

THE E-NEWSLETTER MARCH 2026

SMLM Udan

Society of Meaningful life Management

**THEME: ENVIRONMENTAL POLLUTION -
A CRISIS BEYOND CLIMATE**

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President SMLM Message

Editor in chief - Dr Prof (Hony) Maninder Ahuja



We The Team of SMLM –which deals with holistic health of women and beyond academics –we have our public awareness activities and our social contributions and responsibilities at various issued dealing with our day to day life of women –positive health fitness, awareness about VAW and social problems like pollution and health.

Delighted to present a brief insight into our E-Newsletter dedicated to the important theme of environmental pollution and its impact on our health parameters this is from awareness to Action

Through this issue, our team of experts, editors, and contributors share their perspectives on how pollution is silently influencing health across different stages of life — from adolescence to, menstrual hygiene ,routine life what we can do to mitigate the effects of these pollutants and how menopause is also not spared and is impacted It is not only quality of life but life expectancy is also decreased along with rise in all non communicable disease.

Though air and water pollution comes mainly under preview of government policies but in small steps we all can contribute

I sincerely acknowledge the valuable contributions of our distinguished team: Dr. Jaideep Malhotra, for her insight into how Ovulation and fertility is impaired, Dr. Narendra Malhotra gives a very important brief description of Emerging Therapies Addressing Toxin-Induced Oxidative Stress and Hormonal Imbalance. Dr. Neharika – our vibrant and futuristic Editor-in-Chief describes how we can swap our endocrine disruptors for eco-friendly articles of daily use. We have our Secretary Dr. Anita Kant 's thought provoking message and Dr. Avir Sarkar article is a must read with EDC affecting menstrual cycles of women, that is most profound effect EDC on health of women. Dr. Neha Jha – new salts in MHT, Gurmeet Bhalla on effect of pollution on menopause, Dr. Shweta Rai on how pollution effects post-menopausal extensively. Not only we are covering effect of different levels of pollution on health of women through life course but we are tickling your minds by a quiz – do try it. Dr. Punita Hasija, Coordinator of the Clean Faridabad Project is taking a lead in our project of practical aspect of public awareness programs.

“When the Planet Struggles to Breathe, So Do We”

So this is a Call for Responsible Living. And a Time for Collective Action by at least having dustbins at every feasible place to avoid clutter.

“Healing the Earth, Protecting Our Health”

Beyond these slogans it is a Shared Responsibility of all to work for a - From Awareness to Action, by our garbage collection and segregation steps

“Environment and Health: Two Sides of the Same Breath”

Secretary SMLM Message

Dr. Anita Kant



- Chairman, OBG Services, Asian Institute of Medical Sciences, Faridabad, Haryana
- Past president Faridabad Obstetrics & Gynaecology Society (FOGS)
- Past president Faridabad Menopausal Society (FMS)
- Member of FOGSI Vaccination Committee

Dear Readers,

Environmental pollution has emerged as an important yet often overlooked factor which influences women's health in midlife. Exposure to air pollutants, endocrine-disrupting chemicals, heavy metals, and microplastics can affect hormonal balance, metabolic health, and increase cardiovascular risk besides other problems during the menopausal transition. Addressing environmental determinants of health requires awareness, research, and community action. We must advocate and work for cleaner environments, promote preventive strategies, and support policies that protect women's health.

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Editorial



Dr Neharika Malhotra

Consultant OBgyn and infertility at Rainbow IVF, Agra

Dear Readers,

Environmental pollution today represents a crisis that extends far beyond the widely discussed issue of climate change. Invisible chemicals, toxins, and pollutants present in our air, water, food, and everyday products are silently influencing human health in ways that we are only beginning to understand. Among the most concerning of these are endocrine disruptors—substances capable of interfering with hormonal systems and affecting reproductive, metabolic, and overall health.

As clinicians and scientists, it is important that we recognize how environmental exposures shape the health outcomes of the populations we serve. From menstrual irregularities to compromised bone health,

the impact of pollution on human physiology is increasingly evident and supported by emerging research.

This newsletter brings together insights from experts who explore this important topic from multiple perspectives.

Through this edition titled “Environmental Pollution – A Crisis Beyond Climate,” we hope to encourage awareness, stimulate discussion, and inspire responsible actions—both at an individual and collective level. Environmental health is human health, and protecting one ultimately safeguards the other.

Warm regards,
Dr Neharika Malhotra

QUIZ

WORD SCRAMBLE

Unscramble the letters to find the correct word related to menopause or environmental health.

Scrambled Word	Hint
OENESGRTE	Hormone that declines during menopause
SOHT FLAHES	Sudden heat sensation in menopause
XSTOINSI	Harmful environmental chemicals
NODORECIINE DITRUPSR	Chemicals that disturb hormonal balance
APICLTS	Common pollutant affecting hormone health
VINTAMID	Important for bone health
SONEOOPRIS	Bone disease common after menopause
TIXDEVOCAIN	Process of removing toxins

GUESS THE TERM

Identify the correct term.

Clue 1:

Chemicals in plastics, cosmetics, and pesticides that interfere with hormones.

☞ _____

Clue 2:

The natural stage marking the end of menstruation.

☞ _____

Clue 3:

Environmental pollutants linked to earlier menopause.

☞ _____

Did You Know? (True or False)

- ✓ Exposure to air pollution may accelerate menopause.
 True False
- ✓ Phytoestrogen-rich foods may help menopausal symptoms.
 True False
- ✓ Endocrine disruptors are found only in pesticides.
 True False
- ✓ Bone loss during menopause is influenced only by hormones and not environment.
 True False

Answer Key

Word Scramble

OENESGRTE - Estrogen
SOHT FLAHES - Hot flashes
XSTOINSI - Toxins
NODORECIINE DITRUPSR - Endocrine disruptor
APICLTS - Plastics
VINTAMID - Vitamin D
SONEOOPRIS - Osteoporosis
TIXDEVOCAIN - Detoxification

Guess the Term

Endocrine disruptors
Menopause
Air pollution

Did You Know? (True or False)

True/False
True
True
False
False

From Pollution to Prevention: A Call for Meaningful Living



Dr Maninder Ahuja
President – Society of Meaningful Life Management (SMLM)
Editorial Head – SMLM Newsletter

If we have “Polluted Planet we have Fragile Lives” When the Environment Suffers, Humanity Pays”
All of us know and acknowledge that **“Environmental Pollution is the silent threat to “Meaningful Living” if we heal the planet then we can start process of healing ourselves.**

Clean Faridabad – Beginning at the Source

As the President SMLM and Founder and Chief Editor of the SMLM Newsletter and the initiator of the idea that “We Can Clean Faridabad,” I strongly believe that environmental responsibility begins with small, practical steps.

The first step toward a cleaner city is proper garbage segregation at the point of generation. If every household, clinic, and institution separates wet, dry, and hazardous waste, the process of recycling and disposal becomes far more effective. This initiative is being coordinated by Dr. Punita Hasija, the main coordint, with active collaboration from Indian Medical Association Faridabad and Faridabad Obstetrics & Gynecological Society (FOGS). Together, we aim to promote durable, practical, and user-friendly dustbins that make segregation simple and sustainable.

Through this newsletter, we are also sharing photographs of the garbage bins installed earlier as examples of how small community actions can lead to meaningful environmental change. If citizens, healthcare professionals, and institutions work together, Faridabad can truly become a model of civic responsibility and environmental consciousness.

Let us begin where it matters most — at the point where waste is generated.

Responsible Living: Beginning with Clean Land

Environmental pollution today threatens the health of our planet and the well-being of future generations. Pollution of air, water, and land has become a serious concern across the world. While air and water pollution are largely addressed through government policies, regulations, and environmental control programs, land pollution is an area where every citizen can directly contribute to change.

One of the most visible causes of land pollution is improper disposal of garbage.

Streets, markets, and public spaces often suffer from littering because waste is not disposed of responsibly. The most effective solution lies in segregation of garbage at the point of generation. Every household, clinic, institution, and market

should separate wet waste, dry waste, and recyclable waste before disposal. Responsible living begins with simple everyday habits. When we use proper garbage bins and avoid littering, we protect the soil, reduce environmental contamination, and support recycling efforts that conserve natural resources.

Polluted Planet - Fragile Lives”

The Society of Meaningful Life Management (SMLM) has taken practical steps to promote responsible waste disposal in community spaces. As part of this initiative, SMLM Eco-Bins have been introduced to encourage citizens to dispose of garbage responsibly and maintain cleanliness in public areas.

RESPONSIBLE LIVING

Smart Garbage Collection for Shopping Areas

SMLM ECO-BINS FOR MARKETS & MALLS

-  Attractive, colorful design – blends with shopping environments
-  Disposable garbage bags attach easily – quick clearing during peak hours
-  No-touch usage – promotes hygiene in high-footfall areas
-  Stray-animal proof – keeps markets clean and odor-free
-  Easy to clean & maintain – ideal for daily use



WHY IT MATTERS IN SHOPPING AREAS:

- Prevents littering around shops and food stalls
- Improves customer experience and shop hygiene

These bins are durable, practical, and visually attractive, making them suitable for markets, shopping areas, and public spaces. They serve as a reminder that maintaining a clean environment is a shared responsibility of every citizen.

(Insert photographs of SMLM Eco-Bins here as examples of responsible waste management initiatives.)

Clean surroundings reflect responsible communities. If each one of us adopts the simple habit of segregating waste and using garbage bins properly, we can collectively create cleaner markets, healthier neighborhoods, and a more sustainable environment.

Responsible living begins with small actions—starting with where we place our waste.

Endocrine Disruptors: The Hidden Hormone Threat in Our Environment



Dr Neharika Malhotra
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In recent years, doctors across the world have noticed a worrying rise in hormonal disorders, infertility, early puberty, thyroid problems, and metabolic diseases. While lifestyle and genetics play a role, an important and often overlooked factor is endocrine disruptors present in our everyday environment.

Endocrine disruptors are chemicals that interfere with the body's hormonal system. Hormones act as chemical messengers that regulate vital functions such as growth, reproduction, metabolism, and mood. When external chemicals mimic or block these hormones, they can disturb the delicate balance of our endocrine system.

mimic estrogen in the body. Certain cosmetics, perfumes, and personal care products contain phthalates and parabens, which may alter hormone function. Pesticides used on fruits and vegetables may also act as endocrine disruptors.

Even household products such as non-stick cookware, cleaning agents, flame retardants in furniture, and food packaging materials may release chemicals that affect our hormonal health.

Impact on Women's Health and Fertility

For women, exposure to endocrine disruptors can lead to several reproductive health problems. These chemicals have been linked to **irregular menstrual cycles, polycystic ovarian syndrome (PCOS), reduced egg quality, and infertility.**

Pregnant women are particularly vulnerable because these chemicals can cross the placenta and affect the developing fetus. Studies suggest that endocrine disruptors may influence **birth weight, brain development, and future reproductive health of the child.** Early puberty in girls, which is becoming increasingly common, has also been associated with environmental hormonal exposure.

Effects on Men and Children

Endocrine disruptors do not affect women alone. In men, these chemicals have been linked to **declining sperm counts, poor sperm quality, and hormonal imbalance.**

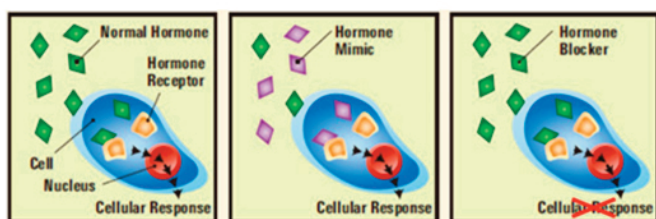
Children are especially sensitive because their bodies are still developing. Exposure during early life may increase the risk of **behavioral disorders, obesity, and metabolic diseases later in life.**



Where Are These Chemicals Found?

The alarming fact is that endocrine disruptors are present in many common items we use daily.

Plastic containers and bottles often contain chemicals like Bisphenol A (BPA) that can



When absorbed in the body, an endocrine disruptor can decrease or increase normal hormone levels (left), mimic the body's natural hormones (middle), or alter the natural production of hormones (right).

What Can We Do to Reduce Exposure?

While it may not be possible to eliminate these chemicals completely, small lifestyle changes can significantly reduce exposure.

Avoid heating food in plastic containers and prefer **glass or stainless steel**

Endocrine Disruptor Swaps For your health & the environment



storage. Wash fruits and vegetables thoroughly to remove pesticide residues. Choose **fresh home-cooked food over packaged or processed foods**. Use **natural or organic personal care products whenever possible**. Reducing the use of plastic bottles, avoiding microwaving plastic, and minimizing exposure to unnecessary chemicals in cosmetics can make a big difference.

The Need for Awareness

Endocrine disruptors are often called “invisible pollutants” because we cannot see or smell them, yet their impact on human health can be significant. Greater public awareness, responsible consumer choices, and stricter regulations are essential to protect future generations.

Our environment directly affects our health, fertility, and the wellbeing of our children. By becoming aware of these hidden hormone disruptors, we can take small but meaningful steps toward a healthier future.

FUN LEARNING SNIPPETS: ENVIRONMENT & HEALTH

Air Pollution and Fertility Studies suggest that exposure to fine particulate matter (PM2.5) may reduce ovarian reserve and sperm quality.

✓ Microplastics in the Human Body

Scientists have detected microplastics in human blood, placenta, and reproductive fluids, raising concerns about long-term reproductive health.

✓ Endocrine Disruptors Around Us

Chemicals like BPA, phthalates, and pesticides can mimic hormones and disturb the body’s endocrine system.

✓ Plastic and Hormones

Heating food in plastic containers may release hormone-disrupting chemicals that affect reproductive health.

✓ Indoor Pollution Matters Too

Household air pollution from cooking smoke and chemicals can impact lung health and pregnancy outcomes.

✓ Green Spaces Improve Health

Living near parks and greenery is linked to lower stress, better pregnancy outcomes, and improved mental health.

✓ Water Contaminants

Heavy metals such as lead, mercury, and arsenic in water can affect fetal brain development.

✓ Climate Change and Women’s Health

Extreme heat and environmental stress may increase risks of preterm birth and pregnancy complications.

Dr. Jaideep Malhotra
Director, Rainbow IVF Agra

Are Microplastics Entering Our Reproductive System?

Microplastics & Infertility

In Ovarian Follicular Fluid

- Microplastics detected in eggs of women undergoing IVF

In Semen & Testes

- Microplastics linked to reduced sperm count & motility

In the Placenta

- Microplastics found crossing the placental barrier

Potential Health Effects:

- Oxidative Stress
- Hormone Disruption
- DNA Damage

Did You Know?

- Microplastics act as carriers for toxins like BPA & Phthalates.
- They may harm egg & sperm quality.
- Impact on fertility & fetal development still under study.

Is Plastic Pollution Harming Our Fertility?

Effect of Environmental Pollution on Menstrual Health in reproductive age women



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Introduction

The menstrual cycle is a fundamental indicator of female reproductive and endocrine health, reflecting the coordinated functioning of the hypothalamic–pituitary–ovarian axis. Variations in cycle length, regularity, duration of bleeding and symptomatology can signal underlying hormonal imbalances or systemic health disturbances. In recent years, increasing attention has been directed toward the role of environmental pollution as a potential contributor to menstrual dysfunction [1]. Rapid industrialization, urbanization and widespread chemical usage have intensified human exposure to pollutants such as airborne particulate matter, heavy metals, persistent organic pollutants, and endocrine-disrupting chemicals present in plastics and personal care products [1,2]. Environmental pollutants may exert subtle yet cumulative effects on reproductive physiology, particularly in women of reproductive age [2]. Menstrual irregularities associated with pollution exposure may precede or coexist with infertility, pregnancy complications and adverse gynaecological outcomes. Understanding the relationship between environmental exposures and menstrual health is therefore essential not only for individual clinical care but also for broader public health planning. This chapter examines the biological mechanisms through which environmental pollutants influence menstrual cycles, reviews evidence from recent scientific literature, and discusses the implications for reproductive health practice and policy.

Biological pathways linking environmental pollution and menstrual function

Environmental pollutants affect menstrual physiology through multiple interrelated biological mechanisms. A major pathway involves endocrine disruption. Many industrial chemicals possess estrogenic or anti-estrogenic properties, allowing them to interfere with hormone synthesis,

metabolism or receptor binding. Such disruptions can alter the delicate hormonal balance required for follicular development, ovulation and endometrial shedding, ultimately resulting in abnormal cycle length or irregular menstruation. Oxidative stress represents another important mechanism. Exposure to air pollutants and heavy metals increases the generation of reactive oxygen species, leading to cellular damage within ovarian and endometrial tissues. Chronic oxidative stress can impair follicular maturation and luteal function, thereby affecting cycle regularity and menstrual flow. Inflammatory responses triggered by pollutants may further compromise reproductive tissues and hormonal signalling. Neuroendocrine disruption of the hypothalamic–pituitary–ovarian axis has also been implicated. Certain pollutants can influence neurotransmitter activity or hypothalamic hormone release, altering gonadotropin secretion patterns. Even subtle disturbances in luteinizing hormone or follicle-stimulating hormone pulsatility may translate into ovulatory dysfunction or shortened or prolonged menstrual cycles. Table 1 summarizes the mechanisms and reproductive health implications of environmental pollution on menstrual cycles.

Pollutant Category	Primary Biological Mechanisms	Effects on Menstrual Physiology	Reproductive Health Implications
Air pollutants (PM2.5, NOx)	Systemic inflammation, oxidative stress	Altered cycle length, dysmenorrhea	Increased risk of anovulation and subfertility
PFAS and persistent organic pollutants	Endocrine disruption, impaired steroidogenesis	Irregular cycles, delayed ovulation	Reduced fecundability, hormonal imbalance
Phthalates and bisphenols	Estrogen receptor interference, HPO axis disruption	Increased cycle variability, abnormal bleeding	Early reproductive aging, fertility challenges
Heavy metals	Oxidative damage, ovarian toxicity	Amenorrhea, prolonged cycles	Ovarian dysfunction, adverse pregnancy outcomes
Menstrual product contaminants	Local tissue exposure, immune modulation	Theoretical risk of cycle disturbance	Need for precaution and product regulation

Table 1. Mechanisms and reproductive health implications of Environmental Pollution on Menstrual Cycles

Air pollution and menstrual cycle disturbances

Ambient air pollution has emerged as a significant environmental determinant of reproductive health. Fine particulate matter (PM_{2.5}), nitrogen oxides and ozone are known to penetrate deep into the respiratory system and enter systemic circulation. Epidemiological studies have reported associations between long-term exposure to particulate air pollution and increased prevalence of irregular menstrual cycles, abnormal cycle length and dysmenorrhea.

Recent population-based analyses using digital menstrual tracking platforms have suggested that higher exposure to particulate matter correlates with deviations from normal cycle length, including both shortened and prolonged cycles. The proposed mechanisms include systemic inflammation, oxidative stress and disruption of endocrine signalling pathways. While these studies benefit from large sample sizes and real-time cycle tracking, they also face limitations related to self-reported data and potential confounding by socioeconomic and lifestyle factors.

Nevertheless, the consistency of observed associations across diverse populations suggests that air pollution may play a contributory role in menstrual irregularities, particularly among women residing in highly polluted urban environments.

Persistent organic pollutants and menstrual health

Persistent organic pollutants, including per- and poly-fluoro-alkyl substances (PFAS), have attracted increasing concern due to their environmental persistence and bio-accumulative nature. These compounds are widely used in industrial applications and consumer products such as non-stick cookware, water-resistant fabrics and food packaging materials. PFAS can remain in the human body for extended periods and have been detected in blood, follicular fluid and reproductive tissues.

Studies examining PFAS exposure have reported alterations in menstrual cycle length, hormonal profiles and time to pregnancy. The endocrine-disrupting properties of these substances may interfere with steroid hormone production and ovarian reserve. Some evidence suggests that PFAS exposure is associated with delayed ovulation or subtle changes in luteal phase dynamics, which may manifest clinically as irregular menstruation.

Although findings across studies are not entirely uniform, the growing body of literature indicates that chronic exposure to persistent organic pollutants may adversely influence menstrual and reproductive health, warranting further investigation into exposure thresholds and vulnerable life stages.

Plastic-associated chemicals and endocrine disruption

Plastic-derived chemicals, particularly phthalates, bisphenols and parabens, are ubiquitous in modern environments. These substances are commonly found in food packaging, personal care products, cosmetics and medical devices. Phthalates, in particular, are known endocrine disruptors and are frequently measured in human biomonitoring studies due to widespread exposure.

Research has linked higher levels of phthalate metabolites to alterations in reproductive hormone concentrations and changes in menstrual cycle characteristics. Women with elevated exposure may experience variations in cycle length, increased cycle variability or changes in bleeding patterns. Adolescents and young women may be especially susceptible; as hormonal systems are still maturing during these stages.

The intimate and repeated use of personal hygiene and menstrual products containing plastic-associated chemicals raises additional concerns regarding localized exposure. While systemic absorption through these routes is still being studied, the potential for cumulative effects highlights the importance of product safety and chemical transparency.

Heavy metals and menstrual irregularities

Heavy metals such as lead, cadmium and mercury are well-established reproductive toxicants. Exposure occurs through contaminated water, food sources, industrial emissions and occupational settings. These metals can accumulate in the body over time and interfere with multiple physiological systems, including reproductive function.

Clinical and epidemiological studies have associated elevated levels of heavy metals with menstrual disturbances such as amenorrhea, prolonged cycles and irregular bleeding. The toxic effects of these metals are thought to result from oxidative damage, disruption of estrogen receptor activity and impaired ovarian steroidogenesis. Additionally, heavy metals may accelerate ovarian aging, further influencing menstrual patterns.

Although exposure levels vary widely across populations, women in low-resource settings or high-exposure occupations may face disproportionate risks, underscoring the importance of environmental monitoring and occupational health safeguards.

Menstrual products as a potential exposure source

Recent analyses have identified the presence of chemical contaminants, including PFAS and plasticizers, in certain menstrual products. Given the sensitive

nature of the vaginal mucosa and the frequency of product use, concerns have been raised regarding potential health effects. While direct evidence linking contaminated menstrual products to altered cycle patterns remains limited, the issue has prompted calls for stricter regulation and clearer labelling. Public awareness of this issue has increased, emphasizing the need for further research to quantify exposure levels and assess long-term reproductive consequences. Until more definitive data are available, adopting a precautionary approach to product selection may be advisable.

Complexity of exposure mixtures and vulnerable windows

One of the major challenges in environmental reproductive health research lies in the complexity of real-world exposures. Individuals are rarely exposed to a single pollutant; rather, they encounter mixtures of chemicals whose combined effects may be additive or synergistic. Moreover, the timing of exposure plays a critical role in determining outcomes. Sensitive windows include prenatal development, adolescence and the preconception period. Exposure during these stages may have lasting effects on reproductive function and menstrual regulation. Longitudinal studies that account for cumulative exposure and critical timing are therefore essential to advance understanding in this field.

Author (Year)	Study Design & Population	Type of Environmental Exposure	Key Menstrual Outcomes Assessed	Main Findings
Wang et al. (2022) [3]	Prospective cohort of reproductive-aged women	Ambient air pollution (PM2.5, NO ₂)	Cycle length, regularity	Higher long-term PM2.5 exposure was associated with increased odds of abnormal cycle length and irregular menstruation
Harley et al. (2023) [4]	Longitudinal biomonitoring study	PFAS (multiple compounds)	Cycle length, ovulatory patterns	Elevated PFAS levels were linked to altered cycle duration and delayed ovulation
Zhou et al. (2021) [5]	Cross-sectional population study	Phthalates (urinary metabolites)	Menstrual regularity, bleeding patterns	Higher phthalate exposure was associated with increased menstrual variability
Pollack et al. (2020) [6]	Preconception cohort study	Plastic-associated chemicals	Hormonal profiles, cycle length	Certain phthalates were related to shorter luteal phases and altered estrogen levels
Nkomo et al. (2022) [7]	Community-based observational study	Heavy metals (lead, cadmium)	Amenorrhea, cycle length	Chronic metal exposure was associated with longer and irregular menstrual cycles

Table 2. Table summarizing recent literature on Environmental Pollutants and Menstrual Cycle characteristics

Table 2 synthesizes recent epidemiological and cohort studies examining the association between environmental pollutants and menstrual cycle characteristics among women of reproductive age. Across diverse study designs, including prospective cohorts, longitudinal biomonitoring studies and cross-

sectional population-based analyses, consistent evidence emerges that exposure to environmental pollutants is associated with alterations in menstrual function. Air pollution, particularly fine particulate matter and nitrogen oxides, has been repeatedly linked to abnormal cycle length and increased menstrual irregularity. Studies focusing on persistent organic pollutants such as PFAS demonstrate associations with changes in cycle duration and ovulatory timing, suggesting disruption of normal hormonal regulation. Plastic-associated chemicals, especially phthalates, were commonly associated with increased menstrual variability, altered bleeding patterns and changes in luteal phase dynamics. Additionally, exposure to heavy metals such as lead and cadmium was found to correlate with more severe menstrual disturbances, including prolonged cycles and amenorrhea, particularly in settings with chronic environmental exposure. Overall, the findings summarized in Table 1 indicate that different classes of environmental pollutants may influence menstrual cycle characteristics through distinct but overlapping mechanisms, reinforcing the role of environmental exposures as important, modifiable determinants of menstrual and reproductive health.

Conclusion

Environmental pollution represents an increasingly recognized factor influencing menstrual cycle characteristics and overall reproductive health. Evidence suggests that air pollution, persistent organic pollutants, plastic-associated chemicals and heavy metals may disrupt hormonal regulation and reproductive tissue function, leading to menstrual irregularities. While methodological limitations remain, the convergence of epidemiological and mechanistic findings supports a cautious approach to environmental exposures. Addressing environmental determinants of menstrual health requires coordinated efforts across clinical practice, research and public policy. Protecting reproductive health in the context of environmental change is an emerging priority that demands sustained attention.

Practical implications

From a clinical perspective, healthcare providers should consider environmental exposure histories when assessing menstrual irregularities, particularly in cases where conventional causes are not evident. Counselling on exposure reduction strategies may form part of holistic reproductive healthcare. At the public health level, stronger regulatory controls on hazardous chemicals, improved air quality standards

and enhanced monitoring of consumer products are essential. Transparency in manufacturing and labelling of menstrual and personal care products can empower individuals to make informed choices.

Future research should prioritize longitudinal designs, standardized menstrual health outcomes and assessment of chemical mixtures. Interdisciplinary collaboration will be critical to translating scientific evidence into effective interventions that safeguard menstrual and reproductive health across populations.

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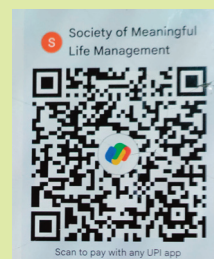
Website: www.smlm.in

For member registration

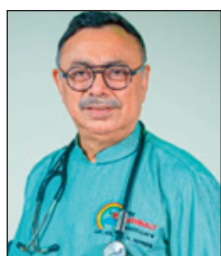
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EMERGING THERAPIES ADDRESSING TOXIN-INDUCED OXIDATIVE STRESS AND HORMONAL IMBALANCE



Dr Narendra Malhotra
Director Rainbow IVF, Agra

Increasing environmental exposure to pollutants such as endocrine-disrupting chemicals, heavy metals, microplastics, and air pollutants has been linked to oxidative stress, inflammation, and disruption of hormonal signaling. These mechanisms may contribute to reproductive disorders, reduced fertility, menstrual disturbances, and adverse pregnancy outcomes. Consequently, recent research has focused on therapies that can counteract toxin-induced oxidative damage and restore hormonal balance.

One promising strategy involves the use of antioxidant-based therapies. Nutraceuticals such as coenzyme Q10, melatonin, N-acetyl cysteine (NAC), resveratrol, and vitamins C and E have been shown to reduce oxidative stress and improve mitochondrial function in reproductive tissues. In women undergoing assisted reproductive techniques, CoQ10 supplementation has been associated with improved oocyte quality and ovarian response.

Another emerging area is the use of anti-inflammatory and detoxification-support therapies. Compounds such as curcumin, omega-3 fatty acids, and polyphenols may reduce inflammation caused

by environmental toxins and help restore endocrine signaling pathways. Additionally, advances in gut microbiome research suggest that maintaining a healthy gut flora may assist in the metabolism and elimination of endocrine-disrupting chemicals. Innovative regenerative approaches are also being explored. Platelet-rich plasma (PRP) therapy, mitochondrial support strategies, and targeted antioxidant treatments are under investigation for improving ovarian function and mitigating toxin-related reproductive damage.

While these therapies show promise, experts emphasize that reducing environmental exposure remains the most effective preventive strategy. Alongside medical interventions, lifestyle modifications such as minimizing plastic use, improving air quality exposure, and consuming antioxidant-rich diets can play an important role in protecting hormonal and reproductive health. Overall, the integration of environmental awareness, lifestyle interventions, and emerging therapeutic approaches may help address the growing burden of toxin-related hormonal imbalance and infertility in the modern world.

Environmental Pollution and Bone Health

A Brief Review for the Medical Community with Public Health Guidance



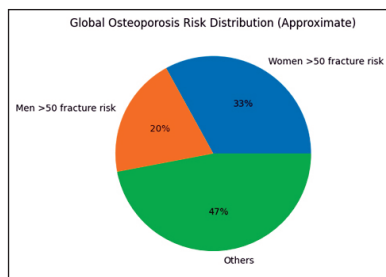
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Introduction

Environmental pollution is widely recognized as a major contributor to respiratory and cardiovascular disease. Recent research has highlighted its impact on skeletal health as well. Long-term exposure to air pollutants such as particulate matter (PM2.5), nitrogen oxides, and heavy metals has been associated with decreased bone mineral density (BMD), increased osteoporosis risk, and a higher incidence of fractures.

Global Burden of Osteoporosis

Osteoporosis affects more than 200 million



people worldwide. Osteoporotic fractures occur approximately every three seconds globally. Nearly one in three women

and one in five men above the age of 50 will experience an osteoporotic fracture during their lifetime.

Major Environmental Pollutants Affecting Bone Health

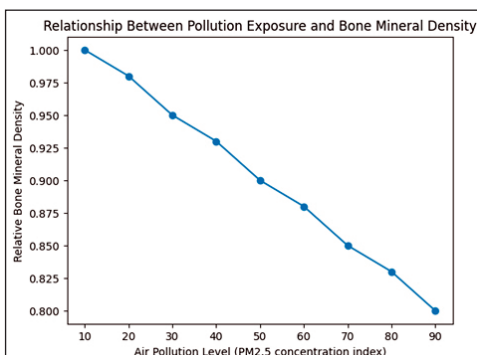
Important pollutants implicated in bone loss include fine particulate matter (PM2.5), nitrogen dioxide, ozone, carbon monoxide, and heavy metals such as cadmium and lead. These pollutants enter the body through inhalation or ingestion and may interfere with normal bone remodeling processes.

Mechanisms of Bone Damage

Environmental pollutants contribute to bone loss through multiple mechanisms including oxidative stress, chronic systemic inflammation, hormonal disruption, and direct toxicity to bone cells. Increased osteoclast activity and reduced osteoblast function ultimately lead to reduced bone density.

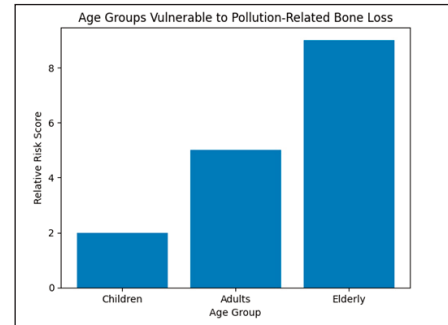
Vulnerable Population Groups

Certain population groups appear particularly vulnerable to pollution-related bone damage. These include elderly individuals, postmenopausal women, individuals living in highly polluted urban environments, and occupational groups with prolonged outdoor exposure such as traffic police and street vendors.



Clinical Pearls for Doctors

- Consider environmental pollution exposure as a potential risk factor in patients with early osteoporosis or unexplained bone loss.



- Urban patients with high pollution exposure may benefit from earlier BMD screening.
- Evaluate vitamin D deficiency aggressively in populations living in highly polluted cities where sunlight penetration is reduced.
- Encourage lifestyle modification including outdoor exercise in cleaner environments and nutritional optimization.
- Patients with chronic respiratory disease due to pollution may have reduced physical activity, indirectly increasing osteoporosis risk.
- In elderly patients presenting with fragility fractures, environmental exposure history may provide additional preventive insights.

Public Health Implications

Environmental pollution may represent a modifiable risk factor for osteoporosis. Public health strategies aimed at improving air quality may therefore have benefits extending beyond respiratory and cardiovascular health to include skeletal health.

Practical Tips for the General Public

- Reduce outdoor exposure during high pollution.
- Use N95 masks in heavy traffic or highly polluted environments.
- Use indoor air purification systems with HEPA filters to improve indoor air quality.
- Maintain adequate calcium intake (1000–1200 mg/day).
- Ensure sufficient vitamin D through sunlight exposure and supplementation.
- Engage in regular weight-bearing physical activity.
- Avoid smoking & excessive alcohol consumption.
- Older adults should undergo periodic bone mineral density screening.

Conclusion

Emerging evidence suggests that environmental pollution plays a significant role in bone health. Reducing exposure to environmental pollutants along with promoting healthy lifestyles may help decrease the burden of osteoporosis and fracture risk in the population.

Newer Drugs in Menopause Management:

Expanding Beyond Conventional Hormone Therapy



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Menopause represents a significant physiological transition in a woman's life characterized by cessation of ovarian follicular activity and decline in circulating estrogen levels. Approximately 70–80% of women experience vasomotor symptoms (VMS) such as hot flashes and night sweats during the menopausal transition. These symptoms may persist for several years and can significantly impair sleep quality, mood, and overall quality of life. Although menopausal hormone therapy (MHT) remains the most effective treatment for vasomotor symptoms, its use may be limited in women with contraindications such as hormone-sensitive malignancies, thromboembolic disorders, or cardiovascular disease. Consequently, research in recent years has focused on non-hormonal and targeted pharmacological therapies for menopause management.¹

Neurokinin Receptor Antagonists

A major breakthrough in the management of menopausal vasomotor symptoms is the development of neurokinin receptor antagonists targeting the hypothalamic thermoregulatory pathway. Estrogen deficiency during menopause leads to increased activity of KNDy neurons (kisspeptin, neurokinin B, dynorphin) in the hypothalamus, resulting in thermoregulatory instability and triggering hot flashes.

Fezolinetant, a selective neurokinin-3 receptor antagonist, is the first non-hormonal drug approved for the treatment of moderate to severe vasomotor symptoms associated with menopause. Clinical trials have demonstrated that fezolinetant significantly reduces both the frequency and severity of hot flashes compared with placebo, with improvements observed as early as the first few weeks of therapy.² The recommended dose is 45 mg orally once daily. Because it does not act through estrogen pathways, fezolinetant provides an important therapeutic option for women who are unable or unwilling to use hormone therapy.³

Another emerging agent is elinzanetant, a dual NK1 and NK3 receptor antagonist currently undergoing advanced clinical trials. Preliminary evidence suggests that it may reduce vasomotor symptoms while also improving sleep disturbances commonly associated with menopause.⁴

Selective Estrogen Receptor Modulators

Selective estrogen receptor modulators (SERMs)

represent another therapeutic approach in menopause management. Ospemifene, an oral SERM, is approved for the treatment of moderate to severe dyspareunia due to vulvovaginal atrophy, a key component of genitourinary syndrome of menopause. It acts as an estrogen agonist on vaginal epithelium, improving epithelial maturation and vaginal lubrication, while demonstrating minimal stimulation of breast tissue.⁵

Tissue-Selective Estrogen Complex

The concept of tissue-selective estrogen complexes (TSEC) has emerged as an innovative strategy to maximize estrogen benefits while minimizing adverse effects. The combination of conjugated estrogens with bazedoxifene provides effective relief from vasomotor symptoms and prevention of postmenopausal osteoporosis while protecting the endometrium from estrogen-induced proliferation. This combination eliminates the need for progestogens in women with an intact uterus and has demonstrated good tolerability in clinical trials.⁶

Emerging Estrogen Molecules

Another promising development is estetrol (E4), a naturally occurring estrogen produced by the fetal liver during pregnancy. Estetrol has unique pharmacological properties with selective estrogen receptor modulation and minimal hepatic stimulation. Preliminary studies suggest that it may offer effective symptom control with a potentially improved safety profile, including a lower risk of thrombotic events compared with traditional estrogens.⁷

Conclusion

Recent advances in menopause pharmacotherapy are shifting the focus from traditional hormone therapy toward mechanism-based and individualized treatments. Neurokinin receptor antagonists such as fezolinetant, emerging agents like elinzanetant, SERMs such as ospemifene, tissue-selective estrogen complexes, and next-generation estrogens like estetrol represent promising options for managing menopausal symptoms. These developments are likely to broaden the therapeutic landscape and provide safer and more personalized treatment strategies for women undergoing the menopausal transition.

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EDC's and Menopause



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EDC's i.e. Endocrine Disrupting Chemicals are synthetic compounds which mimic natural hormones. They can turn on/turn off/or alter normal hormonal signals, even in extremely low amounts. They are also known to cause oxidative stress leading to apoptosis.

Another mechanism of their action is epigenetic modification.

The common ED'S to look out for are:

1. BPA (Bisphenol A).

Found in many plastic products like food & drink containers, cling films, & in the lining of tin cans. BPA is water soluble so it easily leaches into food and water.

Phthalates: A particularly nasty group of chemicals found in toiletries, cosmetics and household cleaning products.

PFAS: (Perfluoroalkyl and polyfluoroalkyl substances) commonly found in non-stick pans, & textile coatings.

Parabens: Compounds used as preservatives in thousands of cosmetics, food, and pharmaceutical products.

Pesticides and Herbicides

PCB's (Polychlorinated biphenyls) : Highly toxic synthetic material used in inks, paints and dyes.

Dioxin: They are unintentional by-products of many industrial processes involving chlorine, including waste incineration, chemical and pesticide manufacturing, pulp and paper bleaching. Small molecules drift into the atmosphere and end up in the soil, where microbes eat them. From there they are passed up the food chain. Food represents our largest exposure to Dioxins. Heavy metals: Cadmium, mercury, arsenic and lead.

According to a recent Washington University study, in 5700 women, Cooper and colleagues proved that phthalates and PCB'S which humans are exposed to through diet, personal care products, & plastics are associated with approximately 2.5 years earlier onset of menopause. This is concerning as menopause can significantly alter a woman's quality of life and is associated with an increased risk of osteoporosis, depression and cardiovascular disease. EDC'S exposure has also been associated with more intense menopausal symptoms, making the menopausal transition more difficult in some women.

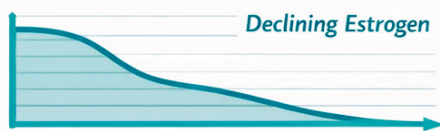
Endocrine Disrupting Chemicals (EDCs) & Menopause:

Environmental Chemicals and Hormonal Health

What Are EDCs?



Common Sources of Exposure



Key Chemicals



Health Impacts



How to Reduce Exposure



UBIQFIT

Soft Gel Capsules

Ubidecarenone 100 mg, Lycopene 5000 mcg, Omega-3 Fatty Acid (EPA 90 mg + DHA 60 mg) Mixed
Carotene 10% 10.33 mg, Wheat Germ Oil 25 mg, Calcium Ascorbate 75 mg, Piperine 5 mg
Vitamin B-12 mcg, Selenium Dioxide Monohydrate 75 mcg, Zinc Sulphate Monohydrate 27.45 mg

JJ SR 200

Tablet

Natural Micronized Progesterone Sustained Release Tablets 200 mg

ZILOFEM

Soft Gel Capsules

Evening Primrose Oil 1000mg & Tocotrienol 30 mg, Softgels Capsules

VINEC-BR

Tablet

Trypsin 96 mg, Bromelain 180 mg, Rutoside Trihydrate 200 mg

ZILOCAL MAX

Soft Gel Capsules

Calcium Citrate malate 1000mg., Methylcobalamin 1500 mcg, Zinc Sulphate Monohydrate 7.5 mg,
Boron as Sodium Borate 5 mg, L-Methy Folate 800 mcg, Calcitriol 0.25 mcg, magnesium Oxide 50 mg

Rx For Full Dose of Amino Acid

UB-AMINO

Tablets

L-Leucine (101mg), L-Isoleucine (67mg), L-Lysine Hydrochloride (75mg), L-Phenylalanine (68mg),
L-Threonine (53mg), L-Valine (86mg), L-Tryptophan (23mg), L-Methionine (59mg),
L-Histidine (38mg), L-Arginine (100mg) & Vitamin D3 (1000IU) Tablets