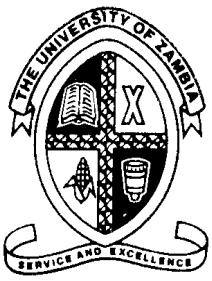

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE

Impact of HIV/AIDS on Postnatal Depression Among Postnatal Mothers at the University Teaching Hospital, Lusaka, Zambia.

Dr. Augustine Cyimana MD

DISSERTATION SUBMITTED TO THE UNIVERSITY OF ZAMBIA IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY

2010

DEDICATION

To my dear Father and late mother,

my dear wife Beatrice,

and my lovely children Mireille, Remy, Jocelyn.

May the Good Lord continue blessing us.

ACKNOWLEDGEMENTS

A project of this nature is virtually impossible to complete without the input of several people. While it is very difficult to mention by name all those who contributed towards the completion of this research project, I would particularly like to thank the following people:

Dr. B. Vwalika my supervisor, for taking interest in this study from the start.

Dr. L. Kasonka my second supervisor who gave special advice from the experience point of view.

Dr. Y Ahmed for advice and assistance with editing.

Special thanks to Mr. E. Mbewe who greatly assisted with data entry, cleaning and analysis using Epi-info and STATA.

Many thanks to the data collectors and Sister in Charge of the antenatal clinic (BO2).

I am greatly indebted to the University of Zambia Research Ethics Committee for their review and allowing me to conduct this study in an ethically approved manner.

Above all, to the mothers who consented to volunteer information used in this study.

STATEMENT

I HEREBY STATE THAT THIS DISSERTATION IS ENTIRELY THE RESULT OF MY OWN PERSONAL EFFORT. THE VARIOUS SOURCES TO WHICH I AM INDEBTED HAVE BEEN CLEARLY INDICATED IN THE REFERENCES AND ACKNOWLEDGEMENTS.

SIGNED:_____

DR. AUGUSTINE CYIMANA

DECLARATION

I DECLARE THAT THIS DISSERTATION HEREIN PRESENTED FOR THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY HAS NOT BEEN PREVIOUSLY SUBMITTED EITHER WHOLLY OR IN PART FOR ANY OTHER DEGREE AT THIS OR ANY OTHER UNIVERSITY NOR IS IT BEING CURRENTLY SUBMITTED FOR ANY OTHER DEGREE.

SIGNED:_____

DR. AUGUSTINE CYIMANA

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APPROVAL

THE DISSERTATION OF DR AUGUSTINE CYIMANA IS APPROVED AS FULFILLING PART OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNECOLOGY BY THE UNIVERSITY OF ZAMBIA.

SIGNATURES

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ABSTRACT

Background: Postnatal depression (PND), a major depressive episode during the puerperium that affects 10% to 22% of adult women before the infant's first birthday. Being HIV positive has been known to be associated with increased risk of mental disease. Its influence on postnatal depression has not been explored. This study examines the association between HIV status and postnatal depression extending upon previous studies by including the role of known determinants for postnatal depression such as mode of baby feeding, maternal age, place of residence and parity. The objective of the research was to study the contribution of HIV/AIDS to the problem of postnatal depression among women delivering at University Teaching Hospital (UTH), Lusaka.

Methods: This was a cross sectional analytic study conducted among 229 postnatal mothers at UTH and included 46 (20.1%) that were HIV positive. Respondents were interviewed using a structured and standardized questionnaire to obtain information on potential demographic and medical risk factors for PND, after which an Edinburgh Postnatal Depression Scale (EPDS) was administered. Results of the 183 postnatal women that were HIV negative were compared with the 46 that were positive. The relationship between the outcome variable (EPDS scores) and the predictor variable (HIV status), and other risk factors, was explored using multiple linear regression. A p-value of 0.05 was considered significant when interpreting the test results at 95% level of confidence.

Results: Apart from the type of infant feeding offered by the 229 mothers, there were no significant differences in studied characteristics between HIV positive and negative women. Using different cut-offs of EPDS scores (8, 10 or 13) the odds of an HIV positive woman having PND was 1.38, 1.15, and 1.70, respectively. However, all the 95% confidence intervals crossed unity and corresponding p values were greater than 0.05. The mean EPDS score for all 229 women was 9.6 (SD 5.4). Using different cut-offs of the mean scores; 146 women had mean EPDS scores greater than 7 (63.8%; 95% CI 56.2-70.0%), and 64 had mean EPDS scores greater than 12 (27.9%; 95% CI 22.2-34.2%). The mean EPDS score of HIV positive women was 10.6 vs. 9.4 for negative women (p=0.1615). There was a statistical difference in mean scores for different categories of the following: parity, days spent in hospital after delivery and type of infant feeding. In a multiple linear regression model, those risk factors, together with other potential risk factors for PND, like place of residence (as a proxy of socio-economic circumstances), parity, gestational age at delivery, and mode of delivery, were added to explore the relationship between mean EPDS score and HIV status. In the model, the EPDS score was independently significantly associated with parity 4 or 5, and mixed infant feeding, though not with HIV status of mother.

Conclusion:
As illustrated by the use of the Edinburgh Postnatal Depression Scale, postnatal depression was not an insignificant condition in the selected hospital population of postnatal mothers at UTH. However, HIV/AIDS was not statistically significantly and independently associated with postnatal depression amongst the mothers, though the use of mixed feeding and higher parity were. It is imperative for health practitioners to consider the possibility of PND, particularly for those with risk factors, including adverse socio-economic conditions and poor obstetric and neonatal outcomes, so as to counsel and refer for further care as necessary.

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ABBREVIATIONS

AIDS	-	Acquired Immune Deficiency Syndrome
EPDS	-	Edinburgh Postnatal Depression Scale
HIV	-	Human Immuno-deficiency Virus
MCH	-	Mother and Child Health
MDG	-	Millennium Development Goal
PND	-	Postnatal Depression
SIDS	-	Sudden Infant death Syndrome
UNZA	-	University of Zambia
UTH	-	University Teaching Hospital
VCT	-	Voluntary Counseling and Testing
ZDHS	-	Zambian Demographic and Health Survey

INTRODUCTION

Postnatal or postpartum depression (PND) is taken to mean the presence of mostly anxiety, self blame or guilt, sleep disturbance, failure to cope with routine activities, tearfulness or low self esteem, loss of libido, ideas of self harm, and neglect of the baby, in a woman who has given birth. This description of PND used for purposes of this dissertation, is derived from Cox (1989), who recognized the difficulty created by the various uses of the term postnatal depression. To this effect Cox is worth repeating as he states that:

> "…One writer for example refers to depression as mood state, whilst another uses the word to describe the cluster of symptoms, which are sufficiently characteristic to make the diagnosis of a depressive illness. A more difficulty, which is even more misleading, caused by the writer who refers to postnatal depression occurring in the first 2 weeks postpartum, as the reader is then uncertain whether the author is referring to postnatal blues, or the early onset of prolonged depressive illness".

Currently, most investigators group postpartum psychiatric disturbances into three categories: maternity blues, postpartum depression, and postpartum psychosis. Maternity blues is a relatively mild emotional disturbance affecting 50 percent to 85 percent of postpartum women (Kennerley and Gath 1989). This transient condition is characterized by mood lability, depression, increased sensitivity to criticism, and despondency, which develop and resolve in the first 2 weeks postpartum. Because of its transient nature, this condition requires little intervention. However, approximately 20 percent of women with maternity blues will go on to develop major depression in the first postpartum year (Kennerley and Gath 1989). A study done by

Adewuya, (2006), in a Nigerian population, clearly demonstrates a strong relationship between maternal mood on day 5, 4 weeks, and 8 weeks postpartum. They found that scores on the Maternity Blues Scale and the Edinburgh Postnatal Depression Scale at day 5 postpartum reliably predict the diagnosis of depression at 4 and 8 weeks postpartum.

In contrast to maternity blue and postnatal depression, psychotic depression in form of puerperal psychosis occurs in a mother who is more disturbed and has delusions as well as perceptual disorders (Cox 1989)

Statement of the Problem

Postnatal depression, a major depressive episode during the puerperium, affects between 10 percent and 22 percent of adult women, and up to 26 percent of adolescent mothers, before the infant's first birthday (Lane et al. 1997). Studies done in Zimbabwe from 1997 to 1999, revealed that up to 40 percent of women who had given birth, were still suffering from PND at 12 months with incidence of new episodes of 16 percent (Patel et al 1998). Similarly in a random sample of women from the community in Zimbabwe, the proportion with postnatal depression was 16 percent (Abas and Broadhead 1997; Nhiwatiwa et al 1998). High rates of depression have also been reported in Zimbabwe and other developing countries, with some community surveys reporting prevalence rates exceeding 50 percent (Broadhead and Abas 1998; Mumford et al 1997).

Although postnatal depression is amenable to treatment, evidence shows that more than 50 percent of all cases are undetected in primary care settings (Briscoe 1986). Studies have suggested that mothers at risk of postnatal depression may be identified

early in the postpartum period, such that secondary preventive interventions may be implemented (Hannah et al 1992; Teissedre and Chabrol 2004; Yamashita et al 2004).

Researchers in the Western culture have reported on the main risk factors to PND as outlined in a meta-analysis by O'Hara and Swain (1996) and others (Barnet et al 1995; Wilson et al 1996; Misri et al 1997; Fisher et al 1997; Adewuya et al 2005). These include: a past history of psychopathology and psychological disturbance during pregnancy, low social support, poor marital relationship, recent adverse life events, baby blues, abuse of tobacco and alcohol, poor obstetric practices, young age at first pregnancy, cesarean section in the nulliparous and early cessation of breastfeeding. It has long-lasting adverse effects on the emotional and cognitive development of the children of affected women (Weinberg and Tronick 1998)

A study done by Chen (1996) in Taiwan has also shown a higher incidence of PND in teenage or adolescent mothers than in older ones.

Little is known about the association of depression among women with known HIV status. This study aims to establish the relationship existing between HIV/AIDS and postnatal depression in women attending postnatal care at the University Teaching Hospital (UTH).

In Zambia, where medical personnel and psychiatrists are scarce, regular identification and care of depressed mothers in the early postpartum period are a challenge. It is also evident that the Zambian scenario is compounded by issues of early childbearing and prevalence of teenage pregnancy, which is high (CSO et al 2003). For example, the median age at first birth for women aged 15-49 years is 18.7 years and three in ten female teenagers (age 15-19) would have begun childbearing.

The risk of pregnancy is also reported in the Zambia Sexual Behavior Survey (CSO et al 2004), which found that among young people aged 15-19 years, 28 percent of boys and 44 percent of girls reported having had sex within the last twelve months. The average age for first sex is around 17 years in females and 17.5 in males.

The prevalence of HIV positive (2001-2002) in adolescents is 9 percent and the highest rate is in the age group from 25-39 years with 38.4 to 40.2 percent from women in urban areas (CSO et al 2003). Nearly half of Zambia's population of over 10 million people is under 15 years old. According to UNAIDS/WHO estimates, 130,000 of these children were living with HIV or AIDS at the end of 2003. (UNAIDS/WHO 2006)

At the end of 2005, UNAIDS/WHO estimated that 17 percent of people aged 15-49 years old were living with HIV or AIDS. Of these million adults, 57 percent were women. (UNAIDS/WHO 2006) Young women aged 15-19 are around six times more likely to be infected than are males of the same age (WHO/UNAIDS, 2005). Despite huge efforts made in the areas of HIV/AIDS through programmers such as exclusive breastfeeding, prevention of mother to child transmission of HIV (PMTCT), in addition to the routine postnatal care, little has been emphasized in the area of mental health care, especially that focusing on the effect of HIV/AIDS on depression in childbirth.

The burden of mental neurological health contributed 13 percent of the global burden of disease in 2001 as reported in the World Health Report (WHO 2002), and is estimated to rise to 14.6 percent in 2020; 4 of the 10 leading causes of disability, and 28 percent of years of life lived with a disability.

Many women suffer from postnatal depression immediately after childbirth. The research on postnatal depression in poor countries suggests rates of 10-36 percent of new mothers. Postnatal depression is of great public health interest because it results in adverse cognitive, emotional and physical outcomes for children. (Global Forum for Health Research 2005).

The impact of HIV/AIDS on women's mental health is likely to be enormous in a country such as Zambia, where up to 30 percent of pregnant women attending antenatal health clinics were found to be positive. In such situations, women must cope not only with illness in their male partners, but also with their own failing health and that of their children.

The outcome of a study carried out by Manopaiboon et al, in Bangkok (1998) showed that HIV- infected mothers had higher depression scores compared to those non-infected. In another study in USA by Ickovics et al (2001), it was found that depressive symptoms among women with HIV were associated with HIV disease progression, when clinical; substance use and socio-demographic variables were controlled for in postnatal mothers. The same study emphasized the importance of recognizing and treating depression among women with HIV.

With the foregoing, it was imperative that a study be carried out to investigate the relationship between HIV/AIDS and postnatal depression among postnatal women at UTH.

LITERATURE REVIEW

Studies are evenly divided in reporting postnatal depression as either more or less severe than depression at other times and there is little evidence that the nature of symptoms differs between postnatal and non-postnatal depression (Righetti-Veltema et al. 1995).

There has been growing international recognition of PND as a major public health concern. Perinatal psychiatric disorder is a leading cause of maternal morbidity, and suicide is an important cause of maternal mortality in the UK and probably also in Northern Europe (CEMD 2002). It is also associated with serious long-term consequences for maternal mental health (Kumar and Robson 1984), with marital problems and psychological health of the partner (Ballard & Davies 1996) and with adverse effects on the cognitive and social development of the infant (Murray and Cooper 2003). This was also confirmed by studies done in Zimbabwe over a 15 yr period where Patel et al (1998) and others found that depression is one of the most important causes of mental morbidity and disability in developing countries (Todd et al. 1999; Abas & Broadhead 1997).

In sub-Saharan Africa, the risk of pregnancy and risk of exposure to HIV is supported by the fact that the percentage of women who report having had premarital sex as teenagers in the eight Anglophone countries—Ghana, Kenya, Namibia, Nigeria, Tanzania, Uganda, Zambia, and Zimbabwe—ranges from 26 to 60 per cent. Nearly the same range exists in the eight Latin American and Caribbean countries (10–40 per cent) (Mensch et al 2006).

For many of these women, it will be their first episode of major depression with symptom onset typically occurring within the first 6-12 weeks postpartum (Augusto et al. 1996). The most severe category of postpartum mental illness is postpartum psychosis, which is a relatively rare condition in 1 or 2 of every 1,000 live births, with onset typically in the first 6 weeks postpartum (Barnet et al 1995; Fisher et al 1997)

There is little being done in Zambia, to ensure the adequate assessment of the mental health status in postnatal mothers and likely contributes negatively to postnatal care. Furthermore, in poorly resourced countries like Zambia, HIV/AIDS has a negative impact on the health of newborn babies especially in mothers with depression in the young age group, who are the most affected by depression after delivery.

Postnatal depression like other mental and neurological disorders causes a heavy burden across the world. This burden is influenced by a number of socio-demographic variables including gender. Postnatal depression is relevant to the generic inequities of low and middle-income countries, including poverty, gender, age and difficulties in accessing services (Global forum for Health Research 2005). None of the Millennium Development Goals specifically refers to mental and neurological health, but nonetheless it is relevant to most, if not all of them.

In some countries like Singapore, Malta, Malaysia, Austria and Denmark there are very few reports of PND, whereas in other countries (e.g. Brazil, Guyana, Costa Rica, Italy, Chile, South Africa, Taiwan and Korea) report higher prevalence of postpartum depressive symptoms.

So far most studies conducted on cross-cultural and social diversity factors to determine prevalence of postpartum depression and depressive symptoms have been

conducted in Western and economically developed countries. Reported prevalence was identified in 40 countries with a wide range of PND ranging from almost 0 to about 60 percent. (Halbreich and Karkun, 2006). This goes to show that the widely cited mean prevalence of PND of 10-15 percent is not representative of the actual global prevalence and magnitude of the problem, due to the wide range of reports. Further no prevalence estimates are available for Zambia. This study will contribute by demonstrating the association between socio-demographic determinants, HIV/AIDS, and reported symptoms of PND. The study will also assist in determining the extent of the condition in the population served by UTH in Lusaka.

There is a considerable body of evidence advocating that both maternal depression and racial adversity have a deleterious impact on the quality of the mother – infant relationship (Murray & Cooper 1997). Infants from poor communities in the developing world are especially vulnerable in this regard since they are subjected to parenting which is under the strain of both marked socio-economic hardship and high rates of depression (Harpham 1994). In a South African peri-urban settlement, it has been found that one in three mothers have depression in the early postpartum period (Murray et al. 1999), a rate three times higher than that which would be expected in developed countries (Cooper & Murray 1998; O'Hara 1997).

In the case of Zambia, further studies are needed to establish the impact of mother – infant relationship in children from mothers suffering from postnatal depression.

Risk factors for postnatal depression

If screening can identify risk factors predicting postnatal depression, this would allow optimum targeting of effective interventions. Systematic reviews identified risk

factors of past history of psychopathology and psychological disturbance pregnancy, low social support, poor marital relationship, recent adverse life events, and 'baby blues' as having moderate to strong associations with postnatal depression (Beck 1996; Wilson et al. 1996).

While western cultures have emphasized psychosocial risk factors for the development of PND, in Africa, poor obstetrics practice and sociodemographic factors may contribute significantly to the risk of PND. This was corroborated by a study done in Nigeria by Adewuya et al (2005), who found that the predictors of PND included hospital admission during pregnancy, female sex of baby, preterm delivery, instrumental delivery, caesarian section and being single.

The 2001-2 Zambia Demographic and Health Survey reports the prevalence of HIV positive adolescents to be 9 percent and the highest rate is in the age group from 25-39 with 38.4 to 40.2 percent from women in a urban setting (CSO et al 2003). Nearly half of Zambia's population is under 15 years old. According to UNAIDS/WHO estimates, 130,000 of these children were living with HIV or AIDS at the end of 2003. (UNAIDS/WHO 2006).

At the end of 2005, UNAIDS/WHO estimated that 17 percent of people in Zambia aged 15-49 years old were living with HIV or AIDS. Of these million adults, 57 percent were women (UNAIDS/WHO 2006). Young women aged 15-19 are around six times more likely to be infected than are males of the same age (WHO/UNAIDS, 2005).

Early marriage has been identified in African cities with high HIV prevalence as one of the multiple behavioral factors, which increase the risk of HIV transmission.

(UNFPA & UNIFEM 2005). Early marriage almost always leads to early pregnancy and childbirth owing to social expectations that young married girls prove their fertility by becoming pregnant almost immediately (Mensch et al. 1998).

Around 15 million adolescents aged 15-19 give birth each year, accounting for more than 10 per cent of all babies born worldwide. (UNFPA & UNIFEM 2005). There is a strong correlation between the age of the mother and maternal mortality and morbidity. For examples girls aged 10 to 14 are five times more likely to die in pregnancy or childbirth than women aged 20 to 24; while girls aged 15-19 are twice as likely to die. The majority of these deaths take place within marriage. In Nigeria, Cameroon and Ethiopia, maternal mortality among adolescents aged under 16 was found to be six times higher than for young women aged 20-24 (Zabin and Kiragu 1998). Notably, for every woman who dies in childbirth, about 30 more suffer injuries, infections and disabilities such as obstetric fistula. (UNFPA & UNIFEM 2005).

The association of the presence of HIV and PND in young mothers becomes important as a reduction in the rates of HIV/AIDS for the 17-24 years age group may help with improved mental health and reduce promiscuity, unsafe sex and high levels of drug usage and addiction. The current evidence from UNAIDS indicates that about 17-22 per cent of girls between 15-19 years in sub-Saharan Africa are already living with HIV, compared to 3-7 per cent of boys of the same age. Cross-sectional studies with biological markers are already showing higher rates of HIV infection in some married adolescent populations in Kisumu, Kenya and in Ndola, Zambia, as compared with their unmarried sexually active counterparts. (UNFPA & UNIFEM 2005).

Determinant risk factors for PND were demonstrated in the study by Manopaiboon et al in Bangkok, (1998), on the impact of HIV-infected women who have recently given birth. At delivery, the women were young (median age, 22 years), primiparous (57%) and asymptomatic (93%). The study showed that those who were HIV-infected in the sample had high depression scores and faced family disintegration, illness in their partners, changing family relationships, loss of income and stigmatization. However, the fact that their study had no control group limited the interpretation that some of the observed findings were directly caused by HIV. This UTH study aims to contribute by making comparisons for further interpretation from both groups, HIV-positive and HIV-negative mothers (group control).

Literature has also demonstrated that, due to the large proportion of HIV-infected women at UTH identified during antenatal HIV screening, screening programs should be linked to appropriate medical services, as well as to social and mental health services. Support for women and their families must be comprehensive and must include health care information, occupational, economic, psychological counseling, and child-care support. As the AIDS pandemic continues, providing family support and care will be a major public health challenge in Zambia.

STUDY JUSTIFICATION

The problem addressed by this study deals with the fact that despite studies elsewhere and anecdotal evidence within Zambia, there is little by way of research on postnatal depression in Zambia, let alone the effects of HIV infection. To this effect, there is need to establish the prevalence of reported symptoms of depression in mothers of known HIV status who give birth at UTH. Establishing a relationship between HIV/AIDS and depression and other related factors may be important in order to deliver quality health services among mothers who delivered at UTH and other health centers. In a situation of critical shortage of trained and skilled manpower, a challenge has emerged toward achieving the Millennium Development Goals (MDGs) where evidence shows that Zambia still lags behind when it came to issues of maternal and child health; especially in the aspect of mental health. The study also recognizes the fact that at the moment, no related research had been done in psychiatry and mental health in Zambia to provide evidence on how best to deal with depression in mothers who had given birth. This may be partly related to the fact that there is a lack of basic instruments that would assist in the early detection of self-reported symptoms of depression in the postnatal period.

This study is meant to form a baseline in the process of studying this neglected area of postnatal depression among mothers in Zambia. There is an increasing need to develop culturally acceptable tools, which would augment the internationally standardized ones. This study would also assist in establishing the prevalence of reported symptoms of depression among mothers of childbearing age who were HIV positive.

This study hopes to contribute to the overall body of knowledge of maternal child health by adding the aspect of mental health with the eventual development of appropriate intervention strategies. This would also contribute towards the process of coming up with practical solutions that assist in achieving the MDGs. Above all, the impact would be on better health and prolonged life amongst mothers, something that would equally impact positively on the emotional and psychosocial development of their infants and family.

RESEARCH QUESTION

Is the postnatal mother's HIV status associated with an increased or decreased risk of postnatal depression?

HYPOTHESIS

Being HIV-positive is associated with an increased risk of postnatal depression (PND) than being HIV-negative.

OBJECTIVE

To study the contribution of HIV/AIDS to the problem of postnatal depression among women delivering at University Teaching Hospital (U.T.H), Lusaka.

Specific Objectives

The specific objectives of this study were to:

1. Determine the prevalence of reported symptoms of postnatal depression at UTH;
2. Determine the prevalence of HIV among women with postnatal depression attending postnatal care at UTH;
3. Establish the socio-demographic factors related to reported symptoms of postnatal depression among women attending postnatal care at UTH;
4. Establish the association between HIV/AIDS and postnatal depression.

METHODS

Study design and Data Handling

This was a cross-sectional study with a target group being all the women who received postnatal care at UTH in the first six months of 2008.

The study population consisted of women who presented with postnatal depression from day 2 to 6 weeks postpartum with their HIV status known. Respondents for the study sample were eligible to take part in the study if they so wished and were 2 weeks to 6 weeks postpartum, had undergone voluntary counseling test and had a documented HIV test results available (typically on the antenatal card. Postnatal mothers staying far away from Lusaka town, those without an HIV result were not eligible to take part in the study.

For a period of six months, 1380 postnatal mothers were attended to at UTH – about 230 per month. Using simple random sampling with a sampling interval of 6 of those with known HIV status, questionnaires were administered to a total 229 postnatal mothers; 46 of whom were HIV positive while 183 were HIV negative. After providing information about the study (appendix I), informed consent (appendix II) was obtained from these women before the standardized and validated questionnaire (appendix III) and the Edinburgh Postnatal Depression scale (appendix IV) were administered by a research assistant. The research assistant was a midwife that was trained to administer the questionnaire and the Edinburgh Postnatal Depression Scale.

Based on the Edinburgh Postnatal Depression Scales (EPDS) the classification of scores from respondents was grouped in three categories of depression. Thus, a score of thirteen or more (≥13) would constitute severe depression. A score of ten to twelve (10-12) would constitute moderate depression while a score of 8-9 would constitute

mild depression. Of those approached to participate, the acceptance/response rate was 99 percent.

The calculation of the sample size used Statcalc in Epi info from two proportions of HIV/AIDS test (reactive and non-reactive).The probability that the two samples were different, that this reflected a true difference in the two populations (C.I. level or 1-α): 95 percent. The probability that the two populations were different, that the sample showed a significant difference (power or 1- β): 90 percent, the ratio (number of unexposed/number of exposed) was estimated to be 3:1; the expected frequency of postnatal depression in the unexposed group was estimated at 15 percent while among the HIV positive mothers it was estimated at 40 percent.

This calculation gave a required sample of 188 (HIV-negative: 141, HIV-positive: 47). To account for non response, 20 percent was added giving a total sample of 211 (155 HIV-negative and 56 HIV-positive) subjects to be included in the study. To increase the power of the study, the branch of controls sampled was increased to 173 respondents and final sample becomes 231 respondents to be included in the study. At the end of the six-month study period, the total number sampled was 229 and this was considered sufficient based on the extra numbers sampled.

Data were initially manually cleaned by checking for correct entries and missing values before being entered on the spreadsheet using the enter data programme in Epi-Info version 6.0. We then transferred the data to SPSS version 10 for further cleaning and analysis. Distributions of data describing the study participants and their HIV status were examined and tabulated. Frequency tables were generated to obtain percentages and measures of central tendency for continuous variables distributed between HIV-positive and HIV-negative mothers.

To simplify analysis, the presence of postnatal depression was categorized into none, mild, moderate and severe using the Edinburgh scores. However, to provide a more clinically relevant assessment, the mean EPDS scores for the various factors and categories were calculated. In addition to the demographic details: maternal age, place of residence, occupation, education, smoking habits, other independent variables studied included parity, gestational age, mode of delivery, days spent in hospital in the antenatal period, days spent in hospital in the postnatal period, whether a recent event (like bereavement in family) had taken place, and type of feeding of the baby. Univariate analyses were conducted using all data available. In two cases there was no information available on infant feeding and these two records were not used to conduct the multivariate analysis.

The differences in means of the EPDS scores and potential confounders of the relationship between PND and HIV status were calculated. The means were compared within the strata of each category and relevant risk factors were considered predictors and potential confounders of the HIV/PND relationship if the p value was <0.2 or based on a review of the literature.

A multivariable regression model was developed using a forward stepwise approach to get a best-fit model taking care to check if any of the selected variables were confounders of the main association between HIV and postnatal depression. A p-value of 0.05 was taken as significant.

The study was approved by the Research and Ethics Committee of the School of Medicine, University of Zambia. Permission was sought from the Managing Director of the University Teaching Hospital after endorsement by the Head of Department of Obstetrics and Gynecology. Written informed consent was obtained from study participants before they took part in the study.

RESULTS

Two hundred twenty nine postnatal women consented to complete the questionnaire and the Edinburgh Postnatal Depression Scale instrument. Demographic and medical characteristics of all 229 women stratified by their HIV status are presented in Table 1.1. There were 46 HIV positive women (20.1%) and 183 HIV-negative (79.9%).

Respondent characteristics by HIV status

Results are presented in appropriate categories and there was no statistical difference in the risk factors for PND of age, place of residence, occupation, level of education, or smoking, by HIV status. Similarly, there was no statistical difference in the 2 groups of women when stratified for HIV status regarding parity, gestational age at delivery, mode of delivery, days spent as an inpatient during the antenatal or postnatal period, or whether they had a recent life event (like bereavement in the immediate family). However, and as expected due to prevention of mother to child transmission counseling, there were statistically more women breastfeeding amongst the HIV-negative group and more women feeding used formula or mixed feeds in the HIV-positive group.

Data for the continuous variables (mother's age, gestational age at delivery, and days spent in hospital before and after delivery) are also presented in Table 1.2 as means, standard deviation, and the minimum and maximum.

Table 1.1: Respondent Characteristics by HIV Status

Risk Factors	HIV Positive n (%)	HIV Negative n (%)	Totals N (%)
All	**46 (20.1)**	**183 (79.9)**	**229 (100)**
Age			
16-19	2 (4.3)	21 (11.5)	23 (10.0)
20-24	13 (28.3)	51 (27.9)	64 (27.9)
25-29	12 (26.1)	51 (27.9)	63 (27.5)
30-34	11 (23.9)	39 (21.3)	50 (21.8)
35+	8 (17.4)	21 (11.5)	29 (12.7)
Residential density			
High	33 (71.7)	113 (61.7)	146 (63.8)
Medium	11 (23.9)	47 (25.7)	58 (25.3)
Low	2 (4.3)	23 (12.6)	25 (10.9)
Occupation			
Self-employed	4 (8.7)	23 (12.6)	27 (11.8)
Employed	8 (17.4)	38 (20.8)	46 (20.1)
House wife	34 (73.9)	122 (66.7)	156 (68.1)
Education			
Primary or None	21 (44.7)	55 (30.0)	76 (33.2)
Secondary	18 (39.1)	70 (38.3)	88 (38.4)
Tertiary	7 (15.2)	58 (31.7)	65 (28.4)
Smoking			
Yes	0	0	0
No	46 (100)	183(100)	229 (100)
Parity			
1	12 (26.1)	79 (43.2)	91 (39.7)
2,3	25 (54.3)	63 (34.4)	88 (38.4)
4,5	7 (15.2)	25 (13.7)	32 (14.0)
6+	7 (4.3)	16 (8.7)	18 (7.9)
Gestational age (weeks)			
24-28	2 (4.3)	21 (11.5)	23 (10.0)
29-33	7 (15.2)	11 (6.0)	18 (7.9)
34-36	8 (17.4)	41 (22.4)	49 (21.4)
37+	29 (63.0)	110 (60.1)	139 (60.7)
Mode of Delivery			
Normal vaginal	18 (40.0)	68 (37.2)	86 (37.7)
Instrumental	1 (2.2)	3 (1.6)	4 (1.8)
Caesarean section	26 (57.8)	112 (61.2)	138 (60.5)
Days in hospital before delivery			
0	32 (69.6)	103 (56.3)	135 (59.0)
1	9 (19.6)	40 (21.9)	49 (21.4)
2	3 (6.5)	21 (11.5)	24 (10.5)
3 or more	2 (4.3)	19 (10.4)	21 (9.2)

Days in hospital after delivery			
0-3	25 (54.3)	88 (48.1)	113 (49.3)
4-7	15 (32.6)	70 (38.3)	85 (37.1)
8-14	4 (8.7)	17 (9.3)	21 (9.2)
15 or more	2 (4.3)	8 (4.4)	10 (4.4)
Recent event			
none	44 (95.7)	167 (91.3)	211 (92.1)
death in family	0 (0.0)	11 (6.0)	11 (4.8)
others	1 (4.3)	5 (2.7)	7 (3.1)
Type of infant feeding*			
Breastfeeding	31 (67.4)	166 (91.7)	197 (86.8)
Mixed	6 (13.0)	15 (8.3)	21 (9.3)
Formula	9 (19.6)	0 (0.0)	9 (4.0)

*Type of feeding $p<0.001$

Table 1.2: Respondent characteristics by HIV Status (continuous variables)

Risk Factors*	**HIV Positive** mean (SD) [min-max]	**HIV Negative** mean (SD) [min-max]	**All** mean (SD)
All	**n=46 (20.1%)**	**n=183 (79.9%)**	**N=229 (100%)**
Age (years)	27.8 (5.7) [17-38]	26.6 (5.9) [16-41]	26.9 (5.8)
Parity	2.8 (2.0) [1-6]	2.3 (1.6) [1-9]	2.4 (1.7)
Gestational age (wks)	37.0 (4.3) [24-44]	36.7 (4.5) [24-44]	36.8 (4.5)
Days in hospital before delivery	0.54 (1.2) [0-7]	1.2 (3.0) [0-28]	1.2 (2.7)
Days in hospital after delivery	4.7 (4.5) [0-22]	5.1 (5.4) [0-31]	5.1 (5.2)

*No statistical difference in means of risk between HIV positive and negative respondents.

Edinburgh Postnatal Depression Scale Score Categories (by HIV Status)

All 229 women completed the questionnaire based on the Edinburgh Postnatal Depression Scale. Table 2.1 illustrates the EPDS scores that are categorized as mild, moderate and severe as previously described in the Methods section and also by HIV status. According to the categorization, over a third (36.2%) had a low score (0-7) indicating no postnatal depression (PND), 12.2 percent had mild PND (EPDS score of 8 and 9), 23.6% had moderate PND (EPDS score 10-12) and 27.9 percent had severe PND (EPDS score 13 or more). When stratified by HIV status, the odds of a woman that was HIV positive having any of mild, moderate or severe PND was 1.38 compared to no PND. However, the 95% confidence interval was 0.69 to 2.77 (p=0.37), indicating the odds were not statistically significantly different from unity. (Table 2.2).

Similarly, the odds of a woman with HIV having moderate to severe and also of having severe PND was 1.15 and 1.70 respectively. (Tables 2.3 and 2.4). However, again the 95% confidence intervals overlapped unity and the p values indicate no statistically significant increase over a woman that was HIV negative.

Table 2.1: EPDS score by HIV Status

EPDS score classification	HIV Positive n (%)	HIV Negative n (%)	Totals N (%)
None (0-7)	14 (30.4)	69 (37.7)	83 (36.2)
Mild (8-9)	7 (15.2)	21 (11.5)	28 (12.2)
Moderate (10-12)	8 (17.4)	46 (25.1)	54 (23.6)
Severe (13 or more)	17 (37.0)	47 (25.7)	64 (27.9)
All	**46 (100) (20.1)**	**183 (100) (79.9)**	**229 (100) (100)**

Table 2.2: EPDS scores (none vs. EPDS>7) by HIV Status

EPDS score classification	HIV Positive n (%)	HIV Negative n (%)	Totals N (%)
None (0-7)	14 (30.4)	69 (37.7)	83 (36.2)
Mild, moderate, severe (8 or more)	32 (69.6)	114 (62.3)	146 (63.8)
All	**46 (100) (20.1)**	**183 (100) (79.9)**	**229 (100)**

'Crude' OR 1.38; (95% confidence interval = 0.69 to 2.77; p=0.37)

Table 2.3: EPDS scores (none vs. EPDS>9) by HIV Status

EPDS score classification	HIV Positive n (%)	HIV Negative n (%)	Totals N (%)
None and mild (0-9)	21 (45.7)	90 (49.2)	111 (48.5)
moderate or severe (10 or more)	25 (54.3)	93 (50.8)	118 (51.5)
All	**46 (100) (20.1)**	**183 (100) (79.9)**	**229 (100)**

'Crude' OR 1.15; (95% confidence interval = 0.60 to 2.20; p=0.67)

Table 2.4: EPDS scores (none vs. EPDS>12) by HIV Status

EPDS score classification	HIV Positive n (%)	HIV Negative n (%)	Totals N (%)
None, mild, moderate (0-12)	29 (63.0)	136 (74.3)	165 (72.1)
Severe (13 or more)	17 (37.0)	47 (25.7)	64 (27.9)
All	**46 (100) (20.1)**	**183 (100) (79.9)**	**229 (100)**

'Crude' OR 1.70; (95% confidence interval = 0.86 to 3.36; p=0.18)

Mean EPDS scores

The overall mean EPDS score for all 229 women was 9.6 (standard deviation 5.4; minimum 0, maximum 27). Table 3 illustrates cut-offs of the mean scores;146 women had mean EPDS scores greater than 7 (63.8%; 95% CI 56.2-70.0%), and 64 had mean EPDS scores greater than 12 (27.9%; 95% CI 22.2-34.2%).

Table 3 also tabulates studies from different parts of the world that used the EPDS cut-offs as stipulated, but which was administered at varying weeks postnatally. A wide variation is noted due to the differences in timing of administration and due to the fact that there was no standardized selection of postnatal mothers.

Table 3: Prevalence of postnatal depression using different EPDS cut-offs

EPDS cutoff	**Patients with EPDS > cutoff n (%)**	**95% confidence interval**		**Studies that used the cut-off**	**Comments**
>=13	64 (27.9)	22.2-34.2		Webster at al (2003)	12.2% at 16 weeks (Australia)
>=12	84 (36.7)	30.4-43.3		Gonidakis et al (2008)	18% in first 6 months (Greece)
>=11	104 (45.4)	38.8-52.1		Sabuncuoğlu and Berkem (2006)	30% in 2-18 months (Turkey);
>=10	118 (51.5)	44.9-58.2		Hanusa et al (2008)	62% at 6-8 weeks (USA)
>=9	129 (56.3)	49.6-62.9		Yamashita and Yoshida (2003; Uwakwe and Okonkwo (2003)	14-17% at 3weeks to 3 months (Japan); 10.7% at 1 week (Nigeria)
>=8	**146 (63.8)**	**57.2-70.0**		Yamashita et al (2000)	17% (by three months postnatally) (Japan)
>=7	159 (69.4)	63.0-75.3		Pitanupong et al (2007); Webster et al (2003)	12% at 6-8 weeks (Thailand); 40% at 16 weeks (Australia)
>=0 (all)	229				

Mean EPDS scores by risk factors

In order to assess the clinical levels of EPDS scores, means were calculated for each risk factor and presented in Table 4. The means were compared within the strata of each category; there was no statistically significant difference in the mean EPDS score of those that were HIV positive (10.6) compared to those HIV negative (9.4). The difference in means between the three categories of residential areas was not significantly different overall (p=0.06). This also applied to gestational age. By contrast, there was a statistically significant difference in means within the strata of parity, days in hospital after delivery and type of (infant) feeding. (Table 4).

Table 4: Mean Edinburgh Postnatal Depression Scale Scores by risk factors

Risk Factors	EPDS score mean (SD)	P-Value	Total n (%)
All	9.6 (5.4)		229 (100)
HIV status			
Reactive	10.6 (5.9)	0.1615	46 (20.1)
Non-Reactive	9.4 (5.3)		183 (79.9)
Age			
16-19	7.7 (4.4)	0.2227	23 (10.0)
20-24	9.5(5.9)		64 (27.9)
25-29	9.9(5.1)		63 (27.5)
30-34	9.3(5.3)		50 (21.8)
>35	11.1 (5.6)		29 (12.7)
Education			
Primary or None	9.1 (5.6)	0.4947	146 (63.8)
Secondary	10.3 (5.4)		58 (25.3)
Tertiary	9.3 (5.2)		25 (10.9)
Residential density			
High	10.2 (5.7)	0.0623	27 (11.8)
Medium	8.8 (4.9)		46 (20.1)
Low	8.0 (4.0)		156 (68.1)
Occupation			
Self-employed	11.1 (4.8)	0.2188	76 (33.2)
Employed	8.9 (5.1)		88 (38.4)
House wife	9.6 (5.6)		65 (28.4)
Smoking			
Yes	n/a		0
No	9.61 (5.4)		229 (100)
Parity			
1	8.4 (4.9)	0.0089	91 (39.7)
2,3	10.0 (5.8)		88 (38.4)
4,5	12.0 (5.2)		32 (14.0)
6+	9.4 (5.2)		18 (7.9)
Gestational age (weeks)			
24-28	11.7 (6.1)	0.0620	23 (10.0)
29-33	10.9 (6.0)		18 (7.9)
34-36	10.1 (5.1)		49 (21.4)
37-45	8.9 (5.3)		139 (60.7)
Mode Of delivery			
Normal vaginal	10.2 (5.4)	0.2814	86 (37.7)
Instrumental	11.5 (1.7)		4 (1.8)
Caesarean section	9.1 (5.5)		138 (60.5)
Days in hospital before delivery		0.7544	
0	9.5 (5.9)		135 (59.0)
1	10.3 (4.6)		49 (21.4)
2	8.9 (5.2)		24 (10.5)
3 or more	9.7 (4.6)		21 (9.2)

Days in hospital after delivery			
0-3	9.1 (4.9)	0.0181	113 (49.3)
4-7	9.2 (5.4)		85 (37.1)
8-14	12.9 (7.2)		21 (9.2)
15 or more	11.4 (5.3)		10 (4.4)
Recent event			
none	9.6 (5.5)	0.4784	211 (92.1)
death	9.1 (4.6)		11 (4.8)
others	12.0 (5.8)		7 (3.1)
Type of infant feeding			
Breastfeeding	9.2 (5.4)	0.0078	197 (86.8)
Mixed	13.0 (4.3)		21 (9.3)
Formula	9.2 (5.6)		9 (4.0)

Effects of HIV status and other risk factors on mean EPDS scores

The relationship between the outcome variable (EPDS scores) and the predictor variable (HIV status) was explored using simple linear regression (Table 5.1). There was no association between mean EPDS score and HIV status.

Based on Table 4 (mean EPDS by risk factors) the apparent relationship between EPDS score and HIV status maybe accentuated (or attenuated) due to the effect of other risk factors like place of residence, parity, gestation, days in hospital postnatally, and type of infant feeding. The output of the model after forward stepwise multiple linear regression is summarized in Table 5.2. Even though there is still no significant association between the mean EPDS score and HIV status, the model shows that adding the above mentioned risk factors altered the association from 1.25 to 0.82 (almost one third). The implausibility of the fact that being HIV positive may be protective of PND (HIV coefficient 0.82 vs. 1.25) is considered moot as there was no statistical significance. Further, the correlation coefficient (R^2 = 15.85729%) indicates that only about 16% of the EPDS score was accounted for by the risk factors included in the model.

The following 2 risk factors were independently and significantly associated with an increase in EPDS score: those with parity 4 and 5 (category 3) and those mothers whose babies were receiving mixed feeding (category 2) (Table 5.2). The coefficient of parity category 3 (parity 4-5) of 3.1 indicates that women with that parity have an EPDS score that is 3.1 more compared to women with other parity. Similarly, women that are mixed feeding their infant have an EPDS score that is 3.2 more compared to women either breastfeeding or feeding formula.

Output of linear regression to explore relationship between mean EPDS score and HIV status and adjusting for potential confounders.

Table 5.1: Simple linear regression

Intercept	b0 = 9.3		P < 0.0001
HIV Status	b1 = 1.253191	r = 0.093916	P = 0.1585

EPDS Score = 9.3 +1.253191 HIV Status

Analysis of variance from regression

Source of variation	Sum Squares	DF	Mean Square
Regression	58.530115	1	58.530115
Residual	6577.417021	225	29.232965
Total (corrected)	6635.947137	226	

Multiple correlation coefficient (R) = 0.093916 [95% CI = -0.036746 to 0.22142]
R^2 = 0.882016%
Ra^2 = 0.441492%

Table 5.2: Multiple linear regression model

Intercept	b0 = 7.876176		P < 0.0001
HIV Status	b1 = 0.823536	r = 0.059065	P = 0.3899
Residential (2)	b2 = -1.487812	r = -0.12392	P = 0.0704
Residential (3)	b3 = -1.466062	r = -0.087092	P = 0.2044
Parity categ (2)	b4 = 1.309198	r = 0.112178	P = 0.1017
Parity categ (3)	**b5 = 3.09903**	**r = 0.191739**	**P = 0.0049**
Parity categ (4)	b6 = 0.820985	r = 0.041482	P = 0.5462
Gest categ (2)	b7 = 1.244142	r = 0.097298	P = 0.1561
Gest categ (3)	b8 = 1.368527	r = 0.066322	P = 0.3343
Gest categ (4)	b9 = 1.59064	r = 0.071708	P = 0.2964
days postnatal categ (2)	b10 = -0.197134	r = -0.017818	P = 0.7955
days postnatal categ (3)	b11 = 2.610636	r = 0.11787	P = 0.0854
days postnatal categ (4)	b12 = 0.690275	r = 0.023389	P = 0.7337
Baby feeding (2)	**b13 = 3.293975**	**r = 0.181076**	**P = 0.0079**
Baby feeding (3)	b14 = -0.090999	r = -0.003144	P = 0.9635

EPDS Score = 7.876176 +0.823536 HIV Status -1.487812 Residential (2) -1.466062 Residential (3) +1.309198 Parity categ (2) +3.09903 Parity categ (3) +0.820985 Parity categ (4) +1.244142 Gest categ (2) +1.368527 Gest categ (3) +1.59064 Gest categ (4) -0.197134 days postnatal categ (2) +2.610636 days postnatal categ (3) +0.690275 days postnatal categ (4) +3.293975 Baby feeding (2) -0.090999 Baby feeding (3)

Analysis of variance from regression

Source of variation	Sum Squares	DF	Mean Square
Regression	1052.281358	14	75.162954
Residual	5583.665778	212	26.338046
Total (corrected)	6635.947137	226	

Multiple correlation coefficient (R) = 0.398212
R^2 = 15.85729%
Ra^2 = 10.300696%

Discussion

To study the contribution of HIV/AIDS to the problem of postnatal depression among women delivering at University Teaching Hospital (U.T.H), Lusaka, the objectives of this study were to determine the prevalence of reported symptoms of postnatal depression, determine the prevalence of HIV among women with postnatal depression, establish the socio-demographic factors related to reported symptoms of postnatal depression among women attending postnatal care at UTH and to establish the association between HIV/AIDS and postnatal depression.

Apart from the type of feeding offered by the 229 mothers to their infants, there were no significant differences in studied characteristics between HIV positive and HIV negative women (Table 1). Using different cut-offs of EPDS scores (8, 10 or 13) the odds of an HIV positive woman having PND was 1.38, 1.15, and 1.70, respectively (Table 2.2-4). However, all the 95% confidence intervals crossed unity and corresponding p values were greater than 0.05. The mean EPDS score for all 229 women was 9.6 (SD 5.4). Using different cut-offs of the mean scores;146 women had mean EPDS scores greater than 7 (63.8%; 95% CI 56.2-70.0%), and 64 had mean EPDS scores greater than 12 (27.9%; 95% CI 22.2-34.2%). The mean EPDS score of HIV positive women was 10.6 vs. 9.4 for negative women (non-significant, p=0.1615). However, there was a statistical difference in mean scores for different categories of the following risk factors: parity, days spent in hospital after delivery and type of infant feeding. In a multiple linear regression model, those risk factors, together with other potential risk factors for PND, like place of residence (as a proxy of socio-economic circumstances), parity, gestational age at delivery, mode of delivery were added to explore the relationship between mean EPDS score and HIV status. In the model, the EPDS score was independently significantly associated with

parity 4 or 5, and mixed infant feeding though not with HIV status of mother (Table 5.2).

Adewuya (2005) in Nigeria, found that being single is among the main predictors of postnatal depression, though marital status was one social demographic feature that was overlooked by this study. However, it has been observed that the women were largely from high density areas. The aspect of one's residential area was also associated with more children and pregnancies compared to those respondents from medium and low density areas.

Depending on the cut-off of the EPDS scores, whether it was 7 or 12, there was a high proportion of mothers reporting symptoms of postnatal depression (27.9 to 63.8%). This also accords with previous observations by other researchers like Cox (1989), Patel et al (1998), Abas and Broadhead (1997), Nhiwatiwa et al (1998) and Mumford et al (1997). This study at UTH was meant to form a baseline for the study of postnatal depression among mothers in an urban setting in Zambia. Furthermore it set out to establish whether those that were HIV positive were more affected. The results suggests that PND is a not a rare condition that needs to be looked out for in a hospital and community setting, if necessary through the use of locally adapted screening tools based on the EPDS. The screening tool like the EPDS administered at discharge and at the six-week postnatal visit would provide an opportunity to assess underlying postnatal depression, before the condition is advanced and mothers are almost psychotic.

The prevalence of HIV in adolescents is 9 percent and the highest rate is in the age group 25-39 years (38.4%) (CSO et al 2003). The proportion of postnatal women in this study that were HIV positive was 20.1% and provided an opportunity to study the

association between HIV status and PND. Nevertheless, a statistically significant relation was not established in this study between HIV/AIDS and PND. This is in contrast to the findings of the study by Manopaiboon et al in Thailand (1998). The outcome of their study was that those who were HIV- infected in the sample had high depression scores and faced family disintegration, illness in their partners, changing family relationships, loss of income and stigmatization. Our findings demonstrated two factors which were independently and significantly associated with PND. These were parity 4 or 5, and mixed infant feeding, though not HIV status of mother (Table 5.2). Type of infant feeding was statistically significantly different between HIV positive and negative women (Table 1.1). More HIV positive women used mixed feeding instead of breastfeeding; and only those that were HIV positive chose to use formula feeding. More detailed studies would be required to understand the relationship between feeding, HIV and PND. For example, in the model, only about 16% of the EPDS score in the study was accounted for by the included factors. Other societal, cultural, socio-economic, family, medical, institutional (like staff attitudes and facility infrastructure), etc., may contribute to the state of postnatal depression in addition to any inherent or past susceptibility to depression.

Since previous studies have not been conducted in Zambia on PND, the use of arbitrary cut-offs for the mild, moderate and severe depression as outlined in Table 2.1 were arbitrary and based on studies in other countries with very different health systems, socio-economic and cultural contexts and value systems. In order to assess the relevance of the clinical significance of the EPDS scores, multiple linear regression was utilized to explore the relationship with HIV status and other risk factors for PND. It is believed this provided a baseline for further studies.

STUDY STRENGTHS AND LIMITATIONS

One of the strengths of this study is that the topic it addresses is novel for Zambia and establishes a basis for the further study of PND. Mental health is a neglected area in women of reproductive health and in pregnancy and postnatally in particular. This study displays the extent of PND among the postnatal mothers in our study population. Another strength of the study is the use of a widely validated, internationally accepted measurement tool, the Edinburgh Postnatal Depression Scale.

There were several limitations to our study. By recruiting our patients from a tertiary hospital population the study may not be representative of the wider population of mothers who deliver without being referred from their health facilities in their respective communities. Thus, caution is exercised here as no overgeneralizations are intended when considering the prevalence of PND and its association with the HIV status of mothers who gave birth or other potential risk factors. The results are therefore, largely interpreted in terms of the group of women attending UTH referred for a variety of reasons related to their pregnancy and child birth.

On the sampling process, we feel that the limitation lay in the fact that only mothers attending UTH, and these were taken at interval as they were captured at maternity ward. We feel that this could have introduced some bias considering that only those women coming to UTH during the stated period, with specific complications were sampled and this could have largely influenced the overall results of our statistical calculations especially when ruling out confounders during multivariate analysis. Most of the respondents who are reviewed at UTH have specific problems while others with no problems after delivery are referred to their local clinic, we feel this

was a limitation in generalizing statistical findings among different categories of postnatal mothers.

Regarding other important potential risk factors, women with stillbirths and early neonatal deaths were not considered in this study. They would presumably have had more PND than other women. Similarly, the marital status of the postnatal mother was not considered.

Other limitations include the inability of the study to isolate or confirm depression by referring the respondents with moderate and severe symptoms for a formal mental state examination in a psychiatric unit.

CONCLUSIONS

As illustrated by the use of the Edinburgh Postnatal Depression Scale, postnatal depression is not an insignificant condition in the selected hospital population of postnatal mothers at UTH. However, HIV/AIDS was not statistically significantly and independently associated with postnatal depression amongst the mothers, though the use of mixed feeding and higher parity were. It is imperative for health practitioners to consider the possibility of PND, particularly for those with risk factors including adverse socio-economic conditions and poor obstetric and neonatal outcomes so as to counsel and refer for further care as necessary.

RECOMMENDATIONS

1. Screening for PND must be a part of the assessment at the first postnatal visit in order to counsel and assist the mothers.
2. Further research is needed to better characterize PND in the different populations in Zambia, including urban/rural, hospital/community based deliveries and including a wide cross-section regarding cultures and socio-economic status.
3. The Ministry of Health must develop a programme to create awareness of PND and put in place policies which will help in screening, and subsequent management.

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APPENDICES

APPENDIX I: INFORMATION SHEET

My name is …….. . We are conducting a study looking at the impact of HIV/AIDS on postnatal depression among the mothers delivering at University Teaching Hospital (UTH).This study is being conducted by Dr Augustine Cyimana as partial fulfillment for the award of the Masters in Obstetrics and Gynecology degree at the University of Zambia which he is pursing and now in his the final year. The study will involve the postnatal mothers from 2wks to 4-6wks following delivery who are willing to participate in this study. Not much attention has paid in the past to the problem of postnatal depression in Zambia. The aim of this study is to establish whether, at UTH, depression does occur in mothers with or without HIV/AIDS after delivery, and if it does, we would like to know the impact that HIV/AIDS has on postnatal depression. In the same line we would like to identify the main risk factors and find out if there is any association between HIV/AIDS and symptoms of depression in postnatal mothers, thereafter give the researcher and the public in general a better understanding of this problem, and help health planners to consider this problem in their quest to deliver quality services. This is why your contribution by giving us your HIV status with other details on you and answering to the appropriate questionnaire will be very much appreciated.To be a participant to this study has no risk at all. You will benefit by having a postnatal care and having information on what is happening in you after you have delivered and you will be given treatment where it is needed.

I invite you to take part in the study. I am going to ask you some question based on the questionnaire that I have. The interview will not take more than 20 minutes. Your participation will be very much appreciated and you are free to refuse participation in the study or withdraw at any stage without any prejudice to your usual medical care in this hospital. The information taken from you with regard to this study will be kept confidential as no full names but initials or numbers will be used in collection of information and analysis of the data. Your approval will be confirmed by your signature or your thumb print on the consent form. If you agree to take part in the study we may now proceed.

APPENDIX II

CONSENT FORM

(To be filled in or read to each respondent in her chosen language.)

This is an important form giving you information about this study that we are conducting. Please read it or someone will read it for you, carefully, and ask questions where it is not clear for you. If you decide to participate in this study, you will confirm by signing or putting your thumb print at the indicated space. You are free to refuse the participation in this study without any risk of change or influence on your treatment and care that you will be receiving in this hospital. You are also free to withdraw from this study at any time you wish to do so and you will still receive the normal care.

PURPOSE OF RESEARCH AND PROCEDURES.

The aim of this study is to establish whether, at UTH, depression does occur in mothers with or HIV/AIDS after delivery, and if it does, we would like to know the impact that HIV/AIDS has on postnatal depression. In the same line we would like to identify the main risk factors and find out if there is any association between HIV/AIDS and symptoms of depression in postnatal mothers. Thereafter give health planners to consider this problem in their quest to deliver quality services.

We would like to find out if there is any association between HIV/AIDS and symptoms of depression in postnatal mothers. This is why your contribution by giving us your HIV status and other details on you and answering to the appropriate questionnaires will be very much appreciated.

RISKS AND BENEFITS

To be a participant to this study has no risk at all. You will benefit by having a postnatal care and having information on what is happening in you after you have delivered and you will be given treatment where it is needed.

CONFIDENTIALITY

All the information including your name and your HIV status will be kept confidential. The all information collected on the questionnaire sheet will be destroyed after transferring the data to the computer where initials of your names will be replaced by computer number of each participant.

For any queries on this study, you are free to contact him physically or on the following address:

University Teaching Hospital (UTH), Department of Obstetrics and Gynecology, Lusaka,

E.MAIL: cbakoj@yahoo.com mobile: 0977-645196 or 0955-450276 or

UNZAREC: e-mail: unzarec@zamtel.zm telephone: 256067.

I thank you sincerely for your time.

I agree to take part in this study

Signature…… Witness……..…

Date…… Date……

APPENDIX III

QUESTIONNAIRE: SOCIAL DEMOGRAPHIC AND BACKGROUND

Names (use initials): _____

1. Age (yrs) (age…….)

1. 12 - 17 ☐ 2. 18-23 ☐ 3. 24-29 ☐

4. 30-35 ☐ 5. ≥36 ☐

2. What is your residential address?

1. Low density ☐ 2. Medium density ☐ 3. High density ☐

4. Non urban ☐

3. Occupation:

1. Self-employed ☐ 2. Employed ☐ 3. House wife ☐

4. Educational level:

1. Primary education ☐ 2. Secondary education ☐ 3.Tertiary education ☐

4. None ☐

5. Do you smoke?

1. Yes ☐ 2. No ☐

6. Parity: ……..

1. P1-3 ☐ 2. P4-6 ☐ 3. P ≥ 7 ☐

8. Gestational age at delivery (weeks):

1. 24wks-28wks ☐ 2. 29wks-33wks ☐ 3. 34wks-36wks ☐

4. ≥37wks ☐

9. Mode of delivery:

1. SVD ☐ 2. Assisted Instrumental ☐

3. Caesarean section ☐

10. Number of days spent in the hospital prior to delivery:

1. 1-3 ☐ 2. 4-7 ☐ 3. 8-14 ☐ 4. 15-30 ☐ 5. 31 and above. ☐

11. Number of days spent in the hospital after delivery: ……

1.1-3 ☐ 2.4-7 3.8-14 ☐ 4.15-30 ☐ 5. 31 and above. ☐

12. Is there any recent event in the family?

1. Death ☐ 2. Loss of Job ☐ 3. Assault ☐ 4. Illness ☐

5. Loss of business ☐

13. What type of feeding for your baby are you using?

1. Exclusive breastfeeding ☐ 2. Breastfeeding + formula ☐

3. Formula only ☐

14. HIV Status:

1. Reactive ☐ 2. Non-reactive ☐

APPENDIX IV: EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)

Adapted from Cox, J.M. Holden, R. Sagovsky (British Journal of Psychiatry June, 1987, Vol, 150)

The Edinburgh Postnatal Depression Scale has been developed to assist primary care health professionals to detect mothers suffering from postnatal depression; a distressing disorder more prolonged than the "blues" (which occur in the first week after delivery) but less severe than puerperal psychosis. Previous studies have shown that postnatal depression affects at least 10 percent of women and that many depressed mothers remain untreated. These mothers may cope with their baby and with household tasks, but their enjoyment of life is seriously affected and it is possible that there are long-term effects on the family.

The EPDS was developed at health centers in Livingstone and Edinburgh. It consists of ten short statements. The respondent ticks which of the four possible responses is closest to how she has been feeling during past week. Most mothers complete the scale without difficult in less than 5 minutes.

The validation study showed that mothers who scored above threshold, 92.3 percent were likely to be suffering from a depressive illness of varying severity. Nevertheless the EPDS score should not override clinical judgment. A careful clinical assessment should be carried out to confirm the diagnosis. The scale indicates how the mother has felt during the previous week and in doubt cases it may be usefully repeated after 2 weeks. The scale will not detect mothers with anxiety neuroses, phobias or personality disorder

Instructions for users:

The mother is asked to underline the response, which comes closest to how she has been feeling in the previous 7 days.

All ten items must be completed.

Care should be taken to avoid the possibility of the mother discussing her answers with others.

The mother should complete the scale herself, unless she has limited English or has difficult with reading.

As you have recently had a baby, we would like to know how you are feeling. Please TICK the answer which comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

1. I have been able to laugh and see the funny side of things.

1. As much as I always could ☐
2. Not quite so much now ☐
3. Definitely not so much now ☐
4. Not at all. ☐

2. I have looked forward with enjoyment to things.

1. As much as I ever did ☐
2. Rather less than I used to ☐
3. Definitely less than I used to ☐
4. Hardly at all. ☐

***3. I have blamed myself unnecessarily when things went wrong.**

1. Yes, most of the time ☐
2. Yes, some of the time ☐
3. Not very often ☐
4. No, never. ☐

4. I have been anxious or worried for no good reason.

1. No, not all ☐
2. Hardly ever ☐
3. Yes, sometimes ☐
4. Yes, very often ☐

***5. I have felt scared or panicky for not very good reason**

1. Yes, quite a lot ☐
2. Yes, sometimes ☐
3. No, not much ☐
4. No, not at all ☐

***6. Things have been getting on top of me.**

1. Yes, most of the time I haven't been able to cope at all. ☐
2. Yes, sometimes I haven't been coping as well as usual, ☐
3. No, most of the time I have coped quite well ☐
4. No, I have been coping as well as ever. ☐

***7**. **I have been so unhappy that I have had difficulty sleeping.**

1. Yes, most of the time ☐
2. Yes, sometimes ☐
3. Not very often ☐
4. No, not at all. ☐

***8**. **I have felt sad or miserable.**

1. Yes, most of the time ☐
2. Yes, quite often ☐
3. Not very often ☐
4. No, not at al ☐

***9**. **I have been so unhappy that I have been crying.**

1. Yes, most of the time ☐
2. Yes, quite often ☐
3. Only occasionally ☐
4. No, never. ☐

***10**. **The thought of harming myself has occurred to me.**

1. Yes, quite often ☐
2. Sometimes ☐
3. Hardly ever ☐
4. Never ☐

Response categories are scored 0, 1, 2, and 3 according to increased severity of the symptoms. Items marked with an asterisk are reverse scored (i.e. 3, 2, 1, and 0). The total score is calculated by adding together the scores for each of the ten items.

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