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COMMENT

Social inequities hurt babies' hearts: a commentary on Forero-Manzano, MJ, et al.

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Pediatric Research (2023) 93:1116–1117; https://doi.org/10.1038/s41390-022-02363-7

Congenital heart disease, one of the most common health conditions in newborns, is partially due to social determinants of health and thus imposes a disproportionate burden upon families that are most socioeconomically disadvantaged. Globally, most deaths from congenital heart disease occur among infants from low-income families and among those who live in low- and middle-income countries.[1] Surgical and medical advancements have made it possible for the vast majority of children with congenital heart disease to grow to adulthood, making it possible for those who have access to healthcare to live longer with these conditions. But, socioeconomically disadvantaged populations have less access to the kind of healthcare that children with congenital heart conditions need to thrive.[2] It is tragic to consider that a significant portion of the global burden due to congenital heart disease may arise from preventable causes that are more prevalent amongst low-income families.

The consensus that social determinants affect the health of children is now generally accepted around the world and has become its own research niche. In the case of the country of Colombia, Forero-Manzano, et al., showed that exposure to smoke from cooking woodstoves or from cigarettes was associated with the severity of congenital heart disease in babies from low-income families.[3] Their work adds to the mountains of evidence showing that exposure to air pollutants affects health in innumerable ways,[4] and babies' hearts could be exquisitely sensitive to these effects, especially if they are born to low-income families.[2]

Unfortunately, their findings are not surprising.

One way in which social determinants affect global health is the higher exposure to environmental pollutants among those who are socioeconomically disadvantaged.[5] One devastating example is the use of woodstoves for cooking, as it is one of the most important sources of indoor air pollution around the world, affecting about a third of the global population.[6] Exposure to woodstove smoke has been associated with many kinds of health conditions including stroke, lung cancer, and ischemic heart disease in countries as diverse as China and Mexico.[7] In certain impoverished regions, traditional stoves use wood and coal. Use of polluting fuels and inefficient cooking technology cause household air pollution, respiratory ailments, heart difficulties, and mortality among impoverished families around the world.[7] Indoor air pollution causes 4 million premature deaths a year, 50% of them in children under 5 years of age.[8] Women and children are disproportionately harmed by household air pollution.[9] The findings of the Forero-Manzano study[3] in Colombia are no exception to this global finding.

Access to clean cooking fuel and efficient cooking stoves has remained a health, gender, socioeconomic, environmental, and climate issue. Three billion people need efficient, safe, and affordable ways to prepare their meals.[7,10] Clean cooking must be a policy, investment, and multi-sector cooperation priority. For these reasons, The World Bank has established a Clean Cooking Fund to accelerate public and private investments to remedy this problem by 2030.[10] The results of this initiative remain to be seen.

Forero-Manzano and colleagues also found an association between cigarette smoke and congenital heart disease among low-income families in Colombia.[3] Exposure to tobacco smoke during gestation continues to be a global health problem and it arises from both exposure to secondhand smoke and also from direct smoking during pregnancy. A recent meta-analysis of global trends in smoking during pregnancy found that most women who smoke daily continue to smoke after becoming pregnant.[11] That meta-analysis estimated the overall global prevalence of smoking during pregnancy to be less than 2%, but in some countries, such as Spain, that prevalence was estimated to be higher than 20%. Another recent study found that 45% of pregnant women in Spain are exposed to cigarette smoke.[12]

Our own studies in Spain illustrate this point.[13] We conducted a study of the 5-year survival of children diagnosed with acute lymphoblastic leukemia (ALL). Although thankfully, survival rates for ALL have reached 90% in high-income countries, we wanted to know if other modifiable factors could increase survival rates even higher. We found that prenatal exposure to cigarette smoke among children with ALL was higher than in the general population; 44.4% from mothers' smoking, and 55.5% due to their fathers' smoking. After the children were diagnosed with ALL, 39.7% of the mothers and 45.9% of the fathers continued to smoke. Sadly, exposure to cigarette smoke was an independent predictor of relapse among the children with ALL, suggesting that exposure to cigarette smoke worsened survival rates among children with this disease.[13]

The implications for preventive efforts are obvious, especially in high- and middle-income countries where smoking cessation programs could be integrated into prenatal care. This investment would make sense, as the contribution of exposure to cigarette

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Received: 5 September 2022 Accepted: 13 September 2022
Published online: 2 December 2022

smoke during fetal development towards the global burden of disease is significant. Exposure to cigarette smoke during gestation, whether directly or as secondhand smoke, has been implicated in a number of neonatal adverse conditions, yet it can be considered a preventable problem.[14–16] Although this is a terrible effect of cigarette smoke on disease in children, it can also be seen as a preventable cause of disease for which interventions exist.

However, we must admit that smoking cessation is complicated. For instance, Patrick Paretti-Watel and Jean Constance[17] conducted a fascinating study of cigarette smoking in France during the early 2000s, a time when cigarette prices were increasing. They hypothesized that cigarette price increases would lower smoking rates among the poor, as they would be less able to afford the smoking habit. However, their study found exactly the opposite. Smoking prevalence declined among executives and professionals, remained stable among manual employees, and grew among the unemployed. The study also showed that low-income smokers smoked more, were more tobacco-dependent, and smoked instinctively or to decrease "bad feelings." By conducting in-depth interviews, these investigators found that impoverished smokers were aware of their addiction, but also talked about the pleasure they get from smoking as a source of stress release and affordable leisure.[17] Thus, one must consider the addictive effects of tobacco smoke and the psychological pressures that befall upon people who are socioeconomically disadvantaged before making a judgment on how they can reduce prenatal exposures to smoke.

The socioeconomic and environmental determinants of congenital heart disease that Forero-Manzano and colleagues[3] found in Colombia are another example of the disproportionate burden of disease that low-income families endure around the world, in spite of so many medical advances in pediatric care. In the U.S. and other countries, medical interventions help people with congenital heart disease survive longer. As a result, the number of adults with congenital heart disease has surpassed the number of children.[2] This is a good thing, but recent epidemiological studies show that these medical advancements are differentially impacting patients due to systemic racism, socioeconomic determinants of health, and other factors.[18,19] Studies so far show that these disparities in congenital cardiology remain at large.

The state of the evidence on the relationship between socioeconomic determinants and congenital heart disease prompted the American Heart Association to issue a strong scientific statement.[2] The AHA concluded that socioeconomic determinants and systemic inequities interact at the population and individual levels to contribute to increased mortality in congenital heart disease patients.

Congenital heart disease is far from the only example in which a disease can be caused or aggravated by poverty combined with exposure to pollutants. The consistent finding that environmental exposures and socioeconomic inequities make for ill health among disadvantaged children should fuel reparative action. If the health of children is a requirement for ensuring a successful future, then identifying and acting upon these preventable causes of disease is a must. Only by acknowledging that socioeconomic inequalities and environmental injustices lead to health disparities, and intervening upon these findings, can we improve the health of all children.

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COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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