

A study on effects of environmental pollution and climate change on the Health of Women in India

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ABSTRACT

The mushrooming of industrialization and its resulting environmental pollutants, the uncontrolled use of synthetic chemicals, the regular exposure to harmful composites at the work station as well as at house adversely disturbs the health of women. Mainly the bio-hazardous compounds are the major reason behind the reproductive disturbance and hormonal disruptions in women causing in irregular menstrual cycles, infertility, abnormal abortions, endometriosis, breast cancers and child birth defects. With a rise in environmental estrogens, the women's health is at higher risk than men. Research and various scientific as well as environmental studies have revealed that there is constant rise in women's health problems due to their exposure to toxic chemicals. Even the regular exposure to the cooking fuel to the household cleaning agents and many personal care essentials lead women to the dangerous chemicals than men. Thus, there is a sheer need for vigilance and awareness of the ill-effects of pollutants on the health of women. The present paper discusses the adverse effects of environmental pollution on women's health in order to increase the awareness of the connection between the environment and women's health.

Key words : Environmental pollution, Chemical toxins, Women, Health, Reproductive disturbances.

Introduction

Environmental pollution is making the world more dangerous to live in. It has impacted human's everyday life to a large extent. In fact, it has posed threat to human's health and lifestyle. No doubt, environmental pollution affects people of different gender but women are at more risk due to physiological and biological differences such as size of the body, hormones and hormonal changes, and various socio-cultural and economic factors (Verchick, 1996). At the time of pregnancy and motherhood, women's

health is more at risk due to environmental pollution.

Climate change as a result of environmental degradation also affects much to women as they are much more directly involved with natural environment for their dependency on various available natural resources for food, fuel and shelter (Sorensen *et al.*, 2018; UN Women, 2021). Irregular Catastrophic storms, floods due to rise in sea level and drought puts people in risk, particularly to poor families. 'Women and girls are the last person to be rescued; they face challenges in terms health risks

as water, health and sanitation issues get compromised; and they are much more engaged in household responsibilities and care work as resources are very few' (UN Women, 2021).

No doubt, women face more vulnerability with regard to environmental hazards and climate change but they have skills to manage both mitigation and adaptation. Women possess array of knowledge and expertise which can be utilised in mitigation of climate change, environmental protection, disaster reduction and adaptation strategies. As women performs larger responsibilities in domestic sphere and community level and has command of conservation of natural and household resources, it helps them well to effectively contribute to changing environmental protection. This paper explores how women's health is affected by environmental pollution. The paper specifically suggests various solution based on the recommendation of reports of various national and international agencies.

Purpose of the Study

The study aims

- To discuss about different pollutants, present both outdoor and indoor that adversely affect human's health and society in general
- To analyse the impact of environmental pollution and climate change on women's health.
- To suggest mechanism and involvement of women in order to prevent environment pollution and safety measures in different health issues.

Research Questions

1. What are the major pollutants that affecting human's health adversely?
2. How do the chemical and environmental pollutants affect women both indoor and outdoor at different stages of life?
3. What are the different strategies that will help in improving the health conditions of women?

Methodology

The present study is grounded on non-empirical technique. For the research purpose, secondary data like articles, books, newspapers and different reports provided by various international and national agencies such as WHO, UNFPA, ILO, UN Women, NIH and OECD were mentioned, referred and ex-

amined.

Results and Discussion

Environmental Pollution and Health

Environmental pollution is largely attributed to industrial development and urban expansion, which have increased environmental health hazards and increased level of pollution, particularly in developing nations. Air pollution, insufficient water supply, lack of cleanliness and hygiene, and dangerous wastes, water pollution cause devastating and fatal diseases, generate harmful living circumstances, and are also mainly responsible for destroying our ecosystems. Environmental pollution disturbs the economic development and aggravates poverty and disparity in both rural and urban areas.

Various studies provide direct link between air-pollution and psychological, cognitive performance, physical healthiness and also some ferocious behaviour. As study done by Kioumourtzoglou and his team points out that a prolonged exposure to raised levels of 'PM2.5' and 'ozone' in the United-States upsurges the danger of stress and depression in the old and middle-aged women (Kioumourtzoglou *et al.*, 2017). However, women's health is being affected adversely due to different influential particles in air. Besides, women are more diagnosed to different negative health issues from different environmental exposures at various stages of life. These negative effects of environmental pollution include 'puberty, reproductive years, pregnancy and the postpartum period, middle age, and older age' (WHO, 2018)

An estimation by World Health Organisation (WHO) reveals that around 7 million people are prone to death almost every year due to exposure to fine particles and elements in polluted air. These particles penetrate deep into the lungs and cardiovascular system, causing acute health problems including stroke, heart disease, chronic obstructive pulmonary diseases, cancer, and respiratory infections, including pneumonia (WHO, 2018). The State of Global Air (SoGA) 2020 reports that in India over 1.67 million annual deaths happened in the year 2019 due to long-term exposure to outdoor and household air pollution

Air Pollutants can be in any form, liquid droplets, solid elements or gaseous. The study shows that the high-level emissions of Suspended Particulate

Matter (SPM) in the mega cities due to air pollution are determinedly above the guidelines set by WHO. (WHO, 2011). Small particles (PM_{2.5} and PM₁₀) emitted from fossil fuel that inhaled extremely into the lungs, and settled in such parts of our body which can worsen many respiratory illnesses like emphysema, bronchitis and asthma. "Urban air pollution continues to rise at an alarming rate, wreaking havoc on human health," (WHO, 2018)

Indoor air quality and pollutants are considered as a major source of health risks for women as they spend more time in an indoor rather than outdoor environment. FIGO (The International Federation of Gynaecology and Obstetrics) has reported that "Globally, air pollutants at indoor can be two to five times higher than outdoors. This can also be a particularly dangerous in low- and middle-income nations where about 3 billion people still cook depending upon solid fuels such as wood, charcoal, crop wastes, dung and coal) and kerosene in open fires and inefficient stoves. This leads to creation of environmental risk that would bear a significant influence on fertility and health at the time of pregnancy" (FIGO, 2018; WHO, 2018). As per census, 2011, about 64% of households overall in India use solid fuels for cooking and heating purposes while in rural areas, as 85 percent of household use solid fuels. (Census, 2011). A cross-sectional study done on impact of indoor air pollution in slums of Kolkata in West Bengal reveals that the majority of the households were exposed to Indoor Air Pollution due to kerosene and neighbourhood smoke and as a result of indoor air pollution, they face different issues such as irritation in the eye, suffocation and dry cough etc. (Maharana *et al.*, 2018).

Like Air pollution, water pollution has also devastated life of humans in many ways. A report by United Nations points out that over three million population in the world are prone to death because of water-related diseases due to contaminated water every year. In India, over one lakh population die of water-borne disease every year. Furthermore, the groundwater in one-third of India's 600 districts is not fit to be used for drinking purposes as there are higher concentration of fluoride, iron, arsenic and salinity that exceeds the tolerance levels. According to the report of World Health Organization, "Excess fluoride in water in India may be impacting tens of millions of people all over the 19 states and on the other hand, excess arsenic may be affecting up to 15 million people in West Bengal" (WHO, 2019).

WHO has reported that, around two billion people across the globe use contaminated drinking water that causes diseases like cholera, diarrhoea, typhoid, polio and hepatitis A etc. it has also been reported that contaminated drinking water is resulting in 485 000 diarrhoeal deaths every year. (WHO, 2019). Pollution in the forms of modern agricultural process also causes innumerable harms to health which are silently affecting to the maximum consumers.

As the rate of urbanisation grows in India, water bodies are also getting toxic gradually as waste water released from cities enter into water bodies. A report by Centre Pollution Control Board (CPCB) reveals that in India, there has been increase of 302 critically polluted river stretches in 2016 to 351 stretches in 2018. An estimation by world bank reports that about 70% of surface water in India is not fit for consumption. On everyday basis, about 40 million litres of wastewater arrive rivers and other water bodies out of which only a tiny fraction of them is adequately treated (We Forum, 2019).

An estimation also shows that in India, the cost of environmental pollution is estimated to be around INR 3.75 trillion a year out of which the health costs caused due to water pollution are estimated at around INR 470-610 billion. These health complications are mostly related with diarrheal mortality and morbidity of children under five and other population morbidities (Mani *et al.*, 2012; We Forum, 2019). In addition to the economic cost, lack of water, sanitation and hygiene causes in the loss of 4 lakhs lives per annum in the country. A report from FAO/IWMI (Food and Agriculture Organization of the United Nations/International Water Management Institute) also reveals that "Water pollution from source of agriculture has also negative effects on human health. For example, high levels of nitrates in water generated through agriculture can lead to methemoglobinemia – a potentially fatal illness – in infants". (FAO/IWMI, 2018)

Environmental Pollution, Climate Change and Women's Health

There are some physiological differences between women's body and men's bodies. Sometime the similar exposure to an environmental pollution is possible to effect women in a different way and more excessively than it impacts on men.

The wave of mechanization, customer-oriented living styles, misapplication of pesticides, and insect-

ticides and disinfectants are accountable for trouble in the ecological equilibrium. Besides, the number of women workers employed in hazardous manufacturing companies is on the rise. Many industries are also using dangerous ingredients like lead, mercury, organic solvent, arsenic, etc, which contribute significantly to environmental contamination. Women those who are in pregnancy and works in such places are at more unsafe and this results in severe obstetric consequence for them.

The data given by the National Exposure USA, "females exposed to certain hazardous substances report more adverse health outcomes than national norms, and in some cases more than similarly exposed males. The entire reproductive cycle may be at risk for exposures to physical and chemical agents in the work place. Some exposures may also be significant in the home and general environment. Issues of significance include infertility and hypofertility, spontaneous abortion, including early undetectable, abortion, teratogenesis and congenital malformation, mutagenesis and hereditary defects" (WHE, 1993).

Another study done by WHO (World Health Organisation) also reveals that approximately 92% of the world's population take shelter in places where air pollution surpasses safe parameters. There is a solid connection between such fertility and health risks in women. Studies done on air pollution also points out that air pollution is linked with number of consequences, from "altered production of sperm and eggs to epigenetic changes and birth defects" (Figo, 2018; WHO, 2018). The surrounding pollution in air increases the levels of infant-mortality and illness, particularly in the first weeks of a kid's life, although there are also signs connecting the exposure of pregnant women to the harmful air pollutants with harmful effects on the foetus (Currie and Neidell, 2005). There is a higher chance of both women and new born baby is being affected to respiratory disorders like Chronic Obstructive Pulmonary Disease (COPD), asthma, chronic bronchitis, and cancer, if a woman during pregnancy is get exposed to air pollution. (Mohapatra and Sarangi, 2021). The situation for women is worse who belongs to marginal and low-income group as they are more exposed to air contamination and dangerous waste locations (NRC, 1991).

The contaminated water is causing mounting problematic situation that disturbing the human health and women are more affected by it. "Up to

80% of illnesses in the developing world are linked to inadequate water quality and poor sanitation". (Women for Water, 2017). Particularly in the countries where the income rate is very low, women are repeatedly in the responsibility to dispose dirty water, human waste and they hardly have access to private or safe cleanliness facilities. This brings in them supplementary disease- transmission. In the most developed nations contaminated water is a key concern influencing the health of women foremost (The Lancet, 2018).

The scarcity of water also influences people to drink from sources which may be biologically and toxicologically contaminated. As women are expected to perform the primary role of serving water for the family members, they are at the higher risk of contracting water borne diseases found particularly among primary water handlers (Birch *et al.*, 2012; Duncan, 2006; Sorenson *et al.*, 2018). Such kind of situation is also found during floods where women are deeply prone to risks of waterborne diseases because of lack of access to safe water and increased contamination of water resources. Women also face acute health problems especially during menstruation and pregnancy due to lack of clean and safe water and adequate sanitation infrastructure as they require more frequent hygiene during this period (Birch *et al.*, 2012; Sorenson *et al.*, 2018).

Hormonal changes and hormones of women also affected harmfully due to the pollutants in the environment. 'Hormonal changes during menstruation have been shown to affect women's susceptibility to environmental threats' (Fox *et al.*, 1993; Swanston, 1994). For example, "fluctuations of progesterone levels due to the menstrual cycle are believed to make women more susceptible to ozone exposure" (Fox *et al.*, 1993). Further, hormonal changes at the time of pregnancy and menopause have also been found to be correlated with an increased vulnerability to environmental threats' (Swanston, 1994). As pregnancy results in various physical changes that incline women to illness when they are unprotected to certain pollutant. As a same way, "Osteoporosis, which profoundly impacts women after menopause, is intensified by environmental conditions" (Berglund *et al.*, 2000).

The eco-feminist, writer, physicist and environmentalist Vandana Shiva in the book Food, Farming and Health (2018) reveals how chemical agriculture is depleting the nutrition value of soil, making plants that lack nutrition but filled with toxic-resi-

dues, which is mainly source of diseases associated with nutrient deficit. Pesticides and chemicals used in industrial agri-business has also been linked with various problems of health like birth defects, neurological disturbances, hormonal imbalance, obesity risks, diabetes, etc. (Stamati *et al.*, 2016).

Conclusion and Recommendations

With the multiple sources of environmental pollution, modes of exposure and complexity of impact on women, there is no one way approach to find solution to address the problem of women particularly in rural areas. Addressing it will require a multi-sectoral approach to policymaking and proactive implementation mechanism that aims to provide a healthy life to women and future generation.

For environmental protection and a sustainable world order, various national and international agencies and international treaties and conventions including more recent sustainable development goals by United Nations have also acknowledged for increasing participation of women and also emphasised for a mainstreamed gender lens. The United Nations Earth Summit (UNCED) held in 1992 had two key conventions — on biological diversity and on combating desertification. These conventions have put forward guides for implementing environmental actions from a gender lens. (OECD, 2008).

The overall UNCED document, Agenda 21, has a focussed chapter on gender, which emphasised on the important role to be played by women in industrialized countries as sustainable consumers. Studies have revealed that women in the developed countries have a lesser carbon footprint than men, taking the majority of “green” decisions at the domestic sphere and for travel as per the report of a Swedish government in 2017. A report by OECD shows that with regard to climate change, women adopt a more holistic approach to mitigation and support broader actions compared to men. It was found that women in comparison to men are more likely to review the environmental and sustainable practices of the companies while buying any product (OECD, 2008; UNEP, 2016).

According to the international agreements, women must get an equal participation in every decision connected with the surrounded environment worldwide. There are immense evidences where in women in various capacities as experts, leaders, educators and innovators either in individually or

through women’s movement have taken huge steps in protecting environment and preserving natural resources (UNESCAP, 2017). During 70, women took centre stage in Chipko Movement of India where they stopped the cutting of trees by physically surrounding the trees. They also take huge role in protecting water sources from corporate control. Women around the world has continuously raised their concern and fight against climate change, and always tried to improve access to, control over and conservation of natural resources. It is highly desirable that voices of women must be integrated into policy and implementation efforts at every level for the human well-being of present and future generations (UNEP and UNF, 2004). Further, Educational and participatory guidance involving the entire society must be provided to ensure that they are aware of the pros and cons of environmental pollution and risks related to the intake of foods. Similarly, Education and awareness regarding the gender specific health hazards of environmental pollution and climate change is highly desirable among policy makers and the same needs to be integrated into public health messaging.

Conflict of Interest

The authors have no conflicts of interest regarding this investigation.

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