

A REVIEW OF THE FEMALE INFERTILITY AND MODIFIABLE RISK FACTORS IN NIGERIA

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Abstract

Infertility is a radical life-changing problem with major psychological, socio-cultural, and economic consequences for the affected individuals at large. Infertility is a chaos that has robbed or ruined couple's happiness. It is the inability of couples to achieve conception despite frequent unprotected sexual intercourse for several months or years. The paper is a review of female modifiable risk factors of infertility in Nigeria. It is also to determine the effects of modifiable risk factors and the prevalence of female infertility in Nigeria. Data were searched from the internet and this served as secondary data. It is evident from the study that modifiable risk factors such as alcohol consumption, stress, cigarette smoking, age, diet and sweetener, modern medicine, endometriosis, and adenomyosis are some of the causes of infertility. Iatrogenic causes of infertility such as abortion and Isthmocele are also responsible for female infertility. The effect of infertility may increase if these modifiable risk factors are not curtailed. This also means that the consequences of infertility such as psychological, stigmatization on families, and affected individuals will likely remain. It can be concluded that infertility can drastically be reduced if women change their lifestyles. Women should therefore not delay conception since age is a factor that determines female fertility and steers clear of these modifiable risk factors. The administration of drugs and its treatment can jeopardize the fertility of women if not handled by qualified personnel.

Keywords: Infertility, Modifiable Risk Factors, Nigeria, Prevalence.

Introduction:

Infertility has been the most challenging problem for both the affected and the medical personnel over some decades. The presence of infertility has always been felt in the human race before now. Infertility is viewed as a global reproductive health issue because the phenomenon had affected 8% and 15% males and females respectively (Lamaran, Natasha, Aminu, Umar & Black, 2016). Infertility is a joint problem for both males and females around the world. In other words, for a woman to be infertile does not mean that she is the root cause of infertility or childlessness, but it has also been recognized that male factor contributes to the problem of infertility or childlessness which made the woman childless (Mallikarjuna & Rajeshwari, 2015). The antagonistic/unfriendly consequences of infertility in developing countries, including Nigeria is so strong and pronounced compared to that of developed societies. Infertility affects the state of being happy, healthy, or of having a successful pregnancy (Ahamefule & Onwe, 2015).

Although the problem of infertility is enormous across the world, the upsurge of this phenomenon is on the increased and alarming in Nigeria. This explains the influx of most couples

into many Nigerian gynecological clinics for consultation in the country as a result of infertility related problems (Ujaddughe, Ujaddughe & Ehisuoria, 2015).

Factors which accounted for female infertility in most cases are lifestyles, smoking of cigarette, excessive alcohol and caffeine consumption, eating habits, late marriage, drug use, and overweight/underweight. These lifestyles can prevent women from conceiving, especially, if they transmitted such lifestyles into their late phase of life (Acharya & Gowda, 2017).

Lifestyle has been defined based on certain behavioural patterns or ways of life that is been produced by the interactions between personal characteristics, social relationships, environmental conditions, and socio-economic situations. MacDonald & Thompson (2005) cited in Khosrorad, Dolaian, Riazi, Mahmoodi, Alavimajd, Shahsavari & Bakhtiari, (2015), introduced the dimensions of lifestyle as nutrition, exercising, self-care, smoking, consumption of alcohol and illegal drugs, social relations, and control of stress. Lifestyle factors are modifiable or change in habits and ways of life that are influenceable in a woman's life which sometimes causes female infertility. These changes can also affect the entire health. When a woman is overweight, it affects her entire systems down to her reproductive tract. Obesity is a lifestyle that has a detrimental impact on women's reproductive organs.

Female genital mutilation as part of cultural practices has a significant effects on the health of the woman. The mutilated woman is prone to vaginal infection; haemorrhage/bleeding during pregnancy and after childbirth. This practice has a damaging effect on the reproductive organs. This infection can affect the uterus, the fallopian tubes and at the same time cause infertility (Almroth, Elmusharaf, El Hadi, Obeid, El Sheikh, Elfadil & Bergström, 2005). Psychologically, infertility related health issues have been viewed as part of mental and emotional problems that prevent man from impregnating his wife (Hess, Ratchneewan & Giliandjr, 2018). Also, infertility has been ascertained to have psychological impacts on couples especially the women because they are always relentless and eager to have children. Infertility is socially unacceptable, childless women are not only harassed by the family members but face various forms of marital instabilities (Fehintola, Fehintola, Ogunlaja, Awotunde, Ogunlaja & Onwuediegwu, 2017). According to Anokye, Acheampong, Mprah, Ope & Barivure, (2017), childless couples are treated like lesser human beings, and are despised in the society/community as a result of infertility. Most people believed that, couples suffering from infertility related problem are as a result of their sins/transgressions. This is enough to demoralize and affect the couple's sexual activities and this may cause depression. This paper seeks to add to the already existing body of knowledge on modifiable risk factors of female infertility. Infertility can be reduced drastically if we change our lifestyles and create awareness of the need to do away with the stigmatization of childless women and couples.

Conceptual Clarification

This section of the paper is concerned with the definition of the major concepts used, including female infertility and modifiable risk factors. The absence of children in a family will render it unstable and present the couple's marriage as a failed one. This indeed has proven that the presence of children is a sign that the couples are productive; this is also why as soon as a man takes a wife he is expected to reproduce. Infertility is when a woman had tried all possible means to get pregnant for several months of unprotected sexual intercourse, amid her trials, pregnancy refused to occur. This also means that the woman for one reason or another may have a fertility issue or her husband could be the cause of her infertility. All the same, infertility is infertility whether it is caused by the woman or man (Uadia et al., 2015). According to Panti and Sununu (2014), infertility is a public health crisis that affects the entire society and misprision to attain up

to the standard of impregnating a woman after 12 months and above of regular and unprotected sexual intercourse as husband and wife.

Modifiable risk factors are those factors or lifestyles which can influence, affect, change, or decreases female chances of getting pregnant. The modifiable risk factor is a lifestyle, behaviours, and habits that expose someone to dangers, contingency, or susceptibility to disease or infertility (Khosrorad, Riazi, Mahmoodi et al., 2015). Also, according to Rasak and Oladipo (2017), the modifiable risk factor of female infertility is as a result of lifestyles ranging from late marriage, smoking of cigarettes, excessive consumption of alcohol, physical damage of uterus, sexually transmitted disease (STD) among others.

Literature Review

A woman's state of being healthy or happy during her preconception period is associated, not only with pregnancy outcome but her lifestyle, health outcomes for herself and her children, that is, the kind of life she lived previously (Akbari, Elmira, Saeieh, Farid and Dinpajouh, 2017). Many at times, lifestyle takes place through modification factors such as age, smoking, drinking, job career, and eating habits. The age at which a woman gets married and start bearing children due to her lifestyle can influence her fertility greatly (Olooto, Amballi& Banjo, 2012). When a woman is growing older, her ovarian reserves automatically becomes lesser, this increases her chromosomal problems with her oocytes (Stevenson, Hershberger & Bergh 2016). That is why a woman may experience her normal menstrual cycle even at the age of 35 and above yet she does not feel the presence of pregnancy (Small et al., 2006) also cited in Stevenson et al., (2016). There are good numbers of working-class ladies who had delayed marriages and also delayed pregnancies to the later days of their lives. This delayed pregnancy can lead to infertility as the woman grows older (Acharya et al., 2017). This is due to the kind of job a lady gets herself involved with which can negatively affect her reproductive organ that may later result in psychological stress and lead to infertility. Also, the environment in which she lives can influence her fertility greatly (Acharya et al., 2017).

Iatrogenic or cause of infertility in most cases are as a result of medical treatment to cure or treat illnesses such as fibroids, abortion, cancer that sometimes needs surgical removal of productive organs of the woman including radiation, chemotherapy (gonadotoxic treatments), (California Health Benefits Review Program, 2017). Infertility can also be as a result of different kinds of conditions like gynecological cancer, fibroids endometriosis, among others which are non-modifiable risk factors of infertility (Vitale, La Rosa, Petrosino, Rodolico, Mineo & Laganà, 2017). Abortion is another modifiable risk factor or origin of infertility in women. Unintentional abortion could be a result of miscarriage that needed urgent attention to save the life of the mother; this best option can result in infertility. Abortion both intentional and unintentional can result in secondary infertility when it is not properly done (Zhou, Liu, Liu, Min, Xingzhi & Qi, 2016).

Excessive alcohol in the body can prevent the body from functioning properly. That is why the body cannot do away with the excess hormones as it will be busy dealing with the alcohol. The blood needs a healthy and clean liver to change food into a form that the body can use for reproductive growth (Suhas, Yogesh, Archana, Pravin, Krutika & Satyavati, 2015). There are toxins in meals we take day and night and also the environment we live in. The effects of toxins in our environment and the food we eat can impair fertility in women. With toxins in the system, pregnancy is under probability (Ashiru, 2017). Pesticides and other chemicals used in both farming and industries are corrosive in nature. They have damaging effects on the reproductive organs and can, therefore, impair fertility in both males and females. These mimic natural hormones interrupt the normal hormone function and it also can alternate endocrine function in a body

system (Uadia & Emokpae, 2015). Excessive iron in the body (through fruits etc) can be a risk factor of infertility in women. Generally, most people believed that fruits are good, yes for the body, but fruits can/may alter insulin metabolism and this might result in Polycystic Ovarian Syndrome (PCOS), (Ashiru, 2017).

Forms of infertility in females.

Primary infertility: This connotes when a woman has never been pregnant, neither did she experience miscarriage before, she is unfruitful and infertile, though, it could be due to some factors such as late marriage, male factor, illness, etc. She is viewed as a barren woman (Rouchou, 2013).

Secondary infertility: Secondary infertility has been viewed as the inability to conceive or bear children even though there is a tendency for a woman to be pregnant after a successful pregnancy before and whether she carries the pregnancy to the term or not. In some cases, she might not have a physical child/children but she had experienced or felt the presence of miscarriage or had given birth to a live baby before the baby's death (Eraky & SeifEl-Nasr, 2016).

Prevalence of infertility in Nigeria

Infertility is a global health phenomenon but its impact on the underdeveloped societies is highly pronounced compared to the developed societies; the prevalence of infertility varies globally. In Nigeria for instance, a study conducted by Fadare and Adeniyi, (2015), showed that the prevalence of infertility in Nigeria was 30.3% while that of Ghana was 11.8%, compared with studies carried out in Scotland and the USA where the prevalence of 9.1% and 10% were reported respectively. These showed higher values in underdeveloped societies when compared with developed societies. Infertility has been estimated worldwide to be about 8 to 12 % couples of reproductive age (Ombelet et al., 2008a,b cited in Inhorn & Patrizio, 2015). Also, according to Cong, Li, Zheng & Tan, (2016), it was reported that, all married couples who are childless account for 10% to 15% worldwide. Factors accounting for infertility in male are 40%; in the female, it is also 40%. The combined factors of infertility (male and female) account for 10%, while the etiology, unknown factors are 10 % that could be the cause of infertility (Basyoni, Algamal, Bakr & Abdo, 2015). This is contrary to the findings made by Ajayi and Dibosa-Osadalor (2011), where infertility was about 25% with 1 in every 4 women were affected with a significant delay in childbearing among reproductive age.

South Asia, Africa, the Middle East, Central/Eastern Europe, and Central Asia attributed infertility to lifestyle, environmental hazards, congenital and hormonal disorders, illnesses, and psychological well-being of individuals. The prevalence of infertility in Sub-Saharan Africa is as high as 30% and is mostly accounted for by males as a contributor factor for infertility (Mascarenhas et al., 2012, cited in Ruggeri, Cannas, Cubeddu, Molicotti, Piras, Dessole & Zanetti, 2016). In most countries including Nigeria, it was estimated that between 30 and 50% of couples are experiencing infertility (Olugbenga, Adebimpe, Olarewaju, Babatunde & Oke, 2014).

In Nigeria also, over 25% to 40% of married couples are affected by infertility problems (Adinma, 2018). Meanwhile, the estimation from the National Demographic and Health Surveys (NDHS), 2013 data revealed a prevalence rate of 11% while epidemiologic rate and clinic-based studies suggested rates of between 14.5% and 30% of infertility among married couples (Dattijo, Andreadis, Aminu, Umar & Black, 2016).

Female Modifiable Risk Factors of Infertility

Modifiable risk factors of infertility in women are those factors that can influence the female reproductive organ by causing damages and infertility. These among others include modern medicines, alcohol, smoking, smart phones, abortion, diet, etc.

Modern Medicines

The use of some modern medicines such as Sulphasalazine which is used to treat inflammatory bowel disease can drastically reduce semen quality, as such there will be insufficient or low sperm count which will result in female infertility from the affected man (Suhas et al., 2015). Sometimes, women take drugs to prevent pregnancy as a form of family planning or preventive major, this can lead to infertility if care is not taken (Suhas et al., 2015). Notwithstanding, preventive care which is beneficial for the user can also impair fertility in women (Acharya and Gowda, 2017).

Alcohol

Alcohol consumption has a significant relationship or link with infertility, as excessive consumption of alcohol can impair fertility and also is associated with increased estrogen levels, leading to decreased follicle-stimulating hormone secretion and affects ovulation significantly. Alcohol affects the ovarian reserve, steroid hormone production, quality, and fecundability (Brooke, Abusief & Missmer, 2016).

Smoking

Smoking is an absolute confirmation of modifiable risk factors with a series of diseases outcomes and with severe complications before and after pregnancy (Practice Committee of the American Society for Reproductive medicine, Birmingham Alabama, 2018). The complications that accompany smoking include preterm delivery, placental abruption, preterm premature rupture of membranes, placenta previa, perinatal mortality, and intrauterine growth restriction. In female smokers, menopause occurs 1 to 4 years earlier than non-smokers (PCASRMBA, 2018).

Smart Phones

The use of mobile phones and wireless networks technology has led to increased exposure to radiofrequency electromagnetic waves which are now part of our lives. It is also one of the causes of infertility in men which can affect their wives. That is to say, the affected man can equally affect his wife by not getting her pregnant (Vitale, La Rosa, Petrosino, et al., 2017).

Stress

Stress and infertility can be seen as a problem which men or women passed through before having children in life. In other words, stress can cause infertility, as infertility itself causes stress (Suhas et al., 2015). If the husband or the woman is stressed up or tired, there may be infrequent sexual intercourse, resulting into the unlikely chance of getting a woman pregnant while if the woman is stressed it will alternate her system or menses and this can greatly influence her chances of getting pregnant as at when due (Suhas et al., 2015).

Diet coke and sugar-free

Aspartame is an artificial sweetener made from aspartic acid used for sweetening some of our items such as mouth spray, flavour use in our juice, etc. Aspartame is likely to be found in some foods, drink, breath fresheners, even chewing gums. Anything labelled 'diet' or 'sugar-free', all

will have aspartame as a sweetener and sweetener can impair fertility in women (Suhas et al., 2015).

Endometriosis

Endometriosis is a benign estrogen-dependent inflammatory disease that occurs due to the ectopic (occurring in an abnormal position) endometrial implants can result in infertility (Deyhoul, Mohamaddoost & Hosseini, 2017). Although controversial, the relationship between endometriosis and infertility has been mentioned in previous studies (Deyhoul et al., 2017).

Adenomyosis

Adenomyosis can affect and causes infertility in women when benign capture endometrium into the myometrium, this reaction makes the uterus bigger, once it covers the surface of the uterus (Sebastiano, Vincenzo & Giuseppe, 2012).

Abortion

Abortion is another modifiable risk factor of infertility in women. Unintentional abortion could be as a result of miscarriage that needed urgent attention to save the life of the mother. This best option can result in infertility. Abortion both intentional and unintentional can result in secondary infertility when not properly done (Zhou et al., 2016).

Effects of infertility

The effects of smoking, alcohol and caffeine consumption, diet, and exposure to electromagnetic fields on women's reproduction as a lifestyle have significant consequences. For instance, cigarette smoke contains many toxins that can impair fertility in women (Vitale et al., 2017). Also, the effects of infertility on childless women differ; infertility has its way of dealing with each affected individuals and societies. Childlessness can reduce or lower the number of birth rate and can also reduce the labour workforce of the younger generation significantly (Rasak & Oladipo, 2017).

Review of Empirical Studies on the Relationship between Modifiable Risk Factors and Female Infertility

Brunori, Cavalcante, Lopes, Lopes, and Barros (2014); Acharya and Gowda (2017), in their studies titled, the relationship between infertility and excessive alcohol consumption; physical activity and smoking of cigarette among women of reproductive age, used a cross-sectional study method. A total sample of 150 female patients with acute coronary syndrome was carried out in Cardiologic Intensive Care Unit and Cardiac Inpatient Unit of a large tertiary teaching hospital located in the capital of the state of Sao Paulo, south-eastern Brazil. Interviews, analysis of patients' charts, and validated questionnaires on smoking, alcoholic consumption, and physical activity were used. About 58.7% were smokers (35.2% high dependence), 42% consumed alcohol (65.1% low risk) and 36.7% were active. These researchers agreed that smoking, alcoholic consumption, and physical activity was significantly correlated to age and infertility.

Also, Fulop, Atombosoba, Teskse, Rucz and Siklosi (2016), examined the relationship among women with secondary infertility and isthmocele seeking for treatment at Endoscopy department of Robert Károly Magán Hospital, Budapest, Hungary between the periods of 1st January 2013 to 31st December 2016, showed that out of the 15 patients who underwent this surgical treatment, 11 patients (73.33%) conceived within the first 12 months, while one (6.67%) conceived within the first 24 months. This contradicts the findings of Basyoni, Algamal, Bakr, and Abdo (2015). On

the other hand, Eraky and Seif El-Nasr in their cohort studies (2016) found out that age factors have a significant relationship with secondary infertility.

Busari and Agokei, (2018), carried out a study to examine the extent to which age, coping style, and psychological distress predict infertility related issues among childless women (female) of secondary school Teachers in Ibadan North Local Government Area, Oyo State, Nigeria. The study adopted a descriptive research design of correlation. The total sample was forty-seven (47) childless female teachers selected and who were willing and available for the study. Findings show that 65.9% of the respondents experience a high level of infertility-related global stress. Pearson correlations shows a negative significant relationship between age and coping style ($r = -0.780$; $p < 0.01$) and ($r = -0.576$; $p < 0.01$) respectively, with psychological distress of positive significant of ($r = 0.699$; $p < 0.01$). The result shows that age and coping styles are significantly related as young couples who are impatient and inexperienced may not utilize these coping strategies, they may likely experience a high level of infertility-related stress (Busari and Agokei, 2018).

A cross-sectional descriptive study was conducted in the radiology unit of a private specialist hospital in the urban area of Calabar. This study was carried out by Ukweh, Okeke, Oku & Ekanem, (2018) on 87 Hysterosalpingogram (HSG) women affected and managed for infertility from November 2015 to October 2017 over a period of 2 years. Findings showed that the mean age of respondents was 34.09 ± 4.82 years. The age of respondents were between 30-39 years (60.9%), nulliparous 70 (80.5%), and 71 (81.6%) who had a previous history of induced abortion. Findings also showed that tubal blockage was 35.6% and hydrosalpinx, 50.6% (Ukweh, Okeke, Oku & Ekanem, 2018). Corroborating above findings and that made by Okonofua, Harris, Kane, and Snow (1997), the mean age and duration of female infertility was 38.3 years and 11 years. A case study research was done on the prevalence and causes of infertility in women from 15-55 years. It took place in four different hospitals centres. These included Obafemi Awolowo University Teaching Hospital Ile-Ife, Obafemi Awolowo University Teaching Hospital Ilesa, Ladoke Akintola University Teaching Hospital Osogbo and General Hospital Ikire in Southwestern part of Osun State Nigeria, involving 200 cases of patients suffering from infertility with 50 patients from each of these centers between 2001-2003. In four of these centers, it recorded high infertility values of 59.4% (Obafemi Awolowo University Teaching Hospital Ile-Ife), 47.7% (Obafemi Awolowo University Teaching Hospital Ilesa), 54.8% (Ladoke Akintola University Teaching Hospital Osogbo), and 44.2% (General Hospital Ikire) respectively. A high value of 77.5% of secondary infertility was also recorded (Sule, Erigbali, and Eruom, 2008).

Eraky & SeifEl-Nasr, (2016), conducted a study on a group of 200 women suffering from secondary infertility that attended the infertility outpatient clinic at El-Manial University Hospital. The questionnaire on infertility risk factors was administered and utilized to enable the clinic to acquire accurate data. Results showed that the mean age of the sample was 27.5 ± 5.58 years old, about 34.5% received secondary education and 62.5% were residents of rural areas. Fifteen percent (15%) of these women had a family history of primary infertility while 20% of the sampled women had a family history of secondary infertility. Also according to Basyoni et al (2015), a case-control study carried out on females attending the outpatient clinic at two tertiary hospitals in El-Manial, Cairo. The questionnaire was distributed to 468 infertile women and 450 fertile women. Findings showed that the age factor was a significant factor in infertile women.

A prospective cohort study on the effect of alcohol consumption on women fertility in Denmark, with 6120 female Danish residents, aged 21-45 years was carried out by Mikkelsen et al., (2016). These women were trying to conceive and not receiving fertility treatment from 1 June, 2007 to 5 January, 2016. Out of the 6120 female, 4210 were pregnant during the treatment. Median

alcohol intake was 2.0 (interquartile range 0-3.5). Compared with no alcohol consumption, were 0.97 (95% confidence interval) 0.91 to 1.03), 1.01 (0.93 to 1.10), 1.01 (0.87 to 1.16), and 0.82 (0.60 to 1.12), respectively. The adjusted fecundability ratio for alcohol consumption of 1-3, 4-7, 8-13, and 14 or more servings per week was 0.97 (95% confidence level) and interval of 0.91 to 1.03, 1.01 (0.93 to 1.10), 1.01 (0.87 to 1.16) and 0.82 (0.60 to 1.12), respectively (Mikkelsen et al., 2016). Effiong et al., (2016) also carried out a study in Uyo that investigated marital satisfaction and age as predictors of alcohol usage during pregnancy. A convenient sampling technique was adopted for pregnant women. Results confirmed the first hypothesis which predicted that pregnant women who were satisfied in their marriages reported less alcohol consumption than their dissatisfied counterparts (1,104)=4.70; $p<0.05$). Findings have also confirmed the second hypothesis which stated that younger pregnant women reported more alcohol usage than their elderly counterparts (5,104) =11.833; $p<0.05$).

In Ogbomoso, Southwest Nigeria, a study was conducted by Oladeji, & OlaOlorun (2018) in the gynecology clinic of the Bowen University Teaching Hospital using the patient's health to screen and determined how serious depression was on infertile patients as well as to understand the social functioning of the patients. A total of 110 women with infertility problems were sampled. The study found out that the prevalence of depression was 52.7%. This result showed that there was significant relationship between the age group of the respondents ($p = 0.889$), their level of education ($p = 0.731$), years since marriage ($p = 0.38$), type of infertility ($p = 0.873$), number of living children ($p = 0.226$), sex of the children ($p=0.257$) and depression. Depression was, however, significantly associated with impairment in social functioning of the respondents ($p=0.005$). Evidence showed that depression is a common co-morbidity in infertile women in Ogbomoso (Oladeji & OlaOlorun 2018).

Conclusion and Recommendations

Infertility is a serious family problem. Some infertility comes inform of disease or illness such as cancer, endometriosis, adenomyosis. Modifiable risk factors such as alcohol, cigarette, and toxic metals, sweetener, pesticides, abortion, drugs use, age, also lead to infertility. Treatment of diseases, abortion (iatrogenic), modern assisted reproductive technologies are other causes of infertility in women. The findings of the study revealed that lack of knowledge, age, cost of treatment and awareness are contributing factors to infertility.

Based on this review study, the following are recommended to reduce the malaise of modifiable risk factors of infertility.

- i. Women should avoid certain lifestyles such as smoking of cigarettes, late marriage and excessive alcohol consumption to safeguard their pregnancies.
- ii. For isthmocele and Iatrogenic to be successfully dealt with, there is a need for medical practitioners to be absolutely careful during treatment and surgical operations. Medical practitioners should also be faithful, diligent to their practice and medical ethics.
- iii. Federal, State, and Local governments should try and implement policies that can prevent young women from fertility threatening lifestyles.

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