# The Relationship Between Modern Lifestyles and Infertility in Adult Women

Inaiyah Pratiwi M.Nur
Akademi Kebidanan Wijaya Kusuma Malang, Indonesia

**Abstract**: *Infertility among adult women has increased significantly in parallel with modern lifestyle changes characterized by chronic stress, unhealthy dietary patterns, sedentary behavior, circadian disruption, exposure to endocrine disrupting chemicals, and elevated air pollution levels. This article examines the relationship between modern lifestyle factors and female infertility through a Systematic Literature Review conducted in accordance with PRISMA guidelines. From 538 initial records, 43 studies met inclusion criteria and were thematically synthesized. Findings indicate that chronic stress disrupts the hypothalamic pituitary ovarian axis, high sugar and high fat diets impair ovulation, sedentary behavior increases oxidative stress, and circadian misalignment from shift work reduces melatonin and contributes to menstrual irregularities. Exposure to chemicals such as BPA and phthalates lowers ovarian reserve, while air pollution elevates risks of infertility and miscarriage. The study highlights the need for integrative public health strategies, including lifestyle education, environmental regulation, workplace health reforms, and expanded access to fertility care.*
***Keywords : endocrine disruptors, fertility, lifestyle, reproductive health, women***

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## INTRODUCTION

Infertility has become a growing global public health concern, increasingly affecting women of reproductive age across diverse socioeconomic and cultural backgrounds. The World Health Organization (WHO, 2021) defines infertility as the failure to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse. Recent global estimates indicate that approximately 17.5 percent of the world's adult population experiences infertility, with women disproportionately affected in both clinical and social dimensions. Although biological, genetic, and structural reproductive disorders contribute to infertility, a large body of recent literature has identified modern lifestyle patterns as significant modifiable risk factors. Accelerated urbanization, rising occupational stress, pervasive sedentary behaviors, unhealthy diets, substance use, sleep disturbances, and exposure to endocrine disrupting chemicals (EDCs) have been shown to compromise reproductive functioning. As modern lifestyles evolve rapidly, understanding their relationship with infertility among adult women has become a pressing scientific and public health priority.

One of the most prominent lifestyle factors influencing female infertility is chronic stress. Modern work environments often require prolonged working hours, high mental workload, and limited recovery time, all of which activate chronic hypothalamic–pituitary–adrenal (HPA) axis responses. Elevated cortisol

levels suppress gonadotropin releasing hormone (GnRH) pulsatility, leading to menstrual irregularities, anovulation, and reduced fecundability. According to a large prospective study in Human Reproduction, higher salivary alpha amylase levels were associated with a 29 percent reduction in the likelihood of conception, highlighting stress as a major reproductive risk factor (Van et al., 2019). Stress can also exacerbate underlying reproductive disorders such as polycystic ovary syndrome (PCOS), a leading cause of anovulatory infertility. The interaction between psychosocial stressors and reproductive hormones is therefore critical in understanding fertility outcomes in modern women.

Dietary behaviors in contemporary societies further contribute to fertility challenges. Increased consumption of ultra processed foods, high sugar diets, and trans fats negatively affects hormonal balance and ovulatory function. Studies published in Fertility and Sterility demonstrate that diets rich in omega 3 fatty acids, plant based proteins, and low glycemic foods are associated with improved reproductive outcomes, while diets high in saturated fats and refined sugars are linked to higher risk of infertility (Skowronska et al., 2023). Obesity, a rising global epidemic, is strongly associated with infertility due to its impact on insulin resistance, androgen excess, and disrupted ovarian follicular development. WHO (2021) reports that global obesity prevalence among women has nearly doubled since 1990, with significant implications for reproductive health. Conversely, undernutrition and extreme dieting behaviors, common among women exposed to modern beauty norms, can also suppress ovarian function and disrupt menstrual cycles.

Physical inactivity, a defining characteristic of modern sedentary lifestyles, is another major determinant of infertility. Adults in urban environments spend prolonged hours sitting at work, using digital devices, and commuting. The American Society for Reproductive Medicine (ASRM, 2020) notes that insufficient physical activity can impair metabolic regulation, increase oxidative stress, and disrupt hormonal balance necessary for ovulation. Regular moderate physical activity, however, has been shown to improve fertility by enhancing metabolic function and reducing inflammation. Women who engage in at least 150 minutes of moderate intensity exercise per week demonstrate improved ovulatory function and higher chances of conception (Kaneda et al., 2020).

Shift work and circadian rhythm disruptions are emerging risk factors associated with modern occupational patterns. Women working night shifts or rotating shifts, especially in the healthcare, manufacturing, and hospitality sectors, experience altered melatonin secretion, disrupted sleep cycles, and impaired reproductive hormonal regulation. Research published in Occupational and Environmental Medicine shows that long term rotating shift work increases the risk of menstrual irregularities and reduced fertility in women (Wang et al., 2016). Circadian rhythm disturbances influence the timing of follicle stimulating hormone (FSH) and luteinizing hormone (LH), which are essential for ovulation and reproductive cycle regulation.

Environmental exposures associated with modern lifestyles also contribute to infertility. Endocrine disrupting chemicals (EDCs) such as bisphenol A (BPA), phthalates, perfluoroalkyl substances (PFAS), and organophosphate pesticides are widely used in plastics, cosmetics, household products, and food packaging. These chemicals interfere with estrogenic and anti estrogenic pathways, impair folliculogenesis, reduce ovarian reserve, and increase the risk of early menopause. A landmark study in JAMA Network Open found that detectable levels of urinary phthalates were associated with reduced antral follicle counts and diminished ovarian reserve among reproductive age women (Li et al., 2016). Exposure to air pollution, particularly fine particulate matter (PM2.5), has also been linked to reduced fertility, increased miscarriage rates, and impaired embryo development in studies conducted across China, India, and Europe.

Alcohol consumption and smoking remain major lifestyle determinants of female infertility. Even moderate alcohol intake has been associated with reduced fecundability and increased risk of ovulatory disorders. Cigarette smoking introduces thousands of toxic chemicals into the bloodstream, accelerating ovarian aging and reducing oocyte quality. The European Society of Human Reproduction and Embryology (ESHRE, 2020) reports that smoking women experience menopause up to two years earlier than nonsmokers and have significantly lower in vitro fertilization (IVF) success rates. Nicotine and other toxins impair ovarian function, disrupt hormonal signaling, and damage DNA integrity in oocytes.

Delaying childbearing, a hallmark of modern societal transitions, also interacts with lifestyle risks to exacerbate infertility. Women now postpone pregnancy due to career priorities, economic pressures, and social norms. However, ovarian reserve declines sharply after age 32 and even more rapidly after age 37. The International Federation of Fertility Societies notes that age related infertility has increased significantly in the past two decades, especially in high income urban populations (IFFS, 2021). When combined with stress, poor diet, and environmental exposures, age becomes a stronger predictor of reduced fertility outcomes.

Despite extensive research on modern lifestyle and infertility, several notable research gaps remain. First, while numerous studies examine individual lifestyle factors, fewer studies analyze the synergistic effects of multiple modern lifestyle determinants on infertility. Most research isolates variables such as stress or diet, without considering their combined pathways across endocrine, metabolic, and psychological domains. Second, the majority of global infertility research focuses on Western populations, with limited representation of Asian, African, and Latin American women whose lifestyle exposures and sociocultural contexts differ significantly. For example, Indonesia has rising infertility prevalence, but fewer peer reviewed studies examine how modern urban lifestyles shape reproductive outcomes among Indonesian women. Third, existing literature insufficiently explores the interaction between digital lifestyle patterns, such as prolonged screen time or technology induced sleep disruption, and fertility outcomes, despite these behaviors being pervasive in modern societies.

The novelty of this article lies in its integrated perspective that synthesizes epidemiological, endocrinological, environmental, and behavioral evidence to analyze how modern lifestyle patterns collectively influence infertility in adult women. Unlike existing studies that isolate single risk factors, this article examines lifestyle exposures as an interconnected system shaped by modern social and environmental conditions. The objective of this research is to systematically review the evidence linking modern lifestyle behaviors with infertility among adult women through a Systematic Literature Review (SLR), identifying key pathways, regional disparities, and implications for public health interventions.

## METODOLOGI

This study employed a Systematic Literature Review to synthesize multidisciplinary evidence on the relationship between modern lifestyle factors and infertility in adult women. The SLR approach was selected to ensure transparency, methodological rigor, and replicability in analyzing evidence from epidemiology, reproductive endocrinology, environmental health, and behavioral sciences. The review followed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) 2020 guidelines, which provide structured procedures for study identification, screening, eligibility assessment, and inclusion (Page et al., 2021). Considering that infertility is influenced by complex biopsychosocial mechanisms, SLR offers an appropriate method for integrating diverse study designs and identifying converging patterns across global research.

Literature searches were conducted across four major academic databases: Scopus, PubMed, Web of Science, and ScienceDirect. Additional searches were conducted through Google Scholar to identify relevant regional studies and grey literature. Search terms included combinations of "female infertility", "modern lifestyle", "diet and fertility", "stress and infertility", "circadian disruption", "endocrine disrupting chemicals", "obesity and fertility", and "occupational lifestyle factors", using Boolean operators. Inclusion criteria consisted of peer reviewed articles published between 2013 and 2024, studies focused on adult women, and research that analyzed lifestyle determinants of infertility. Exclusion criteria included studies on male infertility alone, non empirical commentaries, and research lacking clear methodological descriptions. The initial search yielded 538 records. After removing duplicates and screening titles and abstracts, 287 articles remained. Full text assessment resulted in 43 eligible studies for thematic synthesis.

Data extraction was performed using a thematic synthesis approach as outlined by Mays et al. (2020). Extracted variables included study location, population characteristics, lifestyle exposures (stress, diet, physical activity, sleep, substance use, environmental exposures), infertility outcomes, and key findings. Studies were grouped into thematic categories such as metabolic pathways, environmental toxicology, endocrine regulation, occupational lifestyle, and psychosocial determinants. The Critical Appraisal Skills Programme (CASP) checklist was used to evaluate methodological quality. This approach enabled synthesis of heterogeneous evidence and allowed identification of consistent lifestyle related infertility mechanisms across global populations.
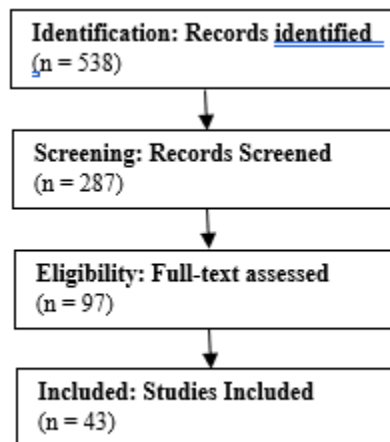


## RESULTS AND DISCUSSION

**Biological, Endocrine, and Metabolic Pathways Linking Modern Lifestyle to Female Infertility**

Modern lifestyle patterns influence fertility in women through interconnected biological, endocrine, and metabolic pathways. These mechanisms operate simultaneously and often synergistically, creating complex conditions that impair ovulation, disrupt menstrual regularity, reduce ovarian reserve, and compromise oocyte quality. Chronic stress, poor diet, sedentary behavior, disrupted sleep patterns, and environmental chemical exposures each contribute to physiological imbalances that increase infertility risk. Understanding these pathways is essential for identifying intervention points and developing comprehensive reproductive health strategies for modern adult women.

One of the most prominent biological mechanisms involves stress induced dysregulation of the hypothalamic pituitary ovarian (HPO) axis. Chronic psychosocial stress activates the hypothalamic pituitary adrenal (HPA) axis, elevating cortisol levels and suppressing the pulsatile release of gonadotropin releasing hormone (GnRH). Reduced GnRH secretion diminishes luteinizing hormone (LH) and follicle

stimulating hormone (FSH) production, impairing follicular development and ovulation. Van et al. (2019) demonstrated that women with higher stress biomarkers showed significantly reduced fecundability, underlining the physiological burden of chronic stress on reproductive functions. Stress also exacerbates insulin resistance and systemic inflammation, creating additional metabolic pathways that negatively influence ovarian function. These overlapping neuroendocrine disturbances illustrate how modern psychological demands can suppress key reproductive processes.

Diet is another central pathway linking modern lifestyle to infertility. Nutritional imbalance, excessive intake of ultra processed foods, high glycemic index meals, and low consumption of micronutrient rich foods disrupt metabolic regulation and hormonal signaling. Increased intake of trans fats and refined carbohydrates has been associated with anovulatory infertility due to altered insulin signaling and ovarian lipid accumulation. Research published in *Fertility and Sterility* shows that diets rich in omega 3 fatty acids, antioxidants, and plant based proteins improve ovulation and reproductive outcomes, while Western dietary patterns increase infertility risk (Skowrońska et al., 2023). Obesity, a major lifestyle related condition, amplifies these risks by elevating leptin, inflammatory cytokines, and androgen levels, which interfere with oocyte development. Conversely, restrictive dieting, low energy availability, and disordered eating can suppress the reproductive axis by reducing leptin and inhibiting GnRH pulses.

Sedentary behavior, increasingly common in digital and urban environments, contributes to infertility through metabolic and inflammatory pathways. Physical inactivity reduces insulin sensitivity and increases adiposity, which in turn disrupts ovarian steroidogenesis. ASRM (2020) highlights that moderate physical activity improves metabolic balance, reduces oxidative stress, and supports ovulatory function, while both extreme exercise and insufficient activity can impair fertility. Physical inactivity also reduces antioxidant capacity, increasing oxidative damage to ovarian tissues and oocytes. Oxidative stress is a major contributor to reduced oocyte quality and accelerated ovarian aging, particularly among women exposed to environmental pollutants.

Circadian rhythm disruption, particularly from shift work and prolonged screen exposure, represents a modern occupational risk factor with substantial reproductive implications. Melatonin, which follows circadian cycles, plays a crucial role in follicular maturation and protection of oocytes from oxidative stress. Irregular sleep patterns and nighttime light exposure reduce melatonin secretion, impairing folliculogenesis and altering sex hormone rhythms. Shift work has been associated with increased menstrual disorders, endometriosis, and decreased fecundability. Wang et al. (2016) reported that long term rotating shift work increases infertility risk due to circadian misalignment and hormonal dysregulation.

Environmental exposures, particularly to endocrine disrupting chemicals (EDCs), represent a powerful and increasingly pervasive component of modern lifestyle infertility pathways. Chemicals such as bisphenol A (BPA), phthalates, parabens, PFAS, and organophosphate pesticides disrupt estrogen and androgen regulation, reduce ovarian reserve, and alter follicular development. Li et al. (2016) found strong associations between urinary phthalate concentrations and diminished antral follicle counts among reproductive age women. Air pollution exposure, particularly PM2.5, has also been implicated in reduced fertility, increased miscarriage, and impaired embryonic development due to oxidative damage and inflammatory responses. Urban environments with high pollution burdens expose women to cumulative chemical and particulate exposures that compound infertility risks.

Alcohol consumption and smoking also impair reproductive functioning through toxic effects on hormone production, ovarian structure, and DNA integrity. Smoking accelerates follicular atresia, reduces ovarian reserve, and increases the likelihood of early menopause. ESHRE (2020) reports significantly lower IVF success rates among smokers, demonstrating that cigarette toxicity directly harms reproductive potential. Alcohol contributes to hormonal imbalance, disrupts menstrual regularity, and elevates oxidative

stress. Even moderate alcohol intake has been associated with reduced fecundability in multiple prospective cohort studies.

Age, an overarching biological determinant, interacts with modern lifestyle patterns in ways that amplify infertility risk. Women are increasingly postponing childbearing, and aging naturally reduces oocyte quantity and quality. When combined with stress, toxic exposures, poor diet, and sedentary behavior, age related fertility declines occur more rapidly. IFFS (2021) reports a global rise in age related infertility, particularly in urban populations where modern lifestyle factors are pervasive.

These biological, endocrine, and metabolic pathways demonstrate that infertility in modern women cannot be attributed to isolated behaviors. Instead, modern lifestyles create cumulative and interacting physiological burdens that disrupt multiple reproductive processes simultaneously. The scientific evidence highlights the need for integrated reproductive health strategies that address diet, stress, physical activity, sleep, occupational exposures, and environmental toxins as interconnected determinants of female fertility.

**Sociocultural, Behavioral, and Environmental Influences on Modern Lifestyle Infertility**

Infertility is shaped not only by biological mechanisms but also by sociocultural norms, behavioral patterns, and environmental contexts that characterize modern living. Urbanization, digital lifestyle trends, shifting gender roles, evolving work structures, and widespread exposure to environmental pollutants collectively contribute to lifestyle patterns that heighten infertility risk among adult women. These factors interact in complex ways that influence reproductive decision making, health behavior, and physiological vulnerability.

Urbanization is a defining sociocultural factor shaping modern infertility. Women living in large metropolitan areas experience higher levels of stress, longer commuting times, greater exposure to air pollution, and increased reliance on processed foods. These urban lifestyle features elevate reproductive risk. A study in *Human Reproduction* found that women residing in high pollution urban centers experienced significantly reduced ovarian reserve markers compared with those living in cleaner environments (Abareshi et al., 2020). Urban environments also promote sedentary behavior due to desk based occupations and reduced opportunities for physical activity. These lifestyle factors compound metabolic dysregulation, contributing to ovulatory disorders and PCOS exacerbation.

Digital lifestyles have introduced novel behavioral patterns that affect reproductive health. Prolonged screen time, common in both professional and personal settings, disrupts sleep patterns through blue light exposure that suppresses melatonin. Sleep disruptions impair reproductive hormone synthesis and are linked to menstrual irregularities. Increased reliance on digital platforms has also been associated with reduced physical activity, social isolation, and elevated stress. Although digital tools provide reproductive health information, they can also contribute to lifestyle imbalances when used excessively without boundaries.

Cultural shifts in gender roles and work expectations contribute to delayed childbearing, increased occupational burdens, and greater stress. Modern women often balance career advancement with social expectations, contributing to higher stress levels and reduced time for health promoting behaviors. Women who work in demanding sectors such as healthcare, finance, or hospitality face high workloads, irregular schedules, and greater exposure to shift work, all of which impair reproductive health. Wang et al. (2016) reported that rotating shift workers exhibit elevated infertility rates and increased menstrual disorders due to circadian disruptions.

Socioeconomic pressures interact with lifestyle risks in important ways. Economic instability, rising living costs, and limited social support systems influence reproductive decision making. Women in lower socioeconomic groups face higher exposure to environmental pollutants, unhealthy diets, and occupational hazards. These conditions exacerbate infertility risks while limiting access to reproductive healthcare.

Behavioral stress associated with financial insecurity also contributes to HPA axis activation and reproductive suppression.

Environmental inequality further shapes reproductive risks. Exposure to chemicals such as phthalates, BPA, pesticides, and heavy metals is significantly higher in low income communities due to proximity to industrial zones, inadequate housing, and limited environmental regulation. Air pollution exposure is similarly stratified, with disadvantaged populations experiencing higher exposure to PM2.5 and nitrogen dioxide. Li et al. (2016) showed that women in polluted regions experienced earlier declines in ovarian reserve, highlighting the intersection between environmental injustice and reproductive outcomes.

To summarize these sociocultural, behavioral, and environmental pathways, the table below synthesizes key modern lifestyle determinants and their documented effects on female infertility.

**Table 1. Modern Lifestyle Determinants and Their Effects on Female Infertility**

| Lifestyle Determinant | Pathway | Documented Effects on Fertility |
|---|---|---|
| Chronic stress | HPA axis activation, cortisol elevation | Anovulation, irregular cycles, reduced fecundability |
| Poor diet & obesity | Insulin resistance, inflammation | PCOS exacerbation, ovulatory dysfunction |
| Sedentary lifestyle | Metabolic imbalance, oxidative stress | Reduced ovulation, low oocyte quality |
| Shift work | Circadian disruption, reduced melatonin | Menstrual disorders, lower fertility |
| Environmental toxins (BPA, phthalates, PFAS) | Endocrine disruption | Reduced ovarian reserve, early menopause |
| Air pollution | Oxidative stress, inflammation | Lower ovarian reserve, miscarriage |
| Smoking & alcohol | Ovarian toxicity, DNA damage | Reduced oocyte quality, early menopause |
| Delayed childbearing | Age related decline | Reduced ovarian reserve and oocyte quality |

These sociocultural and environmental influences underscore that female infertility in modern societies is not solely a biological issue but also a reflection of broader lifestyle and environmental transformations. Addressing infertility therefore requires public health strategies that incorporate environmental regulation, workplace health policies, reproductive education, and community based interventions.

**Integrated Public Health Responses, Preventive Interventions, and Policy Implications for Addressing Lifestyle-Related Infertility in Modern Women**

Addressing infertility associated with modern lifestyle patterns requires an integrated public health response that combines clinical intervention, preventive lifestyle modification, environmental regulation, occupational health reform, and social policy innovation. Modern infertility is a multidimensional issue, shaped by intersecting biological, behavioral, and environmental determinants. Therefore, public health strategies must operate across individual, community, institutional, and policy levels to effectively mitigate risk. The increasing prevalence of infertility among women in urban and industrialized environments

underscores the need for coordinated action that aligns reproductive health strategies with broader lifestyle and societal changes.

At the individual level, lifestyle modification programs have demonstrated significant potential for improving fertility outcomes. Evidence shows that targeted interventions addressing diet, physical activity, stress management, and sleep hygiene can restore menstrual regularity and improve ovulatory function. A study published in *Human Reproduction Update* highlights that women who participated in structured lifestyle modification programs that included balanced nutrition, moderate exercise, and cognitive behavioral stress reduction experienced significant improvements in fertility outcomes, including enhanced fecundability and improved oocyte quality (Shaji et al., 2019). Weight management is especially critical for women with obesity related infertility and for women with PCOS. Even modest weight loss of 5 to 10 percent has been shown to improve ovulation and menstrual regularity. Public health initiatives should therefore promote accessible lifestyle counseling integrated into reproductive health services.

Stress reduction interventions are another essential component of reproductive health promotion. Chronic psychosocial stress has well documented effects on the reproductive axis, and interventions such as mindfulness based stress reduction, yoga, and cognitive behavioral therapy have shown promising results. Van et al. (2019) recorded significant increases in conception probability among women who participated in evidence based stress reduction programs. Such programs should be widely implemented in workplace wellness programs, reproductive health clinics, and community health centers. Given that stress is deeply connected to modern work culture, employers must play a role in providing supportive occupational environments that reduce burnout and protect employee well being.

Environmental regulation represents a critical policy dimension in addressing infertility risks associated with modern chemical exposures. Endocrine disrupting chemicals are pervasive in food packaging, cosmetics, cleaning products, and household materials. Exposure reduction requires both regulatory enforcement and public awareness. Countries in the European Union have introduced restrictions on BPA, phthalates, and PFAS due to their reproductive toxicity. These regulatory frameworks offer models for other regions, particularly in Asia and Latin America, where regulations remain inconsistent. Reproductive health policies must incorporate environmental toxicology considerations by strengthening chemical safety standards, improving labeling transparency, and expanding environmental monitoring systems. For women in urban centers with high pollution exposure, public health interventions should include education on household exposure reduction, such as using BPA free products and avoiding microwaving plastic containers.

Occupational health reforms are equally critical for reducing infertility associated with shift work, sedentary office culture, and high stress environments. Employers should be encouraged or mandated to adopt worker friendly scheduling practices that minimize circadian disruption. Rotating shift schedules should be redesigned to reduce frequency and duration of night shifts. Workplaces should integrate active design principles that reduce sedentary behavior, such as sit stand desks, movement breaks, ergonomic workspaces, and access to recreational facilities. Occupational reproductive health policies should also include protections for women exposed to pesticides, solvents, and toxic industrial chemicals. Regulatory agencies must enforce workplace safety standards and monitor exposure levels in high risk industries such as manufacturing, agriculture, and healthcare.

Access to reproductive healthcare services must be expanded to ensure early detection and management of infertility. Many women delay seeking fertility assistance due to stigma, cost, or lack of knowledge. Public health systems should provide regular reproductive health screenings that include ovulatory assessment, hormone testing, ovarian reserve evaluation, and counseling on lifestyle related risks. Integration of lifestyle counseling into primary healthcare can help women identify modifiable factors early. Policies that subsidize fertility evaluations and treatments can also reduce socioeconomic disparities in

infertility care. Digital health tools can enhance accessibility by providing teleconsultations, menstrual cycle tracking, fertility education, and personalized lifestyle recommendations. However, these digital tools must be evidence based, culturally appropriate, and accessible to diverse populations.

Socioeconomic inequities significantly shape infertility risk and access to interventions. Women in low income communities experience higher exposure to environmental pollutants, greater occupational hazards, poorer diet quality, and limited healthcare access. Addressing these disparities requires multisectoral collaboration involving environmental regulators, labor ministries, social protection agencies, and public health authorities. Policymakers should design targeted interventions that reduce exposure to urban pollution, improve access to nutritious foods, and enhance reproductive healthcare infrastructure in underserved communities. Community based programs that offer lifestyle counseling, subsidized reproductive health services, and environmental health education can mitigate inequalities in infertility outcomes.

Public health education and communication strategies must be strengthened to increase awareness of lifestyle related infertility. Reproductive health literacy remains low in many societies, particularly regarding the effects of diet, pollution, stress, and delayed childbearing on fertility. Public awareness campaigns should emphasize the importance of age, lifestyle, and environmental exposures in fertility outcomes. Educational programs in schools and universities can incorporate reproductive health literacy to ensure that young women understand modifiable risk factors early. Media platforms should disseminate evidence based fertility information and counter misinformation that promotes harmful lifestyle practices.

International cooperation is vital because many reproductive health risks are shaped by global consumer markets, multinational industries, and shared environmental challenges. Collaborative research initiatives, global chemical safety agreements, and cross national reproductive health strategies can enhance monitoring and policy responses. Organizations such as WHO, ESHRE, and ASRM play important roles in disseminating guidelines, supporting research, and promoting best practices for managing lifestyle related infertility.

In summary, addressing modern lifestyle related infertility requires integrated public health strategies that go beyond clinical interventions and acknowledge the systemic nature of modern risk exposures. Policy responses must incorporate environmental regulation, occupational reform, lifestyle modification support, digital health innovations, and socioeconomic equity measures. Tackling infertility in the context of modern lifestyles demands coordinated action across health systems, governments, communities, and individuals. By addressing the root causes embedded in contemporary living patterns, public health systems can significantly improve fertility outcomes and promote reproductive well being among adult women.

## CONCLUSIONS

Infertility among adult women is increasingly shaped by modern lifestyle patterns that interact across biological, behavioral, and environmental domains. Chronic stress, poor diet, sedentary behavior, circadian disruption, chemical exposures, and delayed childbearing collectively impair ovarian function, disrupt hormonal regulation, and reduce fertility potential. The findings of this study highlight that infertility cannot be understood in isolation from broader societal transformations driven by urbanization, digitalization, occupational pressures, and environmental degradation. Modern lifestyles create cumulative physiological burdens that require a comprehensive public health response.

Effective intervention demands integrated strategies that address modifiable lifestyle factors while also confronting structural determinants such as environmental pollution, socioeconomic inequality, and occupational risk exposure. Lifestyle modification programs, stress reduction interventions, and reproductive health education can help women reduce individual risk. At the same time, environmental regulation, workplace reforms, and improved access to reproductive healthcare are essential for addressing

systemic influences on fertility. Policy efforts should prioritize early detection, equitable access to care, and preventive strategies that empower women to make informed reproductive decisions.

Ultimately, modern lifestyle related infertility represents a significant public health challenge that requires coordinated cross sectoral action. By integrating clinical, behavioral, environmental, and policy interventions, health systems can promote reproductive resilience and improve fertility outcomes for women in contemporary societies. Addressing these challenges is crucial not only for individual reproductive well being but also for broader social and demographic stability.

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