

## Environmental and Lifestyle Factors Associated with Infertility Among Women in Rural Areas in South-South Nigeria

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### Abstract

### Original Research Article

Several environmental and life style factors influence infertility in women leaving in rural areas. Infertility in women can be influenced by a combination of environmental and lifestyle factors. These factors include exposure to pollutants such as industrial chemicals, heavy metals (lead, mercury), pesticides, radiation and oil-related contaminants can disrupt the endocrine (hormonal) system. These substances may interfere with ovulation, damage eggs, or affect the uterus and fallopian tubes. This study is aim to evaluate the Environmental and Lifestyle Factors Associated with Infertility Among Women in Rural Areas in South-South Nigeria. This was a cross-sectional study involving 250 women with age between 18 to 47 years. A well-structured questionnaire was administered to participants. The study lasted for a period of 3 months. Statistical analysis was done using SPSS version 25.0 and  $p < 0.05$  was significant. The results revealed that 76% of the participants were married, 68% marriage is more than 5 years, 60% stayed in rural areas, 40% had secondary level of education, 40% are farmers, 68% are in low socioeconomic status, 80% have been expecting child for greater than 5 years, 76% have not consulted and health facility, 80% consulted traditional way, 68% had sedentary life style, 80% leaves on high processed foods, 60% used tobacco, 80% consumed regular alcohol, 80% passed through stress, 76% are exposed to environmental factors, 68% are exposed to radiation, 80% had their daily work greater than 10hrs, 60% had chronic illness, 76% had STI, and 76% have not received counseling regarding lifestyle modification on infertility.

**Keywords:** Environmental, Lifestyle, Factors, Infertility, Rural areas.

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## INTRODUCTION

Reproductive process is an important activity that women of reproductive age engaged in at different levels of relationship (Gbaranor *et al.*, 2020a). Reproduction is an important aspect of African culture

with the aim to maintain continuity in the family circle (Gbaranor K. B., *et al.*, 2020b). Women of reproductive age need to be free from anything that we delay or deny them from conception or from having their normal life (Biraldo *et al.*, 2024). Infertility is a concern to every

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reproductive age woman and their well-wishers and it's on the increase across Africa (Gbaranor, *et al.*, 2025). This raises concern among married women and their husband and is more rampant among both young and old in marriage (Gbaranor, *et al.*, 2025). Several factors such as medical, psychological, social, spiritual, economic and financial have contributed to this increase in the level of infertility. Most victims are having sleepless night with different thoughts that could heighten the psychosocial aspect of their lives (Gbaranor, *et al.*, 2025). Infertility is defined as the inability to achieve pregnancy after 12 months of regular unprotected intercourse—is a pressing reproductive health concern globally, including in rural settings of low- and middle-income countries (World Health Organization definition). Both environmental exposures and lifestyle behaviors have been implicated in altering female reproductive physiology, affecting ovulation, fertilization, and successful conception (NICHD, 2025). In rural areas, unique occupational and environmental conditions, combined with socio-economic and behavioral determinants, may amplify these risks. Environmental toxicants such as phthalates, pesticides, heavy metals, and other endocrine-disrupting chemicals have been shown to interfere with hormonal regulation, follicle health, ovulation, and implantation (Collaborative for Health & Environment, 2025; de Melo-Ferreira *et al.*, 2019). Endocrine disruptors mimic or block natural hormones, modifying endocrine feedback loops critical for reproductive function. Persistent pollutants like polychlorinated biphenyls (PCBs) and pesticides (e.g., organochlorines) have been associated with decreased fecundity and increased time-to-pregnancy in observational studies, suggesting an environmental influence on reproductive outcomes (NICHD, 2025). Heavy metals such as lead, mercury, and cadmium, often found in contaminated water sources near industrial, mining, or agricultural areas, also contribute to endocrine disruption and may impair ovarian function (NIEHS, 2025). Air pollution including particulate matter (PM<sub>2.5</sub>) has been linked with adverse reproductive outcomes such as menstrual irregularities and reduced fecundity, potentially through systemic inflammation and oxidative stress (HubPharm Africa, 2025). Though much of this evidence derives from settings outside rural Nigeria, similar exposures may occur near agricultural burning, dust, or open combustion practices common in rural environments. Water contamination with heavy metals and industrial chemicals can affect reproductive hormones and contribute to follicular dysfunction and menstrual disorders. Rural populations often rely on untreated water sources, which increases the likelihood of exposure to contaminants detrimental to fertility (Times of India, 2025). Women in rural settings often engage in subsistence farming, where chronic exposure to agrochemicals (pesticides and herbicides) is prevalent. Studies show that exposure to such chemicals is linked

with hormonal imbalance, reduced oocyte quality, and impaired implantation (NICHD, 2025; NIEHS, 2025). Direct handling of pesticides without adequate protective gear increases the reproductive risk burden in women working in agricultural fields. Body mass index (BMI) and diet are significant lifestyle determinants of fertility. Both underweight and overweight/obesity are linked with disrupted hypothalamic-pituitary-ovarian axis function, menstrual irregularities, and anovulation (NICHD, 2025). Rural diets, often limited in diversity and micronutrients, may contribute to energy imbalance and reproductive dysfunction. Malnutrition—either overnutrition (obesity) or undernutrition is more common in resource-constrained contexts and can adversely affect fertility. Tobacco smoke contains numerous chemicals that can impair ovarian function, alter estrogen synthesis, and reduce the quality of the reproductive environment (American Society for Reproductive Medicine, cited in Field's article on female infertility). Alcohol misuse disrupts hormone balance and may delay conception. Substance use patterns including recreational drugs further complicate hormonal regulation and reproductive timing (NICHD, 2025). Chronic stress, prevalent in low-resource rural settings, disrupts fertility via neuroendocrine pathways, influencing gonadotropin release and ovulation. Additionally, social stigma associated with infertility may exacerbate stress and impact women's help-seeking behaviors, ultimately contributing to delayed diagnoses and poorer reproductive outcomes (Search8 review on lifestyle and infertility behaviors).

## MATERIALS AND METHOD

This was a cross-sectional study involving 250 women with age between 18 to 47 years. A well-structured questionnaire was administered to participants. The study lasted for a period of 3 months. Statistical analysis was done using SPSS version 25.0 and  $p < 0.05$  was significant.

## RESULTS

The results revealed that 76% of the participants were married (Table 1), 68% marriage is more than 5 years (Table 2), 60% stayed in rural areas (Table 3), 40% had secondary level of education, 40% are farmers, 68% are in low socioeconomic status (Table 4), 80% have been expecting child for greater than 5 years (Table 5), 76% have not consulted and health facility, 80% consulted traditional way (Table 6), 68% had sedentary life style (Table 7), 80% leaves on high processed foods, 60% used tobacco, 80% consumed regular alcohol, 80% passed through stress, 76% are exposed to environmental factors (Table 8), 68% are exposed to radiation, 80% had their daily work greater than 10hrs, 60% had chronic illness, 76% had STI, and 76% have not received counseling regarding lifestyle modification on infertility.

**Table 1: Marital Distribution of Respondents**

Marital Status	Frequency	Percentage (%)
Married	190	76.00
Cohabiting	60	24.00
<b>Total</b>	<b>250</b>	<b>100.00</b>

**Table 2: Duration of marriage relationship**

Education	Frequency	Percentage (%)
<2 years	30	12.00
2-5 years	50	20.00
>5 years	170	68.00
<b>Total</b>	<b>250</b>	<b>100.00</b>

**Table 3: Place of residence**

Occupation	Frequency	Percentage (%)
Urban	10	4.00
Rural	150	60.00
Semi-urban	90	36.00
<b>Total</b>	<b>250</b>	<b>100.00</b>

**Table 4: Socioeconomic status**

Response	Frequency	Percentage (%)
Low	170	68.00
Medium	60	24.00
High	20	8.00
<b>Total</b>	<b>250</b>	<b>100.0</b>

**Table 5: Duration of difficulty in achieving pregnancy**

Response	Frequency	Percentage (%)
< 1 year	10	4.00
1-5 years	40	16.00
>5 years	200	80.00
<b>Total</b>	<b>250</b>	<b>100.0</b>

**Table 6: Type of care sought**

Response	Frequency (%)	Percentage (%)
Public	40	16.00
Private	10	4.00
Traditional	200	80.00

**Table 7: Physical activity level**

Response	Frequency	Percentage (%)
Regular	30	12.00
Occasional	50	20.00
Sedentary	170	68.00
<b>Total</b>	<b>250</b>	<b>100.0</b>

**Table 8: Exposure to environmental factors**

Response	Frequency	Percentage (%)
Exposed	200	80.00
Not exposed	10	4.00
Not Sure	40	16.00
<b>Total</b>	<b>250</b>	<b>100.0</b>

## DISCUSSION

Several environmental and life style factors influence infertility in women leaving in rural areas. Infertility in women can be influenced by a combination

of environmental and lifestyle factors. These factors include exposure to pollutants such as industrial chemicals, heavy metals (lead, mercury), pesticides, radiation and oil-related contaminants can disrupt the

endocrine (hormonal) system. These substances may interfere with ovulation, damage eggs, or affect the uterus and fallopian tubes. Lifestyle factors influencing female infertility include poor nutrition, Smoking, alcohol consumption, substance abuse, sexual behaviors and untreated STIs, stress and psychological factors and physical inactivity or excessive exercise. Unsafe drinking water and food contaminated with chemicals or pathogens can lead to chronic infections or toxic accumulation in the body, negatively affecting reproductive organs.

The study revealed that 76% of the participants were married and because they married, they must expect children at their matrimonial home before they may have issue with their in-laws or husband. Most of the participants have married for more than 5 years and are worried for not getting any child. Again, majority of the participants resident in the rural areas and are mostly farmers and traders. The study revealed that majority of the participants had secondary level of education and as such may not have indebt knowledge about environmental and life style factors that may cause infertility.

The research shows that majority (68%) of the participants are in low socioeconomic status. Socioeconomic status (SES) refers to a combination of income/wealth, education, occupation, and related social resources that affect an individual's access to services, knowledge, and living conditions. Women in rural areas with low SES often face poverty, limited education, food insecurity, and restricted access to healthcare, which interact with broader environmental and lifestyle factors to affect fertility. Women from low-income rural households often live in areas with poor environmental quality such as contaminated water, poor sanitation, and higher exposure to environmental toxins (e.g., pesticides or pollutants from agricultural and industrial activities). These exposures can disrupt hormonal balance and reproductive function. Environmental pollutants like pesticides and heavy metals are endocrine disrupters that can impair ovulation and egg quality. Poor water and sanitation increase the risk of reproductive tract infections, which can lead to infertility if left untreated. Low SES magnifies exposure because poorer households often cannot afford alternative clean water sources or protective measures against these hazards.

Majority of the participants have been expecting child for more than 5 years and this may be due to their constant exposure to environmental hazards and their life style. Since they mostly rural women with secondary level of education, they lack knowledge of the consequences of constant exposure to environmental and life style factors that influence infertility. The study shows the most of the participants consulted the traditionalists instead of employing the services or seek the healthcare facility. Also, other factors such as socioeconomic status, lack of primary healthcare facility,

lack of awareness, and cultural influence may hinder them from seeking or accessing healthcare facility.

The research revealed that majority of the participants are exposed to environmental and life style factors such as Pollution, pesticides, poor sanitation, oil spillage, radiation, occupational hazards, over-weight, smoking, alcohol, poor diet, advanced maternal age (>35 years), heavy metals, stress and physical activity and they disrupt hormonal levels, interferes with ovulation, and lowers the chance of conception.

## CONCLUSION

Environmental and lifestyle factors influence infertility by affecting hormonal balance, ovulation, reproductive organ health, and overall well-being. Many of these factors are modifiable, meaning infertility risk can be reduced through improved environmental conditions, healthier lifestyle choices, and better access to reproductive healthcare. Lifestyle factors influencing female infertility include poor nutrition, Smoking, alcohol consumption, substance abuse, sexual behaviors and untreated STIs, stress and psychological factors and physical inactivity or excessive exercise

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