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Basic Approach to Prevalence of Iron-Deficiency Anemia among Pregnant Women and Children in South Florida before 2003

Rhodner J. Orisma¹

¹ Multidisciplinary Doctoral School
University of Abomey-Calavy
Republic of Benin

Abstract

Obviously iron deficiency is determined as the most prevalent nutritional problem in the world today. It is provoked by a lack of iron in the diet. In South Florida, since pregnant women tend to neglect prenatal care, the prevalence of anemia primarily occurs during the first and second trimesters of their pregnancy. Accordingly, medical studies show that premature deliveries, low birth weight, birth defects, infant mortality, etc. result from iron deficiency anemia. In this, birth defects are, however, considered as quite associated with folic acid deficiency anemia. That explains why, this paper also deals with the study published by the March of Dimes on folic acid and pregnancy. In addition, the paper approaches qualitatively the socioeconomic and sociocultural aspects of the disease according to eight (8) interviews conducted in Broward and Miami Date counties to highlight the existing preventive programs for vulnerable population such as women, infants and children in South Florida, USA.

Keywords: Iron Deficiency Anemia, Folic Acid Deficiency Anemia, Prenatal Care, Low Birth Weight, Cognitive Delay

1. Introduction

Among the diseases, anemia rates are used as indicators to understand the poverty level and malnutrition in a population. Then, anemia that is seen as a malnutrition disease associated with poverty or “a lack of availability of food materials” (Dettwyler, 1992) is an important public health problem. It is the most frequent disease after types I and II diabetes. Its effects (like maternal mortality, low birth weight, birth defects and infant deaths due to birth defects) affect every year vulnerable population, such as pregnant women, teen mothers, children, etc. in South Florida. The whole country, seeking either to stabilize the population or to avoid a demographic scandal, “increased knowledge about screening for iron status, raised questions about the necessity and effectiveness of existing ...programs to prevent and control iron deficiency” (CDC, 1998).

According to Centers for Disease Control and Prevention (CDC, 1998), these programs brought a decline of the prevalence of iron deficiency anemia among children. However, “the rate of anemia among low-income women during pregnancy is high, and no improvement has been noted since the 1970s” (CDC, 1998). In Florida, where the rate of anemia resulted from more than 1.6 million of people living below the poverty level, and determined with the incidence of maternal mortality, low birth weight, birth defects and infant deaths due to birth defects, factors as international migration and majority of the nonwhite population are largely associated with this rate.

For example, Broward County counted 1,623,068 residents and Miami Dade 2,253,362 that gave a total of 3,876,380 for South Florida in 2000; whereas in 1990, the population was estimated at 3,192,755 people. In this, the international migration by itself enhanced a growth of 427,358 people within this decade (US Census Bureau, 2000). Forty-one and two (41 and 42) percent of Whites, 33.8% of Hispanics, 19.2% of Blacks, 1.9% of Asians/Pacifics and 3.9% of others obviously made up the population. Numerous blacks here are African-American. They also compose with a large Haitian population that accounts for more than 100,000” (Broward Regional Health Data Sourcebook, 1997; South Florida Health Data Sourcebook, 1996).

As a function of this, it is to note that: “Florida [the Southernmost United States in the Caribbean region] has on several occasions experienced an influx of refugees who are fleeing their native countries in search of political asylum and the start a new life” (Haitian Nutritional Initiative, 1998). Thus, they either bring with them on the US, their poverty and malnutrition diseases, or leave behind their economic problems and lack of food access.

Here, however, “the adjustment to new customs including new foods is a crucial one. Frequently, the mainstream of their diet is not readily available and appropriate substitutions must be made” (Haitian Nutritional Initiative, 1998). In the meantime, it is understandable that it takes time for the refugees to bring change in their culture of diet. Since this transition probably lasts a bit, refugees could still remain vulnerable. A doctor at Family Health Center in Broward notices that Cubans, Haitians, South Americans, Indians, Pakistanis, just to name a few, come to the clinic with some of the worse anemic cases.

In light of the above explanation, two characteristic questions are formulated to explore the disease in South Florida. The first one refers to a global question like: “How can be explained factors associated with high rate of anemia among pregnant women and their children in South Florida? The other ones are specific or researchable. They are formulated as follows: Does the lack of prenatal care provoke iron and vitamin deficiency anemia in pregnant women? Do the pregnant women’s culture of diet contribute to the prevalence of iron deficiency anemia in South Florida? Can socio-cultural environment be considered as a factor to the incidence of anemia among children?

This study will focus on anemia among pregnant women and children in the southern (Broward and Dade particularly) portion of Florida. This population is very different from other groups of individuals since it is considered at risk or vulnerable. When there are a lack of food access and inadequate prenatal care, due basically to socioeconomic status and sociocultural behavior, women and children remain the first to be touched by this penury and anemia.

According to Florida Health Data Sourcebook (1997), more than 1.6 million *Floridians* including about 525,446 children live below the poverty level. However, behind districts 2 and 3, district 11 designated for South Florida, has the great percentage of children living in poverty. It is probable to consider that the highest rates of anemia are identified with this community. This community could face the highest rates of premature deliveries, low birth weight babies, infant mortality and migration which can primarily create a ‘decrease in its numbers.’

In the other words, this study will attempt to understand the prevalence of anemia among pregnant women and children in South Florida by analyzing the related causes and consequences of the disease. Also, it will attempt to show the consequences of sociocultural behaviors on the other factors that can provoke anemia. This idea can create an adequate iron deficiency anemia awareness among the population and point out the health programs that were or are underway in order to control the disease.

2. Etiology of Iron Deficiency Anemia

As stated earlier, anemia has multiple etiologies. “The etiology of acquired anemia [iron-deficiency anemia] is difficult, if not impossible, to determine in the absence of *serum ferritin* values or bone marrow aspirations” (Molher in Kent & Dunn, 1996: p. 455). Through this, we point out that *serum ferrentin* concentration is considered as an early indicator of the status of iron stores (CDC, 1998). And when the *serum ferrentin* is low, that probably indicates low iron stores, a perceived cause of anemia. Many other factors explain the causes of anemia. Such causes are subnormal levels of hemoglobin hematocrit, serum iron, and/or transferrin saturation (Hoffbrand & Pettit, 1993; Kent & Dunn, 1996).

In addition, we highlight as causes of anemia, blood loss, menstruation, gastrointestinal tract, food sensitivity, hookworms, blood donation, growth, and pregnancy or repeat pregnancy. However, we reveal that the causes of anemia vary in function of regional conditions and population group (CDC, 1984; DeLoughery, 2014). According to CDC (1984):

Thalassemia and iron deficiency anemia may have similar blood film appearances. But in a region where thalassemia does not occur, a hypochromic blood film is much more likely to be due to iron deficiency anemia. Similarly, a high incidence of a hemoglobinopathy, red cell enzyme deficiency, or malaria in a region may suggest a likely cause for anemia in that region (p.2).

Further, adds CDC (1984):

In the occasional region where the diet has a high folate content, for example, bananas, megaloblastic anemia [or folic acid deficiency anemia] would more likely be due to B12 deficiency rather than to folate deficiency. Frequently, several causes of anemia may coexist in the same person and therefore diagnosis may be difficult (p.2).

Since in the previous tips, iron and folic acid are considered as two key words, let us see them below.

2.1 Role of Iron in Human Body

In short, we highlight that “iron plays an important role in many metabolic processes, including oxygen transport, oxidative metabolism, and cellular growth” (Ryan, 1997: p.25). The total body iron averages approximately 2.3g in women and 3.8g in men, which is equivalent to 42mg/kg body weight for a 55-kg woman and 50mg/kg body weight for a 75-kg man, respectively (CDC, 1984). Someone diagnosed with iron deficiency or who has anemia can be currently treated with the oral iron therapy (Janus & Moerschel, 2010).

2.2 Folic Acid Intake

According to the March of Dimes (1999), “folic acid plays an important role in production of normal red blood cells, and that individuals who were deficient in folic acid sometimes developed a form of anemia called megaloblastic anemia” (p.2). Additionally, we point out that people having high levels of a substance called homocysteine in their blood are exposed to heart disease and stroke. Through this, the study also tends to show ‘the role of high homocysteine levels in causing birth defects.’ In this case, “when these people take folic acid, the level of homocysteine in their blood drops, possibly decreasing their risk of cardiovascular disease” (March of Dimes, 1999: p.2).

The ending section displays the background of the iron deficiency anemia. In order to see how the disease is perceived on the global form, the following section as a brief literature review will give you an insight.

3. Literature Review

The following review of literature highlights the relationships between iron deficiency and anemia and the related causes (like poverty or a lack of availability of food materials, SES, inadequate access to prenatal care,

sociocultural behaviors) and consequences (such as premature deliveries, low birth weight babies, and infant development and mortality).

Current research into iron deficiency anemia indicates that 58% of pregnant women in developing countries are anemic (Galloway et al., 2002). The common cause for that is due to inadequate iron intake resulting from inadequate counseling and distribution of iron tablets, difficult access and poor utilization of prenatal health care services, beliefs against consuming medications during pregnancy, and in most developed countries, fears that taking too much iron may cause too much blood or a big baby, making delivery more difficult (Galloway et al, 2002).

In Costa Rica, women having this cultural perception from taking iron supplements during their pregnancy can also nourish the fears that iron prescribed to their children provokes some side-effects and do not administrate it to their children. In this area, (liquid) “iron is said to permanently stain the teeth and some women state their conviction that iron eats away the teeth until they fall apart, and only black nubs are left” (Jefferds, 2002).

Studies for the Russian and Massachusetts (USA) communities show in fact that dietary iron intakes were deficient in the most vulnerable groups like young children and women of reproductive age (Kohlmeier, Mendez & Shalnova, 1998; Sargent & Johnson, 1996). The same studies show that iron deficiency was strongly associated with poverty status or low SES. The studies conclude that women and children in Russian and Massachusetts communities are at higher risk of iron deficiency due to risk factors associated to SES. Further studies in Maryland (USA) and Uzbekistan about anemia in young children precise that anemia is associated with financial difficulty in acquiring food (Giebel, Suleymanova & Evans, 1998; Klesges, Pahor & Shorr, 2001).

The study of Giebel et al. (1998), for example, ‘examined prevalence [...] of anemia in the Muynak District of Uzbekistan, an area of rapidly changing social and economic conditions following the collapse of the Soviet Union.’ Questionnaire data and blood samples were collected on a random sample of 433 children aged 1 through 4 years. The results showed that the prevalence of anemia ranged from 89% in 1-year-olds to 48% in 4-year-olds. Probably, those children could face physical growth and cognitive development problems (Ryan, 1997).

Regarding iron-deficiency anemia and infant development, Ryan (1997) indicates that both iron status at birth and requirements during infancy, and iron-deficiency anemia and growth are relatively important toward understanding the prevalence of iron and vitamin deficiency anemia among pregnant women and children. The study showed that when the mother is iron deficient, probably the fetus will be affected and even the neonatal health. That gives birth to premature deliveries and low birth weight babies, and rise to infant mortality (Galloway et al., 2002).

This literature review tries to ascertain the prevalence of iron-deficiency anemia in pregnant women and children by focusing on related causes (like poverty, inadequate access to prenatal care, sociocultural behaviors) and consequences (such as premature deliveries, low birth weight babies, and infant development problems and mortality). And the report will try to provide evidence to support the idea that the prevalence of iron deficiency anemia might be perceived through the understanding of causes and consequences of anemia indicated above among pregnant women and children in South Florida.

4. Methodology

Anemia has multiple etiologies. Several causes and consequences are examined in order to ascertain the prevalence of anemia among pregnant women and children in South Florida. Since anemia is not considered as a major public health problem in Florida, data are not labeled under anemia disease directly, but under prenatal care, maternal nutrition, child health, etc. Therefore, data were collected under the terms prenatal care, maternal nutrition, child health, WIC (Women, Infants and Children), infant and women mortality rates for the target population. The qualitative method was used to examine those factors and show the prevalence of anemia. However, some numerical data were gathered but remain qualitative because they are collected verbally or within published documents, articles and books.

Between the last quarter of 2002 and the first quarter of 2003, data were collected from HRS including the WIC Office and Broward County Health Department, and within the Health publications (Florida Health Data SourceBook, 1997; Florida Health Data Sourcebook, 1998; March of Dimes StatBook, 1993; Florida vital statistics and health annual reports; Maternal and Infant Health Status Indicators For Florida: 1991-1995; Adolescent Pregnancy Report, Florida's Family Preservation and Support Services Plan, 1995-1999; Florida State Plan of Program Operations and Administration for FFY 1995; Florida Kids Count; CDC's Public Health Surveillance for Women, Infants, and Children; MMWR 1998: Recommendations to Prevent and Control Iron Deficiency in the United States; Haitian Nutrition Initiative, 1998) and internet sites (<http://doh.statefl.us/>, www.cdc.gov and www.modimes.org).

About the interviews, eight (8) short interviews were conducted. Informants in Dade County were contacted from Miami Children's Hospital, U of M Hospital and Clinic, and United Cerebral Palsy. In Broward County, informants were contacted from Family Health Center, Healthy Start Coalition or State Road 84 Health Center, and Trinity Health Center, etc. These informants include friends who work in the medical field or the mentioned health facilities. Four Haitian parents and pregnant women in Broward were currently questioned in order to understand their nutritional attitude and their prenatal care access.

This paper is dealing with the prevalence of iron anemia and its detrimental effects among populations considered at risks, such as pregnant women, infants and children. Since the fieldwork was done in a few days or where access was very limited or restrictive, only integral findings are expected. However, they can provide an insight about the anemic situation in South Florida before the year 2003.

The quantitative information displays numerical data according to each group like women, babies, toddlers, etc., living under detrimental effects of nutritional anemia and nutritional deficiencies. Based on any percentage of people who are identified with this disease, the principal causes, the socioeconomic and sociocultural factors are determined. Original data collected and secondary source data are coded and reassembled into themes, concepts, ideas or arguments to display the findings (Rubin & Rubin, 1995). In addition, this approach indicates the proportion of racial or ethnic groups affected by this disease.

This study is considered as a preliminary step toward an eventual research based on anemia among pregnant women in 2003 and after.

5. Findings: Prevalence of Anemia among Pregnant Women and Children

In the State of Florida, particularly South Florida, there is no special emphasis on the prevalence of anemia. This trend is because the researchers understand that iron deficiency anemia is *acquired anemia*, which means that it is different from the congenital one, and therefore, it might be controlled through healthy and adequate nutritional assistance to vulnerable population that consists of pregnant women, infants, and children. That trend can also explain why health-care providers or agencies are not interested in classifying data for eventual studies on anemia. Even when data are not collected which keep people informed, everyone knows that the risk 'for or prevalence of iron deficiency' exists.

Uthman (1998) argues that "each year thousands are told they suffer from anemia, but most have only a vague understanding of the condition ... 'Anemia' a generic term that includes many specific diseases, each of which has its own history regarding cause, manifestations and treatment." In fact, on the national level, some medical studies have been directed between 1970 and 1998 in which data are collected by sex and age (years), iron deficiency, iron deficiency anemia, etc.

In South Florida when we take into account literature on anemia, public documents and original data associated with the absence of prenatal care, premature deliveries, low birth weight babies, etc., and compare them to the "manifestations of iron deficiency" (CDC, 1984: p. 5) given for the whole country, we consider there is a prevalence of anemia in South Florida. Accordingly, the prevalence of anemia will be shown through the themes displayed below.

5.1 Iron deficiency Anemia and Pregnant Women

Data are not available about the percentage of pregnant women suffering from anemia in South Florida. So, we can take into account the argument of a WIC nutritionist supervisor in Broward. She states: "It is not necessary to seek the percentage of pregnant women suffering from this disease when you know the percentage of pregnant women who don't receive prenatal care," or the percentage of premature deliveries, low birth weight babies, fetal death, etc. In this respect, it is to note that CDC (1984: p.6) points out "among pregnant women, iron-deficiency anemia during the first two trimesters of pregnancy is associated with a twofold increased risk for preterm delivery and a threefold increased risk for delivering a low-birth weight baby. Then, through these complications, "anemia can be 'passed' from the mother to the baby causing the baby to be born too thin, weak, deformed, premature, or sick" (Galloway et al., 1992: p. 539).

In addition, we reveal that 'women who were deficient in folic acid were more likely to have [not only] a baby who was premature and of low birth weight (less than 5-1/2 pounds),' but also to have one with "birth defects of the brain and spinal called neural tube defects (NTDs)" (March of Dimes, 1999: p.2). On this level, available data on these cases can give us an idea about the prevalence of anemia in South Florida.

As a matter of fact, 1996 statistical data for Dade County reported that 7.8% of mothers delivered low birth weight babies and 9.7% of mothers delivered preterm births, and 1995 data for Broward indicated that 16.5% of mothers were recorded as delivering low birth weight babies. However, in Broward, data did not mention premature birth because "low birth weight [is] primarily [considered as] the result of premature birth" (Broward Regional Health Sourcebook, 1997).

Furthermore, since we have no data available about fetal death and birth defect for all South Florida, we just highlight some cases according to two reports, one from Jackson Memorial Hospital, JMH (South Florida Perinatal Network, 1988) and the other from the United Cerebral Palsy-Preschool (UCP-PS). JMH emphasized 36% of fetal death among teen mothers for 1986.

Original data shows that UCP-PS, Miami, recorded between 1997 and 2000, 102 cases of Cerebral Palsy (CP) Children. Besides UCP-PS, there are at least 14 institutions specializing in infant services, developmental delay (or disability) and early intervention. Unfortunately, due to unavailable time, we didn't contact these institutions.

To indicate the prevalence of anemia, we reveal that UCP urges for the prevention of Cerebral Palsy, by the control of diabetes, anemia and nutritional deficiencies. Obviously, all of these unfortunate conditions are primarily due to iron-deficiency and folic acid anemias in pregnant women who receive late prenatal care or no prenatal care.

In fact, women with late or no prenatal care were evaluated to 16.7% in South Florida including about 7.0% in Broward within 1996-1997 (Broward District Health Plan, 1998; Florida Department of Health, 1996). Of this, a Medical Center practitioner, according to original data, indicated that 80.0% of pregnant women were found anemic during their first prenatal blood test. Probably, among these women, "expansion of blood volume by approximately 35% and growth of the fetus, placenta, and other maternal tissues increase the demand for iron threefold in the second and third trimesters to approximately 5.0mg iron/day" (CDC, 1984: p. 9). In this case, if a pregnant woman "[doesn't] take iron supplement to meet increased iron requirements during pregnancy, she cannot maintain adequate iron stores" (CDC, 1984: p. 9) during both given trimesters.

Thus, "these normal physiologic demands are reflected in the CDC trimester specific reference criteria for anemia during pregnancy" (Wilcox & Marks, 1995: p. 28). In addition, these normal physiologic demands in association with a lack of vitamin and mineral supplementation can enhance "the prevalence of underweight" (Wilcox & Marks, 1995: p.23) among pregnant women. In a 1998 study about a Haitian project in Broward, for two treatment Groups, 31% and 41% of 239 and 397 pregnant women did not gain 'enough weight.' Normally, during pregnancy 25 to 35 pounds are additionally required for most healthy and normal weight women, 15 to 25 pounds for overweight women and 28 to 40 pounds for underweight women (Haitian Nutrition Initiative, 1998: p.2).

“Weight gain during pregnancy has a tremendous effect on the outcome of the pregnancy. Adequate weight gain is necessary for normal growth and development of the fetus, and also for the health of the mother” (Haitian Nutrition Initiative, 1998: p.2). In a conversation, a 4 children mother reveals that a pregnant woman must not take too much weight during her pregnancy. This can ‘lead to diabetes mellitus and ‘pregnancy induced hypertension’ (PIH). On the contrary, “if a woman does not gain enough weight, she is far more likely to deliver a low birth weight baby and/or have other complications with delivery and with her baby” (Haitian Nutrition Initiative, 1998: p.2).

Since premature delivery and low birth weight are associated with infancy, let us see them in the following section.

5.2 The Prevalence of Anemia among Children

As previously indicated, data are officially unavailable on anemia according to sex and age (years) in South Florida. Whereas, on national level, “data from the Pediatric Nutrition Surveillance System (PNSS), conducted by the Centers of Disease Control (CDC) in 1980-1991, indicated a 20-30% overall prevalence of anemia among children younger than 2 years of age” (Ryan, 1997: p.22-23). In addition, the CDC points out for all children under 2 years of age whose a hemoglobin is <11.0gdl or a hematocrit, 33.0%, are anemic.

Although other causes during pregnancy and infancy can lead to low birth weight, fetal death and to a subnormal hemoglobin among children concentration, the iron deficiency and ‘B12 vitamin deficiency’ anemias are commonly highlighted (Hoffbrand & Pettit, 1993). Therefore, the percentage of premature deliveries, low birth weight, infant mortality, etc. in South Florida indicates the prevalence of anemia.

5.2.1 Premature Deliveries

Between 1995-1996, South Florida counted 8.6% of premature deliveries compared to the Statewide being 8.4%, nationwide 11% in 1997 (Florida Department of Health, 1996; March of Dimes, 1997; Lawton and Rhea Chiles Center, 1991). Although a premature delivery indicates the iron deficiency among the mothers, but it also does among the infants. “Preterm ... infants are born with the same ratio of total body iron to body weight, but because their body weight is low, the amount of stored iron is low too” (CDC, 1984: p. 5-6). Generally, when there is this kind of complication, study could show that the total amount of iron required for an average pregnancy is [less than] 840mg” (Ryan, 1997: p.18). So, most of the time, pregnant women with poor iron status are unable to transfer at least 350mg of iron to the fetus and placenta. In function of this, their body cannot support a full-term pregnancy. That implies further the premature delivery.

In the Haitian culture according to an interviewee, “we deliver a preterm baby, when we are in ‘perdition,’ [a kind of miscarriage]. In this culture, several factors are associated with ‘perdition.’ The most common one is blood loss during the first months of pregnancy due to bad luck or witchcraft. Rarely, Haitian women follow the biomedical perspectives to explain premature delivery. On April 24, 2003, during a multicultural festival that took place at Wilton Manors Elementary School in Fort Lauderdale, Broward County, a second grade teacher in her late 20s was asked if she has kids since she was seen with 3 ones. She replied, “No, Bondye poko vle mwenn genyen (God doesn’t want yet).” Further, “I had a miscarriage a couple of years ago,” she added. In saying, “God doesn’t want yet,” she would like to imply that God doesn’t conjure yet the bad luck and magic things preventing her a normal-term pregnancy.

5.2.2 Low Birthweight Babies

The conditions that provoke the preterm infants are quite similar to those that explain low birth weight infants. Thus, we recall that iron-deficiency anemia is associated with both conditions” (CDC, 1984: p.5). In this case, we highlight that low birth weight babies are under 2500 grams (very low birth weight are under 1500 grams). In fact, Broward and Dade recorded about 7.9% of low birth weight infants for the years 1995-1996 (Florida Department of Health, 1996; Lawton and Rhea Chiles Center, 1991) while the State of Florida counted 8.34%. At last, we add that these ‘infants are born with lower iron stores and grow faster during infancy, consequently, their iron stores

are often depleted by age 2-3 months and at greater risk for iron deficiency than are full-term infants of normal or high birth weight.'

5.2.3 Infant Mortality

In 1997, CDC analyzes that "low birth weight infants were 21 times as likely and very low birth weight, infants were almost 90 times as likely to die before their first birthday as not low birth weight infants." Here, it is important to remind that birth defects are commonly associated to very low and low birth weight. All of them, in 1990 were responsible for about 33% of infant mortality on countrywide level and 6.4% on statewide level in 1995 (March of Dimes, 1993: p.30; Lawton and Rhea Chiles Center, 1991). Compared to the statewide data, we see that the infant mortality is high in South Florida with a rate of 8.26%.

5.3 Effects of Iron-Deficiency on Child Development

Iron-deficiency anemia is the most common anemia (DeLoughery, 2014). As one of the malnutrition diseases, it provokes mental deficiencies and reduces the intellectual quotient (IQ). "In humans, the brain growth spurt [or increase] is both a prenatal and postnatal event" (Ryan, 1997: p.43). Thus, the iron-deficiency anemia delays this process. Infants with iron-deficiency anemia scored significantly lower than the control and non-anemic iron-deficient groups on both the Mental Development Index (MDI) and Psychomotor Development Index (PDI) (Ryan (1997).

In Dade County, for example a study (Hurtado, Claussen & Scott, 1999) is based on all birth records for the years 1979-80 and all school records for the years 1990-91. Data concerning the children were provided by the WIC Program. "About 69% of the sample was Black, 23% was Hispanic, and 7% was White." The study shows that "children with very low birth weights and those with low birth weights were 4.58 and 2.50 times as likely, respectively, to be classified as mildly or moderately retarded as children with normal birth weights" (Hurtado, Claussen & Scott, 1999: p.117). In addition, the study reveals that "males were 2.17 times more likely to be classified as mildly or moderately retarded than female." At last, to conclude the study "supports [in part] the efforts to provide proper nutrition to mothers, infants, and young children" (Hurtado, Claussen & Scott, 1999: p.117).

5.4 Socioeconomic Implications

As indicated, the population said vulnerable like pregnant women, infants and childhood remains the most affected by iron deficiency and folic acid anemias. However, among individuals whose the socioeconomic status is relatively low, the prevalence of anemia presents the highest rate. In the last quarter of 2002, at the time we started gathering information for the current research, the US Pediatric Nutrition Surveillance System reported increase among low-income children was 13 percent, and that continued to increase up 15 percent until 2007 (Janus & Moerschel, 2010). Since in the United States the ethnic group difference is used as a predicting factor of analyzing the degree of income or the poverty level, statistical data show that the highest rate of no prenatal care or late prenatal care [...], premature deliveries, low birth weights, infant death, birth defects, are primarily recorded among Black and followed by Hispanic and White people. As we already know all of these complications as for leading causes the iron deficiency and vitamin deficiency anemia.

In fact, on countrywide level, CDC, in 1993, indicated that the prevalence of Anemia in low income pregnant women enrolled in public health programs was 9%, 14% and 37% in the first, second, and third trimesters, respectively (CDC, 1998). Despite the fact that data for all pregnant women were unknown, CDC added that "the high prevalence of iron deficiency and iron-deficiency anemias, and the increased demand for iron during pregnancy suggest that anemia during pregnancy may extend beyond low income women" (CDC, 1998: p. 9). Consequently, that explains in 1994 the prevalence of prematurity and low birth weight of 13.2%, 16.0% and 6.1% among infants born to Black, Hispanic and White mothers respectively (March of Dimes, 1997).

In South Florida particularly Dade County, during the third quarter of 1996, counted 11.3% of low birth weight and 12.9% of premature deliveries among infants born to Black mothers. Compare to 6.7% and 8.5% of low birth

weight and premature babies born to Hispanic mothers, the Black mothers proportions are high. Here, among the Black mothers' proportions, those of Haitian mothers represent about 49% of either premature deliveries or low birth weight (Florida Department of Health, 1996). These particular data obviously picture the trend toward the high risk of prevalence of anemia among populations with the lowest income. Thus, we point out that the income of Haitian women is very low vis-à-vis that of African-American women.

Most Haitian pregnant women are refugees and do not speak English. For example in 1992, "22% of the Guantanamo Bay Haitians surveyed reported that they had no schooling and 23% of them reported completion of the 6th grade. Of the 4,414 Guantanamo Bay Haitians who were asked to self-report their knowledge of English, 99% reported 'None'" (Haitian Nutritional Initiative, 1998). The situation of Haitians is similar to that of Central and South Americans. As pointed out, these factors made educational efforts really very difficult, and lead these refugees unable to start a new life and develop a healthy lifestyle (Haitian Nutritional Initiative, 1998). In this case, Family Health Center, Broward, dealing with these refugees, currently receives at least 5.0% of anemic children under 5 years of age and consults pregnant women and breastfeeding mothers with some of the worse anemic cases.

These women or "particularly recent immigrants [coming in US without anything and being] in a very difficult situation both economically and emotionally, work hard during pregnancy, and do not get rest" (Haitian Nutritional Initiative, 1998). Therefore, they have no time or enough time to take care of themselves and their kids. In function of this, if we go back to 1990, we can particularly find among 39.6% of African-American children under six years of age [in Broward and Dade] who were living below the poverty level, the Haitian children might be represented a significant percentage (Florida Kids Count, 1993). Here, all of these factors enhance a sociocultural approach of the target population, such as pregnant women, infants, and children.

5.5 Sociocultural Environment and the Prevalence of Anemia

Here, sociocultural environment expresses any factors other than socioeconomic status which can contribute to the emergence of malnutrition disease. In this, we point out for example sociocultural malnutrition that is "due to factors other than the lack of availability of food materials" (Dettwyler, 1992: p.18). Since the United States is a developed country where individual poverty and food access are more associated with one's level of adaptation than underemployment and 'availability of food materials,' sociocultural factors obviously become an 'accurate predictor' of the prevalence of anemia. So, among many sociocultural factors, we emphasize three important ones such as under education, female headed-family and refugees' environment.

In fact, in a recent study conducted in Miami Dade, the results indicate that "children of mothers with low education and children of mothers with normal education were 11.94 and 8.32 times as likely, respectively, to be classified as mildly or moderately retarded as children of mother with high education" (Hurtado, Claussen & Scott, 1999: p. 117). In this, the results primarily showed a significant relationship between children with a low hemoglobin concentrations and mothers with low education and lack of experience; whereas an educated mother gets control over her pregnancy, focuses on gaining weight, and is aware of taking iron and folic acid supplements in order to avoid premature delivery, low birth weight baby, birth defects and further child cognitive and physical delays.

At last, we reveal two cases concerning either uneducated or ignorant mothers. First, in Broward, we know about a mother under 20 who already has three kids. Now she is pregnant although the doctor's advice claims, "Don't try a fourth pregnancy" or she will be anemic. Then, according to the nurse, "she said that she is pregnant in order to get a car offered by her boyfriend." Second, in Dade, in a conversation, a mother in her 20s who proudly tells us that during her 9 months of pregnancy, she did not go to the clinic. She went to the hospital directly when she got pain delivery. For both cases, maternal attitude is quite related to education rather than financial situation (Dettwyler, 1992).

In both cases, we notice that the cultural environment doesn't provide any necessary advice to these mothers. However, "in any society people are bound to depend on others...for most of what they know about [health and] illness" (Mascie-Taylor, 1993: p. 95). Here everything is left to the individual's self-control while all family

members, friends, and neighbors' supports and advice were supposed to be more influential than whatever the public preventive program or assistance is. That explains why, although migrants, for example, are WIC program and welfare participants, their lifestyle choices remain greatly limited since many have been separated from the extended families and communities they were raised. Housing, employment and supportive families or friends may be very limited to them in the US (Haitian Nutritional Initiative, 1998).

In view of the above, it is to reveal that a Haitian mother accounted that in July 1999 her son, 3, was anemic according to a WIC program evaluation test. This test is required every six months. She was stressed about her son's healthy condition and faced the "cultural bereavement" (Helman, 1998: p.309). She said, here, the babysitter did not feed her son properly since almost every time she noticed that the boy returned home with his lunch. A similar situation was found in Costa Rica. There, a woman "explained that her son developed anemia because she was not taking care of him during the day; he was with a babysitter" (Jefferds, 2002).

6. Discussion

If the prevalence of anemia taken alone is not considered as a major public health problem, on the contrary, that of premature deliveries, low birth weights and birth defects resulting from anemia or the absence of prenatal care does and remains the main emphasis of the whole country. That explains why since 1973, the WIC (Women, Infants and Children) program has continuously focuses on pregnant women, infants and children being the ideal groups to maintain the population growth.

Here we obviously point out that in the State of Florida, the HRS-WIC Program involves in prenatal health care, post prenatal health care, and child welfare in order to raise the level of living among the target population effectively consisting of "low and moderate income pregnant, breastfeeding, and postpartum women; infants and children up to age 5" (FFY, 1996). So, to be eligible for this program, pregnant women and infants must be classified below 185% of the poverty income guidelines established by the federal government. In addition, we indicate that the purposes of the program are to control malnutrition disease associated with iron deficiency anemia and vitamin B12 or folic acid anemia within its target population.

In this respect, the "program [including Medicaid] provides a combination, of supplemental nutritious foods, nutrition education, breastfeeding promotion and support, and referrals for health care" (FFY, 1996). For example, in 1995, 53.4% of total potential eligible population has been served. Particularly, "WIC has proven to be effective in preventing and improving nutrition-related health problems within its target population" (FFY, 1996). In terms of this, the WIC program generally joins the March of Dimes and CDC in their recommendations to prevent and control iron and folic acid deficiencies.

In fact, all of them "recommend universal iron supplementation to meet the iron requirements of pregnancy ... [since] absorption of iron increases during pregnancy" (CDC, 1998: p.2-3). In addition, they recommend that childbearing women or women who could become pregnant consume 400 micrograms of folic acid daily of the synthetic form despite the fact that the body can absorb almost 100.0% of the synthetic form of folic acid (March of Dimes, 1999). But in repeat pregnancy, women should increase their intake of synthetic folic acid between 600 to 1000 micrograms according to their doctor's advice. Here, we mention that Natural Folic Acid 400mcg (Rugby Laboratories), Ferrous Fumerate, Ferrous Sulfate are currently prescribed in Broward.

Thus, at last the preventive program was called to reduce the incidence of low birth weight babies, birth defects and infant mortality. In fact, in Broward, the percentage of low birth weight, very low birth weight (<1500g) (Hurtado, Claussen & Scott, 1999) preterm deliveries and infant mortality decreased 20.8%, 24.4%, 8.4% and 36% respectively between 1991 and 1995 (Hurtado, Claussen & Scott, 1999; Lawton and Rhea Chiles Center, 1991).

In addition, HRS-WIC program in order to improve diets, decrease anemia and improve growth and development among infants and children, extends children's eligible age to at least 6 or to 7 or 12 (FFY, 1996). According to this, foods rich in protein, iron, calcium, and vitamins A and C are recommended. That explains why WIC checks are valid to buy milk, cheese, eggs, cereals high in iron, peanut butter or dried beans or peas, fruit vegetable juices,

iron-fortified infant formula, etc. Most of these foods are served for free in school breakfast and lunch for children over 6-year-old whose parents income is low.

7. Conclusion

In summary, iron deficiency is considered as one of the most widespread deficiencies today. “The most well-known effect of iron deficiency is anemia, a low concentration of blood hemoglobin” (Goodman, Dufour & Pelto, 2000: p.223). Currently, it is characterized by inadequate nutrition, inadequate iron supplements during pregnancy, and blood loss. In South Florida, this pattern of anemia is manifested among women, infants and children despite the fact that women are undereducated ‘about the dietary needs for themselves and their families.’ Consequently, that entails an unexpected percentage of premature deliveries, low birth weight, birth defects and infant mortality. Most of the cases are recorded among Caribbean, Central and South American refugees.

Besides Iron-deficiency, there is the prevalence of B12 vitamin and folic acid deficiency anemia. This new pattern is also responsible for ‘affected pregnancies end in miscarriage or stillbirth and for birth defects such as spina bifida and Anencephaly (NTDs).’ Spina bifida is a leading cause of childhood paralysis, whereas Anencephaly is associated with a severely underdeveloped brain and skull of the baby (March of Dimes, 1999). To prevent all of these incidences in South Florida, Health and Rehabilitation Services (HRS), WIC, Healthy Start Coalition, and so forth, elaborate important programs in order to provide necessary needs to the target population.

In this perspective, we previously pointed out that in 1995 local agencies (Broward and Dade) reached approximately 53.4% of potentially eligible population (FFY, 1996). Finally, we highlight according to Broward District Health Plan (1998) that Health-Care Providers or Agencies in Broward, for example, intended to improve the percentage of healthy people since the year 2000 by increasing live births up to 7 per 1,000 (it was 10.1 per 1,000 in 1997), prenatal care to 90% start in first trimester (it was 84.1% in 1996) and reducing to 5.0% the low birth weight, and 1.0% the very low birth weight compared to 8.2%, and 1.7% in 1997 respectively.

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