



PREGNANCY EXPERIENCE AND OUTCOME: A COMPARISON BETWEEN HIV POSITIVE AND HIV NEGATIVE PREGNANT WOMEN

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ABSTRACT

Irrespective of the health status of a woman, the advent of pregnancy is associated with varying forms of symptoms and discomforts, with varying degrees of impact on the health of the mother or baby. With inter-current medical condition such as HIV infection, with its pan-systemic involvement, effect on well-being of a pregnant woman and her fetus can be predictably deleterious, due to lowered immune profile from decline in CD4 profile. This has potential of undermining pregnancy experience and outcome. Even the administration of antiretroviral drugs has the potential of similarly influencing pregnancy experience and outcome, through its associated untoward effects. In spite of the benefit of anti-retroviral drugs, the presence of the virus still has the potential of negatively impacting on the health of pregnant mothers and her babies, necessitating the need to sustain an increased monitoring of pregnant mothers and their fetuses in utero. This review draws attention to this, seeking to engender the needed increased attention on all HIV positive pregnant mothers with a view at ensuring and assisting them to weather through the storm of HIV infection in pregnancy and ensuring appreciable pregnancy experience and fetal outcome. This study, a retrospective review of a cohort of 243 pregnant women comprising of HIV positive and HIV negative mothers who had ANC and delivered between July 2014 and June 2015 in Bingham University Teaching Hospital, Jos, Plateau State, Nigeria, seeks to compare their pregnancy experience and outcome using their weight performance and their babies' birth weights. The mean booking weight (69.36 ± 11.72) of HIV positive pregnant mothers and that of their HIV negative counterparts (74.46 ± 13.69) were significantly different ($pV = 0.0398$). The differences between the two groups remained significant throughout their pregnancy period with the HIV infected group posting lower weight profile, despite their sustained appreciable weight increase over the period of pregnancy. The mean birth weights of babies of both groups, (HIV positive mothers = 3.17 ± 0.43) and (HIV negative mothers = 3.41 ± 0.46) were similarly different significantly ($pV = 0.0050$). Thus, HIV positive mothers and their exposed babies were found to lag behind in terms of pregnancy experience and outcome indicating deleterious effect and impact of HIV infection on pregnancy experience and outcome, even with the provision of PMTCT services which include the provision of vital anti-retroviral drugs. In recognition of this, effort is recommended to be enhanced and sustained to ensure that all women found HIV positive are provided relevant services to ameliorate impact of the virus on pregnant mothers and their babies.

KEYWORDS: *HIV Infection, Pregnancy Experience and Outcome*

INTRODUCTION

Irrespective of the health status of a woman, the advent of pregnancy heralds a trying moment for

her, being accompanied with significant physical, physiological and emotional changes. These are partly the result of interplay of hormones and

hormonal fluctuations, as well as from the physical strain on the body from its carrying of extra weight within her body and associated transformations during the pregnancy period. The changes and transformation are expected for reasons occasioned by the changes in physical and physiological effect of conception, these being

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natural part of pregnancy manifestation and progress. These can understandably be uncomfortable as they task the body, not previously subjected to such changes, thereby resulting in varying forms of symptoms and discomforts, some of which will not significantly interfere with activities of daily living, while others can be restrictive to normal activities or pose threats to the health of the mother or baby. Two core changes easily noticed following conception are alteration in body configuration and weight gain in the woman, and their magnitudes vary from normal to abnormal. Weight gain, especially, is related to the weight of the baby in utero, the growing placenta and the extra fluid from amniotic fluid and increased cardiovascular circulatory profile. Normal weight gain (with BMI of 18.8 – 24.9) ranges from 11.3 – 15.9kg in a singleton pregnancy, outside of which is considered abnormal, with a total weight gain averaging 10kg in pregnancy [1]. Insufficient or excessive weight gain often heralds danger to and can compromise health of both mother and fetus. Excessively, there is the potential of development of gestational hypertension and pre-eclampsia, while underweight heralds intra-uterine growth restriction, both with attendant deleterious outcome for both parties.

With inter-current medical conditions, underweight in pregnancy is a common deleterious occurrence. In HIV infection, with its pan-systemic involvement, effect on general well-being especially weight performance and pregnancy outcome can be predictably deleterious. This is more so when anecdotally compared to the uninfected counterparts. The presence of the virus in the body of the woman may not adversely affect the pregnancy course; however same cannot be said regarding the fetus (which can become infected in utero). However in advanced stage of infection, AIDS, its effect on pregnancy and outcome, both on the mother and the baby, cannot be ruled out.

Pattern and profile of maternal and child morbidity and mortality have generally been altered by the infection since its advent, especially in sub-Saharan Africa where more than 2 million pregnancies occur among HIV-positive women each year [2]. However, poor documentation has not allowed for satisfactory determination of the extent to which HIV/AIDS contributes to maternal and childhood morbidity and mortality in sub-Saharan Africa [3].

Generally, the effect of infection by the virus is basically lowered immune profile thereby rendering the affected individual to high risk of infection by other organisms, thereby jeopardizing an affected person's health profile. In a pregnant woman, this is

a predictable effect due to the declining CD₄ profile [1]. Observed impacts of maternal HIV infection on the course of pregnancy documented include weight loss, inter-current infections (especially urinary and respiratory, and malaria), anaemia and ante-partum hemorrhage, especially abruptio placentae [1]. Even with anti-retroviral drug administration, lactic acidosis is a recognized adverse drug effects with accompanying gastrointestinal disturbance, fatigue, fever, breathlessness, features of pre-eclampsia, cholestasis and hepatic dysfunction from some of the drugs [4]. Pre-term labour, chorioamnionitis from premature rupture of membranes and eventual puerperal sepsis has been recorded as comparatively heightened in HIV-infected pregnant women [1].

The birth-weight of an infant is a fitting reflection and outcome of a pregnancy experience and performance. Normally, a term baby weighs 2.5kg and above. Any birth weight below this as adjudged as low birth weight, LBW. Infants born with such LBW are at comparatively increased risk of morbidity and mortality when compared to those born with normal weight (≥ 2.5 kg), and these often require more care [5].

HIV positive pregnant mothers have been shown to have more low birth weight babies. In a comparative review in Ontario of HIV-positive and HIV-negative pregnant women between 2002-2003 and 2010-2011, the proportions of singleton births that were small for gestational age (SGA), preterm (PTB) and low birth weight (LBW) were respectively higher significantly (SGA:14.6% vs 10.3%; $pV < 0.001$), (PRB: 14.6% vs 6.3%; $pV < 0.001$) and (LBW:12.5% vs 4.6%) among women living with HIV than among women without HIV [6]. A multi-center prospective observational study conducted in Tanzania revealed similarly trend with demonstrable higher adverse birth outcomes among HIV-infected than HIV-negative pregnant women, even with the use of anti-retroviral drug therapy in pregnancy [7]. Bekana and colleagues have also demonstrated significant higher prevalence of LBW and preterm delivery among infants born to HIV-positive mothers [8]. In a follow up study to compare pregnancy experience and outcome between HIV infected women who received care at FMC Makurdi, between January to December, 2012, and those without HIV infection, low birth weight, low Apgar scores, poor labour dynamics and comparative higher maternal mortality were found among HIV positive than HIV negative mothers [9].

Thus HIV infection and AIDS are an important predictable factors and determinants in maternal and perinatal morbidity and mortality in sub-Saharan Africa [10]. These can be attributed to the accompanying complications of the infection, notably anaemia, preterm labour, intrauterine growth restriction, fetal deaths, stillbirths and low birth weight [11-14]. CD₄ counts less than 200 cells/mm³, maternal BMI less than 18.5 and maternal anaemia, have been demonstrable accompanying complications of the infection [8,12], necessitating a consensus that HIV positive pregnant women be appropriately managed to improve pregnancy experience and outcome.

The advent of PMTCT has improved the outlook of pregnancies, most especially the use of highly active anti-retroviral therapy (HAART) in a triple regimen form. When started early, HAART has been shown to improved pregnancy experience and outcome, being efficacious in reducing viral load and improving immune profile through increased CD₄ population. A follow-up of a cohort of HIV positive pregnant mothers in University of Benin Teaching Hospital (UBTH) from January 2008 to June 2009 has demonstrated such beneficial pregnancy experience and outcome [15]. This study showed that comparatively, there were significantly higher occurrences of intrauterine growth restriction and preterm birth among untreated HIV infection than among those who had HAART. Buttressing this is the occurrence of higher frequencies of birth weight of less than 2.5kg and 5-minute Apgar score less than 7 among infants from untreated HIV infected compared to those from treated mothers [12].

MATERIALS AND METHODS

The study is a retrospective review of a cohort of pregnant mothers (HIV positive and HIV negative) who had ANC and delivered between July 2014 and June 2015 in Bingham University Teaching Hospital, Jos, Plateau State, Nigeria. A total of 243 mothers (comprising of 33 HIV positive and 210 negative pregnant mothers) who delivered therein had their medical records reviewed. Selection of unit of study was made from the delivery register within the labor room on the basis of first documented first chosen and in accordance with their HIV status. Their ANC and delivery folders were retrospectively reviewed to collate the required data. Inclusion criteria for HIV positive cases were been booked and had full ANC at the Bingham University Teaching Hospital Jos, had HAART form of anti-retroviral therapy throughout

the ANC period and subsequently delivered in same facility; while for HIV negative cases, these were been booked, had their ANC, tested HIV negative and subsequently delivered of their babies in same facility during same time period. Matching was made by ensuring that only those with same period of booking on the basis of same semester were recruited into the study. Outcome measures of interest were mothers' weight performance during ANC commencing from booking and through each subsequent ANC visit to delivery, and birth weight of their babies upon delivery.

Mean weight for each group at booking and on subsequent ANC visit was determined and compared for any statistically significant difference using the Student's t-test. The mean birth weight of the infants for each group was similarly determined and compared statistically for any difference using the same Student's t-test. Proportion of infants with birth weight less than 2.5kg was determined for each group and compared using Fisher's Exact Test for test of association. In each test mode, significant level was at $pV < 0.05$.

RESULTS

The mean booking weights of both groups were found to be different (Table 1). That of the HIV positive pregnant women was significantly lower than of their HIV negative counterparts ($pV = 0.0398$). At subsequent levels of weight assessment, the mean weights of the HIV positive group were consistently and significantly lower than those of the HIV negative group (as shown in Table 1). This trend is as shown in Figures 1a and 1b, with those for HIV positive mothers lower than their HIV negative mothers.

Each group, however, had sustained increase in weight gain throughout the pregnancy period. The overall mean weight gain for each group, though different, were not significantly different (Table 2, $pV = 0.8611$). It will be noticed that in terms of overall percentage weight gain, the HIV positive mothers had higher proportion of gain over their mean booking weight. This might be due to the close attention provided them, typical of PMTCT services in study setting. In spite of this, the HIV positive mothers consistently lagged behind their HIV negative counterparts, as shown in Figure 1a and 1b, with no catch-up even up till their delivery period. Thus there are obvious differences in pregnancy experience, as reflected in the respective mean weight gains, between the HIV

positive mothers and the HIV positive pregnant mothers.

Table 1: Mean Weight Performance of Mothers During Pregnancy

Mean Weight (kg)	HIV-negative (n = 210)	HIV-positive (n = 33)	Statistical Outcomes	
			t-test	pV
Booking	74.46±13.69	69.36±11.72	2.067	0.0398
1 st Follow Up Visit	76.01±13.77	70.7±11.38	2.105	0.0364
2 nd Follow Up Visit	77.07±13.33	71.70±11.53	2.188	0.0297
3 rd Follow Up Visit	78.19±13.15	73.08±12.32	2.091	0.0376

Fig 1a: Comparison of Mean Weight of Each Group of Pregnant Mothers at each Visit

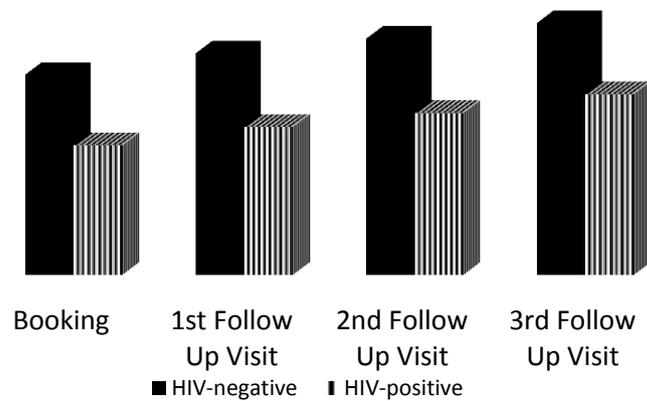


Fig 1b: Comparison of Mean Weight of Each Group of Pregnant Mothers at each Visit

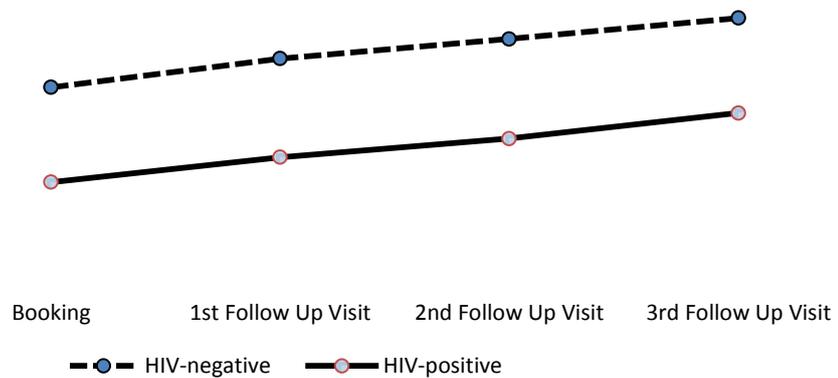


Table 2: Overall Weight Performance

HIV Status	Overall Mean Weight Gain/95%CI (kg)	Overall Mean % Weight Gain
HIV Negative Mothers	3.63±2.80 (3.25 – 4.01)	4.86
HIV Positive Mothers	2.34±5.12 (2.34 – 5.12)	5.37

t-test = 0.1751; pV = 0.8611

Table 4: Mean Birth Weight of Babies

Babies HIV Exposure Status	Mean Birth Weight (kg)
Not Exposed (n = 201)	3.41±0.46
Exposed (n = 33)	3.17±0.43

t-test = 2.833; *p*V = 0.0050

Table 5: Proportion of infants with birth weight less than

	Infant's Birth Weight		
	≥2.5kg	<2.5kg	
HIV Exposed Baby	32	1	33
Non Exposed Baby	208	2	210
	240	3	243

*p*V = 0.3558

Pregnancy outcomes were found to differ between the two groups. Table 4 shows that the mean birth weight of newborn babies of HIV positive mothers was statistically lower than that of the HIV negative mothers (*p*V = 0.0050). Thus lower birth weights were found to be common among the HIV positive mothers compared to among the HIV negative group. Thus, in utero, infants of HIV negative mothers fared better compared to those of HIV positive mothers. However, the proportions of LBW infants (those with birth weight less than 2.5kg) of both groups were not significantly different from each other (*p*V = 0.3558) as shown in Table 5.

DISCUSSION

The outcomes of this review buttress earlier findings [6-8, 15, 11-14, 9]. As in previous studies, maternal HIV infection with resultant effect of reduced protective effect of lowered CD4 profile, was found to significantly impact on the well-being of the affected mothers, thereby resulting in sub-normal health status from inter-current infections. This ultimately resulted in comparatively lower weight profile and weight gain compared to those who are HIV negative [1]. Even with the administration of anti-retroviral drugs, there are attendant adverse effects of gastrointestinal disturbance, fatigue, fever, breathlessness and hepatic dysfunction from lactic acidosis, a known outcome of such drug administration [4]. These have impact in the overall well-being of the pregnant mothers with attendant impact on weight performance and fetal status. It is thus not surprising the poor weight performance of HIV infected mothers and their babies, resulting in eventual pregnancy outcome such comparatively low birth weight. This is even where the infected

mother is on the needed anti-retroviral drugs as has been shown from previous studies [7,8, 10-14].

Despite the low comparative performance of those HIV infected despite being on anti-retroviral drugs, compared to those HIV negative, the advent of the drugs has improved outlook of pregnancies among the infected pregnant mothers compared to those who have no access to such medications and PMTCT services. Thus providing needed PMTCT services to HIV positive mothers is relevant. This is evident from the progressive and impressionable increase in weight gain by the HIV positive mothers as well as the high proportion of HIV exposed infants whose birthweight is ≥ 2.5kg (cf 99.9% among non-exposed infants)

In conclusion, HIV positive mothers and their exposed babies lag behind in terms of weight, as shown from the study. But despite this, the provision of needed PMTCT services has positively impacted on their pregnancy experience and outcome.

It is thus recommended that effort be sustained to ensure the availability and provision of PMTCT services to HIV pregnant mothers to ensure significant positive and desirable pregnancy experience and outcome.

This study shows the deleterious effect and impact of HIV infection on pregnancy experience and outcome, even with the provision of PMTCT services which include the provision of vital anti-retroviral drugs. HIV infection among pregnant women is demonstrably associated with poor pregnancy experience and outcome when compared to non-infected pregnant women. The differences between the two groups were significantly different. They (the HIV positive pregnant women) are thus at risk of poor weight gain and intra-uterine growth restriction, requiring their encouragement to utilize health facilities for close monitoring and follow-up and eventual facility

based or supervised delivery by skilled health care provider.

It is thus recommended that efforts be enhanced and sustained to ensure that all women found HIV positive utilize health facilities and services. Specifically, routine HIV counseling and testing be made essential components of ANC services to which all pregnant women be encouraged to access to ensure early and timely detection and management for better pregnancy experience and outcome. Also, there is the need to reduce the interval between visits by HIV positive pregnant women for quality follow up and intervention to ensure that attendant challenges that may negatively affect their pregnancy experience and outcome are timely identified and appropriately and adequately taken care of. Facility-based delivery and delivery under skilled supervision be mandatory for all HIV positive pregnant women as they are prone to having lower birth weight babies who are in turn are prone to related birth complications.

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