



ISSN : 2350-0743



RESEARCH ARTICLE

FACTORS ASSOCIATED WITH SPONTANEOUS ABORTION AT JARAMOGI OGINGA ODINGA TEACHING AND REFERRAL HOSPITAL BETWEEN JANUARY 2020 AND DECEMBER, 2020

Dr. Kitavi Thomas Makundi (MBChB)¹, Dr. Enoch Muli (MBChB)², Dr. Jackline Wanjiku Githinji (MBChB)³, Dr. Mbago Vivian Nanjala (MBChB)⁴, Dr. Limo Staicey Jepkemboi (MBChB)⁵, Dr. Chelule Emmanuel (MBChB)⁶, Dr. Emekwi Samson Naukoth (MBChB)⁷, Dr. Bett Mercy (MBChB)⁸, Dr. Barare Enock Bendere (MBChB)⁹, and Dr. Okoth Antony Olang'o (MBChB)¹⁰

¹Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Chogoria Mission Hospital, Kenya ²Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Moi Teaching and Referral Hospital; ³Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, PCEA Tumutumu Hospital; ⁴Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Gatundu Subcounty Hospital; ⁵Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Kenyatta National Referral Hospital; ⁶Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, The Kakamega County General Teaching and Referral Hospital; ⁷Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Moi Teaching and Referral Hospital; ⁸Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Jaramogi Oginga Odinga Teaching and Referral Hospital; ⁹Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Vihiga County Referral Hospital; ¹⁰Bachelor of Medicine and Bachelor of Surgery (With IT), Medical Officer Intern, Mbagathi Hospital

ARTICLE INFO

Article History

Received 10th May, 2024
Received in revised form
16th June, 2024
Accepted 17th July, 2024
Published online 30th August, 2024

Keywords:

Abortion, Spontaneous, Missed, Complete, Threatened, Inevitable, Incomplete, Association, Kenya, Kisumu.

*Corresponding author:

Dr. Kitavi Thomas Makundi (MBChB)

ABSTRACT

There are increasing numbers of pregnancies amongst many women of reproductive age. The relative risk of spontaneous abortion in these pregnancies remains unclear. Miscarriage is a public health issue throughout the world. The aim of this study was to assess factors associated with spontaneous abortion in women of reproductive age at Jaramogi Oginga Odinga Teaching and Referral Hospital. The study also expounded on the total burden related to maternal abortion and miscarriage to help prevent such increased occurrences of spontaneous abortions. The study was conducted at JOOTRH in Kisumu County. Study design used was descriptive cross-sectional. The study population was women admitted at JOOTRH with a diagnosis of abortion. Sampling technique used was purposive sampling. The study selectively focused on women with the diagnosis of spontaneous abortions in JOOTRH between January 2020 and December 2020. The summary of the result obtained from the study; Out of 220 cases of spontaneous abortion, the mode age gap of occurrence was between 20-30 years with 116 cases. Majority of spontaneous abortions occurred before the gestational age of 12 weeks. Highest parity was among primiparous with 72 cases. Leading infections associated with spontaneous abortion were UTI by 38%, HIV by 33% and Malaria by 29%. Incomplete abortions were the most common type of spontaneous abortions at 63%. 75.91% (n=167) women had manual vacuum aspiration done to evacuate the remains of products of conception. 47 cases had a previous history of abortion. The prevalence of spontaneous abortion was highest among the second and third decades of maternal life owing to higher rates of birth within this age group. Manual vacuum aspiration is an effective tool in management of early pregnancy complications. Frequency of complications depends on gestational age at time of abortion. There is increased risk of abortion in subsequent pregnancies in mothers with a prior abortion history. Significant limitations encountered included inability to obtain data on ANC visit, lack of information on various infections such as Toxoplasmosis, Rubella, Herpes virus, Cytomegalovirus and Syphilis and inability to perform genetic karyotyping. A prospective study is therefore recommended.

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Citation: Dr. Kitavi Thomas Makundi (MBChB), Dr. Enoch Muli (MBChB), Dr. Jackline Wanjiku Githinji (MBChB) et al. 2024. "Factors associated with spontaneous abortion at jaramogi oginga odinga teaching and referral hospital between January 2020 and December, 2020", International Journal of Recent Advances in Multidisciplinary Research, 11, (08), 10208-10214.

Spontaneous abortion refers to the phenomenon where an embryo or fetus is expelled automatically from the mother's body for some reason, usually before the 28th week of gestation. The age of viability at JOOTRH is considered 28 weeks gestation. Greater than 80% of the cases occur within the first trimester. Spontaneous abortion can be divided into early abortion (<12 weeks) and late abortion (\geq 12 weeks and <28 weeks), or according to the clinical features and different stages of development. It can be categorized as threatened abortion, inevitable abortion, incomplete abortion, complete abortion, missed abortion, recurrent abortion or abortion combined with infection (septic abortion). Maternal deaths secondary to abortions in Kenya is about 488 maternal deaths per 100 000 live births (KDHS, 2014). A cross-sectional study done in Kenya in 2012 showed that Kenya's abortion rate was at 48 per 1000 women aged 15 to 49 years, an abortion ratio of 30 per 1000 live births. The study also showed that 49% of all pregnancies in Kenya were unintended (spontaneous) and about 120,000 women received care for complications of abortion in health facilities out of an estimated 464,000 cases (Bankole, Singh & Egesa, 2015).

Chromosomal abnormality is the most common cause of spontaneous abortion. The incidence of spontaneous abortion increases with the increase of paternal and maternal age. Increasing maternal age is associated with decreased ovarian function, increasing the risk of chromosomal abnormality, which increases the risk of embryo aneuploidy. Obesity is an independent risk factor for miscarriage (Nybo Andersen, 2004). Abnormal anatomical structure of uterus is a risk factor for spontaneous abortion. Uterine septum, endometrial polyp and uterine fibroid can change the normal structure and local environment of the uterine cavity, resulting in reduced embryo implantation area and endometrial blood flow, increasing blood flow resistance, thereby affecting embryo implantation and growth and fetal development. Adenomyosis may result in release of local inflammatory mediators such as prostaglandins which stimulate contraction of the uterus by producing leading to abortion. Some studies have also suggested the risk of spontaneous abortion in PCOS (Polycystic Ovarian Syndrome) patients is higher (Sun *et al.*, 2020).

Other risk factors of spontaneous abortion include infections such as toxoplasma, endocrine abnormalities such as hypo and hyperthyroidism; immunological factor such as antiphospholipid antibodies; blood group incompatibilities; chronic debilitating illnesses including tuberculosis; drug use and environmental factors such as smoking; alcohol use; radiation; environmental toxins; acquired and inherited thrombophilias. The risk also increases with major surgery, trauma, emotional disturbances, severe malnutrition, parity, previous history, and prior malformed fetuses. The complications of abortions include hypovolemic shock due to bleeding secondary to some retained products of conception, acute haematometra, anaemia, infertility, Ashermann's syndrome, sepsis due to dissemination of infection of retained products of conception, injury to intraabdominal viscera and uterine perforation in surgical evacuation of the products of conception and maternal deaths. If products of conception are retained in the uterus, the patient may experience vaginal bleeding with possible infection causing fever, pain and sepsis (septic abortion). The symptoms of spontaneous abortion include cramping pelvic pain, bleeding and expulsion of

tissue. The later phase may begin with gush of fluid following rupture of membranes. Worth-noting, massive hemorrhage is rare. A dilated cervix points towards inevitable abortion. The diagnosis involves clinical evaluation and investigations particularly ultrasonography and quantitative beta human chorionic gonadotropin. Clinical evaluation establishes the diagnosis of threatened, inevitable, incomplete or complete abortion. Ultrasonography and quantitative serum beta human chorionic gonadotropin (beta-hCG) hormone enable exclusion of ectopic pregnancy and retained products of conception (incomplete abortion). The clinician suspects missed abortion if the pregnancy fails to progressively enlarge or the quantitative beta-hCG is low for gestational age and fails to double within 48 to 72 hours. The diagnosis of missed abortion relies on the absence of a fetal pole [by transvaginal ultrasonography] when the mean sac diameter exceeds 25 mm [average of diameters is measured in 3 orthogonal planes]; when there is disappearance of previously detected embryonic cardiac activity and the absent activity when the fetal crown-rump length exceeds 7 mm. Threatened abortion is managed by tocolytics, progesterone support, analgesics, aspirin and other anticoagulants. Bed rest is advised though it does not alter the course of outcome. Inevitable, incomplete and missed abortions are treated by uterine evacuation or waiting for the spontaneous passage of products of conception. The recommended uterine evacuation is suction curettage for gestations less than 12 weeks; dilatation and evacuation at 12 to 23 weeks and medical induction between 16 and 23 weeks. Delayed evacuation predisposes the mother to placental bleeding, uterine perforation by fetal long bones and difficulty dilating the cervix. The risks of mentioned complications are reduced by using osmotic cervical dilators preoperatively mifepristone or misoprostol. Following spontaneous or induced abortion, the clients need emotional support and reassurance that their actions were not the cause. While formal counseling is rarely indicated, it should be accessible.

Problem Statement: During our rotation at the department of Obstetrics and Gynecology between November 2020 and January 2021 as part of our fourth year academic curriculum, we noted a high number of abortions in JOOTRH translating to an average of 5 abortions per week. The majority of the abortions recorded was spontaneous and occurred in a range of parities, gestational ages and maternal ages. In addition, most of the abortions were managed surgically through manual vacuum aspirations. These occurrences and their high rate prompted us to investigate the factors influencing these happenings and their pattern of occurrence. The variation in incidence of spontaneous abortion is attributable to factors such as age of conception, history of spontaneous abortion, cigarette smoking, and use of certain drugs and poorly controlled underlying chronic conditions such as diabetes, hypertension, and overt thyroid disorders amongst others. Insufficient information owing to absence of studies regarding spontaneous abortions in JOOTRH and Kisumu County at large and the aforementioned observations prompted us to explore deeply into the issue to find out at what age most spontaneous abortion occur; assess the factors influencing the occurrence of spontaneous abortion; to investigate positive history of recurrence and explore the measures put aside by JOOTRH to provide appropriate management and to improve outcomes in mothers.

Significance of the Study: Spontaneous abortion is a major area of concern owing to the disease burden, complications and the high rate of maternal deaths. This study will help assess the patterns and the magnitude of the burden in order to inform the major stakeholders in health positions to take part in early interventions. Early interventions reduce complications, morbidity and mortality. Data produced from this study will be used to show how the occurrence of spontaneous abortions relates to maternal age, gestational age, parity, previous abortions, hypertension and diabetes. Through the study, we were able to work hand-in-hand with our health facility (Jaramogi Oginga Odinga Teaching and Referral Hospital) and Maseno University School of Medicine in provision of patient education and prompt management of cases of spontaneous abortion and their complications. The information from the study helped to encourage seeking of medical attention in case of danger signs during pregnancy.

Study Objectives

Broad Objective: To determine the characteristics of abortions at JOOTRH.

Specific Objectives

- To determine the maternal age at which most spontaneous abortions occur.
- To establish the gestational age at which the spontaneous abortions occur.
- To find out the prevalence of spontaneous abortions at different parities.
- To determine the prevalence of different types of spontaneous abortion.
- To determine the clinical conditions associated with spontaneous abortion.

MATERIALS AND METHODS

This research was conducted in Jaramogi Oginga Odinga Teaching and Referral Hospital, a referral hospital found in Kisumu County, Kenya. JOOTRH is a level 5 referral hospital in Kisumu, Kenya, along Kisumu-Kakamega road. It serves Sub-county, County and private hospitals in at least 10 counties within Western Kenya and a population exceeding 10 million people.

Study Area: The study was conducted at the department of Obstetrics and Gynecology Ward 4 at JOOTRH in Kisumu city, Kisumu County.

Study Design: The study design was a descriptive cross-sectional study.

Study Population: The study population was women admitted at JOOTRH with a diagnosis of abortion. A total of 280 abortions occurred at JOOTRH in 2020. Out of the 280, 220 were spontaneous abortions, which were the files we sampled.

Sampling Technique: The sampling technique was purposive. In this study, we sampled 220 files, since a total of 280 abortions occurred in 2020. Out of the 280 abortions that

occurred, 220 had spontaneous abortion. Purposive method is where samples are selected because they contain information of interest to the researcher. The technique is considered easiest, cheapest and least time consuming.

Inclusion Criteria: The inclusion criterion was all women who present with the diagnosis of spontaneous abortions in JOOTRH.

Exclusion Criteria: The exclusion criteria were all other women with other diagnoses and women who were not admitted to the gynecological ward.

Data Collection Method: Retrospective medical record review was used. The files were accessed from the records (review records) department in JOOTRH. A total of 220 files were selected, reviewed and a data extraction sheet designed to extract information.

Data Analysis, Management and Interpretation: Data analysis started on 16th June, 2021, immediately after data collection process. The data from the files was stored safely to prevent loss and distortion of data. The data was arranged in order for easy access. Data analysis involved descriptive statistics including frequencies, means and standard deviations computed using MS Excel 2014. Data collected from the files was entered into excel package for organization into simpler and understandable data. Once processed and organized, the data was cleaned due to the outliers and errors incurred. Textual data spell checkers were also used to lessen the amount of mistyped words. The primary data analysis modality applied was descriptive statistics. The data was finally presented in bar graphs, pie charts and table for easy interpretation. Tables included information regarding the total number of spontaneous abortions, maternal age, parity and gestational age.

Ethical Considerations: Ethical approval for the study was obtained from the Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Review Committee (JOOTRHRC). No personal identifiers such as names and area of residence were entered into the data collection forms. The storage of these forms and the information on them was compliant with good clinical practice recommendations that require patient information to be kept confidential at all times. The forms were stored in a lockable storage area and destroyed upon completion of the study. Collected data was stored in a password-protected electronic database to which only the group, investigators and supervisors had access to. Also the participants will not take part in discussion of the cases with other unconcerned parties.

Dissemination and Communication of the Research Findings: Once all the data collected was analyzed and the research findings printed out, one of the copies was given to the JOOTRH administration. Another copy was submitted to the department of research in Maseno University, School of Medicine. The last copy was submitted to the Maseno University library for future use. The research findings were communicated back to the department of obstetrics and gynecology in JOOTRH.

RESULTS

The result of this study entailed description of the maternal age, parity, infection, type of abortion, post-abortion counseling, interventions, previous history of abortion, complications and chronic illnesses.

Table 1. Maternal Age

Age (years)	16 – 20	21-25	26-30	31-35	36 - 40	41 - 45	46 – 60
Frequency	21	51	65	38	35	7	3

The table above shows results on maternal age. 21 were between 16 and 20 years, 51 between 20 and 25 years, 65 between 26 and 30 years, 38 between 30 and 35 years, 35 between 36 and 40 years, 7 between 41 and 45 years and 3 between 45 and 60 years. These correspond to 10%, 23 %, 30 %, 17%, 16%, 3% and 1%, respectively.

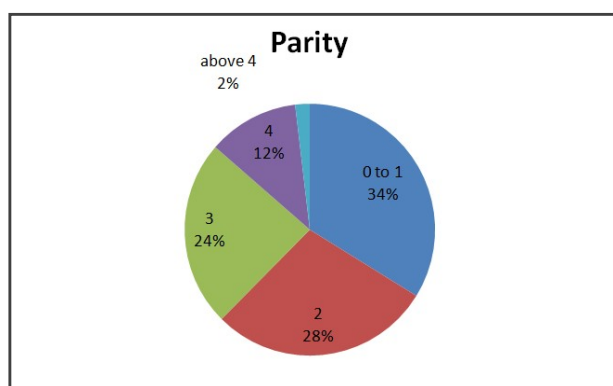
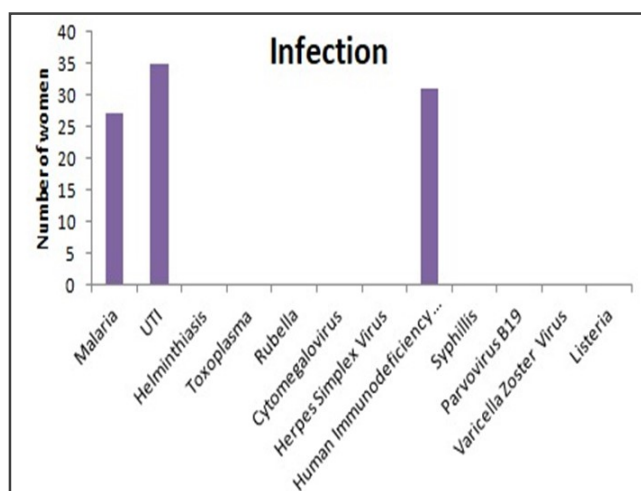


Figure 1: Pie Chart Showing Parity

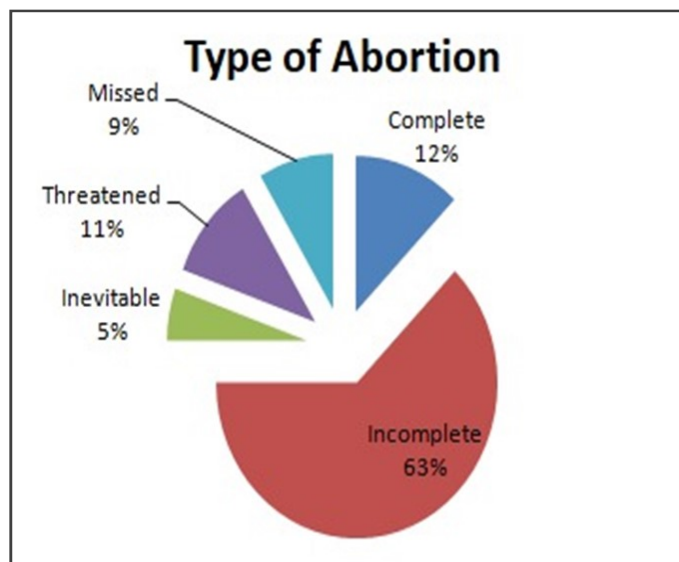
34 % (n=72) had a parity of 0 to 1, 28% (n= 61) had a parity of 2, 24% (n=51) had a parity of 3 and 12% (n=25) had a parity of 4. 2% (n=4) had a parity above 4.

Bar chart showing infections



Those who had UTI were 38%, HIV 33%, Malaria 29% and no cases of the other infections.

A pie chart showing types of abortion



Incomplete abortions 63% complete at 12%, threatened at 11%, missed at 9% and inevitable at 5%.

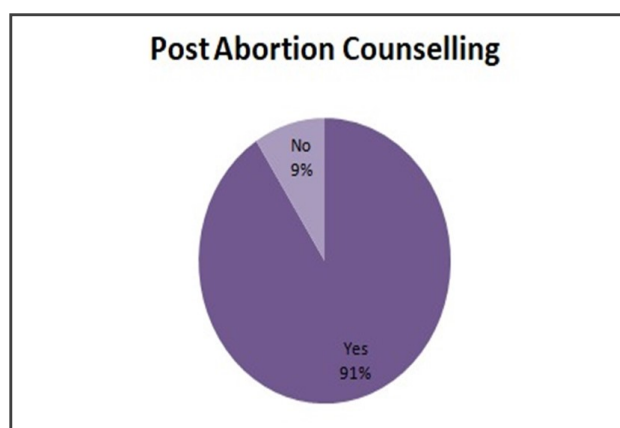


Figure 2. A pie chart showing results on post abortion counseling

90% (n=200). 10% (n=20) were not counseled after the abortion.

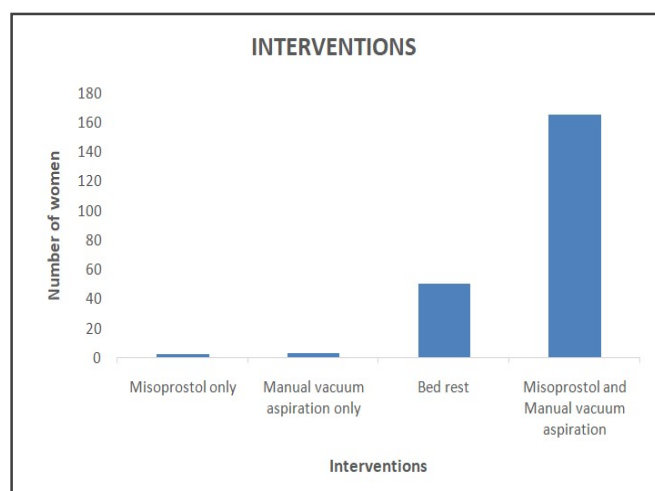


Figure 3: A bar chart showing results on interventions used.

75% (n=165) women were managed with MVA and misoprostol, 1.36% (n=3) had MVA only, 0.91% (n=2) were

given misoprostol only, while the remaining 22.73% (n=50) with complete or threatened abortion were managed by bed rest and monitoring. None of the women had been treated by use of mifepristone or undergone electric vacuum aspiration at JOOTRH.

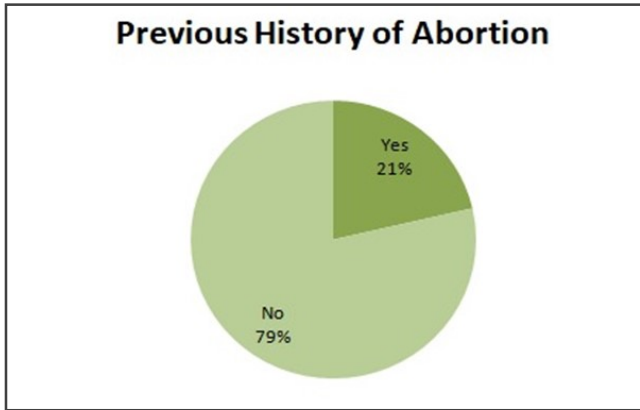


Figure 4. A pie chart showing results on previous history of abortion

79% (n=21) of the patients had a previous history of abortion whereas 21% (n=173) had no prior history.

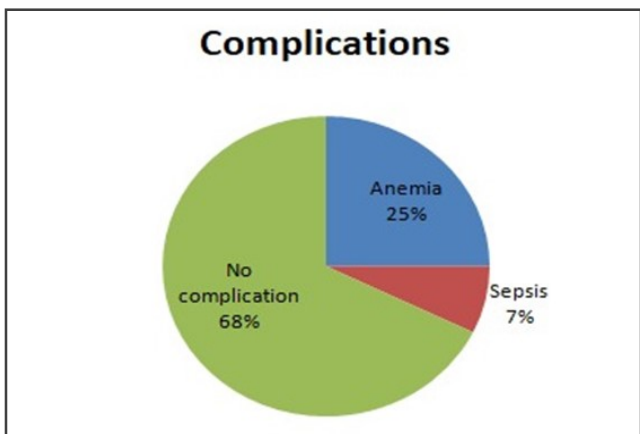


Figure 5. Pie Chart Showing Complications

A pie chart showing results on complications. 25% (n=55) had anemia as a complication, 7% (n=16) had sepsis and 68% (n=129) had no any complication.

Figure 6: Table Showing Chronic Illnesses

	Yes	No
Diabetes	12	208
Hypertension	16	204
Uterine fibroids	3	217

The table above shows 5.45% (n=12) of the women were diabetic while 94.5% (n=208) were not known diabetics 7.3% (n=16) known hypertensive patients as and 92.7% (n=204) had no hypertension. 1.4% (n=3) had uterine fibroids.

DISCUSSION

Maternal Age: Out of 220 cases of spontaneous abortion, 21 were between 16 and 20 years, 51 in 20-25 years, 65 in 26- 30 years, 38 in 30-35 years, 35 in 36-40 years, 7 in 41-45 years and 3 in 45-60 years. These correspond to 10%, 23 %, 30 %,

17%, 16%, 3% and 1%, respectively. The modal age is 26 to 30 years while the mean age is 27.58. The findings are inconsistent with other studies since about a quarter of Kenyan women give birth by age 18, while nearly half give birth by age of 20 years (KDHS, 2014). The high incidence of birth within the first three decades of life increases the likelihood of abortions being reported within these age groups.

Gestational Age: The majority of spontaneous abortions occurred before the gestational age of 12 weeks in women with a parity of less than one (72 out of 220 cases). The results agree with a study by Alves and Rapp (2020) in which the majority of spontaneous abortions occur within the first trimester.

Parity: Of the 220 cases of spontaneous abortion, 72 were primiparous, 61 with a parity of 2, 51 at a parity of 3, 25 at parity 4 and 11 having above 4. These correspond to 34%, 28 %, 24 %, 12%, and 2% respectively. The findings are inconsistent with previous studies since about a quarter of Kenyan women gives birth by age 18; nearly half give birth by age of 20 years while about a fifth of women between 15 and 19 years are primigravida (KDHS, 2014). The high incidence of births within these age groups increases the likelihood of abortions, most of which are primigravida.

Infection: We discovered that the leading infections contributing to spontaneous abortion were; Urinary tract infections by 38% (n=35), HIV by 33 % (n=31) and Malaria by 29 % (n=27) from a sample size of 220 patients which can be attributed to the fact that Kisumu is a malaria endemic zone and the high number of HIV cases in the region.

Types: Our findings show incomplete abortions were the most common type of spontaneous abortions at 63%, complete at 12%, threatened at 11%, missed at 9% and inevitable at 5%. Also evident is that out of the 220 cases of spontaneous abortions only 11% (threatened abortions) had a chance to term and birth. The results were consistent with a study done in Nigeria in 2015 (Adeniran, Fawole, Abdul & Adesina 2015). Incomplete abortions had the highest prevalence often linked to advanced maternal age and women with low socioeconomic status.

Chronic Illnesses: The study showed 5.45% of the women were diabetic while 94.5% were not known diabetics. The results are consistent with a recent study showing spontaneous abortion occurs from suboptimal glycemic control of diabetes (Zakira *et al*, 2021). 7.3% of these women were known hypertensive patients as compared to 92.7% that had no hypertension. The results agree with prior studies that reveal hypertensive disorders may transit to preeclampsia and superimposed chronic hypertension. 1.4% of the women that presented at JOOTRH with spontaneous abortion had uterine fibroids, which is consistent with previous research.

Post Abortion Counseling: The majority of women who had spontaneous abortion received post abortion counseling; 90% (200 out of the 220). However, 10% were not counseled after the abortion.

The findings are consistent with prior research that shows post abortion counseling is integral in reducing repeat abortions by

educating women on certain interventions that help reduce abortions. Also, counseling increases the usage of contraceptives, reducing the likelihood of abortions.

Interventions: It was noted that 75% (n=165) of the women were treated by administration of misoprostol and by manual vacuum aspiration. The number of women who had manual vacuum aspiration done only was at 1.36% (n=3) whereas those who were treated by use of misoprostol only was at 0.91% (n=2). 22.73% (n=50) of the women had complete and threatened abortion and were managed by bed rest and monitored in the ward. The indications for MVA were incomplete miscarriage (n=139), missed abortion (20) and inevitable abortion (n=9). The number of patients who had threatened and complete abortion were 24 and 26 respectively. The findings agree with studies that show MVA is a safe and effective method of uterine evacuation.

Previous History of Abortion: From this study 21% of the patients had a previous history of abortion whereas 79% had no prior history. This corresponds to 21% and 79% respectively. The findings are inconsistent with prior studies that suggest an increased risk of abortion in subsequent pregnancies in mothers with a prior abortion history, and without underlying health conditions or infections.

Complications of Spontaneous Abortion: Out of 220 cases of spontaneous abortion, 55 had anemia as a complication, 16 had sepsis and 129 had no complication, corresponding to 25%, 7% and 68% respectively. Anemia is the most common complication of spontaneous abortion in JOOTRH. The results are consistent with those of a retrospective study conducted in 2014 in Kenya.

Limitations

The researchers encountered various limitations during the study. First, some information such as the number of ANC visits and the gestational age at the first ANC visit could not be attained from the medical records, making the study less informative. Also, information pertaining to infections such as Toxoplasmosis, Rubella, Herpes virus, Cytomegalovirus and Syphilis was unavailable from the patient files, making the investigators unable to assess the link between the infections and spontaneous abortions. Besides, factors such as chromosomal abnormalities could not be assessed within the facility owing to absence of infrastructure to conduct tests regarding genetic karyotyping. Majority of the files had inadequate history, especially the family social history in which some clinicians failed to indicate whether the mother had a history of smoking, alcohol or drug/substance abuse. The absence of such information made it impossible for investigators to establish an association between the mentioned factors and spontaneous abortions.

CONCLUSION AND RECOMMENDATIONS

We conclude that a majority of spontaneous abortions occurred between the age of 25 and 35 years, a third of which were primigravidae. UTI, HIV, and Malaria were associated with these cases. 75% (n=165) were successfully managed with a combination of misoprostol and manual vacuum aspiration. 63% had no associated post procedure

complication. The study recommends the availing of counseling services and follow-up to ensure proper management of women with HIV. In addition, healthcare providers should screen pregnant mothers for urinary tract infections in the first and subsequent ante-natal clinic visits. Stakeholders should provide long lasting insecticide treated nets and intermittent malaria prophylaxis in advance to prevent complications of malaria in pregnancy. Also, clinicians should engage in more intensive history taking, making the patient records detailed to facilitate management. Clinical audits for Post Abortal Care and Standard Operating Procedures would better the outcomes. Most importantly, doctors should pay special attention to primigravidae in prenatal care, early antenatal care to reduce the high incidence of spontaneous abortions in this group.

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