe malnutrition among children in both urban and rural Ghana is primarily due to poverty and inadequate nutritional knowledge of the local population (Stanton, 2001). Unlike most of worldwide *kwashiorkor* incidence that is associated with war, crop failures, civil disturbances or natural disasters, in Ghana *kwashiorkor* is endemic and persistent even in normal and economically stable families.

Children from the poorest households are the most likely to be malnourished and, in particular, to be under weight. The worst affected groups include infants and pre-school children (GHDR, 2001). Lily Yaa Appoh (Appoh & Krekling, 1999) reported in her micro-study from the Volta Region of Ghana that women's beliefs about the causes of *kwashiorkor* are significantly related to the nutritional status of their children. Findings from the children categorized as well nourished (n=49) compared to those suffering from *kwashiorkor* (n=46) indicated that mothers who lacked knowledge about the causes of *kwashiorkor*, were significantly more likely to have a child with the condition.

Reportedly, the persistent malnutrition among children has a negative impact on Ghana's human resource base. Ghana's Minister of Health, Richard Anane, stated that the country might lose \$300 million within the next decade if the rate of malnutrition in children and expectant mothers continues to rise.

Table 1: Major Causes of Under-Five Year Old Mortality (1979-1983) in Ghana

Cause	Percentage of Deaths
Measles	12.6
Pneumonia	9.1
Low Birth Weight	8.2
Anemia	7.2
Diarrhea (all forms)	6.8
Kwashiorkor Malnutrition	3.4
Marasmus Malnutrition	2.7
Tuberculosis	0.6
All other causes	42.7

Note: Recorded total number of deaths during period: 25,502
Source: National Nutrition Survey. Center for Health Statistics, Ghana Ministry of Health, 1986.

Although there are a lot of children suffering from malnutrition in Ghana, the authors of this paper believe that much can be learned from family caregivers of survivors of *kwashiorkor* that can be used to develop public policies and programs to strengthen effective treatment of malnourished children supporting both informal and formal approaches to well-being. Formal supports include the early identification and diagnosis of *kwashiorkor* children by physicians and nurses and subsequent compliance in a nutritional rehabilitation/treatment outpatient day program (24-36 months) at a local polyclinic. The authors believe that informal family supports also ensure the intergenerational survival of most children with *kwashiorkor* and productive participation in development of their countries, especially in Ghana.

Informal family support may significantly contribute to child survival, particularly those who are ill. Findings from the largest empirical study (n=1,057) conducted on Ghanaian elders (Apt, 1996) suggested that grandmothers significantly contributed to the family's functioning. In this study, Ghanaian grandmothers provided informal support (instrumental/emotional) by acting as surrogate mothers, providing childcare, caring for long-term sick/disabled children, providing financial assistance, food preparation, house cleaning, sewing/mending, washing/ironing, gardening, tending animals, shopping, other domestic tasks, counselling/advice, settling family disputes, fulfilling family ceremonial roles, and acting as a family trustee.

In response to her evaluation of intergenerational relationship between elders and young children, Nana Araba Apt (1996) wrote:

...old and young support each other's activities with certain delineation's, the interplay of economic and social activities defining this form.... Among many ethnic groups of Ghana, the factor of age is of considerable importance in structuring the priority of interpersonal relationships. Consequently, the aged formed quite an integral part of the family unit, holding definite and high ranking positions.... The health care role of the woman is a long-standing tradition; elderly women were accorded the status of experts in social and medical problems, folklore, and tradition ... ageing women's social roles remain unchanged. Grandmothers are actively involved in the caring and nurturing of their grandchildren. In performing this role, grandmothers provide food, pay school fees and provide health care. (1996: 30-31).

Methodology

Research Team

Principal investigators included, a social worker and social epidemiologist from the United States. Ghanaian research team members consisted of a public health physician, gerontological social scientist, and a nutrition consultant who were all faculty at the University of Ghana, Legon.³ Other Ghanaian support staff included two community-based public health nurses, and a field research assistant.⁴ The Ghanaian team acted as translators for those individuals who chose to speak in their native language, Ga, or other vernaculars.

Sample selection and recruitment

The convenience sample from this study consisted of index cases and immediate family members who were in the home at the time of diagnosis and treatment of the index cases. Index cases were selected on the basis that they were adolescents or young adults, had received a minimum of two years of treatment for *kwashiorkor* malnutrition in a nutritional rehabilitation program, and had a grandmother or family member present who could report the role of the grandmother in their survival. All subjects interviewed were video and audio taped and paid the equivalent of \$20.00 in Ghanaian currency.

Community health nurses who had been living and providing services in this community for more than 18 years were employed to assist with the identification, recruitment, data translation, and interviewing of research participants in the Accra metropolitan area.

Sample demographics and characteristics

Group family interviews were held from November 2001 to April 2002 with 17 index cases (one set of twins) and 16 families units, totalling 62 persons. Due to young ages of two index cases, six and eleven, two families (six in all), although interviewed and compensated, were dropped from the

study. The final sample consisted of 15 index cases (one set of twins) and 14 family units, totalling 48 persons. Index cases were almost evenly divided between males and females, seven and eight respectively. Males reportedly ranged in age from 12–17 (average age 15.70) and females were reported to be from age 14–23 (average age 17.66). Average size of family group members interviewed (excluding index case): 3.05; range three to four. In contrast to gender of the index cases, family members interviewed were almost always female, 27 to 4. Eleven mothers who participated ranged in age from 32–51 with a mean of 39.64 years. Six Aunts ranged in age from 42 to 54 (average age 47.8). Three of the Aunts became surrogate mothers to four index cases due to the premature death of their mothers (and in two cases both parents). Fathers were present at two interviews,⁵ aged 45 and 50. There were a total of ten grandmothers (mean age 56.81) and one great-grandmother who was 100 years old. Siblings who were interviewed included two half-brothers, ages 25 and 27, and a sister age 28.

All of the interviews took place in the densely populated and very impoverished fishing communities of Jamestown and Chorkor which are in urban Accra.

Structure of instrument

Qualitative questions were designed around the following variables/themes:

- Kwashiorkor/malnutrition history (medical care and rehabilitation);
- Informal caregiving (grandmothers and surrogate grandmothers and other relatives);
- Formal caregiving and intervention (nutrition rehabilitation program participation).

Findings

Kwashiorkor/malnutrition history

Children in the study treated for *kwashiorkor*, presented symptoms as young as six months and as old as three years of age with a primary symptom of excessive diarrhea described as “toilet watery”. The age of origin of the condition is consistent with the literature (Appoh & Krekling, 1999; Stanton, 2001).

The majority of mothers and surrogate mothers believed that the child became sick due to the lack of breast milk and/or giving cocoa as a food supplement. This finding is consistent with the study that Appoh (Appoh & Krekling, 1999) conducted on the knowledge that women in the Volta Region of Ghana had about the causes of *kwashiorkor*. Of the 95 women interviewed (46 had well nourished children and 46 had children suffering from *kwashiorkor*), 67 believed that it was caused by a lack of (the right type of) food.

Family members, especially grandmothers, indicated that they believed the health care given to their children at the nutritional rehabilitation polyclinic was successful. After the intervention, their children began to crawl/walk, eat normally, and participate in the family.

Informal caregiving: grandmothers and surrogate relatives

Grandmothers, surrogate mothers, and family members presented the grandmothers as being very strong, self-reliant and sufficient. This was evidenced in the following testimonials of instrumental and financial support given to their daughters and grandchildren (malnourished and healthy).

My mother (grandmother) went to the hospital, cooked fresh food and light soup and gave him medicine ... she sold drinks (palm wine) to earn funds ... without the help of my mother my son would have died.

Grandmother sold small items and gave to daughter to take baby to clinic; now stays home to help with kids and pay school fees

My daughter was so young at the time that I would go with her to the clinic or take the baby myself ... I also sold Kenke for income.

Reportedly, another grandmother worked as a nursery school teacher to support the family while her daughter stayed home with the index case.

Formal caregiving and intervention: nutrition rehabilitation program

Most of the grandmothers of the kwashi-ill toddlers advised their daughters to seek help. This is consistent with findings on the role of Ghanaian elders from a study conducted by Social Gerontologist Nana Araba Apt (1996). She reported that elderly Ghanaian women were accorded the status of experts in social and medical problems. In our study, a mother of triplets said it wasn't until two died a couple of months apart that she sought formal treatment for the last child at the insistence of her mother.

My mother advised me to take her to the hospital ... a week later I took her ... didn't know what was wrong ... afraid that she was getting worse and I did not want her to die.

Another grandmother was adamant in telling us that she was skilled in observing that her grandchild was sick and did not hesitate to tell her daughter to seek medical treatment because she knew how healthy babies behave and looked and knew that this one was ill. She was the mother of twelve children; this included 4 multiple births of twins. She also happily informed us that both her oldest and youngest children had delivered twins too!

My mother told me to take my son to the clinic ... took him to the clinic and I was told to bring him back at another time by the doctor ... when symptoms worsened and became more pronounced I returned to the poly-clinic and then was referred by the physician to the malnutrition program.

The majority of *kwashiorkor* survivors in the study were evaluated and treated at a community-based outpatient Nutritional Rehabilitation Program in the polyclinic. All received a “kwashi diet” (see Figure 1) consisting of vitamins, distribution of milk powder, a soybean-whole-wheat blend or fish powder, an oil-sulgum-wheat-soy blend. All were given instruction in food preparation (cooking of porridge, Kwashi diet) and sterilization of cooking utensils and baby bottles, respite in nursery, and education and counselling at a pre-natal program

One family, however, admitted seeking indigenous treatment (herbalist/spiritualist) prior to securing traditional medical care. This is what they said:

[We] ... thought his illness was “witchcraft” ... maybe someone in the family was hurting the boy.... First we took him to a spiritualist and they prayed for him and did some rituals because he did not get better we took him to the clinic.... Later [we] found out it was a sickness.

Appoh found in her study of Ghanaian mothers of well-nourished (n=49) and *kwashiorkor* (n=46) children in the Volta Region that 67 believed correctly that *kwashiorkor* was caused by a lack of food in contrast to 27 women who responded incorrectly, 17 of whom believed that *kwashiorkor* was caused by evil spirits/witches or *gbogbovo/adzetowo* (1999: 54). There was a statistically significant strong relationship with beliefs that the mothers held about the causes of *kwashiorkor* and the nutritional status of their children. In other words, mothers with correct beliefs about the causes of *kwashiorkor* had children with better nutritional status than mothers with incorrect beliefs. Many of the children suffering from *kwashiorkor* in Appoh’s study wore amulets around their bodies that they thought would ward off the evil spirits causing the condition.

For more than ten years the Ministry of Health (MOH) in Ghana has embarked on nutritional education for mothers in health centres or polyclinics (Appoh, 1999). Here nutritionists teach, enlighten, advise or acquaint family members with effective methods to ensure survival of *kwashiorkor* victims through adequate food preparation and feeding from two to three years daily. Caregivers, mostly grandmothers, were taught how to sterilize utensils, give vitamins, and prepare clean water and a nutritious porridge that they feed to the child onsite (breakfast and lunch) and take a large portion home for an evening meal. Sites are equipped with baby beds, toys, cooking ovens, etc., for the day-long stay. The impact of formal treatment on the survival of these children was documented by Victor Lavy, John Strauss, Thomas Duncan and Philippe De

**Figure 1: Kwashi Diet
Composition of a PEM Rehabilitation Diet¹**

Meal	Content
<p><i>Breakfast Options</i></p> <p>Corn pap² with akara or moi-moi³</p> <p>Boiled yam or bread with fish stew</p>	<p>Corn, sugar, black-eyed beans, pepper, onion, crayfish, palm-oil, salt.</p> <p>Bread, yam, fish, pepper, fresh tomatoes/ tomato paste, onion, palm-oil, salt.</p>
<p><i>Lunch Options</i></p> <p>Amala, Eba or Eko (Agidi) with vegetable soup</p>	<p>Dough from yam flour, fermented and fried cassava meal or fermented corn flour, meat or fish, crayfish, egusi (melon seed), fresh tomatoes/tomato paste, pepper, onion, leafy vegetables, palm oil, salt.</p>
<p><i>Dinner Options</i></p> <p>Bean or yam pottage</p> <p>Rice with stew</p>	<p>Yam or black-eyed beans, crayfish, pepper, onion, fresh tomatoes/tomato paste, palm oil, salt.</p> <p>Rice, meat or fish, pepper, onion, fresh tomatoes/tomato puree, palm oil, salt.</p>
<p>¹Adapted from Smith, I. F., O. Taiwo & M. H. N. Golden, "Plant Protein Rehabilitation Diets and Iron Supplementation of the PEM Child," <i>European Journal of Clinical Nutrition</i> 43 (1989): 350-355 and Smith, I.F. & E. O. Ojofeitimi, <i>Nutrition and Diet Therapy for Health Care Professionals in Africa</i>, Ibadan, Nigeria: Y-Books Publisher, 1995.</p> <p>²Corn gruel commonly called pap is made from fermented corn (maize) from which most of the hull has been removed during processing.</p> <p>³Akara is seasoned and fried bean balls; moi-moi is steamed bean pudding.</p>	

Vreyer (1995). They discovered during their study of the impact of the quality of health care on children's nutrition and survival in Ghana that child services (measured by the weekly hours of availability of child health care) has a significant and positive impact on the survival of children both in samples in rural and urban Ghana. If child services were extended by an additional hour a week (approximately a 15 percent increase), the median survival duration of children would increase by one percent in urban areas; and if rural child services equalled the urban mean (11.5 hours a week), the mean survival time of rural would increase by 9.3 percent.

Limitations

Any exploratory field research faces limitations in replicability and generalizability. If this is extended to conducting such field research in the neighborhoods of urban Accra, Ghana, such limitations have the potential of being severe. In order to address these concerns the research was thoroughly documented in several concurrent ways including video and audio tape and the use of independent observers who took copious notes. Translators ensured that the respondents understood the questions that were posed and also that the team members understood the responses. Still this study had limitations that are important to appreciate in areas of sample selection, response validity and generalizability.

The selection of families was dependent upon the memories of public health nurses assigned to the Princess Marie Louise Children's Hospital in Accra because for cases such as those we sought to study there are no long-term medical records. The reasons that records fail to survive for long periods of time in Ghana include many factors such as the physical deterioration of paper due to high humidity and storage capacity. The Princess Marie Louise Children's Hospital is the site of the first entry of the Ga phrase *kwashiorkor* into the medical lexicon. The sample reflected families that had been in the care of the nursing staff of this one hospital and had experienced a child with kwashiorkor as long as 18 years prior to the interviews. Issues of memory, sample bias, and sample mortality are all substantial.

In addition, all of the families were Ga, which indicates limited generalizability to other ethnic groups in Ghana or elsewhere. Within the traditional Ga culture there is little attention to the documentation of birth dates or the calendar date of sentinel events in peoples' lives. Therefore the precision of dates, ages, and the progression of events for this sample could be challenged in absolute terms. Relative validity is expected to be accurate to the extent that the events of childrearing, clinical experiences, births and deaths were described in association with other key events, including political and historical events that served as markers in time. Poor literacy, multiple vernacular languages, the potential desire to please the research team, and an ongoing challenge to preserve privacy in the often-crowded conditions in which interviews were conducted all could test the replicability of our findings.

To address these issues the process was systematic and each family interview was conducted in strict accord with the written protocol.

These limitations indicate that generalizability to populations that are substantially different or to circumstances in which malnutrition is not an endemic condition, such as situations involving war, civil dislocations, or acute crisis, are unwarranted. Such limitations also suggest that replication of this effort in Ghana as well as in different cultures where malnutrition is endemic would be highly desirable. Others have commented on the endemic nature of *kwashiorkor* in Ghana and the health and social circumstances that sustain this dubious distinction in that country (Sommerfelt & Stewart, 1994; Oppong, 1999).

Discussion and implications

Although *kwashiorkor*, as a major category of childhood malnutrition has been in the literature for over 70 years, a decided lack of literature on the long-term survival of *kwashiorkor* victims provides little guidance to those who would create and manage rehabilitation efforts or to respond to the needs of children and their families who do, in fact, survive. This study observed well-developed young adults, as respondents, who had survived *kwashiorkor* because of the involvement of a multi-generational family system. They were contributing to their families and to the larger society. The pediatric malnutrition literature, however, has little-to-no mention of the roles of older women, or the extended family, in child survival from *kwashiorkor*.

Common problems of poverty, lack of education and economic opportunity, the failure of most men and fathers to be active in child rearing or economic support of the families, and a medical care system that relies on the parents of profoundly sick children to manage compliance with a long and difficult malnutrition rehabilitation program all mitigate against successful treatment and survival. These factors increase the importance of the older women in all aspects of family viability. The significant and persistent involvement of grandmothers and senior women in the survival of these families is a major determinant of the survival of these children from *kwashiorkor*. Early detection and insistence on medical intervention, economic and child care support, housing, social integration, emotional support, and more all facilitated child survival of the grandchildren; women with sick children who do not enjoy the support of such strong women would seem to be at a decided disadvantage regarding completion of the rehabilitation of the child.

Recognition of the importance of the older women suggests that the Ministry of Health and the medical care systems would benefit from substantial economic and social support of the older women as a means of improving the success of the malnutrition programs, in general, and the *kwashiorkor* rehabilitation efforts, specifically. Because few developing nations have significant social security systems, the endurance of older women is largely a consequence of their own efforts and ingenuity. Their larger role in society and in the survival

of children should be recognized and supported by the national governments on behalf of the grandchildren and great grandchildren who represent the future.

This study also reinforces an important and broadly generalizable reality that applies to many public health and medical situations affecting the poor and to populations in developing nations. Intervention with pediatric care is not just about the mother and the sick child; in such situations the entire family structure becomes involved in the care and keeping of the children, participation in rehabilitation efforts, wage-earning, food preparation, ensuring housing, and all other matters that affect the family. These multi-generational households depend on the elder women in ways that affect all other aspects of the family's survival. It is consistent with these observations that the survival of the youngest children is also dependent upon the actions, wisdom, and experience of the oldest women in the household.

The authors acknowledge the sponsors of the research: College of Health and Human Services, Graduate School and World College, Eastern Michigan University, Ypsilanti, Michigan, USA and the U.S. Department of State, Fulbright Program, Washington, DC. This paper was presented at the annual meeting of The Association for Research on Mothering (ARM), May 2004, York University: Toronto, Canada.

¹*Kwashi* means the first child; *orkor* means the second child; "What happens when the second child is born?"

²The English name is Protein-Energy Malnutrition (PEM) or Protein Calorie Malnutrition (PCM). Disorder differs significantly from Marasmus, which is severe starvation from which the negative neurological outcomes on survivors are permanent.

³Phyllis Antwi, MPH, MD, Bruce Owusu, MPH, Ph.D., and Nana Araba Apt, MSW, Ph.D.

⁴Beatrice Addo, Elizabeth Martey, and Frank Ampougah.

⁵We later found out that in several of the families the fathers were not present because they were working and one father was an invalid.

References

- Agarwal, S., Attah, M., Apt, N., Grieco, M., Kwakye, E. A., & Turner, J. 1997. *Bearing the Weight: The Kayayoo—Ghana's Working Girl Child*. May. Monograph. Centre for Social Policy Studies: University of Ghana, Legon.
- Appoh, L. A., & Krekling, S. 1999. "Mothers' Beliefs About Causes of Kwashiorkor and the Nutritional Status of Children in the Volta Region of Ghana." *Ifè Psychologia* 71: 46-59.
- Apt, N. A. 1996. *Coping With Old Age in a Changing Africa: Social Change and the Elderly Ghanaian*. Aldershot, Brookfield, Vermont: Avebury.

- Ashitey, G.A. 1994. *Ghana Health: Twelve Selected Published Papers of G.A. Ashitey*. Belfast: Bel-team Publications.
- Ayettey, S. (2001. Correspondence to principal investigators, February, March. *Ghana Human Development Report (GHDR)*. 2001. Institute for Statistical, Social and Economic Research. University of Ghana-Legon: Ghana.
- Lavy, V., Strauss, J., Duncan, T., & DeVreyer, P. 1995. "The Impact of the Quality of Health Care on Children's Nutrition and Survival in Ghana." LSMS (Living Standards Measurement Study) Working Paper No. 106. Washington, DC: The World Bank.
- McGadney-Douglas, B. F., Douglass, R. L., Garrison, E. R., Antwi, P., and Owusu, B. 1999, November. "Social and Behavioral Characteristics of Long-Term Survivors of *Kwashiorkor* in Ghana." Paper presented at the African Studies Association. Philadelphia, PA.
- McGadney-Douglas, B. F., Douglass, R. L., Antwi, P., Owusu, B., and Garrison, E. R. 2000, March. "Social and Functional Characteristics of Long-Term Survivors of *Kwashiorkor* in Ghana." Annual Meeting, Michigan Academy of Arts, Science, and Letters, Saginaw Valley State University, Saginaw, MI.
- McGadney-Douglas, B. F., Douglass, R. L., Apt, N., Antwi, P., Garrison, E. 2001, March. "The Role of Grandmothers in the Survival of Children with *Kwashiorkor* in Ghana." Michigan Academy of Science, Arts & Letters, Annual Meeting, The University of Michigan, Dearborn, MI.
- Oppong, C. 1999. "Infants' Entitlements and Babies' Capabilities: Explaining Infant Hunger." *Institute of African Studies: Research Review* 15 (2): 35-63.
- Smith, I. F. & Ojofeitimi, E. O. 1995. *Nutrition and Diet Therapy for Health Care Professionals in Africa*. Ibadan, Nigeria: Y-Books Publisher.
- Smith, I. F., Taiwo, O., & Golden, M. H. N. 1989. "Plant Protein Rehabilitation Diets and Iron Supplementation of the PEM Child." *European Journal of Clinical Nutrition* 43: 350-355.
- Sommerfelt, A. E., & Stewart, M. K. 1994. "Children's Nutritional Status." *Demographic and Health Surveys Comparative Studies No. 12*. Calverton, Maryland: Macro International Inc.
- Stanton, J. 2001. "Listening to the Ga: Cicely Williams' Discovery of *Kwashiorkor* on the Gold Coast." *Women and Modern Medicine. The Wellcome Series in the History of Medicine*. Clio Medica, Vol. 611. L. Conrad & A. Hardy, eds. Amsterdam: Editions Rodopi, B.V. 149-171.