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The Risk Factors of Infertility Associated with Unsafe Abortion in a Sub-Saharan Population

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Abstract

Background: Unsafe abortion (USA) is defined as the termination of a non-desired pregnancy, performed by an unqualified person or in an environment without minimum medical standards, or both. It can impact negatively the fertility in the future by tubo-peritoneal lesions. The current study aimed to highlight the infertility factors associated with USA. **Material and Methods:** From January 1st 2000 to December 31st 2021, a total of 3876 patients that sought care for infertility in the University Clinic of Kinshasa and the Edith Medical Center were enrolled. The socio-demographic, clinical and paraclinical variables were recorded and analyzed in relation to USA history. **Results:** The patients' average age was 33.4 ± 5.7 years. Half of them were housewives; about sixty percent of the patients were nulliparous (59.31%). Seventy percent had a secondary infertility with 43.33% having a history of unsafe abortion. The main diagnosis was genital infections and uterus myoma. The chronic endometritis, bilateral tubal occlusion and Uterine synechiae were more associated with USA group. The spermogram anomalies and other partners' lesions seemed of infectious origin. **Conclusion:** The USA remains a more frequent phenomenon in our setting. The chronic endometritis, bilateral tubal occlusion, uterine synechiae and indirectly uterus myoma were the infertility factors related to USA. The genital infection of any origin seems to be the main denominator underlying the female and the male infertility in our setting.

Keywords

Unsafe Abortion, Secondary Infertility, Infertility Factors, Tubal Infertility, Sub-Saharan Setting

1. Introduction

Unsafe abortion (USA) is defined as the termination of a non-desired pregnancy, performed by an unqualified person or in an environment without minimum medical standards, or both [1]. It can impact negatively the fertility in the future by some tubo peritoneal lesions namely tubal occlusion or synechiae. Infertility of tubal origin is the most frequent in sub-Saharan areas [2].

In fact, infertility is a dramatic situation worldwide but especially in sub-Saharan areas, known as pronatalist [3]. It is considered as a public health problem by WHO owing to its prevalence that climbs to 25% of couples in some regions and its social complications like stigmatization [4]. In contrary to some Asian areas where infertility is the most primary, caused by ovarian failure and dystrophy [5], in Sub-Saharan setting, secondary infertility of tubal origin predominates, most low-income regions are characterized by sexual promiscuity, mainly in urban setting recognized by Eriksen *et al.* [6] as a high reservoir of infection enhancing the chance of having sex with an infected person. Ngowa *et al.* [7] in Cameroon found the prevalence of voluntary induced abortion around 25% among the patients seeking care in obstetrics and gynecology facilities. The secondary type of infertility is the most frequent around sixty percent of the patients [8]. The main cause evoked is infection secondary to sexually transmitted microorganisms, unsafe abortion and delivery in poor hygiene conditions.

In DRC, the prevalence of unintended pregnancies is estimated at 147 per 1000 women and the incidence of abortion at 56 per 1000 women; aged between 15 to 49 years. Around 73% of abortion were induced and 45% were unsafe [9]. The above-mentioned sexual promiscuity associated with low prevalence of contraceptives methods leads to unintended pregnancies that end by unsafe abortion; our country has the more restrictive laws for induced abortion [10]. In a previous research, we found that the infertility was secondary for most of the patients and associated with tubo-peritoneal lesions and the history of unsafe abortion [8]. On the other hand, infertility management in terms of investigations and treatments is unaffordable for an average sub-Saharan couple, because of the people's poverty and the lack of relevant facilities and medical insurance [3]. Patients must support their care by themselves. Therefore, the best way to tackle infertility issues remains the prevention. So in order to identify the risk factors of infertility associated with unsafe abortion in our area, we aimed to undertake the current study.

2. Material and Methods

The current study was a cross-sectional and undertaken in the University Clinic of Kinshasa and the Edith Medical Center; from January 1st, 2000, to December 31st 2021. That corresponds to the period where data were recorded properly in our setting. All the patients that sought care for infertility during that period and whose files had more than half of variables of interest (3876 patients) were enrolled. Apart from some relevant parameters that lack in many files e.g., the socio-demographic status; the variables of interest were Age of the patient, parity,

civilian status; infertility duration, length of the cycle (short: <24 days, normal: 24 - 32 days; long: >33 days); the diagnosis made after the two first consultations, conception after the treatment, paraclinical findings in ultrasound, hysterosalpingography (HSG), laparoscopy and endometrial biopsy. The last was performed for hormonal purposes and lately for ruling out any organic pathology, namely endometritis.

The data were recorded in Microsoft Access 2013 and analyzed with Stata IC18 software. The quantitative variables were summarized as mean and standard deviation and the qualitative variables expressed as proportions. The comparison between proportions was made by Pearson Chi-square test and between the means by student' t-test, the strength of association between variables, by Logistic regression, mainly multivariate analysis. The test was significant for a p-value < 0.05.

3. Results

3.1. Socio-Demographic and Clinical Characteristics of Patients

The patients' average age was 33.4 ± 5.7 years and ranged from 20 to 49 years old. Half of them were housewives (49.11%); almost all were married (97.31%). The duration of infertility varied from 1 to 28 years with an average of 4.4 ± 3.8 years and 36,5% had more than 4 years of infertility. Fifteen per cent had an irregular menstrual cycle and 5% spaniomenorrhea (Figure 1).

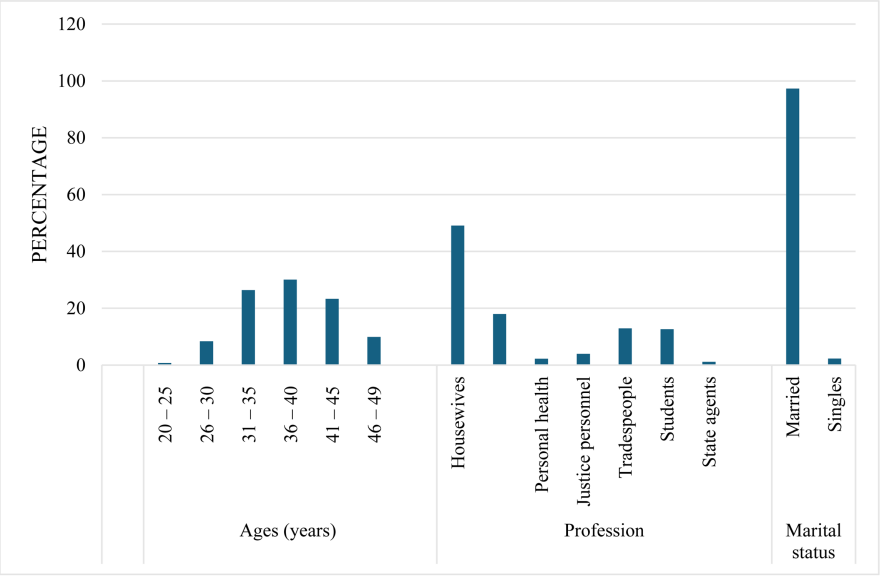
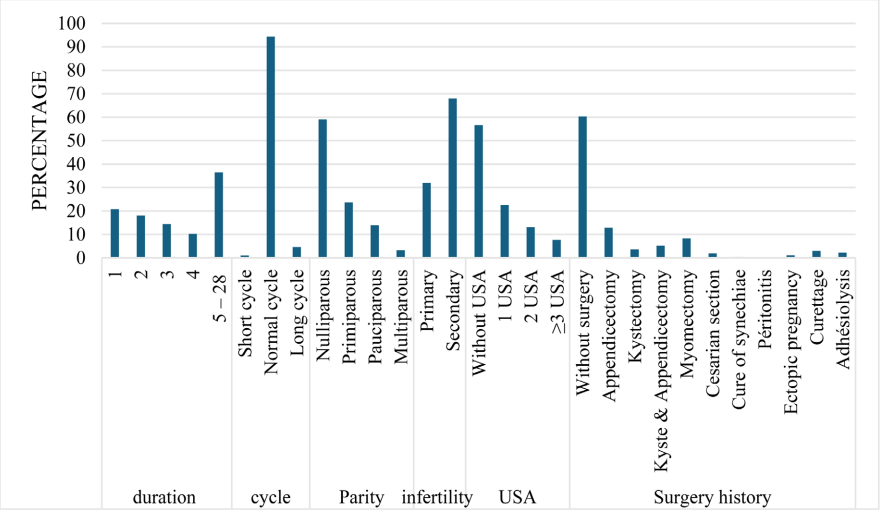


Figure 1. Socio-demographic characteristics.

According to Figure 2, about sixty percent of the patients were nulliparous (59.31%). Almost seventy percent (68.4%) had a secondary infertility with 43.33% having a history of unsafe abortion and forty percent (39.66%), a history of pelvic surgery: the most frequent being appendicectomy (12.87%) and myomectomy

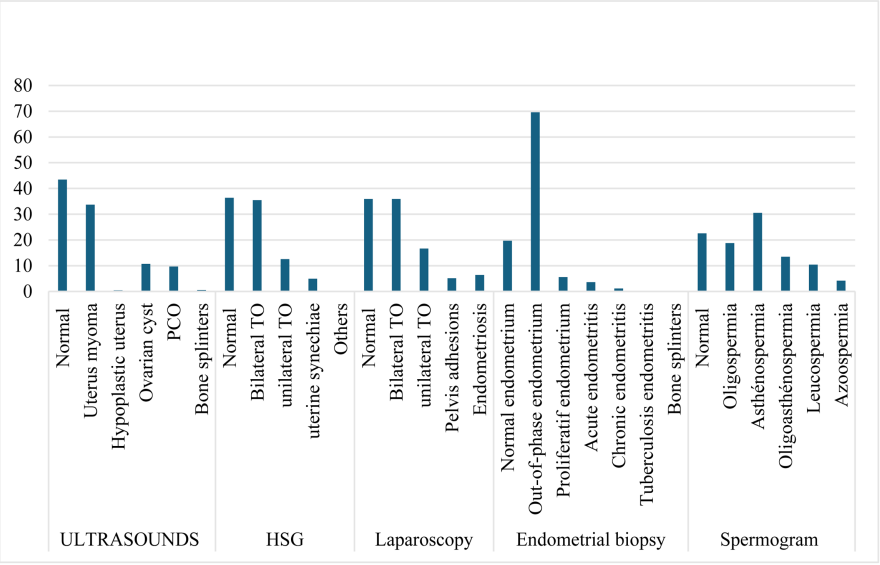
(8.34%). Most of the menstrual cycle ere normal (93%). After the two first consultations the main diagnosis were genital infections (18.9%) and uterus myoma (10.62%).



Legend: duration = duration of infertility in years, cycle = the length of the cycle, USA = Unsafe Abortion.

Figure 2. Clinical characteristics of the patients.

For paraclinical findings (**Figure 3**): in ultrasounds a third of patients (33.7%) had uterus myoma and a tenth (9.69%) polycystic ovary. At hysterosalpingography, 48.06% had tubal occlusion with bilateral occlusion for 73.84% of them and among 78 patients who underwent laparoscopy, half of them (52.57%) had tubal occlusion with 73.84% of them bilateral occlusion. Endometrial biopsy realized



Legend: HSG Others = Adenomyosis, myoma class 0; TO = Tubal Occlusion.

Figure 3. Paraclinical characteristics.

for 1107 patients showed anomalies in a fifth of them (80.31%): out-of-phase endometrium (69.56%), acute endometritis (3.61%), chronic endometritis (1.17%) and tuberculosis endometritis (0.18%). Seventy-eight percent (77.57%) of the 904 partners sperm were pathologic: oligospermia (17.17%); asthenospermia (32.38%) oligo-asthenospermia (11.45%), leucospermia (12.65%) and azoospermia (3.92%). After the treatment 7.67% among the 3876 patients conceived naturally.

3.2. Unsafe Abortions and Patients' Characteristics

According to Figure 4, while the age of patients increased by one year, the number of USA increased by 1.2% ($\beta = 0.012$; 95%IC [0.0047 - 0.023], p = 0.002). Almost 45% of all the patients had a history of USA with 58% of the single and 42.7% of married (p = 0.000).

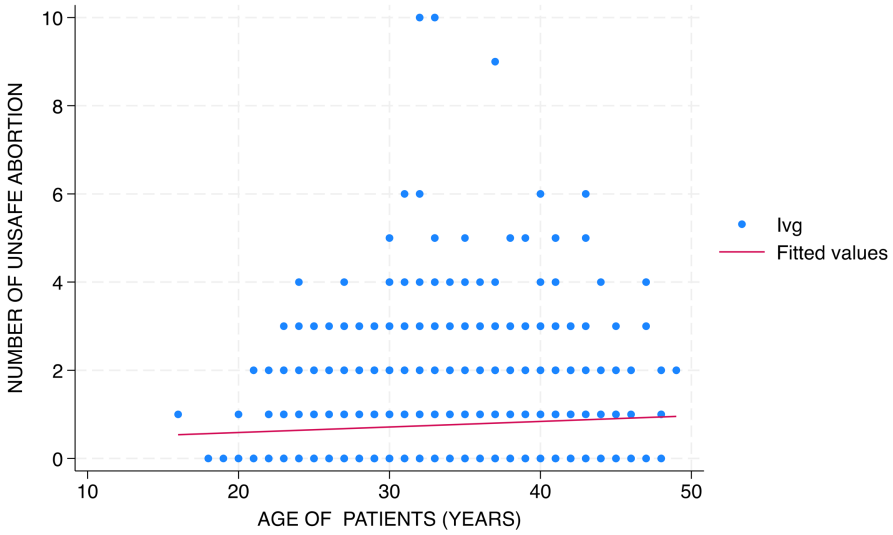


Figure 4. The number of USA (UnSafe Abortions) according to age of the patients.

The paraclinical analysis showed that at endometrial biopsy, the chronic endometritis was more frequent in the USA group (54.6%) than in the non-USA and acute endometritis in the non-USA (75%) p = 0.019. And at HSG, Bilateral tubal occlusion (57.2%) and Synechiae (52.9%) more frequent in the non-USA group (p < 0.000) than USA group. The spermogram anomalies were significantly (p = 0.000) more frequent for the non-USA partners than their counterparts, with asthenospermia the most frequent (42.38%). And after treatment the non-USA patients, mostly (p = 0.05) conceived naturally (63.03% vs 36.97%).

In comparison with the patients non-USA, the patients USA had three times more risk to have uterine synechiae at HSG (OR = 2.47; 95% CI [1.42 - 4.28], p = 0.000). and 5 times more risk (OR = 4.85; 95% CI [1.20 - 19.62); p = 0.000) to have bilateral tubal occlusion at laparoscopy. In contrary, the risk of hyperprolactinemia was reduced by 40% (OR = 0.60; CI 95% [0.38 - 0.94], p = 0.02), acute endometritis by 64% (OR = 0.36 CI 95% [0.14 - 0.92], p = 0.03) and

PCOS (OR = 0.65; CI 95% [0.45 - 0.94], p = 0.02) by 35%. The risk of getting any spermogram anomalies was significantly reduced for the partners of USA history compared to their counterparts: by 40% for oligospermia (OR = 0.572; 95%CI [0,349 - 0.936]; p = 0.026], by 65% for asthenospermia (OR = 0.346; 95%CI [0.224 - 0.533]; p = 0.000]; by 50% for oligoasthenospermia (OR = 0.504; 95%CI [0.287 - 0.884]; p = 0.017); by 70% for leucospermia (OR = 0.310; 95%CI [0.175 - 0.548]; p = 0.00]. The chance to conceive was reduced by 30% among the patients with USA history (OR = 0.78; 95%CI [0.558 - 1.00]; p = 0.051] (Table 1).

Table 1. Association between different characteristics and UNS.

VARIABLES	OR	IC	P
Age			
20 - 25	1		
26 - 30	3.37	0.67 - 15.8	0.14
31 - 35	3.20	0.67 - 15.2	0.14
36 - 49	2.99	0.63 - 14.1	0.16
Diagnosis			
Normal	1		
Infection	0.84	0.68 - 1.041	0.11
Uterine myoma	1.03	0.80 - 1.33	0.77
PCOS	0.92	0.28 - 1.26	0.25
Beginning pregnancy	1.88	0.80 - 4.38	0.44
Hyperprolactinemia	0.60	0.38 - 0.94	0.02
Others	0.64	0.42 - 99	0.03
HSG			
BTO	1.23	0.94 - 1.61	0.12
UTO	1.32	0.89 - 1.94	0.15
Outerine synechiae	2.47	1.42 - 4.28	0.00
Others	1.34	0.97 - 2.19	0.06
Cœlioscopy			
BTO	4.85	1.20 - 19.12	0.02
UTO	1.74	0.36 - 8.08	0.49
Pelvic adhesions	0.85	0.65 - 11.25	0.90
Endometriosis	0.57	0.49 - 6.60	0.65

Continued

Endometrial biopsy (Novak)			
Normal enterometrium	1		
Dechaled endometrium	0.69	0.47 - 1.02	0.06
Proliferative endometrium	1.30	0.66 - 2.57	0.43
Acute endometritis	0.36	0.14 - 0.92	0.03
Chronic endometritis	1.31	0.38 - 4.53	0.66
TBC Endometrial	1.09	0.06 - 17.94	0.24
Ultrasound			
Normal ultrasound	1		
Uterine myoma	0.89	0.72 - 1.09	0.28
Hypoplastic uterus	0.73	0.17 - 3.1	0.67
Ovarian cyst	0.77	0.56 - 1.05	0.10
PCO	0.65	0.45 - 0.94	0.02
Osteoid metaplasia	1.43	0.47 - 4.3	0.51

Legends: BTO = bilateral tubal occlusion, UTO = Unilateral tubal occlusion, PCO = Polycystic ovary.

4. Discussion

The socio-demographic profile of the patients was characterized by an average age of 33.4 ± 5.7 years old and most of them were nulliparous and with secondary infertility (68.01%). That means a population of a relatively aged patient that sought care for infertility, at the beginning of the decline of their fecundity [10]. According to nowadays mindset, the motherhood is postponed by young people to prepare their future [11]. Furthermore, in the current study, the advancement in age was correlated with the increasing of the number of unsafe abortions by 1.2% per year [$\beta = 0.012$; p = 0.002]. This situation can be explained by the occurring of unintended pregnancies meanwhile, resulting in unsafe induced abortions (USA). Because our country has more restrictive laws regarding abortion [12]. Forty-five percent of the patients, *i.e.* almost half of them; had a history of unsafe abortion. It's a more frequent phenomenon in developing countries. Almost 55 million induced abortions were performed all around the world per year, among them 45% were unsafe and nearly ninety-seven per cent taking place in Africa and Latin America [13]. In our setting, the rates of unintended pregnancies and induced abortion were estimated respectively at 147 per 1000 and 56 per 1000 women aged between 15 to 49 years old [9]. The relaxation of morals in the population associated with the less prevalence of the contraceptive's methods [14] may explain the widespread of the unintended pregnancies and USA with its

immediate complications namely hemorrhage and late infertility related to tubo-peritoneal lesions [8].

In contrary with Asia setting, where the primary infertility is the most prevalent with ovarian pathologies being the main causes [15], in Sub-Saharan areas, the secondary infertility due to uterus, tubal et peritoneal lesions predominates [16]. In the current study, chronic endometritis and out-of-phase endometrium; bilateral tubal occlusion and uterine synechiae, were associated with USA.

Chronic endometritis makes the endometrium unable to respond properly to progesterone and to turn its cells components into a receptive phenotype [17]. That can also explain the more frequent out-of-phase endometrium for our patients [18]. Indeed the dilatation and curettage were the method frequently used to induce abortion or to treat the induced abortion complications, so the remnant trophoblastic tissues and the septic condition of USA could explain the CE. Uterine synechiae is the main complication the D&C method, mainly if abortionists are not skilled. The adhesion of the two walls of the uterus impeded the reproductive process to occur. The role of synechiae as risk factor of infertility is well known and sometimes appears as a situation without solution [19]. In the other hand, the patients with USA history had five times more risk of having bilateral tubal occlusion compared to their counterparts. This finding is consistent with a previous study undertaken in the same setting thirty-one years before [8]. The authors noticed that the most frequent type of infertility in sub-Saharan region is the tubal infertility; secondary to tubal blockade or peri tubal adhesions. Many developing countries are characterized by sexual promiscuity; especially in their urban areas, considered by Ericksen *et al*, as a high reservoir of infection [6]. The Less use of contraceptive methods mainly barrier methods leading to sexually transmitted diseases that go hand by hand with unintended pregnancies contributed to the late infections complications of USA in terms of tubal occlusions and adhesions [20] [21].

Uterine myoma happened to be among the main findings at ultrasounds in the current study. It is the pathology of the women in their late thirties et forties; the age being its main risk factor [22]. Furthermore, according to certain studies [23] the sub-Saharan women are more susceptible to develop uterine myomas (numerous and big myomas) and considered as risk factors of infertility [24]. That is consistent with the current study findings: the population was mostly above 35 years old. Thanks to USA; the women remained childless, nulliparous for a long-time, condition for uterine myoma developed [22].

For the male partners, 77.5% of them had anomalies in their spermogram, the same way as in a previous study where 75% of the partners were concerned with 4% of them having azoospermia. The high level of leucospermia (12.65%) found is consistent with infectious origin of those sperm anomalies. The spermogram anomalies were more prevalent among the partners of non-USA history; especially Asthenospermia, oligospermia; oligoasthenospermia and leucospermia. Furthermore, acute endometritis was predominant in the same group. In the other hand

after treatment most conceptions occurred in the non-USA group. Albeit the group; infection seems to be the common denominator of those anomalies underlying the infertility problem associated or non with USA. Especially since we had found in a previous study in the same area that, most of the naturally conception was associated with antibiotherapy [21]. The merit of the current study is to be one of the rare addressing the consequences of USA on the fertility and its limitation is its retrospective design impeding exploitation of some relevant variables like socio-economic level.

5. Conclusion

USA remains a more frequent phenomenon in our setting, contributing as provider of infertility factors namely chronic endometritis; bilateral tubal occlusion; uterine synechiae and indirectly uterus myoma. Genital infection of any origin seems to be the main denominator underlying the female and the male infertility in our setting.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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