

## ORIGINAL RESEARCH ARTICLE

# The association between the prevalence of HIV infection and ectopic pregnancy

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Mokoena M. Mohosho

Department of Obstetrics & Gynaecology, Ladysmith Provincial Hospital, Kwazulu Natal, South Africa

\*For Correspondence: Email: mohoshomartins@gmail.com; Phone: +27 73 193 4098

### Abstract

Women infected with the human immunodeficient virus have a higher risk of pelvic inflammatory disease, which could lead to development of ectopic pregnancy due to fallopian tubal pathology. Due to short pregnancy period, women with ectopic pregnancy unlikely complete the antenatal screening, which includes HIV tests. Therefore, it is postulated that un-screened HIV infection prevalence in women with ectopic pregnancy diagnosis could be significantly higher than in women with normal intrauterine pregnancy (IUP). The aim of the present retrospective cross-sectional study was to determine the association between ectopic pregnancy and HIV infection in KwaZulu Natal Province hospital setting, between 2016 and 2017. 5427 pregnant women with normal pregnancies formed the intrauterine pregnancy (IUP) cohort, while 83 patients were part of the ectopic pregnancy cohort. The statistical HIV prevalence was significantly higher in the ectopic pregnancy cohort (56.63% vs 39.4%, P-value of 0.001). In addition, HIV prevalence in the ectopic pregnancy cohort was analyzed per age group, and it was found to be higher in the 25-34 years age group (88.3%) than the 16-24 (43.3%) and 35-42 (60%) years age groups. This study highlights the significance of conducting a full antenatal screening programme in patients who present with ectopic pregnancy, to improve the rate of HIV infection testing and treatment in women who present with ectopic pregnancy. (*Afr J Reprod Health* 2023; 27 [2]: 87-91).

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**Keywords:** Ectopic pregnancy, HIV infection, antenatal screening

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### Résumé

Les femmes infectées par le virus de l'immunodéficience humaine ont un risque plus élevé de maladie inflammatoire pelvienne, ce qui pourrait entraîner le développement d'une grossesse extra-utérine due à une pathologie des trompes de Fallope. En raison de la courte période de grossesse, il est peu probable que les femmes ayant une grossesse extra-utérine complètent le dépistage prénatal, qui comprend des tests de dépistage du VIH. Par conséquent, il est postulé que la prévalence de l'infection à VIH non dépistée chez les femmes ayant reçu un diagnostic de grossesse extra-utérine pourrait être significativement plus élevée que chez les femmes ayant une grossesse intra-utérine normale (PIU). Le but de la présente étude transversale rétrospective était de déterminer l'association entre la grossesse extra-utérine et l'infection par le VIH dans le cadre hospitalier de la province du KwaZulu Natal, entre 2016 et 2017. 5427 femmes enceintes avec des grossesses normales ont formé la cohorte de grossesse intra-utérine (IUP), tandis que les patientes faisaient partie de la cohorte de grossesse extra-utérine. La prévalence statistique du VIH était significativement plus élevée dans la cohorte de grossesse extra-utérine (56,63 % contre 39,4 %, P-value de 0.001). De plus, la prévalence du VIH dans la cohorte des grossesses extra-utérines a été analysée par tranche d'âge et s'est avérée plus élevée dans la tranche d'âge 25-34 ans (88,3 %) que chez les 16-24 ans (43,3 %) et 35-42 ans (60 ans). % ans groupes d'âge. Cette étude souligne l'importance de mener un programme complet de dépistage prénatal chez les patientes qui présentent une grossesse extra-utérine, afin d'améliorer le taux de dépistage et de traitement de l'infection par le VIH chez les femmes qui présentent une grossesse extra-utérine. (*Afr J Reprod Health* 2023; 27 [2]: 87-91).

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**Mots-clés:** Grossesse extra-utérine, infection par le VIH, dépistage prénatal

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### Introduction

Ectopic pregnancy (EP) involves the implantation of the fertilized ovum outside the uterine cavity. Symptoms of this obstetric pathology includes pelvic pain and bleeding<sup>1,2</sup>. The main risk factor for this pathology is the pelvic inflammatory disease,

which alters the function and anatomy of fallopian tubes<sup>1</sup>, causing pelvic adhesion and tubal obstruction with a subsequent increase in the risk of ectopic pregnancy<sup>3</sup>. The incidence of EP varies among locations, which depends on early diagnosis with beta-human chorionic gonadotropin (b-HCG) assays and the improvement of ultrasound techniques<sup>4</sup>.

Globally, the incidence of EP has not changed in the last years, showing between 1.5% and 2.0% in all pregnancies<sup>1,5</sup>.

It has been reported that young women infected with the human immunodeficient virus (HIV) have a higher risk of pelvic inflammatory disease<sup>6</sup>. This leads to a higher risk to develop an EP. In contrast with EP, intrauterine pregnancy (IUP) likely progresses to full term and childbearing. Due to the short pregnancy period, women with EP may not complete the antenatal screening, which includes voluntary HIV tests. Previous study conducted in Thailand, showed a relatively high HIV seroprevalence of 4.3% in patients with ectopic pregnancies<sup>7</sup>.

In South Africa, the HIV-infected women population increase year after year<sup>8,9</sup>. In the year 2017, The National Confidential Enquiries into Maternal Deaths in South Africa reported that non-pregnancy related infections, mainly AIDS, contributed 32.7% of all maternal deaths<sup>10</sup>. The 2019 National Antenatal Sentinel HIV Survey reported the highest HIV prevalence of 41.1% among pregnant women in KwaZulu Natal province<sup>11</sup>. And, The Saving Mothers Report (2017) showed that 3,53% of all maternal deaths were due to EP in KwaZulu Natal province during 2014-2016 period<sup>10</sup>.

## Methods

### Study design

A retrospective cross-sectional study was conducted in KwaZulu Natal Province, uThukela district at Ladysmith Provincial Hospital, between April 2016 and March 2017. The aim of the present retrospective study was to determine the association between EP and HIV infection. The main question to answer was whether HIV infection rate was higher in women with EP than in women with IUP. In addition, the prevalence of HIV infection in the EP cohort was compared among the formed age groups.

### Study population

Between April 2016 and March 2017 two cohorts of women who attended at Ladysmith Provincial Hospital were selected. The first cohort was women with ectopic pregnancy diagnosis who were managed surgically (EP cohort). The second cohort were women who had normal IUP and delivered their babies (IUP cohort). Within the EP cohort, three age groups were formed to compare the HIV prevalence among them<sup>12</sup>.

The inclusion criteria were i) women who had surgical-intraoperative confirmation of EP during the

study period and a known recorded HIV status in their files, the latter refers to women who knew their HIV seropositivity statuses on treatment and those who tested HIV positive or negative during admission period and ii) women who had normal IUP with known HIV status and delivered their babies during the study period. Exclusion criteria for this study were i) women who had medical treatment for EP and ii) women with no HIV status results recorded in their files.

### Data collection

Potential patients' names and hospital numbers were collected from the gynaecology and maternity admission books. The files of women with ectopic pregnancy diagnosis and women who had deliveries of their babies during the study period were selected from hospital records. In the EP group, a total of 92 patients' files were retrieved and 83 met the inclusion criteria. A total of 5 427 files of women who had IUP and delivered their babies during the study period were retrieved, and all met the inclusion criteria. The information needed for the study was retrieved from the files and entered in the data collection sheets designed. Anonymization of personal data was carried out to keep the confidentiality regarding the diagnosis of the patients.

### Measurements

Patient records were assessed, and information needed, HIV status; age; EP and IUP diagnoses was extracted. The prevalence of HIV infection was compared between the two cohorts. The overall ectopic pregnancy rate was determined, and compared to previous studies. For the ectopic pregnancy (EP) cohort, the HIV infection prevalence was compared among the formed age groups.

### Data analysis

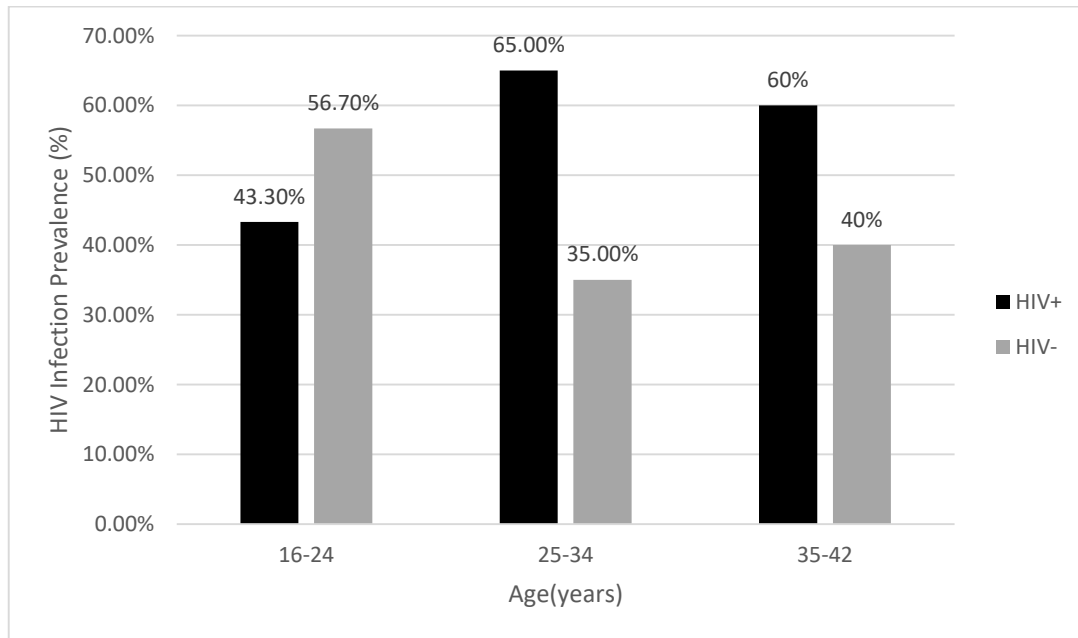
Statistical analysis was performed manually. Results were calculated using the Chi-Square test, and differences with  $p < 0.05$  were considered significant. The Confidence Interval (CI) was calculated using normal approximation to the binomial.

## Results

A total of 5510 pregnant women (EP and IUP patients) who met the study inclusion criteria were admitted and treated at The Ladysmith Provincial Hospital, in KwaZulu Natal Province, uThukela district, between April 2016 and March 2017. During the study, 5427 pregnant women had a normal intrauterine pregnancy and formed the IUP cohort, while 83 patients had

**Table 1:** HIV status in the study population

Pregnancy Type	HIV status		p-Value
	Positive	Negative	
Ectopic pregnancy	47 (56.63%)	36 (43.37%)	0.001
Normal intrauterine	2,138 (39.40%)	3,289 (60.60%)	
Total	2,185	3,325	



**Figure 1:** Prevalence of HIV infection among EP cohort age groups

ectopic pregnancies and were surgically managed, this formed EP cohort. The incidence of EP per 1000 normal pregnancy was 15 (95% CI, 12.2-18.9). HIV prevalence in the EP cohort was higher than the HIV prevalence in the IUP cohort (56.63% vs 39.4%, p-value of 0.001). Table 1.

In the EP cohort, HIV infection prevalence was analyzed by age groups. The 25-34 years group shows a higher prevalence 28/43 (65%) than the 16-24 years 13/30 (43.3%) and 35-42 years 6/10 (60%) groups. Figure 1.

**Discussion**

The World Health Organization (WHO) refers to the HIV testing services (HTS) as a full range of services that provide testing, counselling, information, prevention, treatment and care<sup>13</sup>. In the South African setting, similar HIV testing services are rendered where Antenatal Screening Programme includes the testing of HIV, Syphilis and Rhesus statuses in pregnant women<sup>11</sup>.

Worldwide, data for the causes of maternal deaths are needed to improve policies in this particular field, and in childbirth conditions. According to the 2017 WHO Trends, the proportion of death due to maternal causes was estimated at 9.2%<sup>14</sup>. However, the WHO system faces challenges in identifying the causes of maternal deaths, likely due to the misclassification of the real causes<sup>14</sup>.

The prevalence or incidence of EP, as well as EP-related maternal deaths, varies among countries. In the US, the incidence of EP is 19.7 per 1,000 pregnant women<sup>15</sup>. In Canada, the overall prevalence of EP was estimated at 14.2 per 1,000 women in a population-based retrospective cohort study of 1,117,571 women, between 1989 and 2013<sup>16</sup>. In South Africa, according to several studies, the incidence of EP is around 11.0 per 1,000 normal pregnancy, and the mortality rate was estimate between 2.0-2.31%<sup>17</sup>. However, these values vary within the country, mainly due to different socioeconomic factors and HIV epidemic. Hence, maternal deaths, as well as their causes and

provincial distributions, are reviewed and published every 3 years in Saving Mothers Annual Reports<sup>10</sup>.

In addition to the incidence of the underlying causes, such as EP, on maternal deaths, there are indirect causes, such as non-pregnancy-related infections. According to the WHO, the effect of HIV infection on maternal deaths is around 1% of overall maternal deaths<sup>14</sup>. This value has differences between regions, countries and socioeconomic conditions. The African Region has the major index of HIV infection with two-thirds of the global HIV population. And the prevalence of HIV infection among pregnant women is estimated at 30%, with almost no variation over the last years<sup>11</sup>.

The present retrospective study was carried out in KwaZulu Natal province, in the uThukela District. The KwaZulu Natal province is similar to other South African rural provinces and has similar proportion of maternal deaths<sup>10</sup>. In 2017, maternal deaths in the KwaZulu Natal province was 20% of overall national maternal deaths, whereas the maternal deaths due to EP was 2.73%, in the same period<sup>10</sup>. In addition, provincial HIV prevalence in antenatal clinics was 38.5%, while the uThukela district prevalence was 41.5%<sup>11</sup>, in the same year.

In this context, the present study demonstrates a higher incidence of HIV infection in the EP cohort than in IUP cohort. The incidence of HIV infection in EP cohort was further analyzed per age ranges. The higher incidence was observed between 25-34 years. The latter phenomenon could be explained by the fact of knowing their HIV status and the intention to become pregnant. According to the Antenatal Annual report<sup>11</sup>, in 2019 knowledge of HIV-positive status before getting pregnant was higher among 25-34 years-old women, compared to younger women. In addition, the intention to get pregnant is higher in women between 25-35, while unintended pregnancy occurs more often in younger women (15-19 years-old)<sup>11</sup>. This data demonstrates the importance of conducting a full antenatal screening, which includes HIV tests in pregnant women with EP diagnosis.

## Conclusion

The implementation of the HIV testing services programme for patients with EP is modest. This study highlights the significance of conducting a full antenatal screening programme in patients who present with ectopic pregnancy as in patients with

normal IUP. This will improve the rate of HIV infection testing and treatment in women who present with ectopic pregnancy.

## Implementation of findings

The outcomes of the study may assist in formulating HIV screening guidelines, policies and protocols for patients with ectopic pregnancy.

## Ethical approval

The ethical approval of this research was obtained from the Ethics Committee – UMGungundlovu Health Ethics Board (Ref UHERB 007/2019), the KwaZulu Natal Provincial Department of Health (Ref KZ\_202006\_014), and the Clinical manager of Ladysmith provincial Hospital.

## Conflict of interest

None.

## References

- Hendriks E, Rosenberg R and Prine L. Ectopic Pregnancy: Diagnosis and Management. *Am Fam Physician* 2020;101(10):599–606.
- Hendriks E, MacNaughton H and MacKenzie MC. First Trimester Bleeding: Evaluation and Management. *Am Fam Physician* 2019;99(3):166–74.
- Charvériat A and Fritel X. [Diagnosis of pelvic inflammatory disease: Clinical, paraclinical, imaging and laparoscopy criteria. CNGOF and SPILF Pelvic Inflammatory Diseases Guidelines]. *Gynecol Obstet Fertil Senol* 2019;47(5):404–8. <https://doi.org/10.1016/J.GOFS.2019.03.010>.
- Scibetta EW and Han CS. Ultrasound in Early Pregnancy: Viability, Unknown Locations, and Ectopic Pregnancies. *Obstet Gynecol Clin North Am* 2019;46(4):783–95. <https://doi.org/10.1016/J.OGC.2019.07.013>.
- Pillai DAS and RS DCS. Incidence, diagnosis and management of ectopic pregnancies: A review. *Int J Clin Obstet Gynaecol* 2020;4(5):220–3. <https://doi.org/10.33545/GYNAE.2020.V4.I5D.708>.
- Glenda E Gray, and James A McIntyre. Effect of HIV on women. *AIDS Read* 2006;16(7):365–8.
- Pongsuthirak P, Vutyavanich T, Apichartpiyakul C, Vithayasai V and Piromiertamorn W. Seroprevalence of Human Immunodeficiency Virus in Patients with Ectopic Pregnancies. *Thai J Obstet Gynaecol* 1995:123–9.
- World Health Organization. HIV/AIDS. Fact Sheet 360. Geneva: 2013.
- Mugauri HD, Karakadzai M, Mugurungi O, Welfare C, Chirenda J and Tshimanga M. Exploring HIV Testing

- Service Models for Enhanced Positivity Yield in Southern Africa, 2022: A Systematic Review 2022. <https://doi.org/10.21203/rs.3.rs-1497896/v2>.
10. South African Department of Health. Saving Mothers. Annual report. 2017.
  11. Woldeesenbet SA, Kufa-Chakezha T, Lombard C, Manda S, Cheyip M, Ayalew K, Chirombo B, Barron P, Diallo K, Parekh B and Puren A. The 2019 National Antenatal Sentinel HIV Survey, South Africa. South Africa: 2021.
  12. Mohosho MM. HIV prevalence in patients with cervical carcinoma: A cohort study at a secondary hospital in South Africa. *Medicine (Baltimore)* 2021;100(35):e27030. <https://doi.org/10.1097/MD.00000000000027030>.
  13. Consolidated guidelines on HIV testing services (2015) 2015. <https://www.who.int/publications/i/item/9789241508926> (accessed September 11, 2022).
  14. Maternal mortality: Levels and trends 2000 to 2017 n.d. <https://www.who.int/publications/i/item/9789241516488> (accessed September 14, 2022).
  15. Tenore JL. Ectopic Pregnancy. *Am Fam Physician* 2000;61(4):1080–8.
  16. Chouinard M, Mayrand MH, Ayoub A, Healy-Profitós J and Auger N. Ectopic pregnancy and outcomes of future intrauterine pregnancy. *Fertil Steril* 2019;112(1):112–9. <https://doi.org/10.1016/j.fertnstert.2019.03.019>.
  17. Amoko DH and Buga GA. Clinical presentation of ectopic pregnancy in Transkei, South Africa. *East Afr Med J* 1995;72(12):770–3.