

## Mobilising and evaluating existing heat adaptation measures to protect maternal and child health



Empirical research indicates that even brief periods of extreme heat exposure are associated with adverse outcomes related to pregnancy, such as pre-eclampsia, gestational diabetes, preterm birth, low birthweight, and stillbirth.<sup>1,2</sup> Although the detrimental effects of extreme heat exposure on pregnancy outcomes have emerged as a priority research area, the potential long-term consequences of prenatal heat exposure on health in childhood and adulthood have been overlooked in climate change and health discussions.<sup>3</sup> Although the exact biological mechanisms remain to be established, protracted exposure to extreme heat during pregnancy is likely to affect fetal programming through complex cellular and molecular pathways, which has the potential in some cases to lead to lifelong physical and neurological disorders in affected children.<sup>3,4</sup>

Pregnancy is a crucial period in a person's life, characterised by substantial alterations in their biological, physiological, psychological, and social functioning. These changes can potentially compromise pregnant people's ability to cope with additional hazards, such as extreme heat. Consequently, it is argued that existing climate change adaptation strategies might not sufficiently address the unique needs of pregnant people and developing fetuses. Evidence-based solutions can help draw policy makers' attention to the urgent need for tailored heat adaptation strategies designed to safeguard the health of pregnant people and their fetuses.

Individual-level and community-level adaptation interventions, which involve pregnant people as active decision makers, can be implemented to address the challenges posed by extreme heat. These interventions can be home-based and low-cost, making them sustainable, easily mobilised, accessible, and practical. Given the universal nature of these interventions, they can be implemented across different economic and geographical settings. Examples of such interventions include health education sessions that educate pregnant people on coping strategies for heat and heatwaves, the provision of cold potable water, the use of ice towels and affordable water sprays, hand and feet immersion in cold water, and provision of cooling fans. Midwives, nurses, community health workers, and volunteers are

key in delivering these interventions during prenatal checks, community visits, or during pregnancy-related home visits, particularly in low-income and middle-income countries.<sup>5</sup>

Specifically, pregnant people can be encouraged to wear loose-fitting, full-sleeved cotton clothing. Such clothing can help shield pregnant people and their fetuses from direct heat exposure while facilitating efficient heat dissipation through increased air permeability and airflow across the skin's surface.<sup>6</sup> Pregnant people can also be instructed about self-dousing with water or applying ice towels around their necks. This practice serves the dual purpose of increasing cerebral blood flow while reducing the risk of hyperthermia and heatstroke during pregnancy.<sup>6,7</sup> Encouraging rehydration and electrolyte supplementation is crucial for adapting to extreme heat. Pregnant people should be advised to consume ample amounts of cold fluids to maintain hydration.<sup>5,8</sup> In accordance with WHO recommendations on health promotion interventions for maternal and newborn health, pregnant people can be encouraged to lie and sleep on their left side as this position enhances blood and nutrient flow to the developing fetus, optimising its wellbeing during extreme heat events.<sup>8</sup>

Midwives, nurses, and community health workers who have received training in maternity care have a unique advantage in implementing these personalised heat adaptation interventions because their instructions on maternity care are generally well received by pregnant people and their families. The unique trust can establish a strong foundation for effective implementation. Furthermore, integrating education on heat action plans in routine antenatal care empowers nurses, midwives, and community health workers to ensure pregnant people and new parents are prepared in time for oncoming heatwaves.

In addition to individual-level interventions, appropriate measures to adapt living spaces can play a crucial role in reducing environmental heat exposure to pregnant people and fetuses. Various low-cost interventions at the structural level can be promoted by health-care workers. These interventions include the use of window blinds and reflective curtains, external awnings, misting fans,

low-cost white paint coatings for roofs and external walls, and installation of air ducts and air vents.<sup>7</sup>

Implementing community-level interventions is also essential to mitigating adverse effects of heat exposure on maternal and fetal health. These interventions can include the development of a heat emergency response plan, targeted education and awareness campaigns for expectant parents, and afforestation programmes aimed at increasing urban green space and vegetation coverage. These community-level measures can effectively contribute to reducing the detrimental effect of heat on the health of pregnant people and their fetuses.<sup>5</sup> Although an early warning system for heatwaves is important, it might not be sufficient in reducing high-risk behaviours among the target population unless there is an effective communication channel to reach the individuals at highest risk. In this regard, midwives, nurses, and community health workers can play an instrumental role as key communicators, delivering the early warning heatwave message and educating pregnant people on effective personal protective measures against extreme heat. Their involvement ensures that important information reaches the intended audience and empowers pregnant people to take appropriate measures to safeguard their health and the health of their fetuses.

At the policy level, the implementation of a social protection scheme holds great potential in providing support during pregnancy. One such intervention is conditional cash transfer, which has been successfully implemented in numerous low-income and middle-income countries.<sup>9</sup> This scheme's positive impact lies in its ability to reduce the necessity for demanding outdoor activities, including physically laborious tasks, during pregnancy. As a result, the scheme directly contributes to mitigating the exposure of pregnant people and their fetuses to extreme heat conditions.<sup>10</sup> Furthermore, beyond alleviating the physical burdens associated with pregnancy, cash transfer schemes and the distribution of resources (eg, food, livestock, or poultry products) can play an important role in meeting the nutritional needs of pregnant and lactating parents.<sup>9</sup>

Many of the interventions mentioned here are based on traditional knowledge and practice. However, their

efficacy has not been thoroughly evaluated in the context of randomised controlled trials. Therefore, it is essential to conduct well designed studies in diverse socioeconomic and geographical contexts to assess the efficacy of these adaptation interventions in protecting the health of pregnant people and developing fetuses from extreme heat. Through rigorous evaluations, researchers can gather scientific evidence and determine the true effect and benefits of these interventions.

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