

Continuing Education Contact Hour Opportunity

Assessment of Anemia Knowledge, Attitudes and Behaviors Among Pregnant Women in Sierra Leone

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Abstract

Introduction: Iron deficiency anemia prevalence of pregnant Sierra Leone women currently is reported to be 59.7%. Anemia is considered to be a direct cause of 3-7% of maternal deaths and an indirect cause of 20-40% of maternal deaths. This study explores knowledge, attitudes, and behaviors of urban pregnant Sierra Leone women regarding anemia. **Method:** Hemoglobin levels were obtained from 171 pregnant women. Knowledge, attitudes, and behaviors of anemic pregnant women were compared to those without anemia. This mixed-method study was framed around the Modified Ecological Model for Health Behavior and Health Promotion. **Results:** Participants scored low ($M=64\%$ correct) on a 10-item anemia knowledge questionnaire. Forty percent of participants provided erroneous information regarding improving iron status. Participants were likely to believe that anemia caused difficulty in pregnancy. Factors affecting anemia status include pica ($\chi^2=4.18$; $p=0.041$). **Discussion:** Findings from the study indicate that early prenatal intervention and financial security had a positive impact on anemia status, whereas pica, and misinformation about anemia prevention and treatment had a negative impact on participant anemia status. To address misinformation about anemia, the health services sector needs to incorporate health promotion strategies and social marketing principles that are based on socio-ecological theoretical models reflective of diverse populations.

Keywords: anemia, maternal health, nutrition, Sierra Leone, social determinants.

Introduction

According to the United States Agency for International Development (USAID) (2011), "anemia affects more than 500 million women in developing countries... [where] 4 of every 10 pregnant women and 3 of every 10 non pregnant women are anemic" (USAID, p. 1). Anemia is considered to be a direct cause of 100,000 maternal deaths (4% of maternal mortality) and an indirect cause of morbidity and death due to exacerbation

of conditions in HIV/AIDS and hemorrhagic situations (United Nations Children's Fund (UNICEF), 2008). Anemia caused by lack of iron is the most common micronutrient deficiency in the world (World Health Organization (WHO), 2012). Iron deficiency anemia is determined as hemoglobin values less than 11 g/dL of blood (WHO, 2001). There are numerous factors that contribute to anemia. The USAID anemia report (2011) presented the following:

Anemia has multiple causes: failure to meet increased iron requirements during pregnancy, inadequate intake of micronutrients (particularly iron), closely spaced births allowing inadequate time for maternal repletion, and infections that destroy red blood cells, interfere with red blood cell formation, increase blood loss and/or deplete nutrient uptake (e.g. malaria, hookworm, HIV, diarrhea, and others). (p. vi)

Although reports exist about what is being done and what should be done globally to address maternal anemia prevention and treatment (USAID, 2011), maternal mortality and anemia prevalence around the world including Sierra Leone continues to remain high (Stoltzfus & Dreyfuss, 1998; Torlesse & Hodges, 2001; Galloway, 2004; WHO 2005, 2007).

In Sierra Leone, where the population was 4.96 million (Government of Sierra Leone, 2008), the prevalence of anemia was considered severe at 59.7%. At the time, there were approximately 160,000 anemic pregnant women (de Benoist, McLean, Egli, & Cogserll, 2008; USAID, 2011). In a previous study, estimated anemia prevalence in Sierra Leone was documented to be as high as 68% (WHO, 2004; Hamsire, 2004). Cited reasons as to why iron deficiency anemia is high in nations such as Sierra Leone, include malaria that is endemic in the region (Mateli, Donato, & Shein, 1994; Lamina, 2003), possible poor health provider knowledge about nutrient values (Hamsire, 2004; USAID, 2011), lack of knowledge about maternal anemia, and lack of participation by pregnant women in activities or behaviors that improve their anemia status (USAID, 2011), all of which pose challenges to addressing the maternal anemia issue. In addition, women often have low iron bioavailability, low use of intermittent preventive treatment for pregnant women (IPTp) and low consumption of iron supplements during pregnancy due to unavailability of the tablets or the undesirable side effects experienced (USAID, 2011).

In order to further explore the extent of anemia in an urban community and to determine contributing factors, the study assessed anemia knowledge, attitudes, and behavior of pregnant women who were living in urban Western Area. The study was based on elements of the Modified Ecological Model for Health Behavior and Health Promotion (MEMHBHP)

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(M'Cormack in press) that include the interconnectedness of the following constructs that effect behavior: intrapersonal (demographic, structural, self efficacy); social and cultural environment (interpersonal, institutional, organizational, social climate); cues to action; physical environment (physical setting, biological, genetic); policy (local, state, global); physical environment; policy; and cost/benefit analysis (Janz, Champion & Stretcher in Glanz, Reimer & Lewis, 2002; Sallis & Owen in Glanz, Reimer & Lewis 2002). The purpose of the study was to examine whether differences in anemia knowledge, attitudes and behavioral factors existed between pregnant women with anemia and those without anemia. Therefore, The current study focused on the effect of intrapersonal and behavioral factors on anemia status.

Methods

Participants

Human subjects approval was obtained from the Research and Ethics Committee of the Ministry of Health and Sanitation in Sierra Leone and from the office of Sponsored Projects

Administration from Southern Illinois University Carbondale. Pregnant women were identified and recruited from a convenient sample of five health facilities. The facilities were identified and selected for their proximity to the urban area and their role in serving pregnant women. The facilities included in the study were from the three regions of urban Western Area (central, western, and eastern): two government hospitals identified as GH and MCH, a Christian private hospital (private east), a private reproductive health clinic (private west) and a private obstetric and gynecological clinic (private OBGYN). This was an unmatched case-controlled study based on convenient purposeful sampling (Figure 1). Participants visiting one of five health clinics during their prenatal health clinic days were recruited over a period of four months. Staff members at each clinic identified pregnant women attending the facility for the first time to receive prenatal services. If it were identified that it was a pregnant woman's first time at the facility, they were referred to either the researcher or one of the research assistants covering the facility.

The researchers further established eligibility by determining whether it was the pregnant woman's first prenatal visit for the current pregnancy. After consent was obtained to

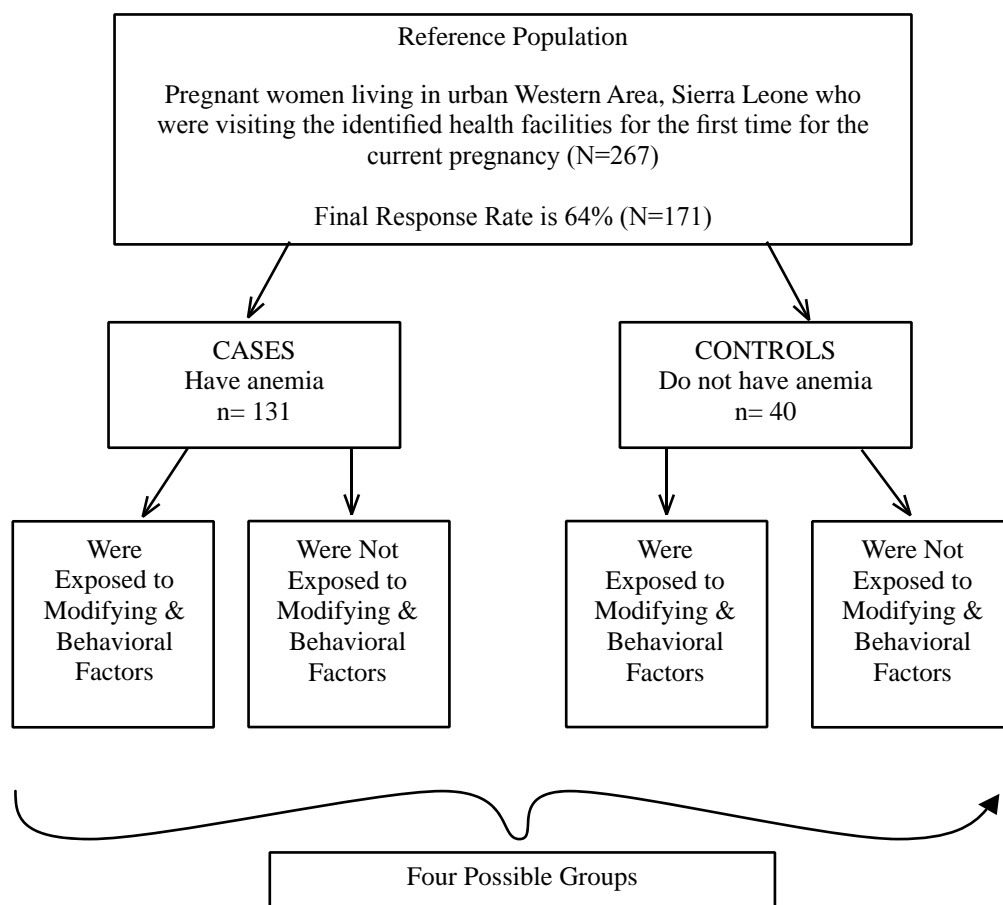


Figure 1. Design of the Unmatched Case-control Study

participate in the study with a thumbprint, blood samples from finger-sticks were collected to assess hemoglobin (Hgb) levels to identify cases (having anemia) and controls (not having anemia). Universal precautions were observed to obtain blood samples. Participants were compensated with two cups of rice and two cups of dried beans.

Material and Procedure

Participants were interviewed by the bilingual (English and Krio) researcher and three research assistants, who were trained to gather and record clinical data (height, weight), conduct finger sticks to collect blood samples using universal precautions, use the mobile hemoglobin testing equipment, and orally administer the questionnaire in the lingua franca Krio. The questionnaire was translated into Krio and back translated into English by two independent bilingual (English and Krio) individuals and adjusted appropriately. A pilot study was conducted prior to implementing the study and item inconsistencies were identified and rectified. The questionnaire comprised of knowledge, attitude, and behavior questions that were derived from the widely used Demographic and Health Survey (DHS) (Measure DHS, 2012), Key Indicators Survey (KIS) (Measure DHS, 2012), and World Health Survey (World Health Survey, 2012). A developed knowledge section (10 items) from the literature review was tested for reliability using Kuder-Richardson Formula 20 (KR20) and measured 0.48, indicating a measurement of diverse knowledge (Patock, 2004). The attitudes section was tested for reliability using Chronbach's alpha and measured 0.75, indicating an acceptable internal consistency of the scale items (Gliem & Gliem, 2003). Qualitative and quantitative data were collected. Qualitative responses to open ended questions were coded, themes developed and interpreted, and finally the interpreted themes were summarized using quantifiable measures (frequencies). Quantitative data were analyzed using Statistical Package for the Social Sciences (SPSS) version 16. Descriptive statistics were reported about the pregnant women and t-tests and chi-square were computed to determine if statistical differences existed between participant cases and controls. Researchers collected demographic information and information related to anemia knowledge and attitudes toward anemia prevention and treatment. Statistical significance is reported either as $p < 0.05$ or $p < 0.01$.

Results

Two hundred and sixty-seven participants were recruited and complete data were obtained from 171 women ($M_{\text{age}} = 23.85$ years, $SD = 5.69$, age range: 13–36 years; $M_{\text{gravida}} = 2$ pregnancies, $SD = 1.27$, gravida range: 1–8 pregnancies) resulting in a final response rate of 64%. Participants were recruited from a government-run general hospital ($n=25$, 15%), a government-run maternal and child hospital ($n=31$, 18%), a Christian private hospital in eastern urban Western Area ($n=59$, 34%), a private reproductive health clinic in western urban Western Area ($n=46$, 27%), and a private obstetric and gynecological clinic in central urban Western Area ($n=10$, 6%). One hundred and thirty-one participants (77%) had anemia.

Knowledge about Anemia Causes, Prevention, Treatment, and Resources

To assess anemia knowledge, participants responded to questions related to anemia causes, prevention, treatment, complications stemming from anemia, and where they could get additional information about anemia. Participants scored less than 70% on a ten-item scale assessing their anemia knowledge ($M_{\text{total}}=64\%$; $M_{\text{anemia}}=63\%$; $M_{\text{no anemia}}=68\%$). T-test analyses between the two groups did not yield significant effects. A ceiling effect was observed for three items that were answered correctly by a high proportion of participants: *does malaria cause anemia* ($n=149$, 87%), *does poor diet cause anemia* ($n=150$, 88%), and *does vaginal bleeding during pregnancy cause anemia* ($n=152$, 89%). Conversely, the following items had the lowest number of correct responses: *does receiving a blood transfusion cause anemia* ($n=91$, 53%), *does HIV/AIDS cause anemia* ($n=85$, 50%), *does the common cold cause anemia* ($n=75$, 44%), and *does coughing cause anemia* ($n=55$, 32%).

Qualitative responses to anemia causes found that few individuals were able to identify specific elements of inadequate nutrition as causes of anemia. Responses were recorded for 162 participants. Inadequate nutrition included not having a balanced diet containing protein-rich foods ($n=10$, 6%); not consuming iron-rich foods such as fish, chicken, beef, pork, beans (black-eyed beans) ($n=62$, 38%); and not taking preventive measures such as consuming iron supplements or treating malaria ($n=8$, 5%). Forty-five percent of participants ($n=68$) did not provide correct information about anemia causes, which included participants stating, having condition of anemia as a cause ($n=9$, 6%), “thinking too much”/“being worried” ($n=7$, 4%), and “too much sun exposure” ($n=4$, 2%). Also, general responses for anemia causes or that lacked elaboration were considered erroneous or incomplete responses, such as “not eating fruits”, “not eating good food” or not enough “vegetable intake” ($n=12$, 7%). Fifty-six participants stated, “don't know” as a response and were unable to provide any correct response (35%). More than 50% of participants presented incorrect and/or incomplete responses. Only about a third of participants were able to correctly identify particular food items and cite specific examples of causes ($n=68$, 42%).

Qualitative responses to anemia prevention and treatment were recorded for all 171 participants. A majority of participants ($n=90$, 53%) were able to correctly identify preventive and treatment options for anemia. Examples of these preventive measures were eating nutritionally sufficient diets ($n=85$, 50%), that included green leafy vegetables such as potato leaves or eating *pumehun* (rice mix with green leafy vegetables) ($n=19$, 11%), and protein rich foods ($n=18$, 10%) were considered for anemia treatment and prevention. Participants also indicated intake of iron supplements ($n=10$, 6%), and multivitamins ($n=9$, 5%), as preventive and treatment options. Participants mentioned treating illnesses, such as HIV/AIDS and malaria as ways to prevent anemia ($n=3$, 2%). Additional recommendations included getting blood transfusions, seeing health professionals, or eating vitamin C rich fruits ($n=5$, 3%). Additionally, participants indicated that keeping away from open, wood or coal hearth fires, which emitted smoke during cooking, was a preventive measure ($n=3$, 2%). Participants also mentioned following recommendations of a health care

provider to treat and prevent anemia (n=18, 10%).

Sixty-one percent of participants (n=106) erroneously provided information about anemia prevention and treatments such as providing references to having sound sleep, resting, and not over thinking (n=17, 10%). Participants would often cite erroneous information, which was evidenced in participants being unsure when to use mosquito nets or believing that consumption of red foods such as palm oil and *Vimto* (n=12, 7%) were treatments for anemia. Some participants (n=30, 17%) indicated that “blood tonics” were good treatments for anemia yet these tonics often contained alcohol. In addition, comments that lacked elaboration such as “eat well”/“eat good food” (n=61, 36%), “eat vegetables” (n=14, 8%), “take vitamins” (n=13, 8%), and “take medicine” (n=11, 6%) were put in the same category of incorrect/incomplete. A few participants did not know how to prevent or treat anemia (n=30, 17%).

In response to complications due to anemia, 106 participants (62%) provided a range of correct responses, whereas 46 participants (27%) provided incorrect responses. Thirty-six participants (21%) did not know which complications could arise from having anemia. Correct responses by participants included complications that can affect daily living and productivity of the woman such as: feeling dizzy (20%), feeling sick or ill (10%), feeling weak (8%), having anxiety (6%), passing out (3%) and having headaches (3%). In addition, participants indicated relatively mild complications such as insomnia (8%) and being pale (3%) to more severe complications such as possible death of the woman (8%). In addition to maternal complications, participants indicated fetal and newborn complications such as failure to thrive and possible fetal death (3%). Definitive statements such as “she will die” or “baby will die” were considered incorrect statements. Other statements considered incorrect as they were incomplete or were not supported by the literature were lack of desire to sleep under a mosquito net, getting malaria, lack of appetite, being short tempered, or losing one’s mind (Table 1).

Participants identified resources where they could get additional information about anemia. The majority of participants indicated that they could get information about anemia from medical settings such as from hospitals (n=135, 79%), health care professionals (n=22, 13%), and clinic or health center (n=12, 7%).

Attitudes toward Perceived Anemia Threat

Results indicate that on a 3-point scale (1-disagree; 2-neither agree/disagree; 3-agree) participants were more likely to agree with the following statements: *anemia makes pregnant women too tired to work* (M=2.81), *anemia makes giving birth difficult* (M=2.55) and *anemia does not make pregnancy easier* (M=2.55). Participants also agreed with the following: *it is possible to prevent anemia in pregnancy* (M=2.57) and *treating anemia will increase/improve strength* (M=2.77). Participants were neutral about the following statements: *anemia is the fate of pregnant women* (M=2.15), *treating anemia is good for babies* (M=2.0), and *it is difficult to treat anemia* (M=1.96) (Table 2). Participants’ attitudes towards perceived anemia threats were not very different based on one’s anemia status. However, participants who did not have anemia were significantly more likely to note that treating anemia is good for babies, $t(143) = 1.96, p = .05$.

Behaviors Affecting Anemia Status

Most behavioral differences found between those with anemia and those without anemia were not statistically significant. Less than half of participants were participating in behaviors to reduce their risk of being anemic. Forty three percent of participants reported taking an iron supplement (n=73) or malaria prophylaxis (n=72, 42%) at the time of the study (Table 3). Less than a third of participants (n=47, 27%) had slept under a mosquito net (ITN) during the previous night or slept under one regularly (n=52, 30%). Those who did not use mosquito nets regularly (n=117, 68%) indicated that it was too expensive (n=23, 20%), too hot (n=21, 18%), it was not available (n=8, 7%), or they did not know how to use one (n=5, 4%).

The majority of participants reported that they ate protein rich foods such as fish (n=136, 80%) or beans or peanuts (n=125, 73%) on a daily basis. Several indicated that they did not eat chicken or meat regularly as they were expensive. Factors that affected anemia status included consumption of non-food items or having pica ($\chi^2=4.18; p=.041$) and visiting the health clinic after the first trimester (between 1st and 2nd trimester: $\chi^2=6.12; p=.013$; between 1st and 3rd trimester: $\chi^2=6.33; p=.012$) (Table 3). Although other behavioral differences exist between those with anemia and those without anemia, the findings did not yield statistical significance.

It must be noted that there are several limitations to the study that must be considered when interpreting the results. Data were aggregated for all facilities and reported. Although five distinct facilities were selected for the study, their inclusion in the study through purposeful sampling resulted in a diversity of participants that was reflective of the region. Previous reports have indicated that participants use health facilities based on the location and price (Government of Sierra Leone, 2008). All facilities at the time of the study required a small fee to enroll in prenatal services that were comparable, except for the private central facility. The private central facility had a relatively higher fee structure than the other facilities. Locations were selected for their proximity to different parts of urban Western Area. The demographic information of the participants in the study were reflective of those living in urban Western Area, Sierra Leone.

Discussion

Although this study based on the MEMHBHP specifically looked at intrapersonal and behavioral factors affecting maternal anemia, it does have broader implications and supports the USAID anemia report recommendations to address maternal anemia (2011). The recommendations include: multi-pronged interventions to address the multiple causes of anemia, increase awareness about anemia knowledge, improved distribution of iron supplements and anti-helminthes, increased and renewed political commitment, expand the roles for communities, and strengthen monitoring and evaluation efforts (USAID, 2011).

Participants’ knowledge about anemia causes, prevention, and treatments need to be addressed, as it was generally poor. If knowledge is lacking, this could be problematic for participants to make decisions based on sound information to reduce anemia risk. As more than three quarters of participants indicated that they could get more information about anemia at a hospital or

Table 1

Qualitative Responses to Knowledge Item about Anemia Complications

Participant Responses to: what are the complications with anemia? (N=171)	n	%
Correct response	106	61.99
Feel Dizzy (aed go tun/yai go dark)/light headed	35	20.47
Feel sick/feel ill/feel bad/don't feel good	17	9.94
Woman might die	14	8.19
Feel Weak/Can't do anything (labor)	13	7.60
Insomnia	13	7.60
Anxiety (cot at)/ Too much thinking	10	5.85
Anemia/Anemic complications/eyes whiten/body will whiten/pale	6	3.51
Headache	6	3.51
Have blackout	6	3.51
Lose weight (bodi go reduce)	4	2.34
Other (premature baby, miscarriage, baby could die, drowsy and sleepy	4	2.34
Baby won't grow/develop (Failure to thrive)	3	1.75
Heart Palpitations/ Irregular Heartbeat	3	1.75
Don't know	36	21.05
Incorrect response	46	26.90
She Will Die/ She will die quickly	13	7.60
Baby will die	4	2.34
Get Malaria/have malaria/fever grips	4	2.34
Vomit	3	1.75
Increased blood pressure/high blood pressure	3	1.75
Stress	3	1.75
Nervousness	3	1.75
Other (lack of appetite, put body under strain, not thinking straight/lose mind, feel tormented/bother some ("mona"), body won't be fine, lose sight and go blind, be nauseous, have nightmares (tormented sleep), malaria, not restful, be tormented, have short temper, won't want to sleep under mosquito nets, people will be angry with you		

Note. Thirty-nine participants (39) provided multiple responses to the question (35 provided 2-3 responses and four participants provided >4 responses). Responses of "don't know" were considered "Not correct" as a correct answer was not provided. Where a "don't know" response was provided, that was the only statement made.

clinic (87%), the health facility environments would be ideal to address anemia causes, prevention, and treatment. These facilities would have to be staffed by trained health care clinicians or health educators who are qualified to provide anemia prevention and treatment education. Education should include antenatal care that focuses on intake of iron rich foods, iron supplementation, malaria prophylaxis and anti-helminthes. Education also should focus on addressing myths that have

potential detrimental effects. For example, "blood tonics" that contain alcohol can have a negative effect on the fetus, such as fetal alcohol syndrome. In addition, clarifying that red foods and purple foods such as palm oil and sodas do not contribute to improved iron status; educating about illnesses such as HIV and AIDS or helminthes (worms) infections that can contribute to diminished iron status; and discussing that coughing in itself does not decrease anemia status can assist with improving

Table 2

Comparing Participant Attitudes toward Perceived Anemia Threats by Anemia Status

Anemia Threats	M (SD)		<i>t</i>	<i>df</i>	<i>p</i>
	Have Anemia	Don't Have Anemia			
Possible not to have anemia when pregnant	1.99 (0.94)	2.00 (0.95)	-0.05	164	.96
All pregnant women have anemia	2.46 (0.84)	2.36 (0.87)	.68	164	.50
Anemia does not make pregnancy easier	2.57 (0.69)	2.46 (0.59)	-.62	149	.53
Anemia makes giving birth difficult	2.57 (0.76)	2.46 (0.82)	.77	163	.44
Anemia makes pregnant women too tired to work	2.81 (0.53)	2.81 (0.51)	-.06	162	.95
Anemia is the fate of pregnant women	2.14 (0.92)	2.18 (0.91)	-.25	161	.80
Treating anemia is good for babies	1.92 (0.92)	2.26 (0.82)	-1.96*	143	.05
It is possible to prevent anemia in pregnancy	2.54 (0.78)	2.64 (0.71)	-.69	162	.49
It is difficult to treat anemia	2.09 (0.91)	1.89 (0.95)	1.14	160	.26
Treating anemia increases/improves strength	2.74 (0.58)	2.87 (0.41)	-1.6	89	.18

Note. Means are based on following scale: 1 – disagree; 2 – neither agree/disagree; 3 – agree. WHO standard for anemia are hemoglobin levels <11.0g/dL. *

$p < .05$. ** $p < .01$

understanding of anemia.

There is a fatalistic attitude toward anemia in pregnancy and it is considered inevitable, however, participants indicated that there may be ways to address anemia that would improve one's overall health status. If women believed that anemia was both preventable and treatable, opportunity for interventions that can be accepted can be developed.

As iron deficiency anemia is a diet-related micronutrient deficiency, identifying and encouraging a wide variety of local, seasonal and regional foods that are rich sources of both heme and non-heme iron and subsequently educating women about the breadth of their use and how to prepare them promotes self-efficacy. Interventions that are based on a variety of locally available foods make it cost-effective (Mello et al., 2010). Health educators should work closely with the agricultural sector, urban gardens and local communities to provide a multi-pronged approach to ensuring availability and usability of locally grown foods.

To facilitate the process of health and nutrition education, it is important to establish a liaison between health care professionals and the community. Garnering community support and increasing support through the use of community health workers (CHW) is particularly useful as they can be versed in preventive measures to address anemia and fill the service sector gap, thus solving a lack of human capacity problem by being able to reach isolated areas. These CHWs can encourage women to visit a health care professional in the first trimester

in order to receive appropriate prenatal interventions such as participation in intermittent prevention treatment for pregnant women (IPTp) and use of insecticide-treated bed nets (ITNs) to reduce malaria. Community health workers can also support and encourage pregnant women to consume iron supplements and anti helminthes, which can increase hemoglobin and improve anemia status, while reducing the consumption of non-food items (pica) that can displace nutrients and hinder blood iron.

Health care professionals and CHW can incorporate social marketing techniques as a channel for health education to deliver health messages. In a population that has very low literacy, it is necessary to use easily accessible channels and mediums including one-on-one interventions at point of care, community based interventions such as classes or the use of the radio, to distribute to a wide range and high number of individuals.

In addition to education, it is important to provide other support to pregnant women. Currently, through a national initiative, Sierra Leone provides free health care services (FHCI) to their vulnerable populations: pregnant women, lactating mothers and children less than five years old (Save the Children, 2011). The FHCI addresses the economic barriers faced by Sierra Leone pregnant and lactating women. Now, women can have improved access to qualified health care professionals and free child delivery is available at health facilities in the hopes of reduce poor birthing outcomes from

Table 3

Comparisons of Select Behaviors/Modifying Factors Affecting Anemia Status

Modifying variable (% of total)	n (%)		Total	x ²	p
	Have Anemia	Don't Have Anemia			
Had/have pica					
No	82 (48)	32 (19)	114 (67)		
Yes	49 (29)	8 (5)	57 (33)		
Total	131 (77)	40 (23)	171 (100)	4.18*	.041
Trimester of 1st health care visit					
< 12 weeks	35 (21)	19 (11)	54 (32)		
> 24 weeks	96 (56)	21 (12)	117 (68)		
Total	131 (77)	40 (23)	171 (100)	6.12*	.013
Trimester of 1st health care visit					
< 12 weeks	35 (42)	19 (23)	54 (64)		
> 24 weeks	27 (32)	3 (3)	30 (36)		
Total	62 (74)	22 (26)	84 (100)	6.33*	.012
Income per month					
Non Poor (\$63- \$200)	41 (66)	7 (11)	48 (77)		
Non Poor (> \$200/mo)	8 (13)	6 (10)	14 (23)		
Total	49 (79)	13 (21)	62 (100)	5.23*	.022
Taking malaria prophylaxis					
No	75 (44)	24 (14)	99 (58)		
Yes	56 (33)	16 (9)	72 (42)		
Total	131 (77)	40 (23)	171 (100)	0.095	.758
Taking iron supplement					
No	69 (41)	28 (16)	97 (57)		
Yes	61 (36)	12 (7)	73 (43)		
Total	130 (77)	40 (23)	170 (100)	3.897	.142

Note. WHO standard for anemia are hemoglobin levels <11.0g/dL.

*p < .05. **p < .01

complications and decrease home deliveries. In addition, FHCI allows for women to receive free iron-folate supplements to address the increased micronutrient demands of pregnancy. However, this endeavor does not address issues of transportation for prenatal care, nor does it provide a mandate to support the needs for pregnant women needing anemia interventions beyond supplements. As it stands FHCI is not sustainable and exerts a strain on the limited existing resources (Donnelly, 2011).

Although the issue of economic sustainability to provide free health care for Sierra Leone's vulnerable is elusive, a multilevel, socio-ecological approach can be instrumental to address health issues at the intrapersonal, interpersonal and systems levels that incorporate biological, societal, educational environmental, economical and political aspects of health and wellbeing (M'Cormack, in press; McLeroy, Bibeau, Steckler, & Glanz, 1988). In addition, the availability, access, and consumption of iron-rich local foods as well micronutrient

supplements are necessary through multi-level support (USAID, 2011). Finally, social marketing campaigns that consider literacy limitations, financial constraints will bolster the multi-sectored approach in urban Sierra Leone.

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**This article may provide one
Continuing Education Contact Hour Opportunity for CHES (Approval Pending)**

Instructions and self-study questions may be found on page 36

Continuing Education Contact Hour Self-Study

Assessment of Anemia Knowledge, Attitudes and Behaviors Among Pregnant Women in Sierra Leone

Active members of Eta Sigma Gamma may receive one (Category 1) continuing education contact hour for CHES and MCHES. Complete the self-study questions below by circling the correct answer and completing your contact information. A score of 80% is passing. Send a copy of this page to: Susan Koper, Eta Sigma Gamma, 2000 University Avenue, CL 325, Muncie IN 47306; or FAX this page to 765-285-3210. This CECH opportunity is available from February 22, 2013 through December 31 2013. (Approval Pending)

1. What did the participants provide as consent to participate in the study?
 - a. A signed form
 - b. Their thumbprint
 - c. A urine sample
 - d. A blood sample
2. The purpose of the study was to examine differences in anemia knowledge, attitudes, and behavioral factors between pregnant, anemic women and what other sample group?
 - a. Anemic women who are not trying to become pregnant
 - b. Non-pregnant, non-anemic women
 - c. Pregnant, non-anemic women
 - d. Anemic women who are trying to become pregnant
3. In this study, what was one of the main findings that had a positive impact on anemia status?
 - a. Financial security
 - b. Postnatal care and treatment of anemia
 - c. Pica
 - d. Misinformation about anemia prevention
4. Participants in this study received this as compensation for participation:
 - a. 20 cassava leaves and 1 cup of rice
 - b. 1 bushel of fresh mangos
 - c. 2 cups rice and 2 cups dried beans
 - d. 1 pound of popcorn seeds
5. In the developed knowledge section from the literature review, the Kuder-Richardson formula 20 was used as a test for the following:
 - a. Validity
 - b. Standard deviation
 - c. Accuracy
 - d. Reliability
6. Which of the following questions was **NOT** an observed ceiling effect that was answered correctly by a high proportion of participants?
 - a. Does receiving a blood transfusion cause anemia?
 - b. Does vaginal bleeding during pregnancy cause anemia?
 - c. Does malaria cause anemia?
 - d. Does poor diet cause anemia?
7. When participants were asked to identify preventive and treatment options for anemia, which of the following choices was considered erroneous information?
 - a. Treating illness (HIV,AIDS)
 - b. Consumption of red foods
 - c. Receiving blood transfusions
 - d. Keeping away from open fires
8. According to the authors, which of the following is a limitation of the study?
 - a. Diversity of participants was reflective of the region.
 - b. There was a variance in the fee structure for subject's.
 - c. There were not enough participants.
 - d. The participants used a translator across participating health facilities.
9. The authors believe that to facilitate the process of health and nutrition education, it is important to establish a liaison between the community and the following group or entity:
 - a. Government
 - b. Grocery markets
 - c. Health care professionals
 - d. Social media
10. Of the social marketing techniques mentioned, which would the authors find **LEAST** effective in the delivery of health messages to the members of the sample population?
 - a. Radio messages
 - b. One-on-one intervention
 - c. Reading literature
 - d. Holding educational classes at a health facility

Name: _____

Address: _____

E-mail: _____

CHES/MCHES #: _____

Remember to keep a copy for your records.