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Unraveling the Long-Term Effects of Stress on Pregnancy Outcomes in Underserved Communities

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Abstract

Maternal health disparities remain a pressing global issue, disproportionately affecting underserved communities due to historical and intergenerational trauma. This review examines how racial, social, and economic disparities contribute to chronic stress, which in turn negatively impacts pregnancy outcomes. Historical patterns of healthcare exclusion, including systemic racism, economic barriers, and cultural mistrust of medical institutions, have led to persistent inequities in maternal care access. These factors contribute to chronic stress, which has been linked to adverse pregnancy outcomes such as preterm birth, low birth weight, and increased maternal morbidity. The physiological and psychological effects of chronic stress are explored through the lens of endocrine and immune system disruptions, including cortisol dysregulation and inflammatory responses that increase pregnancy complications. Additionally, the mental health implications such as heightened anxiety, depression, and PTSD further exacerbate the risks to both maternal and fetal health. Addressing these disparities requires a multifaceted approach that integrates trauma-informed prenatal care with community-based support systems. Trauma-informed care emphasizes culturally competent healthcare practices, mental health screenings, and patient-centered approaches that prioritize emotional well-being. Community-driven solutions, including doula programs, peer-support networks, and holistic social interventions, provide critical resources that help mitigate stress during pregnancy. This review further advocates for policy interventions aimed at reducing maternal health disparities, including expanded Medicaid coverage, improved access to equitable healthcare, and investment in community-led maternal health initiatives. By drawing on historical lessons and integrating holistic, patient-centered care models, policymakers and healthcare providers can work toward eliminating maternal health inequities worldwide. Future maternal health frameworks must embrace a combination of systemic policy changes and grassroots initiatives to ensure safe and healthy pregnancy outcomes for all individuals, regardless of socioeconomic status.

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1. Introduction

Maternal health disparities remain a persistent public health crisis, disproportionately affecting underserved communities worldwide (Matthew *et al.*, 2021). Pregnant individuals from marginalized backgrounds particularly those experiencing racial, social, and economic inequities face significantly higher risks of adverse pregnancy outcomes, including preterm birth, low birth weight, maternal morbidity, and mortality. These disparities are driven by a combination of structural barriers to healthcare access, socioeconomic stressors, and systemic discrimination (Churchwell *et al.*, 2020). The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) have identified chronic stress, poor healthcare access, and social

determinants of health as critical factors contributing to maternal health inequities. However, traditional maternal healthcare models often fail to address the root causes of these disparities, necessitating a more holistic, trauma-informed approach to maternal care (Kimberg and Wheeler, 2019). One of the most significant yet overlooked contributors to maternal health inequities is historical and intergenerational trauma. The cumulative effects of systemic racism, medical discrimination, and socioeconomic oppression have led to chronic stressors that transcend generations (McKinley *et al.*, 2019). This mistrust has contributed to lower prenatal care utilization, delayed medical interventions, and higher pregnancy-related complications. Furthermore, epigenetic research suggests that prolonged exposure to stress and trauma can have biological effects on fetal development, increasing susceptibility to health complications even before birth (Barouki *et al.* 2018). Understanding the long-term consequences of historical and intergenerational trauma is essential for designing maternal healthcare strategies that effectively address these disparities (Phillips-Beck *et al.*, 2019). This review aims to examine the physiological and psychological effects of chronic stress during pregnancy and propose integrative healthcare solutions that can improve maternal health outcomes in underserved communities. The physiological impact of chronic stress includes cortisol dysregulation, immune system suppression, and inflammation, all of which increase pregnancy risks. Additionally, the psychological toll manifesting as anxiety, depression, and post-traumatic stress disorder (PTSD) further exacerbates health complications, affecting both the mother and the developing fetus. Addressing these challenges requires a comprehensive, trauma-informed healthcare approach that recognizes the effects of chronic stress and integrates both medical and community-based interventions. This explores trauma-informed prenatal care models, which emphasize culturally competent medical practices, mental health screenings, and patient-centered care. Additionally, it highlights the importance of community-based support systems, such as doula programs, peer-led education, and social services, in alleviating maternal stress and improving pregnancy outcomes. Beyond clinical care, the article underscores the need for policy interventions aimed at expanding access to equitable maternal healthcare, investing in social determinants of health, and strengthening public-private partnerships to reduce disparities. By drawing parallels between historical patterns of healthcare exclusion and current maternal health inequities, this article advocates for a hybrid approach that combines scientific, clinical, and community-driven strategies. The goal is to bridge the gap between traditional maternal healthcare and the lived experiences of pregnant individuals in underserved communities. Through policy reform, trauma-informed care, and community-based initiatives, it is possible to create a more inclusive, equitable, and effective maternal healthcare system that ensures healthier pregnancy outcomes for all individuals, regardless of their socioeconomic background (Starrs *et al.*, 2018; Olonade *et al.*, 2019).

2. Methodology

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology was used to conduct a systematic review of the literature on the long-term effects of stress on pregnancy outcomes in underserved

communities. A comprehensive search was performed across multiple databases, including PubMed, Scopus, Web of Science, and Google Scholar, to identify relevant studies published within the last 20 years. Keywords included "maternal health disparities," "chronic stress and pregnancy," "intergenerational trauma," "underserved communities," and "trauma-informed prenatal care." Inclusion criteria encompassed peer-reviewed articles, clinical studies, and policy reports that examined the physiological, psychological, and social determinants of maternal stress and its impact on pregnancy outcomes. Exclusion criteria included studies that lacked empirical evidence, focused on non-human subjects, or did not specifically address underserved populations. Following database searches, duplicate studies were removed, and an initial screening of titles and abstracts was conducted to assess relevance. Full-text articles were then reviewed to evaluate methodological rigor, sample size, and study design. The selected studies were critically appraised using the Cochrane Risk of Bias Tool and the Newcastle-Ottawa Scale to ensure validity and reliability. Data were extracted on key variables, including sources of chronic stress, physiological and psychological effects on pregnancy, historical healthcare disparities, and the effectiveness of trauma-informed interventions.

The synthesis of findings was conducted using a narrative approach, categorizing results based on biological, psychological, and policy-related factors contributing to maternal health disparities. Meta-analysis was performed where possible to quantify associations between chronic stress and adverse pregnancy outcomes, such as preterm birth, low birth weight, and maternal morbidity. The review also included qualitative studies to capture lived experiences and perspectives of pregnant individuals in underserved communities. The systematic review highlights the multifaceted nature of stress-related maternal health disparities and supports the need for integrative healthcare models. The findings underscore the importance of trauma-informed prenatal care, community-based interventions, and targeted policy reforms in mitigating stress-related pregnancy risks. Future research should focus on longitudinal studies to better understand intergenerational effects and assess the long-term impact of policy changes in reducing maternal health inequities.

2.1 Historical and intergenerational trauma: roots of maternal health disparities

Maternal health disparities among underserved communities are deeply rooted in historical patterns of exclusion and intergenerational trauma (Roy, 2019). The cumulative effects of systemic racism, economic marginalization, and medical discrimination have contributed to significant inequities in maternal healthcare access and pregnancy outcomes. Understanding the historical and biological mechanisms that drive these disparities is crucial for developing effective interventions. This examines how past healthcare exclusion, inherited stress, and cultural mistrust shape modern maternal health inequities and continue to influence pregnancy outcomes in marginalized populations.

Throughout history, racial and ethnic minorities, particularly Black, Indigenous, and other marginalized communities, have faced systemic barriers to adequate maternal healthcare (Julian *et al.*, 2020). In the United States, Black women experience three to four times higher maternal mortality rates than their white counterparts, a disparity linked not only to

socioeconomic factors but also to structural racism within the healthcare system. Historical injustices such as the Tuskegee Syphilis Study (1932-1972) and the forced sterilization of women of color under eugenics policies have fostered deep-rooted mistrust in medical institutions, discouraging many from seeking prenatal care (Wilson *et al.*, 2020). Even today, implicit biases among healthcare providers contribute to dismissal of pain, inadequate medical interventions, and lower-quality maternal care for marginalized populations. The legacy of segregation in healthcare systems has also resulted in geographic disparities, where hospitals and clinics in underserved communities are often underfunded and understaffed. Many rural and low-income urban areas lack specialized maternal care services, forcing pregnant individuals to travel long distances for prenatal visits or rely on emergency care. Delayed access to obstetric services increases the risk of preventable pregnancy complications, such as preeclampsia, gestational diabetes, and postpartum hemorrhage (Fabiya *et al.*, 2019).

Economic instability is a key factor contributing to maternal health disparities. Underserved communities face higher rates of poverty, food insecurity, and unstable housing, all of which significantly impact pregnancy health. Lack of health insurance or underinsurance prevents many individuals from receiving regular prenatal screenings, nutritional counseling, and perinatal mental health support (Arenson *et al.*, 2019). Even when healthcare is available, the high costs of medical care, childcare, and unpaid maternity leave create additional stressors that can negatively impact pregnancy outcomes. Moreover, the stress of job insecurity and workplace discrimination can exacerbate maternal health risks. Many pregnant individuals in low-wage jobs experience unsafe working conditions, lack of accommodations, and employer retaliation, leading to increased stress levels and adverse pregnancy outcomes. Without structural reforms addressing income disparities, employment protections, and universal maternal healthcare, these barriers will continue to perpetuate generational cycles of maternal health inequities (Gammage *et al.*, 2020; Tikkanen *et al.*, 2020).

Intergenerational trauma refers to the transmission of stress, trauma, and adverse experiences from one generation to the next, often through both biological and environmental pathways. Emerging research in epigenetics has demonstrated that chronic stress can alter gene expression, leading to increased susceptibility to health conditions such as hypertension, diabetes, and mental health disorders (Vidrascu *et al.*, 2019). For pregnant individuals, prolonged exposure to chronic stress leads to elevated cortisol levels, which can cross the placenta and negatively impact fetal development. High cortisol exposure has been linked to preterm birth, low birth weight, and long-term neurodevelopmental disorders in children. Furthermore, maternal stress during pregnancy increases the likelihood of postpartum depression and anxiety, affecting parent-child bonding and early childhood development. Addressing these biological mechanisms of intergenerational trauma requires a holistic healthcare approach that integrates prenatal mental health services with social support systems.

The long history of medical discrimination has led to widespread mistrust of healthcare institutions among marginalized communities. Many individuals fear mistreatment, medical negligence, or coercion, leading to delayed or inadequate prenatal care (Vedam *et al.*, 2019). Studies have shown that Black and Indigenous women are

more likely to report negative healthcare experiences, including dismissal of symptoms, lack of informed consent, and racial microaggressions during medical visits. This mistrust often results in avoidance of hospitals and reliance on alternative care practices, which, while culturally significant, may not always provide adequate medical intervention for high-risk pregnancies (Connell *et al.*, 2019). Cultural mistrust is also reflected in lower participation rates in maternal health research and clinical trials, further limiting the representation of underserved populations in medical studies. The exclusion of diverse racial and ethnic groups from research contributes to gaps in medical knowledge, ineffective treatment recommendations, and continued health disparities (Williams *et al.*, 2019). Increasing diversity in medical research, training culturally competent healthcare providers, and involving community leaders in maternal health initiatives are essential steps toward rebuilding trust and improving maternal care utilization. The persistent maternal health disparities in underserved communities are deeply connected to historical patterns of exclusion, systemic racism, and intergenerational trauma. Structural barriers in healthcare access, economic instability, and cultural mistrust continue to shape maternal stress levels and pregnancy outcomes today. Addressing these disparities requires a comprehensive approach that acknowledges the biological, psychological, and sociocultural factors influencing maternal health. Trauma-informed care models, community-based healthcare interventions, and targeted policy reforms must be implemented to reduce chronic stress and improve pregnancy outcomes for future generations (Chamberlain *et al.*, 2019; Tebes *et al.*, 2019).

2.2 Physiological and psychological effects of chronic stress on pregnancy

Chronic stress during pregnancy poses significant risks to both maternal and fetal health, influencing outcomes through physiological disruptions and psychological distress (Davis and Narayan, 2020). Prolonged exposure to stress triggers hormonal imbalances, immune dysfunction, and mental health challenges that can lead to adverse pregnancy complications. Understanding the mechanisms through which chronic stress affects pregnancy is crucial for developing effective interventions. This explores how endocrine and immune system disruptions, along with mental health challenges, contribute to poor maternal and neonatal outcomes.

The endocrine system plays a crucial role in pregnancy by regulating hormonal changes necessary for fetal development (Solano and Arck, 2020). However, chronic stress disrupts this system, primarily through cortisol dysregulation. Cortisol, the body's primary stress hormone, is produced by the hypothalamic-pituitary-adrenal (HPA) axis in response to stressors. While normal cortisol fluctuations are essential for fetal organ maturation, excessive and prolonged cortisol exposure has been linked to preterm birth, intrauterine growth restriction (IUGR), and low birth weight. Under chronic stress, the maternal HPA axis remains overactive, leading to elevated circulating cortisol levels. High cortisol concentrations prematurely activate the fetal HPA axis, triggering early release of corticotropin-releasing hormone (CRH) a key regulator of labor onset (Dickens and Pawluski, 2018). Studies have demonstrated that increased CRH levels in stressed pregnancies are associated with higher rates of preterm labor (before 37 weeks of gestation), which increases

the likelihood of respiratory distress syndrome, neurodevelopmental impairments, and neonatal intensive care unit (NICU) admissions. Additionally, cortisol dysregulation can impair placental function, reducing nutrient and oxygen exchange between the mother and fetus (Johns *et al.*, 2020). This can contribute to fetal growth restriction and increase the risk of metabolic disorders later in life. Given these risks, stress-reduction interventions and prenatal screenings for high-risk pregnancies are essential for mitigating the adverse effects of cortisol dysregulation.

Chronic stress also affects the maternal immune system, triggering persistent inflammatory responses that may compromise pregnancy health (Seiler *et al.*, 2020). Under normal conditions, pregnancy requires a delicate immune balance, allowing the maternal body to tolerate fetal tissue while still protecting against infections. However, stress-induced inflammation can disrupt this balance, leading to placental dysfunction, preeclampsia, and gestational hypertension. Stress activates the sympathetic nervous system, increasing the release of pro-inflammatory cytokines such as interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF- α), and C-reactive protein (CRP). Elevated levels of these inflammatory markers have been linked to placental insufficiency and endothelial dysfunction, key contributors to preterm labor and pregnancy-induced hypertension. Moreover, inflammatory stress responses can increase the risk of spontaneous abortion and stillbirth by impairing vascular development in the placenta. In cases of severe maternal stress, chronic inflammation may trigger immune rejection of the fetus, leading to pregnancy loss. Addressing maternal stress through early medical intervention, mental health counseling, and lifestyle modifications can help regulate inflammatory responses and support healthier pregnancy outcomes (Beversdorf *et al.*, 2019).

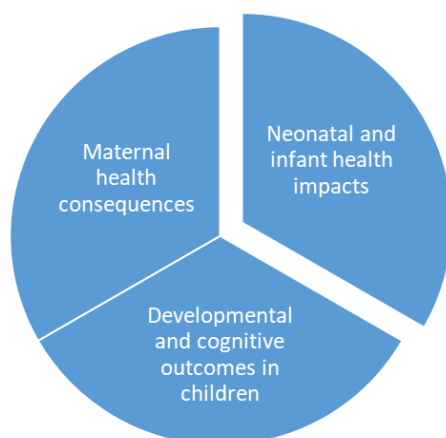


Fig 1: Long-term effects of stress on pregnancy outcomes

The psychological burden of chronic stress during pregnancy extends beyond physiological changes, significantly affecting maternal mental health. Pregnant individuals exposed to prolonged financial, social, or emotional stressors are at increased risk of developing anxiety disorders, depression, and post-traumatic stress disorder (PTSD) (Simpson *et al.*, 2018). Studies show that one in five pregnant individuals experience clinically significant anxiety or depressive symptoms, with higher rates among those from underserved communities. Chronic exposure to stressors such as domestic violence, racial discrimination, or lack of social support exacerbates emotional distress, sleep

disturbances, and mood instability during pregnancy. Left untreated, perinatal depression and anxiety can contribute to substance use disorders, poor prenatal care adherence, and increased risk of postpartum depression (PPD). Furthermore, PTSD related to previous traumatic experiences, intimate partner violence, or adverse childhood events can increase pregnancy complications and interfere with maternal bonding (Fredland *et al.*, 2018). Women with PTSD often have heightened cortisol reactivity and exaggerated fear responses, which can contribute to emotional dysregulation, self-harm behaviors, and increased medical complications. Integrating perinatal mental health screenings and trauma-informed care into routine prenatal visits is essential for identifying and supporting at-risk individuals.

Maternal stress does not only affect the mother but also has lasting consequences for fetal development and child health. Research in fetal programming and developmental origins of health and disease (DOHaD) suggests that intrauterine exposure to chronic stress can alter fetal neurodevelopment, metabolic function, and immune resilience. Elevated maternal cortisol levels during pregnancy can influence fetal brain development, leading to structural and functional changes in regions associated with stress regulation, emotional processing, and cognitive function (Lautarescu *et al.*, 2020). Studies have linked maternal stress exposure to higher risks of attention-deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and mood disorders in children. Additionally, prenatal stress increases the likelihood of infant temperament difficulties, excessive crying, and poor self-regulation in early childhood. Longitudinal studies have shown that children born to mothers who experienced high stress levels during pregnancy are more likely to develop anxiety disorders, depression, and reduced coping mechanisms in adulthood. Beyond neurological effects, prenatal stress is associated with higher risks of obesity, cardiovascular disease, and type 2 diabetes in offspring due to epigenetic modifications in stress-response genes and metabolic pathways (Agarwal *et al.*, 2018). These findings highlight the critical need for maternal stress management programs, early-life interventions, and supportive parenting resources to mitigate the long-term health risks in children.

Chronic stress during pregnancy poses serious risks through endocrine disruptions, immune dysregulation, and psychological distress, which collectively increase the likelihood of preterm birth, pregnancy complications, and long-term child health issues. Elevated cortisol levels, inflammatory responses, and heightened emotional distress contribute to poor pregnancy outcomes and can have lasting consequences on fetal development (Wu *et al.*, 2020). Addressing these challenges requires comprehensive, trauma-informed prenatal care that integrates mental health support, stress-reduction interventions, and equitable healthcare access. By recognizing and mitigating the physiological and psychological effects of chronic stress, healthcare providers can help improve maternal and child health outcomes, particularly in underserved communities.

2.3 Integrative healthcare models for trauma-informed maternal care

Pregnant individuals in underserved communities often experience chronic stress and intergenerational trauma, which negatively impact maternal and fetal health outcomes. Traditional prenatal care models frequently overlook the

psychosocial determinants of maternal health, failing to address mental health needs, systemic healthcare disparities, and social support deficits. Integrative healthcare models that incorporate trauma-informed prenatal care and community-based support systems can bridge this gap, providing holistic and culturally responsive care (Rutman *et al.*, 2020). This section trauma-informed prenatal care approaches and community-based interventions, emphasizing their role in improving pregnancy outcomes for at-risk populations.

A key principle of trauma-informed prenatal care is ensuring that healthcare providers are trained in cultural competency and patient-centered approaches. Many individuals in underserved communities, particularly those from historically marginalized backgrounds, have experienced medical discrimination, racial bias, and inadequate access to quality care. As a result, there is a widespread mistrust of healthcare institutions, which can discourage prenatal care engagement. To address these barriers, healthcare professionals must adopt a trauma-sensitive approach, acknowledging patients' lived experiences and tailoring care to their unique needs. This includes. Training providers in implicit bias reduction to foster trust and improve patient-provider relationships. Using patient-centered communication techniques that validate concerns and encourage shared decision-making. Providing culturally responsive care, such as offering language interpretation services, traditional birth practices integration, and community liaisons to enhance patient comfort (Handtke *et al.*, 2019). Studies indicate that culturally competent and respectful maternity care models improve patient satisfaction, increase prenatal visit attendance, and enhance maternal-infant bonding postpartum.

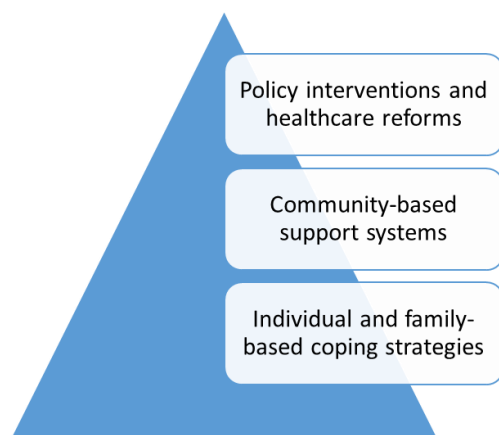


Fig 2: Strategies for mitigating stress in pregnancy

Chronic stress and trauma significantly contribute to anxiety, depression, and post-traumatic stress disorder (PTSD) in pregnant individuals. However, mental health concerns are often underdiagnosed in standard prenatal care settings, especially in underserved populations where access to mental health professionals is limited (Willey *et al.*, 2020). To counter this, routine mental health screening should be integrated into prenatal visits, ensuring early identification and intervention for at-risk individuals. This approach includes. Standardized mental health assessments, such as the Edinburgh Postnatal Depression Scale (EPDS) or Perceived Stress Scale (PSS), administered at multiple prenatal checkpoints. Onsite mental health counseling or referrals to trauma-informed therapists, ensuring patients have access to

cognitive behavioral therapy (CBT), support groups, or psychiatric care if needed. Mindfulness-based prenatal interventions, including yoga, meditation, and stress-reduction workshops, which have been shown to lower cortisol levels and improve pregnancy outcomes. By integrating mental health support into routine prenatal care, maternal psychological resilience improves, leading to lower rates of preterm birth, pregnancy complications, and postpartum mental health disorders.

Community-driven maternal care models, such as doula programs and peer-support networks, play a critical role in reducing pregnancy-related stress, increasing healthcare engagement, and improving birth outcomes. Doulas trained birth companions who provide emotional, informational, and physical support have been particularly effective in addressing racial disparities in maternal health (Thurston *et al.*, 2019). Research has shown that doula-assisted births lead to. Lower rates of preterm birth and cesarean delivery, particularly among Black and Indigenous pregnant individuals. Reduced labor complications and shorter hospital stays due to continuous support during labor and delivery. Higher maternal satisfaction and postpartum mental health stability, as doulas offer advocacy, emotional reassurance, and postpartum care guidance. Similarly, peer-support networks, including motherhood circles, virtual support groups, and community mentorship programs, provide safe spaces for pregnant individuals to share experiences, receive advice, and access social resources. These networks reduce social isolation, a significant contributor to prenatal anxiety and depression, and strengthen community resilience.

Addressing social determinants of health (SDOH) is essential for reducing maternal stress and improving overall pregnancy outcomes. Many underserved individuals face barriers such as unstable housing, food insecurity, unemployment, and lack of transportation, which exacerbate prenatal stress and limit healthcare access (Chen *et al.*, 2020). Integrative healthcare models must incorporate policy-driven interventions that address these systemic issues, including. Housing assistance programs, such as subsidized maternal housing or emergency shelter services, ensuring pregnant individuals have a stable living environment. Nutritional support initiatives, including access to Women, Infants, and Children (WIC) programs, food banks, and community gardens, which provide prenatal vitamins, balanced diets, and proper maternal nutrition education. Employment protection and paid maternity leave policies, allowing pregnant individuals to prioritize health and prenatal care without financial distress. Studies demonstrate that interventions targeting SDOH significantly reduce pregnancy complications, improve fetal health, and lower maternal stress levels. Implementing these programs at a community and policy level ensures long-term improvements in maternal health equity. Integrative healthcare models that incorporate trauma-informed prenatal care and community-based support systems provide a comprehensive approach to maternal well-being. By training culturally competent providers, embedding mental health support into prenatal visits, expanding doula access, and addressing SDOH, healthcare systems can reduce maternal health disparities and improve pregnancy outcomes in underserved communities (Negussie *et al.*, 2019; Huggins *et al.*, 2020). This holistic, multi-level strategy empowers pregnant individuals, enhances maternal resilience, and fosters healthier pregnancies and births.

2.4 Policy interventions to reduce maternal health disparities

Maternal health disparities remain a significant public health issue, particularly in underserved communities where racial, socioeconomic, and systemic barriers limit access to quality prenatal and postnatal care (Adams and Thomas, 2018; Chinn *et al.*, 2020). These disparities contribute to higher rates of maternal mortality, preterm birth, and pregnancy-related complications. Effective policy interventions must focus on expanding access to equitable maternal healthcare and integrating holistic and preventive care strategies to address both medical and social determinants of maternal health.

A primary barrier to maternal healthcare access in underserved populations is lack of health insurance coverage and financial constraints. Many pregnant individuals, particularly in low-income and minority communities, rely on Medicaid for prenatal and postnatal care. However, restrictive eligibility criteria, gaps in coverage, and lack of postpartum care extensions contribute to poor maternal health outcomes. Expand medicaid eligibility to cover all pregnant individuals regardless of income level, ensuring continuity of care from conception to postpartum recovery (Gordon *et al.*, 2020). Extend postpartum medicaid coverage beyond 60 days to at least one year, as recommended by public health experts, to prevent postpartum complications and maternal mortality. Mandate insurance coverage for mental health services, doula support, and midwifery care, recognizing the critical role of comprehensive maternal support systems. Studies show that states with extended Medicaid coverage experience lower maternal mortality rates, reinforcing the importance of sustained policy investments in maternal healthcare accessibility.

Many underserved communities, particularly rural areas and inner-city neighborhoods, face severe shortages of maternal healthcare providers and facilities. The closure of maternity wards in rural hospitals has created maternal healthcare deserts, where individuals must travel long distances to access prenatal and delivery services. Policy interventions to improve healthcare infrastructure should include. Increasing funding for maternal health clinics in high-risk areas, ensuring that essential prenatal, delivery, and postpartum services are available locally (Dudley *et al.*, 2018; Khorrami *et al.*, 2019). Incentivizing obstetricians, midwives, and maternal health specialists to practice in underserved regions through student loan forgiveness programs, higher reimbursement rates, and rural health fellowships. Expanding telehealth services to provide virtual prenatal care, mental health counseling, and lactation support, particularly for individuals facing geographic or mobility barriers. By prioritizing infrastructure improvements, policymakers can reduce barriers to timely maternal care, preventing complications and improving birth outcomes.

Traditional maternal healthcare models often fail to address the unique needs of diverse populations, leading to distrust in medical institutions and underutilization of services. Community-led initiatives, which incorporate peer support, culturally competent care, and holistic health practices, have been highly effective in improving maternal health outcomes (Chomat *et al.*, 2019). Policy recommendations to support community-based maternal health programs include, increasing federal and state grants for Black maternal health programs, Indigenous birth initiatives, and culturally tailored

prenatal education programs. Funding doula and midwifery services for Medicaid recipients, recognizing the proven benefits of continuous, community-based birth support. Developing maternal mentorship programs, where experienced mothers provide guidance, emotional support, and healthcare navigation assistance to at-risk pregnant individuals. By investing in grassroots maternal health initiatives, policymakers can enhance trust, engagement, and positive birth experiences in marginalized communities.

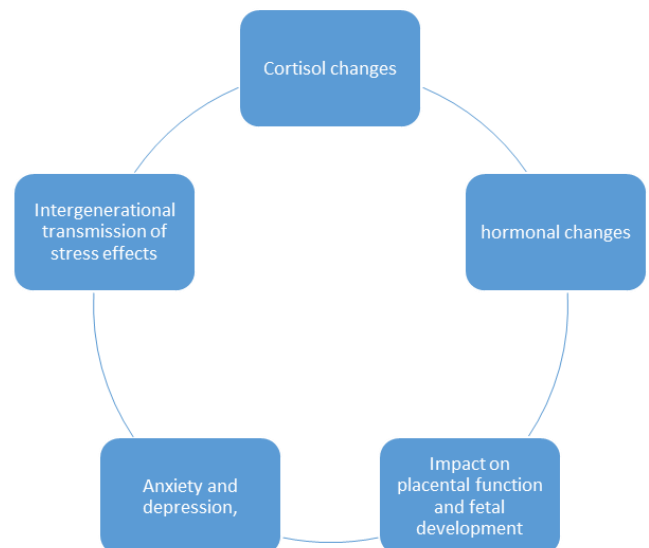


Fig 3: The science of stress and pregnancy

Chronic stress during pregnancy, particularly in low-wage, high-demand jobs, contributes to adverse birth outcomes, including preterm birth and low birth weight. Many pregnant individuals in underserved communities face unsafe working conditions, lack of paid leave, and job-related discrimination, exacerbating stress and health risks. Policy measures to improve workplace accommodations for pregnant individuals should include, mandating paid maternity leave policies, particularly for low-income workers, to allow for adequate prenatal care and recovery time post-birth (Jou *et al.*, 2018; Franco *et al.*, 2020). Strengthening workplace protections against pregnancy discrimination, ensuring that employers provide reasonable accommodations, such as reduced physical labor, flexible scheduling, and remote work options. Expanding employer-sponsored maternal wellness programs, including prenatal stress management workshops, lactation support, and childcare assistance. Countries with stronger maternity leave policies and workplace protections have significantly lower maternal stress levels and better pregnancy outcomes, highlighting the need for comprehensive labor policy reforms in the U.S. and beyond. Addressing maternal health disparities requires multi-faceted policy interventions that go beyond traditional medical models to include social, economic, and structural supports. Expanding Medicaid coverage, improving healthcare infrastructure, funding community-led initiatives, and enforcing workplace protections are essential steps toward achieving equitable maternal healthcare (Hunter and Lawton, 2020; Mangrum *et al.*, 2020). By adopting these holistic and preventive strategies, policymakers can reduce maternal mortality, improve pregnancy outcomes, and promote long-term maternal and child well-being.

3. Conclusion

Chronic stress during pregnancy, particularly in underserved communities, has profound physiological and psychological effects on both maternal and fetal health. Elevated cortisol levels, immune system disruptions, and increased inflammatory responses contribute to adverse pregnancy outcomes, including preterm birth, low birth weight, and heightened risk of complications. Furthermore, maternal stress is linked to mental health disorders such as anxiety, depression, and PTSD, which not only affect pregnancy but also have long-term consequences on child development. Historical patterns of healthcare exclusion, systemic racism, and intergenerational trauma further exacerbate these disparities, creating an urgent need for comprehensive and sustainable interventions.

To address these challenges, a multidimensional approach is essential, integrating trauma-informed prenatal care and community-based support systems. Trauma-informed care—rooted in cultural competency, patient-centered approaches, and routine mental health screenings—can significantly improve maternal health outcomes. Community-driven initiatives, such as doula programs, peer-support networks, and social determinants of health interventions (e.g., housing, nutrition, and employment support), provide holistic and sustainable support that empowers pregnant individuals. Expanding Medicaid coverage, improving healthcare infrastructure, and promoting workplace accommodations for pregnant individuals in high-stress environments are also key components of a long-term solution.

Future maternal health policies must focus on equity-driven reforms that prioritize access to quality care, mental health integration, and innovative maternal health models. Advancements in telehealth, AI-driven prenatal monitoring, and public-private partnerships have the potential to revolutionize maternal healthcare delivery. By bridging gaps in care through policy innovation and community-based strategies, healthcare systems can reduce maternal health disparities and improve outcomes for future generations. Addressing chronic stress in pregnancy is not just a medical necessity but a social imperative, requiring collaborative efforts from policymakers, healthcare providers, and communities to ensure healthier pregnancies and improved long-term maternal and child well-being.

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