

Original Paper

# Assessment Of Nutritional Status Of Hiv Infected And Hiv Negative Pregnant Women In Ngaoundere, Cameroon

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**Background & objectives:** Malnutrition (underfeeding) can affect the treatment of AIDS in that it reduces the ability of the intestine to absorb drugs, organic substances and micronutrients. Underfeeding could also increase the chances of transmission of the disease from an infected mother to the baby during pregnancy. The objective of this study is to compare the energy intake, weigh rate and nutritional status between the HIV and non HIV pregnant women attending two referrals hospitals in Ngaoundere (Cameroon).

**Methods:** A cross sectional study using 24-hour dietary recall was applied to a sample of 109 women, randomly selected from a population-based and anthropometric data were done.

**Results:** Result show that HIV negative pregnant women consumed less energy intake per day than the HIV infected pregnant women at all age groups with no significant difference ( $F_{cal}=1.19, p=0.317$ ). Gain in weight between the HIV infected and HIV negative pregnant women in relation to their various age groups was no significant ( $F= 1.23, p=0.27$ ). There was no significant influence of HIV status in pregnant women BMI ( $F=2.29, p=0.133$ ).

**Interpretation & conclusion:** In this study, the higher consumption of energy by HIV infected pregnant women than HIV negative women could be because HIV infected pregnant women were at the beginning of the infection which has not yet affected the immune system. In the two referral hospital of Ngaoundere besides HIV screening tests, should be also nutritional services to advice these women on their nutritional habits.

**Keywords:** Malnutrition, Body mass Index, HIV/AIDS, energy consumption

## 1. Introduction

Acquired Immune Deficiency Syndrome (AIDS) is an infectious disease caused by the Human Immunodeficiency Virus (HIV) which appeared for the first time in the mid 1980 (BICE,

1993). The Human Immunodeficiency Virus (HIV) reproduces in certain blood cells and more specifically in the white blood cells (WBC). The HIV thus attacks and weakens the immune system rendering the victim vulnerable to infections. It

has ravaged sub-Saharan Africa for decades and is still a major cause of adult morbidity and mortality (Masanjala, 2007). Recent estimates by the World Health Organization (WHO) show that about 33.3 million people are living with HIV/AIDS worldwide with 22.5 million living in sub-Saharan Africa (Global Report, 2010). The prevalence in Cameroon stands at 5.5 % with the Adamawa region occupying the 5<sup>th</sup> position with 6.9 % (Comité National de Lutte contre le Sida, 2004).

Studies outlined that there is a relationship between malnutrition and AIDS (AIDS institute, 1995). Research shows that, the chance of infection with the HIV virus might be reduced in individuals who have good nutritional status with micronutrients and especially, vitamin A playing significant roles (ACC, 1998). Malnutrition (underfeeding) can affect the treatment of AIDS in that it reduces the ability of the intestines to absorb drugs, organic substances and micronutrients. Underfeeding could also increase the chances of transmission of the disease from an infected mother to the baby during pregnancy (Semba, 1997).

This affirmation thus necessitates certain questions on the increasing rate of HIV positives in this region of the world, which

is one of the most affected (CNLS, 2004). One would therefore be tempted to believe that underfeeding plays an important role in increasing the damaging effects of the HIV/AIDS. In the town of Ngaoundere, there is a dearth of informations on the relationship between underfeeding and HIV/AIDS. Thus, this study was undertaken to compare the energy intake, weight rate and nutritional status between the HIV and non-HIV pregnant women attending two referrals hospitals in Ngaoundere, Cameroon.

## 2. Materials And Methods

### Study Area

Ngaoundere is the capital city of the Adamawa Region, Cameroon. The city is located at latitude 7°19'N and longitude 13°34'E. Its population was estimated at about 230,000 inhabitants in 2001 (Tchotsoua, 2006). The Adamaoua region is high in altitude; its whether is between 22 and 25°. This plateau contains 2 types of climates: the Sudanese type of tropical climate and the Cameroon type of equatorial climate. The Sudanese type of tropical climate has a dry season covering the period of November to March; then comes the moist season with down falls ranging from 900 mm to 1500mm. The

Cameroon type of equatorial climate has a long dry season followed by a long rainy season. The down falls here range 1500mm to 2000mm per year (Okouba *and al.*, 2010).

### Study population and Design

The study was cross-sectional in design. Pregnant women that attended antenatal services of the two referral hospitals in Ngaoundere (Protestant and Regional) were enrolled for the study. The study was conducted from May 2003 to January 2005. A total of 109 pregnant women at their third trimester were randomly selected and enrolled for the study. They were grouped into HIV infected (13) and non-HIV infected (96).

Four age groups were ranged for the evaluation of age influence as a factor studied (<19 years, 19-22 years, 23-26 years, > 27 years).

### Questionnaire Administration

Questionnaires were administered to the women to collect data on: Age, level of education, number of children, gravidity, preferred meals, family inherited illnesses, certain disease frequency in the family and pre-natal treatments. Nutritional feeding habits were obtained through interviews on the diets. A 24-hour dietary recall was applied to a sample of women, randomly selected from a

random population-based study sample. Most of the women had common feeding habits and their common meals were reported to be cereals (maize), tubers (cassava) and vegetables. The conversion of quantity consumed into calories was done with the help of a chart on food and nutritive value (FAO, 1968; Yadang, 2000).

### Assessment of nutritional status of the pregnant women

Anthropometry is the measurement of human body. It is a quantitative method and is highly sensitive to nutritional status (Amuta and Houmsou, 2009). The anthropometric factors: Weight (Kg) and Height (m) were used to calculate the Body Mass Index (BMI) as:

$$BMI = \frac{Weight (Kg)}{Height (m^2)}$$

As the aforementioned formula reflects the human body without pregnancy, we subtracted the foetal weight from the total weight of the pregnant woman to get the exact BMI.

We generally assume that a body mass index less than 18.5 implies that the woman is thin and between 18.5 and 25, we say the woman has a normal weight meanwhile values superior than 25 indicates over weight (Gallagher *and al.*, 2000).

### Statistical analysis

Collected data were analyzed using Statgraphics 3.0. The one way ANOVA test was used to find significant difference between the means. The significance level was at  $p \leq 0.05$  level.

### 3. Results

#### Comparison of energy intake between HIV infected and HIV negative pregnant women in Ngaoundere, Cameroon

The quantity of energy consumed by HIV negative pregnant women and HIV infected pregnant women is shown in Figure 1. The result shows that HIV negative pregnant women consumed less energy intake per day than the HIV infected pregnant women at all age groups with no significant difference ( $F_{cal}=1.19$ ,  $p=0.317$ ).

#### Variation in weight gain of HIV infected and HIV negative pregnant women.

Studies and analysis of the weight parameter of HIV infected and HIV negative pregnant women showed that the daily weight gain by HIV negative pregnant women is  $0,041 \pm 0,029$  kg/day,  $0,042 \pm 0,033$  kg/day;  $0,054 \pm 0,047$  kg/day;  $0,057 \pm 0,06$  kg/day for group I, II, III and IV respectively,

meanwhile for HIV infected women it is  $0,038 \pm 0,023$ kg/day;  $0,039 \pm 0,014$ kg/day;  $0,044 \pm 0,012$ kg/day;  $0,017 \pm 0,037$  kg/day for group I, II, III and IV respectively (Figure 2). No significance difference was observed in weight gain between the HIV infected and HIV negative pregnant women in relation to their various age groups ( $F= 1.23$ ,  $p=0.27$ ).

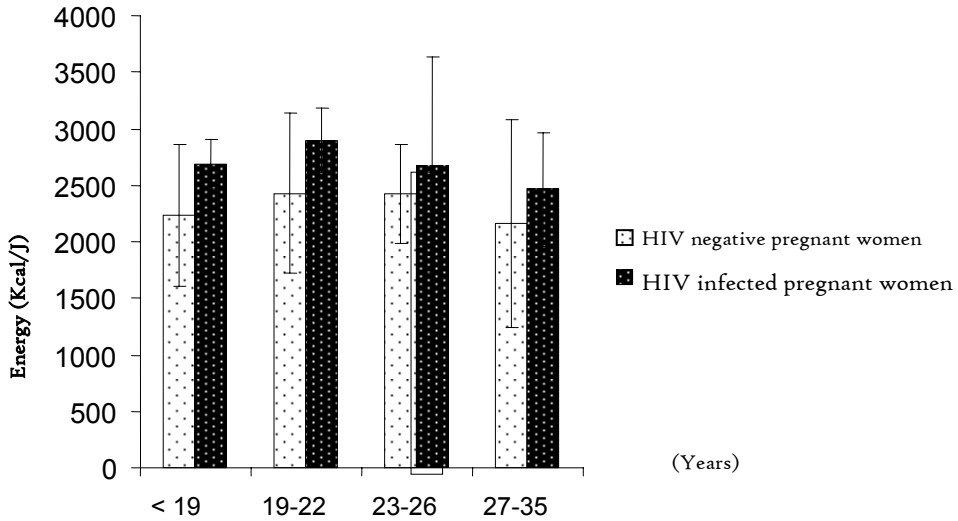
#### Body Mass Index (BMI) of HIV infected and HIV negative pregnant women

The body mass index of HIV infected and HIV negative pregnant women is shown in Figure 3. It is observed that HIV status does not influence pregnant women BMI ( $F=2.29$ ,  $p=0.133$ ).

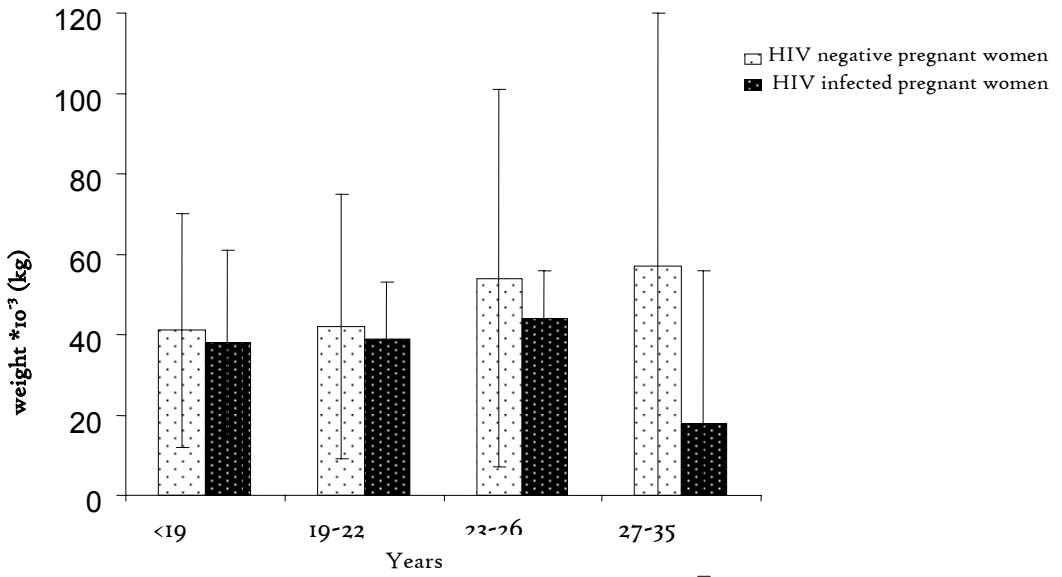
Pregnant women were grouped into 3 depending on their Body Mass Index (Table 1). Results showed that 0,92% of the HIV infected pregnant women are underweight, 7,34% are of normal size, and 3,67% are overweight, while 0,92% of the negative were of underweight 46,79% are of normal size, and 40,36% are overweight. Although according to the body mass index of women at the start of pregnancy, 18,34% are thin and 81,65% normal.

**Table 1:** Percentages on the Body Mass Index of HIV infected and HIV negative pregnant women in relation to their age group.

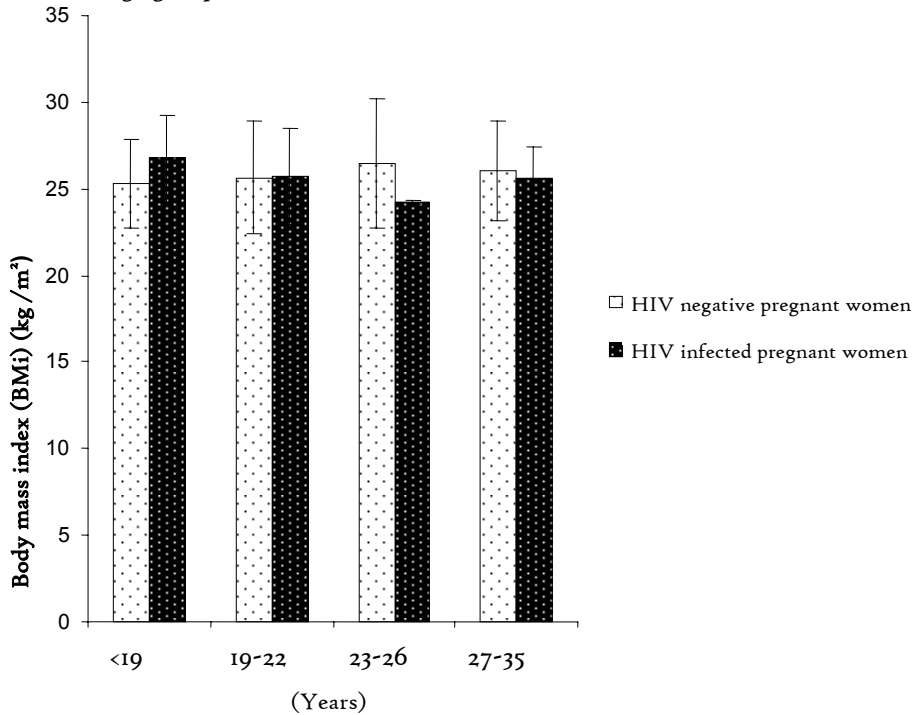
BMI (Kg/m <sup>2</sup> )	Number	
	HIV positive (%)	HIV Negative (%)
Underweight (< 18.5)	1 (0,92)	1 (0,92)
Normal weight (18.5-25)	8 (7,34)	51 (46,79)
Overweight (> 25)	4 (3,67)	44 (40,36)



**Fig1:** Comparison of energy intake between HIV infected and HIV negative pregnant women in relation to age.



**Fig 2:** Variation in weight gain among HIV infected and HIV negative pregnant women in relation to age groups



**Fig 3:** Variation in Body Mass Index among HIV infected and HIV negative pregnant women in relation to age group

#### 4. Discussion

Generally, the energy intake by HIV infected pregnant women appears to be higher than that of HIV negative pregnant women. This could be because HIV infected pregnant women were at the beginning of the infection which has not yet affected the immune system. It could be also due to the fact that there were not aware of their HIV status which could have affected their mind therefore influencing them to lose weight through their thoughts. A study reported that the quantity of energy necessary for pregnant women of the third trimester is 2,250 kcal per day. However, a comparison of the energy taken by the HIV negative and HIV infected pregnant women in this study revealed that the energy levels were higher than values reported by Dupin *and al* (1992). This could be justified by the fact that these pregnant women were in the third trimester of pregnancy when they have the tendency of eating a lot irrespective of their HIV status.

In our study group, we noticed that infected pregnant women and non infected pregnant women gain weight during pregnancy. We observe that the biggest mean rates of gain for 3<sup>rd</sup> trimester of pregnancy in our population

group is 0,399kg/wk for HIV negative pregnant women and 0,308 kg/wk for HIV infected pregnant women. The presumably gain weight from HIV-uninfected adult women from the United States and Europe are 0,30 to 0,54 kg/wk during the 3<sup>rd</sup> trimester. However, people on whom we worked have weight ranges these values. This result is similar to those reported by Strauss *and al.* (1999) and Ladner *and al* (1998), but contrasts that of Kim *and al.* (1996) who observed HIV infected subjects to be suffering from underfeeding and weight lost at the onset of the infection. The difference between our study and that observed by Kim *et al.* (1996) is that the subjects enrolled in our study were found to have more energy intake than the recommended energy consumption. The energy surplus consumed by these pregnant women would have compensated the expected weight. We did not find further evidence in the literature that suggested differences in the pattern of weight gain by HIV status. But we know that lean body mass loss can be improved when nutrition counseling is combined with nutritional interventions (Stack *and al.*,1996). The body mass index observed in our study show that HIV status does not influence the

weight gain by pregnant women. This result is similar with studies reported in Tanzania who find that there is not significant difference between body mass index infected and HIV-negative women (Villamor *and al.*, 2004). This could be justified by the fact that these infected women are at the beginning of their illness.

### 5. Conclusion

Our study report that, no significant difference was observed between HIV infected and HIV negative pregnant women with regards to energy intake and weight gain. Our results also showed that age groups and HIV status had no significant influence on the pregnant women's Body Mass Index. Besides HIV screenings test, were done to the women attending their antenatal services in there should be also nutritional services to advice these women on their nutritional habits.

### Acknowledgements

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