

# Comparative study of the impact of past pregnancy outcome on future fertility

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## ABSTRACT

**Introduction:** The impact of previous pregnancy outcome on future fertility in Nigeria has not been appreciated, hence the continued neglect of the adoption of safe motherhood measures in this sub-region. The objective of this study was to compare the past pregnancy outcomes among fertile and infertile patients in a Nigerian population.

**Methods:** An institutional-based comparative case-controlled study of past pregnancy outcomes among infertile and fertile women was conducted. The data was managed using Epi-Info and the Statistical Package for Social Sciences.

**Results:** 708 patients consisting of 472 pregnant women (fertile) and 236 infertile women were investigated. Infertile women were at a significant risk of having an adverse pregnancy outcome, such as induced abortion (p-value is 0.0001), postabortal sepsis (p-value is 0.0001), postpartum infection (p-value is 0.001), manual removal of the placenta (p-value is 0.0005) and prolonged unsupervised labour (p-value 0.0001), compared to pregnant fertile women. Logistic regression analysis of variables at 95 percent confidence intervals showed that the adjusted odds ratio for prolonged labour, prolonged rupture of membranes, postabortal sepsis and postpartum infection still remained significant.

**Conclusion:** Previous mismanaged pregnancies impacted negatively on future fertility. Efforts should be directed towards the prevention of unplanned pregnancies. Motherhood must be made safer in planned pregnancies by prevention of complications, and aggressive and prompt treatment of any complication if and when it occurs.

**Keywords:** fertility, future fertility, mismanaged pregnancy, past pregnancy outcome, pregnancy outcome

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## INTRODUCTION

Safe motherhood means ensuring that all women receive the care they need to be safe and healthy throughout pregnancy and childbirth. The global safe motherhood initiative (SMI) was launched to raise awareness about the scope and consequence of poor maternal health and to mobilise action to address the high rates of deaths and disability from the complications of pregnancy and childbirth.<sup>(1,2)</sup> There is a general ignorance on the importance of adverse pregnancy outcome on future fertility in Nigeria. About 15% of all pregnancies will result in complications.<sup>(3)</sup> If untreated, many of these complications will be fatal. Maternal complications experienced by women who survive abortion or childbirth are also of great concern. For every woman who dies as a result of pregnancy, some 30–50 women live but experience lasting morbidities as a result. These morbidities include infertility, pelvic pain and fistula, among others.<sup>(2-6)</sup>

The problem of unsafe abortions in Nigeria has been a subject of numerous publications.<sup>(7-8)</sup> In Nigeria, the maternal mortality ratio accounts for 1,500 per 100,000 live births and unsafe abortions account for about 40% of maternal deaths.<sup>(7)</sup> Most are performed in back street clinics by quacks, herbalists, and inexperienced health workers. On average, about 80% of abortion deaths are due to illegal abortions. For many that survive, they suffer complications such as secondary infertility, chronic pelvic pain and dyspareunia.<sup>(6)</sup> The majority of the pregnant women deliver in unsafe environments often complicated by sepsis, and yet they do not seek orthodox medical care.<sup>(2-5)</sup> Many of these symptoms of infections may be subclinical, while other symptoms which manifest are improperly treated using antibiotics bought over-the-counter often in inadequate dosages. The long-term effects of these on future fertility is often underestimated or totally ignored.

Preventing and managing these problems require well-functioning health systems that provide accessible, high-quality care from the household to the hospital level.<sup>(6)</sup> Unfortunately, this level of healthcare services is non-existent in Nigeria. Hence, the unrestricted sexual activities and poor pregnancy care continue to impact negatively on future fertility. The focus of this article was to assess the impact of previous pregnancy care on future fertility in a Nigerian population.

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**Table I. Distribution of obstetrical variables for cases and controls.**

Variable	No. (%) of cases	No. (%) of controls	p-value
Any abortion			
Yes	150 (63.6)	114 (24.2)	0.0001
No	86 (36.4)	358 (75.8)	
Abortion is:			
Spontaneous	10 (4.2)	49 (10.4)	0.1527
Induced	140 (59.3)	65 (13.8)	0.0001
Postabortal sepsis			
Yes	112 (80.0)	7 (2.1)	0.0001
No	28 (20.0)	58 (89.2)	
Ectopic pregnancy			
Yes	8 (3.4)	10 (2.1)	0.4501
No	128 (96.6)	462 (97.9)	
Postpartum infection			
Yes	36 (15.3)	466 (98.7)	0.0001
No	200 (84.7)		
Prolonged labour	5 (2.1)	1 (0.2)	0.0005
Prolonged rupture of membranes	11 (4.6)	1 (0.2)	0.0001

**Table II. Obstetrical and gynaecological surgical history in previous pregnancy.**

Variable	No. (%) of cases	No. (%) of controls	p-value
Manual removal of placenta	10 (4.2)	2 (0.4)	0.0002
Puerperal endometrial curettage	11 (4.7)	2 (0.4)	0.0002
Caesarean section	4 (1.7)	10 (2.1)	0.832
Salpingectomy for ruptured ectopic pregnancy	7 (2.9)	15 (3.2)	0.9702

## METHODS

This is a comparative case control study conducted at the infertility and antenatal clinics of Obafemi Awolowo University Teaching Hospital over a period of one year. There were 236 cases of infertile patients, and 472 age-matched pregnant women who served as controls. The infertile cases were women with secondary infertility seen at the infertility clinic during the study period. The age-matched controls (fertile women) were pregnant women seen at the antenatal clinic immediately after the index cases of secondary infertility and who fall within the inclusion criteria. There were two controls to one case. Secondary infertility was defined in this study as the failure to conceive after one year of regular intercourse without contraception in a couple who have conceived in the past, irrespective of the outcome.<sup>(9)</sup> Excluded from the cases were women who did not fulfill the criteria of secondary infertility as defined in this study. Excluded from the controls were primigravidae and 48 other women who became pregnant following treatment for infertility. Informed consent was obtained from the cases and controls, and only those who consented to the study were interviewed.

Information about the cases and controls were obtained by detailed pretested pro-forma administered by the researcher and colleagues, who were properly briefed about the study. The data was analysed using the Epi Info software. Frequency tables were then generated for all the variables.

**Table III. Crude odds ratio for variables.**

Variable	Crude OR (95% CI)
Induced abortion	8.51 (5.80–12.51)
Postabortal sepsis	59.60 (22.85–144.61)
Postpartum infection	16.78 (6.12–49.83)
Manual removal of placenta	2.13 (1.40–4.08)
Prolonged labour	7.24 (3.4–22.32)
Prolonged rupture of membranes	3.76 (2.59–7.23)

Univariate analysis was used to determine the association between independent variables and the secondary infertility outcome using the crude odds ratio (OR). Data stratification was used to search for the 95% confidence intervals (CI) of the OR. Chi-square analysis with Yates' correction (for proportion) was used to determine the significant variables at  $p < 0.05$ . The significant variables were then subjected to multivariate analysis using the Statistical Package for Social Sciences (SPSS) version 2.0 (SPSS Inc, Chicago, IL, USA), logistic regression to estimate the adjusted OR, while confounding variables were controlled for. The research protocol was approved by the Obafemi Awolowo University Teaching Hospital research ethical committee.

## RESULTS

236 women with secondary infertility and 472 pregnant age-matched controls were studied. The mean duration of infertility was 3.53 years. More (56.8%) of the infertile

**Table IV. Logistic regression analysis of variables, adjusted odds ratios and 95% confidence intervals.**

Variable	Regression coefficient (SE)	Adjusted OR (95% CI)
Prolonged labour	7.0216 (0.4480)	7.5506 (3.3297–20.7307)
Prolonged rupture of membranes	2.8109 (0.9503)	16.1688 (2.2973–113.7902)
Postabortal sepsis	4.6522 (0.5836)	97.9730 (16.1464–160.9183)
Postpartum infection	2.8642 (0.6829)	18.2552 (4.7098–70.7570)

SE: standard error

patients were of low parity, compared with 34.3% controls. Para 2 or more accounted for 16.8% of cases and 65.7% of controls. Table I shows that a history of any type of abortion increases the risks for future infertility, 63.7% of cases compared to 24.2% of controls being affected ( $p = 0.0001$ ). However, spontaneous abortion is not significantly associated with infertility among infertile patients (4.2%), compared to 10.4% of controls ( $p > 0.5$ ).

There was a higher proportion of induced abortion among infertile patients (59.3%) compared to controls (13.8%), which is significant ( $p = 0.0001$ ). Previous history of postabortal sepsis, prolonged rupture of membranes, postpartum infection, and prolonged labour were all significantly associated with infertility. Previous history of ectopic pregnancy, on the other hand, occurred in 3.45% of infertile women, compared to 2.1% of pregnant women, but with no significant difference ( $p > 0.05$ ).

Table II shows the past obstetrical and gynaecological surgical history in previous pregnancy. While previous caesarean section and salpingectomy for ruptured ectopic pregnancy did not significantly increase the risk for infertility ( $p < 0.05$ , respectively), previous manual removal of placenta ( $p = 0.002$ ) and puerperal endometrial curettage ( $p = 0.0002$ ) impacted negatively on future fertility. Table III shows the crude OR for the significant variables. Postabortal sepsis had the highest crude OR of 59.6, followed in descending order by postpartum infection (16.78), induced abortion (8.51), prolonged labour (7.24), prolonged rupture of membranes (3.76) and manual removal of the placenta (2.13). Table IV shows the logistic regression analysis, adjusted OR and 95% CI. Only four variables remained significantly associated with secondary infertility. These include postabortal sepsis, postpartum infection, prolonged labour and prolonged rupture of foetal membranes.

## DISCUSSION

This study showed that any previous adverse pregnancy outcome may jeopardise future fertility. It is paradoxical that Nigeria, with a high total fertility rate, has also become one of the countries with a high rate of infertility due to abused or mismanaged fertility.<sup>(10)</sup> This comparative study clearly shows the relative odds for each adverse

pregnancy outcome. Induced abortion ( $p = 0.0001$ , OR 8.51) and postabortal sepsis ( $p = 0.0001$ , OR 59.61) were both significantly associated with secondary infertility at univariate analysis, as more infertile patients were likely to have more induced abortions and postabortal sepsis compared to controls (Tables I and II). The crude OR of 8.51 for induced abortion in this study was slightly higher than 7.4 reported by Okonofua in a related study.<sup>(7)</sup> However, after multiple logistic regression, only postabortal sepsis retained significant association with secondary infertility (adjusted OR 97.97). This underscores the fact that the high prevalence of secondary infertility in Nigeria following induced abortion is due to associated postabortal sepsis.<sup>(7,8,11-13)</sup> As a result of the restrictive abortion laws in Nigeria, many women seek induced abortion in the hands of unqualified practitioners, leading to a high rate of maternal deaths and abortion sepsis among survivors.<sup>(7,12,13)</sup> Since a similar association between induced abortion and infertility had not been found in areas where abortion is legal, it has been suggested that liberalisation of abortion laws could reduce the rate of abortion-related infertility in this population.<sup>(7,8)</sup> However, more important is the use of family planning methods among men and women in their reproductive age. While the controversy surrounding the liberalisation of abortion laws in Nigeria may not be resolved in the near future, the widespread use of contraceptive methods would go to a great extent in reducing the incidence of unwanted and unplanned pregnancies.<sup>(14)</sup>

Ectopic pregnancy did not show a significant relationship with infertility in this study. Postpartum infection, on the other hand, showed a highly statistical significant relationship with a high adjusted OR of 18.3 (95% CI 4.7–70.7). Contributory factors to postpartum infections, such as prolonged rupture of foetal membranes, prolonged labour, puerperal endometrial curettage and manual removal of placenta,<sup>(15-18)</sup> all showed a significant relationship. This may not be surprising, since the majority of births in Nigeria, as in most developing countries, take place at home or in mission houses, usually assisted by untrained attendants, viz. relatives or traditional birth attendants, who do not appreciate the significance of aseptic techniques.<sup>(17-19)</sup> These conditions are aggravated by inaccessibility and poor utilisation of health services and

poor quality of these services. The aversion for caesarean section, religious beliefs and poverty greatly contribute to the difficulty in eradicating delivery at home and mission houses.

In conclusion, this study highlighted the odds for any adverse pregnancy outcome in previous pregnancy on future fertility, with postabortal sepsis and postpartum infections being the major factors. Since the majority of these factors are avoidable, the author recommends that a major campaign be mounted to enlighten the public on the importance of making motherhood safer in pregnancy and avoiding unplanned pregnancies with abstinence and application of modern contraceptive methods by all men and women in the reproductive age. This is particularly more pressing in the Nigerian environment, where the desire for children by the average African woman is often very strong, and infertility is regarded as a social stigma with varying emotional and psychological consequences.<sup>(20)</sup> In addition, investigation and management of infertility are not only slow and time consuming, but also costly and often unrewarding.

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