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A Study on Maternal Nutrition in HIV Pregnant Women Suffering From HIV.

Lalhlimpuii Murray[1], Usham Shantikumar Singh[2], Usharani Akoijam Devi[3], Lalzikpuii Tochhawng[4], Telen Thangkhojam Kom[5], Madhumita Roy[6], Amritha Madhukumar[7], L. Ranjit Singh[8]

[3,5,8]*Professor, Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal, Manipur.*
[1,2,5,6,7]*Resident, Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal, Manipur.*

Abstract
Background: *HIV infection in pregnancy has become one of the most common infections of pregnancy in developing countries. This has major implication for the management of HIV sero-positive pregnancies and childbirth. There is a bidirectional relationship between nutritional status and the course of HIV/AIDS.*
Aims &Objectiv*e: i) To study nutritional status of pregnant women suffering from HIV/AIDS. ii) To determine other associated factors affecting the health status of HIV sero-positive pregnant women.*
Materials and methods: *A cross–sectional study was conducted from September 2017 to March 2019. All HIV sero-positive pregnant women beyond period of viability (period of gestation ≥28 weeks) attending antenatal clinic of RIMS Hospital were included in the study. Data were collected from PPTCT Centre RIMS, Imphal, Manipur.*
Results: *A total of 27 HIV sero-positive pregnant women who reported for delivery from September 2017 to March 2019 were registered in the study. Maximum number of participants belong to the age group of 20-30 years and constitutes 59.3%.The mean mid upper arm circumference was found to be 23.74±1.66cm, which shows that majority of HIV sero-positive pregnant women had MUAC of >22cm i.e. within normal range. The mean hemoglobin percentage was found to be 10.6±1.67gm/dl. In the study, two-third of the participants had normal BMI (63%) but remaining patients had BMI of 25-30 (37%) falling in the range of overweight. There was poor correlation between serum albumin level of HIV sero-positive pregnant women and birth weight of babies.*
Conclusion: *The present study gives an insight into the nutritional status of HIV sero-positive pregnant women in Manipur and concludes that pregnancy does not alter the course of HIV/AIDS and HIV infection has no impact on pregnancy outcome.*

Keywords: Body mass index, HIV sero-positivity, Mid upper arm circumference, PPTCT.

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I. Introduction

Pregnancy complicated by HIV infection is considered high risk. While fertility is decreased following HIV infection, pregnancy does occur. Pregnancy does not alter the course of HIV infection and HIV infection also does not have any impact on pregnancy outcomes other than perinatal transmission.[1]

HIV infection in pregnancy has become one of the most common infections of pregnancy in developing and under-developed countries. This has major implications for the management of pregnancy and childbirth. The triad of Human Immunodeficiency Virus, nutritional status and immune system are closely interwoven each one having impact on the other.[2]

Out of 36.9 million people living with HIV/AIDS, 19.1 million were girls and women. Globally, one young woman becomes infected with HIV every single minute, with some countries reporting that more than 10 percent of young women in the age group of 15-24 years are living with HIV. In Swaziland, 40% of pregnant women are infected with HIV.[3]

India has third largest HIV epidemic in the world. As per HIV estimation 2017 report, National adult (15-49 years) HIV prevalence is estimated at 0.22% (0.16% - 0.30%). Amongst the States/UTs in 2017, Mizoram has highest estimated adult HIV prevalence of 2.04%, followed by Manipur (1.43%), Nagaland (1.15%), Telangana (0.70%) and Andhra Pradesh (0.63%).[4]

Nutritional status should be assessed at regular intervals as part of management of HIV infected pregnant women.[5] Malnutrition and low serum albumin among HIV-infected individuals are co-factors for HIV disease progression. Albumin is a hepatic synthesized protein frequently used to estimate overall nutritional status.[6] Anemia has been shown to be the most commonly encountered hematological abnormality in HIV sero-positive patients with estimates as high as 95% depending on clinical setting.[7]

There is a bidirectional relationship between nutritional status and the course of HIV disease. Pregnant women with low body mass index before the third trimester of gestation appears to be associated with increased risk of Mother-to-Child transmission. Low weight gain during pregnancy is an independent risk factor for intrauterine growth restriction. Both maternal nutrition and HIV infection are important determinants of outcomes of pregnancy. It is essential to characterize the changes and predictors of nutritional status indicators among HIV-infected women.[8]

Manipur is one of the six high prevalent States in India, with HIV prevalence rate of 0.4% among pregnant women attending antenatal clinic (Sentinel Surveillance 2016-2017). Manipur contributing hardly 0.2% of the overall population of India contributes nearly 8% of the HIV infected population in India.[9] The present study was aimed at assessing the nutritional status of pregnancies with HIV/AIDS for better understanding of their nutritional needs for optimum pregnancy outcomes.

II. Materials And Methods

Study Design:
Cross- sectional Study.
Study Setting:
This study was carried out in the Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal, Manipur.
Study Duration:
September 2017 to March 2019.
Study Population: Pregnant women suffering from HIV/AIDS admitted in the antenatal ward and out-patients of Department of Obstetrics and Gynecology of RIMS, Imphal.
Inclusion Criteria:
i) Pregnant women between 20-40 years of age.
ii) Who had undergone counseling and testing.
iii) Pregnant women of >28 weeks of gestation.
Exclusion Criteria:
i) Patients who are HIV sero-negative.
ii) Patients who are not willing to participate.

Study Variables: Age, Gravida, Parity, occupation, Religion, Community, Body Mass Index, Hemoglobin, mid upper arm circumference, Serum albumin, Mode of delivery, Birth weight.
Statistical Analysis:
Data was analyzed using SPSS version 21.0 IBM for WINDOWS. Descriptive statistics such as frequency, Mean, percentage, SD were used. Chi-square test/Fisher Exact test was used to test the association between proportions and paired t-test was used to compare between two Means.
Ethical Issues:
The study was carried out after obtaining due approval from the Research Ethics Board, Regional Institute of Medical Sciences, Imphal. Confidentiality of the cases were maintained

III. Results & Observations

Table1: Age distribution of respondents

Age (in years)	No. of patients	%
<20	2	7.4
20-30	16	59.3
>30	9	33.3

Table 1 shows that majority of the respondents were from age group of 20-30 years comprising 59.3% followed by >30 years with 33.3%.

Table 2: Distribution of patients based on address

Participants	No. of patients	%
Urban	9	33.3%
Rural	18	66.7%

Table 2 shows that majority of the patient belong to people from rural areas with 66.7% and remaining 33.3% are from urban areas.

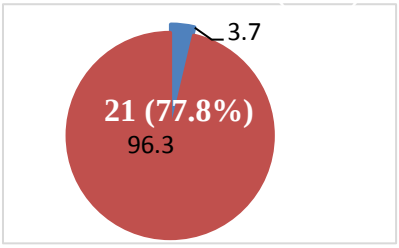

Figure 1 shows the distribution of participants by neonatal deaths. In the study, there were only 3.7% had neonatal deaths.

Table 3: BMI (kg/m^2) distribution of patients studied

BMI (kg/m^2)	No. of patients	%
<18.5	0	0.0
18.5-24.9	17	63.0
25-30	10	37.0
>30	0	0.0
Total	27	100.0

The mean BMI was found to be 21.54±3.18 Kg/m^2

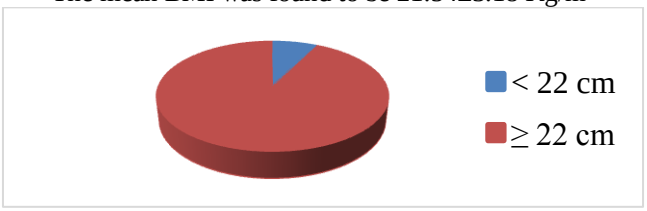

Figure 2: Distribution of respondents by their mid-upper arm circumference

Mean mid-upper arm circumference was found to be 23.74 ± 1.66cm.

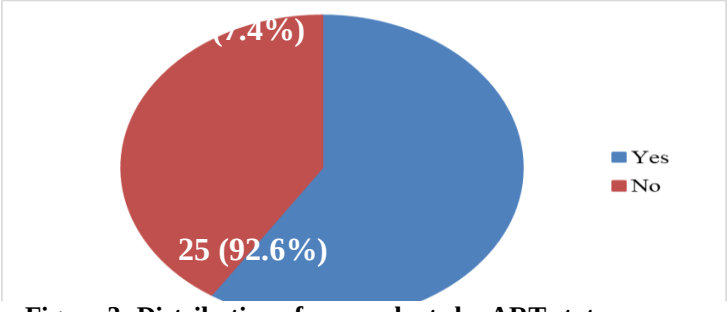

Figure 3: Distribution of respondents by ART status.

In figure 3, the pie chart shows that majority (59.3%) of the participants were on anti-retroviral treatment and the remaining 40.7% had not taken any anti-retroviral treatment.

Table 4: Laboratory findings of the participants

Laboratory findings	No. of patients (n=27)	%
Hb		
< 11 gm/dl	14	51.9
≥ 11 gm/dl	13	48.1
Serum albumin		
Within normal limits	10	37
Abnormal	17	63

The mean value of hemoglobin(Hb) was 10.62±1.67gm/dl. The hemoglobin level was <11gm/dl in 51.9% of the respondents.

Table 5: Birth weight of babies of patients

Baby Weight (kg)	No. of patients	%
<2.5	3	11.1
2.5-3.5	19	70.4
>3.5	5	18.5
Total	27	100.0

The above table shows birth weight of majority of the were within normal limit (2.5-3.5kg). Low birth weight was observed in only 11.1% of the cases.

Table 6: Distribution of patients according to mode of delivery

Mode of Delivery	No. of patients	%
NVD	22	81.5
LSCS	4	14.8
Breech vaginal delivery	1	3.7
Total	**27**	**100.0**

Table 6 shows that majority of the women delivered vaginally (81.5) and only 14.8% needed CS.

Table 7: Association between BMI and low birth weight of baby

BMI	Low birth weight [< 2.5 kg], n (%)		p-value*
	Yes	No	
Normal	3 (17.6)	14 (82.4)	0.274
Abnormal	0 (0.0)	10 (100.0)	

The above table shows that there is no association between BMI and low birth weight baby.

Table 8: Association between hemoglobin of HIV sero-positive pregnant women and low birth weight baby

Anemia [Hb<11 gm/dl]	Low birth weight [< 2.5 kg] n (%)		p-value*
	Yes	No	
Yes	1 (7.7)	12 (92.3)	1.000
No	2 (14.3)	12 (85.7)	

The above table depicts that there is no association between hemoglobin status of the HIV positive pregnant women and low birth weight of babies.

Table 9: Association between MUAC of HIV positive pregnant women and giving birth to a low birth weight baby

MUAC in cm	Low birth weight [< 2.5 kg] n (%)		p-value*
	Yes	No	
< 22	0 (0.0)	2 (100.0)	0.481
≥ 22	3 (12.0)	22 (88.0)	

The above table shows that there is no significant association between the mid upper arm circumference of the mother with the birth weight of the baby.

Table 10: Association between serum albumin of HIV sero-positive pregnant women and low birth weight.

Serum albumin	Low birth weight [< 2.5 kg], n (%)		p-value*
	Yes	No	
Normal	1 (10.0)	9 (90.0)	1.000
Abnormal	2 (11.8)	15 (88.2)	

The above table shows that there is no significant association between serum albumin of HIV sero-positive pregnant women with the birth weight of the baby.

IV. Discussion

In the present study, the total number of HIV sero-positive pregnant women attending antenatal clinic and admitted for delivery were 27 in number. The most common HIV sero- positive pregnant women were in the age group between 20-30 years (59.3%) followed by 31-40 years of age (33.3%). It may be because of the active phase of sexual life in younger age group. According to Swati G et al[10], 41.9% of the sero-positive pregnant women were in the age group of 20-24 years.

In the current study, two-third of the population belong to rural areas (66.7%) while only one third belongs to urban population (33.3%). This is in contrast to a study conducted by Solomon S et al[11], where the prevalence of HIV infection for HIV-1 antibodies were 7.4% urban and 7.0% in rural areas respectively. This may be related to lack of awareness among the people living in the rural areas as well as the poor socio-economic and educational status of the people living in these areas.

In the current study, more than two- third of the respondents delivered by vaginal route (81.5%) as compared to caesarean section (14.8%) which were performed for various obstetrical indications. There was a small percentage of vaginal breech delivery (3.7%). As India is a resource restraint country, most of the HIV sero-positive women delivered vaginally unless there are obstetrical indications. Kumar KJ et al[12] observed that 75% of HIV sero-positive women delivered vaginally.

In the current study, patients on ART have a low birth weight of 12.5% as compared to those who are not on ART (9.1%), clearly showing that there is no association between birth weight and patients on ART. The current study clearly indicates that there is no significant association of ART with birth weight (p-value: 0.440).

In the present study, two-third of the respondents had normal body mass index (63%) and the remaining had BMI of 25 to 30 (37%). According to a study conducted by Crum-Cianflone et al[13,] HIV-infected patients were increasingly overweight or obese at diagnosis and during HIV infection. The multivariate factors associated with greater increase in BMI during HIV infection include more recent year of diagnosis, lower BMI at diagnosis, higher CD4 cell count, lower HIV RNA level, lack of AIDS diagnosis, and longer HIV duration (all $p<0.05$).

Villamor E et al[15] in their study observed that the mean BMI was no different between 1810 HIV sero-positive pregnant women (23.6, SD 3.4) and 11,950 HIV sero-negative pregnant women (23.5, SD 3.4).The mean BMI in the study was found to be 21.5±3.1 and its association between low birth weight along with the HIV positive mothers on ART were also found to be insignificant in this study (p value=1). According to a study conducted by Xiao PL[14] no significant difference in the relationship between maternal HIV infection and adverse pregnancy outcomes was detected among the groups of different study periods; and also Anti-retroviral drugs usage did not significantly change the associations of maternal HIV exposure with low birth weight and preterm delivery.

In the current study, BMI has no significant association with poor maternal as well as neonatal outcome and most of the respondents attain a normal BMI. This could be due to maximum number of asymptomatic HIV infections included in the study. This might also indicate that nutritional status in pregnant women of Manipur was optimal.

Ververs MJ et al[16] stated that the mid upper arm circumference (MUAC) cut off values of <22 to 23cm in pregnant women have a significant risk for having low birth weight. In the present study, the mean MUAC was 23.7±1.6 and there is no significant association between the birth weight and MUAC(p-value-0.48).

In the current study, out of 27 participants more than half of the patients had hemoglobin of <11gm/dl (51.9%) and 48.1% of the patients had hemoglobin of >11gm/dl. The clear relationship between HIV sero-positivity and a decreased hemoglobin concentration in pregnancy is confirmed in the present study. Hence, HIV sero-positive women were significantly more likely to have anemia in pregnancy. In our observations, more than half of the patients have hemoglobin concentration lesser than normal value. In a study conducted by Nandlal V et al[17] 64.2% of the HIV-Infected pregnant women were diagnosed with mild anemia (Hb<11) and in univariate analysis, CD4 cell count and gravidity were significant risk factors for anemia in pregnancy.

Nutritional indicators had no role whatsoever with the birth weight in the present study. It was also observed that, there was poor correlation between serum albumin and low birth weight and was found to be statistically not significant (p=1.000). Swain Set al[18] also observed that there was no correlation coefficient of maternal serum albumin level (p=0.1097) with low birth weight and was not statistically significant as well.

V. CONCLUSION:

The present study observed that HIV sero-positive rate was highest in age group 20-30 years of age group (59.3%). HIV seropositive women also had significantly lower mean hemoglobin (10.6 versus 11.6gm/dl) with emphasis on correction of anemia for optimum pregnancy outcome.

The present study found that maternal BMI has no relation with birth weight and the BMI of most of the participants were normal (63%). As BMI varies during pregnancy more studies are needed to be undertaken to research specific cut-off points for BMI to be measured, for example in the first, second or third trimester, and that can identify risk for pregnant women on low birth weight. In the current study, more than two-third of the respondents delivered vaginally (81.5%) followed by caesarean section (14.8%) and then by breech vaginal delivery (3.7%). PPTCT programs should be effectively implemented as prevalence rate of HIV is high in Manipur. The mean MUAC was found to be 23.7±1.66 and this has no significant association with birth weight and nutritional status of the patient. Similarly, serum albumin has no significant association between maternal nutrition status and birth weight of the baby.

In conclusion, pregnancy does not alter the course of HIV/AIDS nor HIV has an adverse effect on pregnancy outcomes besides perinatal transmission. To make a more definitive conclusion, longer term studies with large sample size are required.

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