EDITORIAL

Climate change and reproductive health

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Climate change has become a global issue. World Health Organization (WHO) has estimated an increase of 250,000 deaths between 2030-2050, due to climate effect. Though Pakistan does not contribute much to the cause of global warming, but suffers enormously due to climate change. The massive floods in 2022, in Sindh and Baluchistan provinces of the country caused tremendous destruction, and people are still unable to recover from these setbacks. The spectrum of climate change includes flood, drought, air pollution, wildfires, heat waves and increase in vector-borne diseases. All of this influence reproductive health. It effects both men and women. Pregnant women are included in the vulnerable group for these changes. Climate change has been identified as an important cause of maternal and perinatal mortality, as well as involves all aspects of obstetric outcomes. The resulting complications include preterm labour and delivery, decrease in gestational length, stillbirth, intrauterine demise and a high rate of miscarriages. The effect of climate change on economy is also well established. With 1°C rise in temperature, 12% decrease in global GDP is expected.

Women in low and middle income group countries are more susceptible to the climate change. Usually they are malnourished, underweight, having increased surface area to body weight, long hours of working either in fields or household chores makes them more vulnerable. Also included in this group are the developing foetus, elderly people, young children, disabled and immunocompromised individuals.[1]

The most common effect of climate change is increase in temperature which influences all stages of fertility. Ovarian reserve as determined by the antral follicular count (AFC) is found to be decreased in warm weather. A 1°C rise in temperature was associated with a -1.6% (95% confidence interval [CI], -2.8, -0.4) lower AFC.[2] High temperatures also act as teratogens. Exposure to temperatures ≥ 30°C for more than 10 days have been observed to be associated with increased risk of congenital heart defects in the foetus.[3]

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Investigators have found an increase rate of stillbirth, affecting women in early second and third trimester, male foetuses and in young women between 25-34 years of age.[4] This association with temperature was linear, with every 10°F rise in temperature, the risk for foetal death increased by 10.4%. The suggested mechanism include damage to the cells, resulting in impaired placental circulation and death. Previously also researchers have found that heat increased uterine contractions (due to increased release of prostaglandins and oxytocin),[5] leading to increased incidence of miscarriages, and preterm birth.[6]

An important cause of Perinatal mortality globally and especially in low middle income countries is Preterm birth. In a case-crossover study from South Korea, investigators found a 5°C rise in temperature in four weeks before delivery was associated with increased risk for preterm birth with an odds ratio (OR) of 1.03 (95% confidence interval [CI]: 1.02, 1.05). This was more marked in women with increased maternal age more than 35 years.[7] Short term effects of extreme heat in days preceding delivery also includes decrease in duration of gestational age.[8] Increased heat also influences male reproductive health. Though direct effect of increased temperature on spermatogenesis is not known, but it is well established that occupational exposure to heat environment can have an adverse effect on it.

In the year 2022, two provinces of Pakistan were heavily effected by the floods. At that time, it was estimated that 650,000 women were pregnant, with 73,000 deliveries in the month immediately after floods. There is no scientific literature available on the outcome of these pregnancies. Available literature from world on neonatal outcome, suggests exposure to such harsh circumstances results in delayed motor development in the new born at six months of age.[9] Increase in the temperature also leads to increase in the incidence of heat stroke.

Climate change also increases the prevalence of vector borne diseases. These include increased reporting for malaria, chikengunya, dengue and Zika virus infections. In Sindh province, around 70,000 cases of malaria were reported in 2023, following floods, compared to 20,000 cases in 2021.[10] These vector borne diseases are associated with adverse maternal and perinatal

outcomes, including intrauterine deaths, preterm labour and delivery, congenital malaria, neonatal anaemia.[11] Infection with dengue virus is also associated with obstetric complications including preeclampsia, eclampsia and low birth weight.[12] The aftermath of floods also include water borne enteric diseases including cholera and diarrhoea.

Air pollution is mainly composed of carbon mono oxide, nitrogen dioxide, ozone, sulphur dioxide and particulate matter <2.5µm in diameter. The levels of air pollution in urban areas of Pakistan like Karachi and Lahore, ranks them as fourth most polluted cities in the world. Air pollution leads to changes in placenta, and in-utero exposure is also associated with neonatal effects like asthma, lower intelligence quotient and attention defect disorders.[13] A recent study of a large population based cohort found increased exposure of particulate matter < 2.5µm in prenatal period, with cerebral palsy in the newborn.[14] Air pollution will be acting as a significant contributor towards large number of premature deaths in adult population as well.

Mental health is also affected by the climate change. From increased burn out phenomena among health care providers to increase in domestic violence by the spouse, all have been observed earlier.

There are recognized efforts on international and national level to mitigate the effects of climate change. It is necessary that health care providers update their knowledge about effects of climate change. At the same time educating the general masses about the preventive measures is equally important to protect against adversities. Universities should encourage focus on climate research and provide funding for such activities. Increased awareness among students at all stages can be advantageous. Changes should also be made in the curriculum at all levels to increase awareness about climate change. From simple measures like increased tree plantation, to modifying the daily activities, proactive measures to decrease sun exposure, educating people about steps to prevent dehydration and heat stroke, all can make a difference in the lives of common people. Structural changes like construction of health care centres with resilient materials resistant to floods should be considered. This has proved sustainable in neighbouring Bangladesh, which also faces similar situations of frequent floods. All these factors placed together will have a large benefit on the natural disaster of Climate Change!.

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