



Original Research Paper

Environmental Pollution and Adverse Pregnancy Outcomes: Rethinking India's Abortion Law from a Human Rights Perspective

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Abstract

Environmental pollution has emerged as a quite worrisome public health problem and it holds high importance for maternal and fetal health. The study highlights the links between environmental pollution and pregnancy outcomes and also superficially analyses the abortion law in India with the urge to assess it in the light of human rights principles. The research is of doctrine and descriptive design with secondary data sources from journal achievements with peer review system, legal provisions, judicial decisions, government reports and international publications. Qualitative content analysis shows that: Exposure to air pollutants, heavy metals, pesticides, and industrial chemicals are closely related to miscarriage, congenital abnormalities, pre-term birth and fetal growth restriction. The study reveals the current shortcomings of the Medical Termination of Pregnancy Act on pollution induced reproductive hazards and suggests to incorporate environmental health and reproductive rights or integrate reproductive health with human rights in the law to guarantee the reproductive justice and improved maternal health.

Keywords: Environmental Pollution, Adverse Pregnancy Outcomes, Abortion Law, Medical Termination of Pregnancy Act, Human Rights, Reproductive Rights, Maternal Health, Environmental Justice.

chemicals (EDCs) (Stillerman et al., 2008; Sun et al., 2022).

Introduction

Environmental pollution has now become one of the biggest public health issues in the 21st century, and is particularly felt by the weaker section of society, specially the pregnant women and fetuses. Environmental load of toxicants has systemically grown due to accelerated industrialisation, urbanisation, vehicular exhaust emissions, and unethical disposal of wastes, exposure to pesticides and soil, water and air pollution in developing countries like India. There are many epidemiological studies of adverse pregnancy outcomes, such as spontaneous abortion, congenital anomalies, fetal growth restriction, stillbirth, preterm birth, and low birth weight, related to environmental pollutant exposure in mothers, including fine particulate matter (PM_{2.5}), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃), heavy metals, pesticides, and endocrine-disrupting

Pollution not only poses a risk to the health of mother and fetus, but also gives rise to serious legal and ethical issues regarding autonomy of procreation and easy access to safe abortions. The MTP Act of 1971 (2021) in India, which allowed abortions under certain conditions, does not specifically mention 'environmental induced abnormalities of foetus' or increased environment risks as a separate legal ground, subject to reproductive protection. As a result, women at risk of pollution related foetal anomalies may find they are unable to navigate through the procedures, are exposed to uncertainty regarding medical outcomes, and are often entangled in legal intervention, thus posing multi-layered challenges between the laws and the realities of public health (Hirve, 2004; Tripathi, 2023).

The situation is not just a medical problem, it is a human rights problem as well. Reproductive rights

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are part of the rights to health, dignity, informed decision making, equality and bodily autonomy as recognised in the international human rights instruments. The degradation of the environment that affects reproductive health impacts on these basic rights. Any degradation of the environment that has an impact on reproductive health that means it is also impacting upon these basic rights. Socioeconomically disadvantaged women suffer more from the effects of climate change and pollution and are more likely to live in highly polluted areas and to have poor access to quality prenatal health care and reproductive health services. So there is a growing link between the topics of environmental issues and reproductive issues, and the pressure of sustainable development.

Although there is increased scientific research showing associations between pollution and pregnancy problems, few interdisciplinary studies have considered human rights implications of pollution and abortion law in terms of India. Largely, legal structures currently in place in around the world deal with medical necessity without comprehensive embedding of environmental determinants of reproductive health. The aim of this study is thus to analyse and compare various pieces of the evidence before the Court of environmental epidemiology, reproduction health, constitutional law and international human rights to assess if the Indian abortion law is equal to the demand of protecting women whose pregnancies are put at disadvantage by environmental pollution. The research offers new insights to the policy arena by demonstrating the need for a rights-based approach to environmental health law that is adaptable to the evolving nature of environmental health issues and reproductive rights.

Literature Review

Existing studies exploring the link between environmental pollution and the health outcomes of pregnancy have revealed that there are significant associations between maternal exposure to pollutants and poor fetal health. Stillerman et al. (2008) collected epidemiological data on environmental exposures that were associated with reproductive disorders and found that exposure to air, environmental tobacco smoke, pesticides and persistent organic pollutants significantly raise the risk of fetal growth restriction, congenital anomalies and preterm delivery. Finally, in an umbrella review by Sun et al. (2022), based on 36 systematic reviews and meta-analysis, there was strong evidence that PM_{2.5} and PM₁₀ exposure in pregnancy is associated with decreased birth weight, premature delivery, and spontaneous abortions.

Earlier studies on chemical contaminants also have yielded similar conclusions. Vrijheid et al. (2011) found that there were strong associations between exposure to industrial pollutants and the presence of congenital malformations, and Woodruff et al. (2011) have pointed out that environmental chemicals might enter the fetal circulation system during sensitive developmental windows affecting fetal development. Pedersen et al. (2013) also found that Neonates who are exposed to air pollution from traffic are at almost 7 times higher risk of having congenital heart defects. Long-term exposure to particulate matter and ozone were found to increase the risks of preterm birth (PM and O₃) (Ha et al., 2014), further underscoring the importance of urban environmental quality.

The research from South Asia points to high, inequitable exposure of pregnant women in densely populated urban areas. It has been noted by Siddika et al. (2019) that exposure of maternal heavy metals like arsenic and lead has a detrimental impact on the health and growth of the foetus and babies. Bekkar et al. (2020) integrated the outcomes of all the global epidemiological studies and found that both outdoor and indoor pollution exposures are consistently linked to miscarriage, stillbirth, hypertensive disorders during pregnancy and low birth weight.

Pijneters titled "Abortion Law and Reproductive Rights in India" and studied the rights of women to abort in India. Several infrastructural problems, shortage of providers and regulations have meant that legal liberalization does not result in equal access to the safe abortion service as discussed in Hirve 2004. In India, although the law has been changed, women's access to reproductive health care services remains poor, social stigma exists, and there is limited awareness of this service, all of which push women towards unsafe abortions (Kumar, 2016).

The concept of reproductive autonomy has been repeatedly suggested by human rights scholars that it ought to be understood in the broader context of environmental justice issues. Cook and Dickens (2006) stated that there are barriers that hinder women to have safe and effective abortions which are violations of women's right to health and dignity and equality. While the amendment to India's abortion law in 2021 marks an important advance, practical implementation remains fraught with issues of judicial discretion and medical gatekeeping, restricting options for reproductive justice for the marginalised women, argues Tripathi (2023).

The right to reproduction is also recognized in international law as being related to the environment. The conditions for reproduction and other fundamental rights to be enjoyed were considered to be contingent on the provision of healthy environments by Knox (2018). Boyd 2021 also argued that a right to a clean healthy and sustainable environment reinforces state responsibilities to ensure the health and wellbeing of mothers and infants is not compromised by the risks of pollution. Overall, the body of scientific literature corroborates the strong scientific association of environmental pollution to undesirable pregnancy outcomes and highlights the lack of attention accorded to the environmental determinants in the abortion legislation and reproductive rights discourse in India. The interdisciplinary gap upon which the present study is based is set up. The present study places itself on the basis of the interdisciplinary gap.

Objectives:

The study is designed to look at the ramifications of environmental pollution such as its effects on adverse pregnancies; assess the effectiveness of the Indian abortion law in the context of environmental pollution as a reproduction risk; discuss the issue from a human rights perspective; look at legal and policy gaps and make recommendations for strengthening reproductive justice and environmental health protection measures in the context of pollution.

Methodology

The study design is doctrinal descriptive research with the secondary approach, which is a study that examines the knowledge by considering various sources of literature. Publications, reports, and judgment decisions of international organizations, books, and publications from peer-reviewed journal articles, and government and legal acts and reports were used to gather relevant information. The collected literature was analysed through qualitative content analysis which focused on the subject of relationship between environmental pollution, adverse pregnancy outcomes, abortion laws in India, and its human rights issues.

Results and Analysis

The thematic analysis of the legal documents, scientific literature and human rights level, led to the identification of five major themes related to environmental pollution and poor pregnancy outcomes, and the quality of the Indian abortion law.

Theme 1: Environmental Pollution as a Significant Determinant of Adverse Pregnancy Outcomes

Reviewed studies have confirmed regular findings of adverse consequences of environmental pollutants exposure to mothers on pregnancy outcomes. Miscarriage, congenital birth defects, premature birth, fetal growth restriction, stillbirth and low birth weight have been linked to Fine particulate matter (PM_{2.5}), Nitrogen dioxide, Sulphur dioxide, Heavy metals, Pesticides, Industrial chemicals and Endocrine-disrupting compounds. Pollution becomes evident to affect fetal development in all trimesters of pregnancy and also during organ formation in the first trimester. The results validate the identification of environmental pollution as a significant public health problem that needs to be recognized in reproductive health policies by a legal framework.

Table 1 Major Environmental Pollutants and Reported Pregnancy Outcomes

Environmental Pollutant	Major Source	Reported Pregnancy Outcome
PM _{2.5} and PM ₁₀	Vehicular emissions, industries	Preterm birth, miscarriage
Nitrogen dioxide (NO ₂)	Traffic pollution	Congenital anomalies
Sulphur dioxide (SO ₂)	Industrial emissions	Low birth weight
Lead	Industrial waste	Neurological defects
Arsenic	Contaminated groundwater	Stillbirth, fetal growth restriction
Pesticides	Agricultural activities	Congenital malformations
Endocrine-disrupting chemicals	Plastics and industrial products	Hormonal disorders, fetal abnormalities

The evidence shows that there is a significant risk to reproductive health when exposed to the environment for a long period of time.

Theme 2: Environmental Pollution and Reproductive Rights

The analysis indicates that the environmental pollution has direct impact on women's reproductive autonomy both by putting them at risk of complications in abortion and the appearance of foetal abnormalities. Polluted environment has adverse impacts on women's reproductive health while they frequently lack access to special follow-up pregnancy testing and reproductive health care. This situation denies reproductive choices and is disproportionately experienced by economically vulnerable populations.

Table 2 Impact of Environmental Pollution on Reproductive Rights

Human Rights Dimension	Effect of Environmental Pollution
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Right to Health	Increased pregnancy complications
Right to Life	Higher fetal mortality risk
Right to Dignity	Psychological distress during pregnancy
Reproductive Autonomy	Restricted informed reproductive choices
Equality	Greater burden on vulnerable populations

The results found that reproductive justice and environmental justice were well connected.

Theme 3: Limitations of India's Abortion Law in Addressing Environmental Risks
The Medical Termination of Pregnancy Act, 1971 (MTP Act) 2021 has made significant strides in the law, with greater access to abortion providers. The law, however, does not make environmental pollution or fetal abnormalities caused by environment as a separate ground for pregnancy termination. Medical board advice and judicial decisions are likely to become a fallback position for women with a foetal abnormality detected late in pregnancy and suspected of being the result of pollution. If a foetal abnormality is detected in late pregnancy and is suspected to have resulted from pollution, women will increasingly have to rely on medical board advice and/or judicial decisions.

Table 3 Assessment of Existing Legal Framework

Legal Provision	Present Status	Identified Limitation
Medical grounds	Available	Limited environmental recognition
Fetal abnormalities	Recognized	Environmental causes not specified
Extended gestation	Permitted in specific cases	Requires medical approval
Human rights perspective	Limited	No explicit environmental protection
Preventive provisions	Absent	Focus remains curative

The analysis indicates that the current legal approach is mostly concerned with medical consequences instead of environmental causal factors.

Theme 4: Human Rights Perspective on Environmental Reproductive Justice
The legal capacity to enjoy the environment is now popularly regarded as a part of the right to reproductive rights in the international human rights instruments. The examined literature shows that environmental pollution risks and violations women's right to health, dignity, equality, privacy, and bodily autonomy. Environmental rights are now increasingly becoming an area of legal change around the world.

Table 4 Environmental Pollution and Human Rights

Human Right	Pollution-Related Concern
Right to Health	Increased disease burden
Right to Dignity	Emotional and physical suffering
Right to Equality	Greater impact on marginalized women
Right to Privacy	Judicial involvement in reproductive decisions
Right to Safe Environment	Environmental degradation

The results highlight the need to consider environmental determinants of health to ensure reproductive rights are made a reality.

Theme 5: Need for Legislative and Policy Reform
The literature is unanimous that legal strengthening needs to be realized by incorporating environmental health concerns into reproductive laws. Pollution-induced reproductive risks are a right priority factor and a need to recognize in policy reforms; improve environmental monitoring during pregnancy; reinforce environmental regulations; increase environmental health care coverage; and employ a rights-based strategy that underscores women's reproductive autonomy.

Table 5 Suggested Policy Reforms

Area	Recommended Reform
Abortion Law	Recognize pollution-induced fetal abnormalities
Environmental Policy	Strengthen pollution control mechanisms
Public Health	Improve prenatal environmental screening
Healthcare	Increase access to specialist maternal care
Human Rights	Integrate reproductive justice into environmental governance

Analysis shows that coordinated reforms in the three policy domains—environmental, reproductive, and health—would strengthen protection for maternal and fetal health.

The qualitative evidence is overwhelmingly convincing that background ambient air pollution leads to poor pregnancy outcomes. Although there is significant scientific evidence that links pollution with scenarios such as miscarriages, congenital anomalies, still births and fetal developmental disorders, environmental risk factors are not explicitly mentioned in the Indian abortion law which is primarily based on traditional medical issues and does not explicitly support including environmental risk factors in reproductive decision making. Overall, the thematic analysis is also indicative of environmental degradation as a public health problem, but also a human rights issue that

impacts women's rights to health, dignity, equality, and reproductive autonomy. Thus, the comprehensive rights-based legal structure that incorporates environmental health concerns in the abortion policy would assist in enhancing reproductive justice and improve the protection of maternal and foetal health in India.

Discussion

The results of the research confirm that contamination of the environment has become a major issue of the public health and has direct implications for both maternal and fetal health. The scientific evidence repeatedly shows that exposure to the pollutants of the air and all other chemicals from heavy metals, pesticides and industrial chemicals during pregnancy increases the risk of problems including miscarriage, congenital anomalies, preterm birth, stillbirth and low birth weight. The results suggest that there is a necessity to ensure that attention to environmental pollution not only for an ecological issue but also an important element in reproductive health care that needs to be strengthened by healthcare or legal interventions.

The analysis also shows that the MTP Act, 1971 (recently amended in 2021), has increased access to safe abortion services but does not explicitly include abnormalities, including those induced by the environment, or as risks to reproduction, as grounds for termination of pregnancy. As a result of such situations, it is possible for women to experience legal uncertainty, longer time to medical clearance and inequitable access to reproductive care. The lack of alignment with the scientific evidence and the current legislation is an indicator of the necessity of a more responsive and inclusive approach in relation to reproductive legislation.

As seen from the human rights standpoint, the research highlights the interdependence of the reproductive rights to health, dignity, equality and a healthy and clean environment. Women who reside in low-income and polluted areas suffer more than other women from environmental degradation, which further compounds their reproductive health disparities. The results indicate the inclusion of environmental health issues in the abortion law and reproductive health policies could help to bolster reproductive justice, improve legal protections for women affected by abortion, and foster a more holistic rights-based strategy to maternal health care in India.

Conclusion

The findings of the study suggest that adverse pregnancy outcomes are significant environmental factors and have a serious impact on maternal and

foetal health. Ongoing scientific research shows that there is a link between environmental exposures and reproductive issues; however, the legislation surrounding abortions has not sufficiently reflected or recognized the increased environmental risk factors. The analysis further underscores the need to consider reproductive health in a Human Rights framework as encompassing the rights to a healthy environment which may include access to health, dignity and equality, and reproductive autonomy. Hence, there is an urgent need for legal and policy changes that reflect the four fundamental questions of reproductive justice in the context of recent environmental health evidence and international human rights standards.

Recommendations

The study suggests that upsetting policy makers by taking the reproductive health policy and the Medical Termination of Pregnancy (MTP) Act and clarifying the fact of environmentally induced fetal abnormalities and reproductive risk owing to the pollution. Incorporation of environmental risk assessment into prenatal healthcare by routine screening and better prenatal medical counselling of pregnant women living in polluted environments. More effectively implementing the law of environmental protection, better monitoring of industrial and chemical pollutants and deeper public understanding of the environmental reproductive health are also crucial. Further, the engagement of legal professionals, healthcare doctors, environmental scientists, and human rights institutions should be fostered to develop an integrated and rights-based approach which would help protect maternal health and encourage reproductive justice in India.

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