Ohio Journal of Public Health, Vol. 7, Issue 2 ISSN: 2578-6180

RESEARCH ARTICLE

The Impact of the Five Domains of Social Determinants of Health on Resilience Among Postpartum Women in Dayton, Ohio

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Submitted January 23, 2025 Accepted March 18, 2025 Published July 23, 2025 https://doi.org/10.18061/ojph.v7i2.10326

ABSTRACT

Background: The objective of this study is to utilize patient-reported experiences and publicly available neighborhood social determinants of health (SDoH) characteristics to examine resilience among postpartum women within the 5 domains of SDoH.

Methods: Postpartum women receiving care at a large urban medical center in Ohio from 2017-2019 participated in a 3-part survey. The survey collected demographic information, barriers to care, and agency (confidence in achieving goals) and pathway (ability to identify strategies to achieve goals) resilience scores. Participants were grouped by 1) neighborhood SDoH characteristics, categorized into high- or low-severity based on publicly available zip code data (crime rate, food desert, and poverty level) and 2) self-reported barriers to care marked as problematic at least some of the time. Statistical analyses included t test and analysis of variance (ANOVA).

Results: Responses from 69 participants were analyzed. Participants in high-crime areas had significantly higher agency scores than those in low-crime areas (high = 28.6±3.1 vs low = 26.1±3.5; p=.003). Pathway scores were significantly lower among participants reporting barriers such as food insecurity (problem = 22.3±5.9 vs no problem = 27.0±3.8; p=.008), insufficient time for medical appointments (problem=21.5±6.9 vs no problem=27.0±3.9; p=.01), lack of support from friends (problem=22.7±5.6 vs no problem=27.0±3.9; p=.02), difficulty finding childcare (problem=23.9±5.4 vs no problem=27.2±3.7; p=.02), and feeling overwhelmed by stress (problem=25.6±4.5 vs no problem=27.9±3.5; (p=.02).

Conclusion: These findings emphasize the need for targeted programs addressing SDoH affecting pregnant people in Ohio during the perinatal period. Initiatives should focus on reducing stress, strengthening social support, food security, and resilience-building in urban communities.

Keywords: Social determinants of health; Resiliency; Barriers to care; Pregnancy; Survey design

INTRODUCTION

The impact of social determinants of health (SDoH) on pregnancy outcomes has received increasing attention in recent years. The inverse association between SDoH, prenatal care utilization, and pregnancy outcomes is well-documented.[1–9] The long-term effects of redlining have created geographic areas with overlapping social vulnerabilities. Historically, redlined neighborhoods are linked to poor health outcomes, including high preterm birth and infant mortality rates and low prenatal care initiation.[10,11] Additionally, redlining has shaped racial composition, necessitating an analysis of racism's role in shaping SDoH experiences.[1,5,12] Resilience may serve as a protective factor by mitigating the impact of adverse

circumstances, including SDoH and prenatal stress, on pregnancy outcomes.[13–16] However, few studies have examined resilience in pregnant women within the context of the 5 domains of SDoH and the neighborhood characteristics shaped by redlining.[17]

The inherent overlap makes it difficult for researchers, health care providers, and policymakers to pinpoint specific factors that influence patients' access to health care and their health outcomes.[5,18,19] Interventions addressing SDoH have been shown to improve prenatal care utilization, maternal health behaviors, and maternal and infant outcomes.[1,20] Many SDoH correlate with a patient's zip code, with neighborhood characteristics described through economic variables, crime statistics, segregation data, and assessments of walkability, food availability, and perceived safety.[8,10,21–32]

The Centers for Disease Control and Prevention (CDC) categorizes SDoH into 5 domains: economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context. Each domain encompasses factors that affect health and well-being.[33] Economic stability includes financial status, employment status, food insecurity, and housing instability. Education access and quality refers to the ability to find and use health information and is related to completion of high school, college attendance, spoken language, and literacy. Health care access and quality refers to the ability to access and use health services and includes insurance coverage, access to providers, access to providers with cultural competency and language needs, and factors affecting the ability to access health care. Neighborhood and built environment represents the connection between where a person lives and their health and includes access to healthy food, transportation, safety/crime and violence, walkability, parks, geography/zip code, and air and water quality. Social and community context represents the connection between health and areas where a person lives, works, and plays and includes support systems, community engagement, stress, and discrimination.[33–36]

Pregnancy represents a significant time in a person's life marked by physiologic and hormonal changes, potentially exacerbating both the positive and negative social factors that influence physical and mental health, relationships, work, stress, and financial stability.[14] One study revealed that 84% of pregnant participants experienced stress ranging from low to severe levels.[37] High stress and anxiety are associated with adverse infant health outcomes such as preterm birth, reduced fetal heart rate–movement coupling, increased birth complications, and a higher risk of maternal postpartum depression and anxiety.[38,39]

Resilience, the ability to respond and adapt to stress, varies based on an individual's circumstances and resources. Resilience does not imply invulnerability to stress but rather the capacity to cope with adverse events.[37] Resilience has been quantified using 2 components: agency (confidence in achieving goals) and pathway (ability to identify strategies to achieve goals).[40] Protective factors, including social support, education, youth, and self-efficacy, are associated with higher resilience levels and reduce trauma-related psychopathology, anxiety, depression, and related medical morbidity and mortality.[13,38,39,41,42] Mapping out demographic and socioeconomic factors within a neighborhood tells a story of the specific vulnerabilities to which residents are exposed. As social vulnerabilities differ by individuals, communities, and racial groups, the risk of exposure to adverse events, and the level of resilience required to maintain physical and mental health, varies accordingly.[17,43]

Despite the growing literature about the role of SDoH in health outcomes, gaps remain regarding how individual experiences within specific SDoH domains relate to resilience among pregnant populations. Understanding these relationships is necessary to inform targeted interventions and policies that address the unique challenges faced by postpartum individuals, particularly those living in neighborhoods affected by historical redlining and experiencing structural inequalities. This study aims to address these gaps by examining resilience among postpartum individuals through self-reported experiences and publicly available neighborhood-level data. Using the CDC's 5 SDoH domains as a framework, this study investigates how neighborhood characteristics and personally experienced barriers to care relate to resilience among postpartum women.

METHODS

Data and Participants

This study was conducted using a 3-part survey given to postpartum patients at a southwestern Ohio medical center between 2017 and 2019. Patients were eligible for inclusion if they were 18 years or older and could read English. The survey included a consent cover letter, questions about demographic information, different barriers to care they may or may not have experienced, and a resiliency questionnaire. The study team entered survey responses into Research Electronic Data Capture (REDCap).[44] The study was approved by the Wright State University institutional review board (#6114).

Measures

Resilience was measured using Snyder's cognitive model of hope questionnaire, which generates agency and pathway scores.[40] Scores are continuous variables ranging from 4 to 32, with higher scores indicating greater hope or resilience.

Neighborhood characteristics were coded using the 2014 Montgomery County Health Assessment (CHA), the most recent dataset available for specific zip codes.[11] Characteristics were categorized as low- or high-severity based on CHA ratings for poverty (the percent of the population living below the poverty level), crime (rates of crime per 1000 residents), food desert (low-income census tract areas where a large number of people live more than a mile from the nearest supermarket), no prenatal care (the percent

of women with no prenatal care in the first trimester), and infant mortality (number of infant deaths per 1000 live births) (Table 1).

Barriers to care included transportation (being able to get to places), food security (having enough to eat), finances (having enough money), stress (feeling overwhelmed by stress), lack of social support (having family support, having friend support), childcare availability (finding childcare), fatigue (feeling tired all the time), and insufficient time for doctor visits. Each barrier was coded as a binary variable (yes or no) based on whether participants identified it as problematic at least some of the time.

Demographic data, barriers to care and neighborhood characteristics were categorized into the 5 domains of SDoH. Economic stability included the CHA Poverty ratings and barriers to care related to money and food insecurity. Education access and quality included highest education level completed. Health care access and quality included type of insurance, the timing of prenatal care initiation, car ownership, barriers related to car ownership, barriers related to transportation and time for medical visits, and CHA ratings for no prenatal care and infant mortality. Neighborhood/built environment included length of residence in their current zip code, CHA ratings for crime and food desert status. Social/community context included barriers related to family and friend support, childcare availability, overwhelming stress, and fatigue.

Statistical Analysis

Participants were grouped by severity of the neighborhood characteristics and self-reported barriers to care. Demographic characteristics, neighborhood characteristics, and barriers to care were compared by race using chi-square tests for categorical variables and analysis of variance (ANOVA) for continuous variables. Resilience scores were compared by severity of the neighborhood characteristic and barriers to care using t test and ANOVA to control for race. Statistical significance was defined as $p < .05$. All analysis was performed using SPSS Version 29.0 (IBM, Armonk, NY).

RESULTS

Overall, 114 surveys were completed during the study period. Responses from participants residing in Montgomery County, Ohio, were coded for neighborhood characteristics, resulting in 69 surveys included for analysis. The cohort was diverse in race, marital status, age, and education (Table 2). Most participants identified as White (50%), while 36% identified as Black, and 13% identified as other races including Hispanic, Asian, mixed race, or other. Racial groups were similar in age, type of transportation used for prenatal care visits, number of children, resilience scores, and the presence of barriers to care. However, significant differences were observed across racial groups for marital status ($p = .005$), education level ($p = .03$), and type of health insurance ($p < .001$).

Tables 3 and 4 present data with Column 1 representing low-severity categories (eg, low crime rates, barriers not identified as problematic, higher education levels, living with others), which are expected to have minimal impact on resilience scores. Column 2 represents high-severity categories (eg, high crime rates, problematic barriers, lower education levels, living alone) which are expected to have a greater impact on resilience scores.

Resiliency score comparisons for demographic characteristics, neighborhood characteristics, and barriers to care were conducted using ANOVA (controlling for race) and t tests (without controlling for race). Across all comparisons, racial group did not account for a significant amount of variance, and p values were not statistically significant. In some cases, the number of participants in certain racial categories was insufficient to yield reliable results. As a result, Tables 3 and 4 report values based on t test comparisons without controlling for race.

Resilience and Economic Domain

Agency and pathway resilience scores did not differ by the severity of poverty or by participants reporting problems with having enough money (Table 3). However, pathway resilience scores were significantly lower among participants who reported problems with having enough to eat (problem = 22.3 ± 5.9) compared to those who did not report this as an issue (no problem = 27.0 ± 3.8; $p = .008$).

Resilience and Education Access and Quality Domain

Agency and pathway resilience scores did not differ among participants with lower levels of education (high school or less) and those with higher education levels (some college or more) (Table 3).

Resilience and Health care Access and Quality Domain

Agency and pathway resilience scores did not differ based on the type of insurance, self-reported initiation of prenatal care during the first trimester, car ownership, or problems with transportation. Similarly, no differences in agency and pathway scores were observed among participants living in neighborhoods with high versus low rates of no prenatal care in the first trimester or neighborhoods with high versus low rates of infant mortality (Table 3). However, pathway resilience scores were significantly lower for participants reporting problems with having enough time to visit

Table 1. Coding for Severity of Neighborhood Characteristics

Vulnerability	Coded as low-severity			Coded as high-severity	
Poverty (%)	0-1.6	1.7-2.6	2.7-3.7	3.8-5.6	5.7-8.9
Crime	5.8-8.0	8.1-19.0	19.1-33.3	33.4-68.9	69.0-120
Food desert	No			Yes	
No prenatal care (%)	8.9-13.8	13.9-20.4	20.5-25.0	25.1-30.3	30.4-35.2
Infant mortality	0.0-2.3	2.4-6.8	6.9-13.4	13.5-21.7	21.8-76.9

the doctor (problem = 21.5 ± 6.9) compared to those who did not identify this as an issue (no problem=27.0 ± 3.9; p = .01).

Resilience and Neighborhood/Built Environment Domain

Agency and pathway resilience scores did not differ among participants who reported living in their current neighborhood for less than 2 years compared to those living there for more than 2 years. Similarly, no differences were observed between participants living in a food desert and those not living in a food desert (Table 4). Agency resilience scores were significantly higher for participants living in neighborhoods with high crime rates (high crime=28.6 ± 3.1) compared to those living in neighborhoods with low crime rates (low crime = 26.1 ± 3.5; p = .003).

Resilience and Social/Community Context Domain

Agency and pathway resilience scores did not differ among participants living alone versus those living with others or among participants reporting involvement of the baby's father versus those reporting no involvement. Similarly, no differences were observed among participants reporting problems with family support and those without such problems (Table 4). Pathway resilience scores were significantly lower for participants reporting problems with friend support (problem = 22.7 ± 5.6) compared to those without such problems (no problem = 27.0 ± 3.9; p = .02). Pathway resilience scores were also significantly lower for participants reporting difficulties finding childcare (problem = 23.9 ± 5.4) compared to those without such difficulties (no problem = 27.2 ± 3.7; p = .02). Participants overwhelmed by stress had significantly lower agency resilience scores (problem = 26.7 ± 3.7) compared to those not reporting stress as a problem (no problem = 28.9 ± 2.7; p = .005). Pathway resilience scores were also significantly lower for participants overwhelmed by stress (problem = 25.6 ± 4.5) compared to those who were not (no problem = 27.9 ± 3.5; p = .02). Agency and pathway resilience scores did not differ for participants who reported being too tired for everyday activities compared to those who did not.

DISCUSSION

Among the 5 domains of social determinants of health (SDoH), we found lower pathway resilience scores in the high-severity categories for problems such as having enough to eat (economic), having enough time to go to the doctor (health care), and having sufficient friend support, finding childcare, and feeling overwhelmed by stress (social/community context). Conversely, higher agency resilience scores were observed in neighborhoods with high crime rates (neighborhood/built environment), while lower agency scores were linked to feeling overwhelmed by stress (social/community context). These findings align with existing literature which associates higher resilience with neighborhood crime and lower resilience with diminished social support.[13–15,27]

Table 2. Demographic Characteristics, Severity of Neighborhood Characteristics, and Barriers to Care by Racial Group

		Black (N=25)	White (N=35)	Other Races (N=9)	P
Age (in years)	18-27	18 (72%)	18 (51%)	5 (56%)	.56
	28-34	5 (20%)	14 (40%)	3 (33%)	
	35+	2 (8%)	3 (9%)	1 (11%)	
Marital status	Single	20 (80%)	12 (34%)	5 (33%)	.005
	Married	5 (20%)	22 (63%)	3 (56%)	
	Divorced	0	1 (3%)	1 (11%)	
Highest level of education	High school degree or less	16 (64%)	9 (26%)	6 (67%)	.03
	Some college	6 (24%)	17 (49%)	2 (22%)	
	4 or more years college	3 (12%)	9 (26%)	1 (11%)	
Type of health insurance	Private insurance	4 (16%)	17 (49%)	4 (44%)	<.001
	Medicaid	21 (84%)	16 (46%)	1 (11%)	
	Self-pay	0	2 (6%)	4 (44%)	
Transportation to prenatal care	Own car	16 (67%)	32 (91%)	8 (89%)	.20
	Ride with family/friend	4 (17%)	2 (6%)	1 (11%)	
	Public transportation	2 (8%)	0	0	
	Walk	0	1 (3%)	0	
	Insurance provided ride	2 (8%)	0	0	
Number of children		2.1 ± 1.3	1.9 ± 1.3	2.9 ± 1.3	.14
Number years living in current zip code		5.4 ± 7.7	6.3 ± 8.8	7.1 ± 7.3	.86
Resiliency score	Agency	27.8 ± 3.6	27.5 ± 3.5	27.7 ± 3.3	.95
	Pathway	25.9 ± 4.7	26.8 ± 4.1	27.8 ± 3.3	.49
Neighborhood vulnerability (high-severity)	Poverty	15 (60%)	7 (20%)	4 (44%)	.006
	Crime	20 (80%)	15 (45%)	5 (56%)	.03
	Food desert	11 (44%)	6 (17%)	1 (11%)	.04
	No prenatal care	20 (80%)	6 (17%)	3 (33%)	<.001
	Infant mortality	8 (32%)	1 (3%)	0	.003
Barrier to care (IS a problem)	Getting places	6 (24%)	3 (9%)	2 (22%)	.24
	Having enough to eat	6 (24%)	0	0	.003
	Having enough money	8 (32%)	5 (14%)	2 (22%)	.26
	Feeling overwhelmed by stress	18 (72%)	15 (43%)	4 (44%)	.07
	Having family support	6 (24%)	0	1 (11%)	.01
	Having friend support	5 (20%)	0	1 (11%)	.03
	Finding childcare	8 (32%)	5 (14%)	1 (11%)	.06
	Being too tired for everyday activities	8 (32%)	6 (17%)	1 (11%)	.24
	Not having enough time	3 (13%)	0	1 (11%)	.11

Data are presented as mean ± SD or N (%)

Our study contributes to the literature by examining resilience among Black and White postpartum individuals and identifying negligible impacts of the severity of neighborhood characteristics such as poverty levels and food deserts on resilience scores, an area not previously reported. In addition, we highlight the adverse impact of being overwhelmed by stress on both agency resilience (confidence in achieving goals) and pathway resilience (confidence in identifying strategies to achieve goals). Overall, pathway scores were significantly lower than agency scores across all neighborhood characteristics and barriers to care. This indicates that postpartum individuals in our population feel confident in their abilities to accomplish goals but less confidence in knowing how to achieve them.

The high rates of maternal mortality in Ohio have created an urgent need for increased interventions and programs aimed at maternal health.[45,46] Our findings suggest that programs should focus on self-reported barriers to care rather than broader neighborhood characteristics. Programs addressing social support and stress reduction should be accessible to all pregnant people, regardless of race, socioeconomic status, or neighborhood context. Prior successful interventions such as SDoH screenings, prenatal counseling, advanced practice nursing involvement, and support groups provide a framework for future efforts. [1,4,47]

Stress is a multifaceted factor, compounded by socioeconomic instability, mental health disorders, and global phenomena such as COVID-19 pandemic and social unrest.[48,49] Although patients and communities must be approached with individualized care, research has shown nonpharmacologic therapy including exercise, meditation, and mindfulness are effective in reducing stress, lowering anxiety levels, and improving overall psychological well-being during pregnancy.[47,50]

Strengths and Limitations

This study is limited by the small sample size which restricts our ability to detect differences in the severity of neighborhood characteristics and barriers to care. The survey was only offered in English, limiting generalizability to non-English-speaking populations. Additionally, certain racial groups in the sample did not reside in neighborhoods with low rates of infant mortality or crime, reflecting the historical impact of redlining. This limits our ability to generalize the effects of the severity of neighborhood characteristics across racial, ethnic, and cultural groups. A key strength of the study is its use of both self-reported and publicly available data, which minimizes bias associated with self-reporting.

Table 3. Resilience Scores by Social Determinants of Health Domains: Economic, Education, and Health care

		Column 1 (low-severity)	Column 2 (high-severity)	P
Economic domain				
	Poverty (% of population living below poverty level)	**≤ 3.7%**	**≥ 3.8%**	
	Resiliency - agency score	27.3 ± 3.7	28.4 ± 2.9	.18
	Resiliency - pathway score	27.0 ± 4.2	26.0 ± 4.2	.15
	Having enough money is a problem	**No**	**Yes**	
	Resiliency - agency score	27.9 ± 3.6	27.1 ± 3.1	.45
	Resiliency - pathway score	27.1 ± 3.9	24.9 ± 4.7	.07
	Having enough to eat is a problem	**No**	**Yes**	
	Resiliency - agency score	27.7 ± 3.5	27.8 ±3.0	.92
	Resiliency - pathway score	27.0 ± 3.8	22.3 ± 5.9	.008
Education domain				
	Highest level of education completed	**> High school**	**≤ High school**	
	Resiliency - agency score	27.2 ± 3.4	28.3 ± 3.5	.22
	Resiliency - pathway score	26.5 ± 3.9	26.8 ± 4.6	.74
Health care domain				
	Type of insurance	**Private**	**Public or self pay**	***P***
	Resiliency - agency score	28.1 ± 3.0	27.5 ± 3.7	.46
	Resiliency - pathway score	27.3 ± 3.9	26.2 ± 4.4	.33
	Trimester when first attended prenatal care	**1st**	**2nd or 3rd**	
	Resiliency - agency score	27.5 ± 3.5	29.8 ± 2.5	.15
	Resiliency - pathway score	26.3 ± 4.1	30.0 ± 3.4	.06
	Have own car	**Yes**	**No**	
	Resiliency - agency score	27.9 ± 3.5	26.9 ± 3.4	.37
	Resiliency - pathway score	26.8 ± 4.1	25.8 ± 4.7	.46
	No prenatal care (percentage of women with no prenatal care in the first trimester of pregnancy)	**≤ 25.0**	**≥ 25.1**	
	Resiliency - agency score	27.1 ± 3.5	28.5 ± 3.3	.09
	Resiliency - pathway score	26.9 ± 4.0	26.3 ± 4.6	.54
	Infant mortality (number of infant deaths per 1000 live births)	**≤ 13.4**	**≥ 13.5**	
	Resiliency - agency score	27.6 ± 3.6	27.9 ± 2.5	.82
	Resiliency - pathway score	27.0 ± 4.1	24.8 ± 4.9	.77
	Getting places is a problem	**No**	**Yes**	
	Resiliency - agency score	27.7 ± 3.5	27.7 ± 3.2	.98
	Resiliency - pathway score	26.9 ± 3.7	24.9 ± 6.0	.14
	Not having enough time to go to the doctor is a problem	**No**	**Yes**	
	Resiliency - agency score	27.6 ± 3.5	29.5 ± 1.9	.30
	Resiliency - pathway score	27.0 ± 3.9	21.5 ± 6.9	.01

Data are presented as mean ± SD

Table 4. Resilience Scores by Social Determinants of Health Domains: Neighborhood/Built Environment and Social/Community Context

		Column 1 (low-severity)	Column 2 (high-severity)	P
Neighborhood/Built environment				
	Number of years in current zip code	**> 2**	**≤ 2**	
	Resiliency - agency score	27.4 ± 3.8	28.0 ± 3.1	.46
	Resiliency - pathway score	26.5 ± 4.4	26.7 ± 4.2	.88
	Crime (crime rate per 1000 residents)	**≤ 33.3**	**≥ 33.4**	
	Resiliency - agency score	26.1 ± 3.5	28.6 ± 3.1	.003
	Resiliency - pathway score	25.8 ± 4.0	27.1 ± 4.3	.22
	Food desert (low-income census tracts where a significant number of residents are > 1 mile from the nearest supermarket)	**No**	**Yes**	
	Resiliency - agency score	27.4 ± 3.6	28.6 ± 2.7	.20
	Resiliency - pathway score	26.5 ± 4.0	26.9 ± 4.8	.76
Social/Community context				
	Living arrangement	**With others**	**Alone**	***P***
	Resiliency - agency score	27.5 ± 3.4	28.3 ± 3.7	.43
	Resiliency - pathway score	26.9 ± 3.9	25.8 ± 5.2	.39
	Relationship with baby's father	**Involved**	**Not involved**	
	Resiliency - agency score	27.7 ± 3.4	27.0 ± 6.2	.72
	Resiliency - pathway score	26.7 ± 4.0	24.0 ± 8.0	.27
	Having family support is a problem	**No**	**Yes**	
	Resiliency - agency score	27.6 ± 3.6	28.4 ± 2.4	.56
	Resiliency - pathway score	26.9 ± 3.8	24.3 ± 6.9	.36
	Having friend support is a problem	**No**	**Yes**	
	Resiliency - agency score	27.7 ± 3.5	28.0 ± 2.7	.82
	Resiliency - pathway score	27.0 ± 3.9	22.7 ± 5.6	.02
	Finding childcare is a problem	**No**	**Yes**	
	Resiliency - agency score	27.8 ± 3.5	27.0 ± 3.6	.45
	Resiliency - Pathway Score	27.2 ± 3.7	23.9 ± 5.4	.02
	Being overwhelmed by stress is a problem	**No**	**Yes**	
	Resiliency - Agency Score	28.9 ± 2.7	26.7 ± 3.7	.005
	Resiliency - Pathway Score	27.9 ± 3.5	25.6 ± 4.5	.02
	Feeling too tired for everyday activities is a problem	**No**	**Yes**	
	Resiliency - agency score	27.9 ± 3.5	27.3 ± 3.3	.52
	Resiliency - pathway score	27.2 ± 3.9	24.9 ± 5.0	.06

Data are presented as mean ± SD

It is also important to note that data were collected prior to the COVID-19 pandemic. The pandemic and its aftermath have exacerbated many SDoH including financial instability, food insecurity, mental health stressors, and access to health care. The disruptions may have amplified barriers to care and further impacted postpartum resilience which are not reflected in this study. Further research should examine whether the relationships observed in this study persist or have shifted in the post-pandemic context. Further research is also needed to explore factors influencing resilience and SDoH among pregnant people in our region. Identifying these factors will enable targeted interventions and resources to improve women's confidence in knowing how to achieve their goals, as indicated by pathway resilience scores.

PUBLIC HEALTH IMPLICATIONS

This study highlights the need for targeted interventions addressing social factors and neighborhood characteristics affecting pregnant individuals in Ohio and the United States. Persistent racial and socioeconomic disparities in maternal and neonatal morbidity demand urgent action to implement programs that enhance resilience, reduce stress, and strengthen social support, particularly in underserved communities.

Our findings suggest shifting the focus from abstract neighborhood metrics to tangible, self-reported barriers directly affecting resilience and health outcomes. Programs must address structural and individual challenges that hinder the ability to take actionable steps toward achieving goals. Confidence in abilities (agency resilience) is insufficient without clear strategies to navigate systemic barriers (pathway resilience).

Ohio's high maternal mortality rates signal a public health crisis requiring community-based solutions. Interventions such as SDoH screenings, prenatal counseling, peer support networks, and stress management programs can effectively address these challenges. Addressing systemic racism, food insecurity, and health care access is essential for sustainable change. Equity-focused maternal health strategies can transform outcomes for individuals, families, and communities and serve as a nationwide model for reducing health disparities.

CONFLICTS OF INTEREST

The authors have no conflicts of interest or disclosures to declare.

ACKNOWLEDGMENTS

Funding. The project was nonfunded.

AUTHOR CONTRIBUTION

Katie M. Whitehead, Araam E. Abboud, Laura A. Bute: formal analysis, visualization, writing-original draft, writing-review and editing. Katherine E. Wilcher: formal analysis, data curation, visualization, writing-original draft, writing-review and editing. David N. Dhanraj: investigation, formal analysis, writing-review and editing. G. Theodore Talbot: conceptualization, methodological development, data collection, investigation, supervision, writing-review and editing. Rose A. Maxwell: conceptualization, methodological development, data collection, formal analysis, investigation, data curation, project administration, supervision, writing-original draft, writing-review and editing

REFERENCES

1. Gadson A, Akpovi E, Mehta PK. Exploring the social determinants of racial/ethnic disparities in prenatal care utilization and maternal outcome. *Semin Perinatol*. 2017;41(5):308-317. https://doi.org/10.1053/j.semperi.2017.04.008
2. ACOG committee opinion no. 729: importance of social determinants of health and cultural awareness in the delivery of reproductive health care. *Obstet Gynecol*. 2018;131(1):e43-e48. https://doi.org/10.1097/AOG.0000000000002459
3. Shah LM, Varma B, Nasir K, et al. Reducing disparities in adverse pregnancy outcomes in the United States. *Am Heart J*. 2021;242:92-102. https://doi.org/10.1016/j.ahj.2021.08.019
4. Reyes AM, Akanyirige PW, Wishart D, et al. Interventions Addressing Social Needs in Perinatal Care: A Systematic Review. *Health Equity*. 2021;5(1):100-118. https://doi.org/10.1089/heq.2020.0051
5. Dagher RK, Linares DE. A critical review on the complex interplay between social determinants of health and maternal and infant mortality. *Children*. 2022;9(3):394. https://doi.org/10.3390/children9030394
6. Peahl AF, Rubin-Miller L, Paterson V, et al. Understanding social needs in pregnancy: prospective validation of a digital short-form screening tool and patient survey. *AJOG Glob Rep*. 2023;3(1):100158. https://doi.org/10.1016/j.xagr.2022.100158
7. Girardi G, Longo M, Bremer AA. Social determinants of health in pregnant individuals from underrepresented, understudied, and underreported populations in the United States. *Int J Equity Health*. 2023;22(1):186. https://doi.org/10.1186/s12939-023-01963-x
8. Dove-Medows E, Deriemacker A, Dailey R, et al. Pregnant African American Women's Perceptions of Neighborhood, Racial Discrimination, and Psychological Distress as Influences on Birth Outcomes. *MCN Am J Matern Child Nurs*. 2020;45(1):49-56. https://doi.org/10.1097/NMC.0000000000000589
9. Farewell CV, Schmiege SJ, Leiferman J. Racial differences in psychosocial resources and mental and physical health outcomes during pregnancy: a structural equation modeling approach. Preprint. Posted online July 19, 2024. https://doi.org/10.21203/rs.3.rs-4617998/v1
10. Krieger N, Van Wye G, Huynh M, et al. Structural racism, historical redlining, and risk of preterm birth in New York City, 2013-2017. *Am J Public Health*. 2020;110(7):1046-1053. https://doi.org/10.2105/AJPH.2020.305656
11. Dayton Montgomery Public Health. *Montgomery County Community Health Assessment 2014*.; 2014.
12. Wallace ME, Green C, Richardson L, Theall K, Crear-Perry J. "Look at the whole me": a mixed-methods examination of Black infant mortality in the US through women's lived experiences and community context. *Int J Environ Res Public Health*. 2017;14(7). https://doi.org/10.3390/ijerph14070727
13. Solivan AE, Wallace ME, Kaplan KC, Harville EW. Use of a resiliency framework to examine pregnancy and birth outcomes among adolescents: a qualitative study. *Fam Syst Health*. 2015;33(4):349-355. https://doi.org/10.1037/fsh0000141
14. Davis EP, Narayan AJ. Pregnancy as a period of risk, adaptation, and resilience for mothers and infants. *Dev Psychopathol*. 2020;32(5):1625-1639. https://doi.org/10.1017/S0954579420001121
15. Alves AC, Cecatti JG, Souza RT. Resilience and stress during pregnancy: a comprehensive multidimensional approach in maternal and perinatal health. *ScientificWorldJournal*. 2021;9512854. https://doi.org/10.1155/2021/9512854
16. Redhunt AM, Ledyard R, Collier ARY, Hacker MR, Burris HH. Resilience as a potential modifier of racial inequities in preterm birth. *Ann Epidemiol*. 2023;83:54-59.e1. https://doi.org/10.1016/j.annepidem.2023.04.010
17. Alves AC, Souza RT, Mayrink J, et al. Measuring resilience and stress during pregnancy and its relation to vulnerability and pregnancy outcomes in a nulliparous cohort study. *BMC Pregnancy Childbirth*. 2023;23(1):396. https://doi.org/10.1186/s12884-023-05692-5
18. Neerland C, Slaughter-Acey J, Behrens K, et al. An evidence map for social and structural determinants for maternal morbidity and mortality: a systematic review. *Obstet Gynecol*. 2024;143(3):383-392. https://doi.org/10.1097/AOG.0000000000005489
19. Keith MH, Martin MA. Social determinant pathways to hypertensive disorders of pregnancy among nulliparous US women. *Womens Health Issues*. 2024;34(1):36-44. https://doi.org/10.1016/j.whi.2023.08.001
20. Page A, McCann R, Maness S, Merriweather M, Dobbs PD. Beyond the first trimester: social eeterminants of delayed prenatal care at a community health center using the PRAPARE tool. *J Racial Ethn Health Disparities*. Published online June 27, 2024. https://doi.org/10.1007/s40615-024-02052-7
21. Jiang Y, Backus K, Camardo M, Morin J, Velazco O, Kershaw T. Utilizing social determinants of health to identify most vulnerable neighborhoods-Latent class analysis and GIS map. *Prev Med*. 2024;184:107997. https://doi.org/10.1016/j.ypmed.2024.107997
22. Habtemariam H, Schlichting LE, Kole-White MB, Berger B, Vivier P. Neighborhood risk and prenatal care utilization in Rhode Island, 2005-2014. *Birth*. 2024;51(3):559-570. https://doi.org/10.1111/birt.12810
23. Thermidor S, Gaballa D, Hentz R, et al. Clinical, sociodemographic, and neighborhood characteristics associated with adverse pregnancy outcomes. *J Womens Health (Larchmt)*. 2024;33(3):308-317. https://doi.org/10.1089/jwh.2023.0032
24. Avorgbedor F, McCoy TP, Wideman L, Shriver LH, Buehler C, Leerkes EM. Racial disparities in neighborhood and household socioeconomic disadvantage predict postpartum weight retention. *AJPM Focus*. 2022;1(2):100029. https://doi.org/10.1016/j.focus.2022.100029

25. Hailu EM, Riddell CA, Tucker C, et al. Neighborhood-level fatal police violence and severe maternal morbidity in California. *Am J Epidemiol*. 2024;193(12):1675-1683. https://doi.org/10.1093/aje/kwae124

26. Sealy-Jefferson S, Butler B, Price-Spratlen T, Dailey RK, Misra DP. Neighborhood-level mass incarceration and future preterm birth risk among African American women. *J Urban Health*. 2020;97(2):271-278. https://doi.org/10.1007/s11524-020-00426-w

27. Shannon MM, Clougherty JE, McCarthy C, et al. Neighborhood violent crime and perceived stress in pregnancy. *Int J Environ Res Public Health*. 2020;17(15). https://doi.org/10.3390/ijerph17155585

28. Francis B, Pearl M, Colen C, Shoben A, Sealy-Jefferson S. Racial and economic segregation over the life course and incident hypertensive disorders of pregnancy among Black women in California. *Am J Epidemiol*. 2024;193(2):277-284. https://doi.org/10.1093/aje/kwad192

29. Vaughan SE, Misra DP, Gohar J, Hyer S, Price M, Giurgescu C. The associations of objective and perceived neighborhood disadvantage with stress among pregnant Black women. *Public Health Nurs*. 2023;40 (3):372-381. https://doi.org/10.1111/phn.13177

30. Sealy-Jefferson S, Messer L, Slaughter-Acey J, Misra DP. Interrelationships between objective and subjective measures of the residential environment among urban African American women. *Ann Epidemiol*. 2017;27(3):164-168. https://doi.org/10.1016/j.annepidem.2016.12.003

31. Sealy-Jefferson S, Giurgescu C, Slaughter-Acey J, Caldwell C, Misra D. Neighborhood context and preterm delivery among African American women: the mediating role of psychosocial factors. *J Urban Health*. 2016;93(6):984-996. https://doi.org/10.1007/s11524-016-0083-4

32. Giurgescu C, Zenk SN, Dancy BL, Park CG, Dieber W, Block R. Relationships among neighborhood environment, racial discrimination, psychological distress, and preterm birth in African American women. *J Obstet Gynecol Neonatal Nurs*. 2012;41(6):E51-61. https://doi.org/10.1111/j.1552-6909.2012.01409.x

33. US Centers for Disease Control and Prevention CDC. Social Determinants of Health (SDOH). About CDC. October 15, 2024. Accessed December 26, 2024. https://www.cdc.gov/about/priorities/why-is-addressing-sdoh-important.html

34. US Department of Health and Human Services. Social Determinants of Health - Healthy People 2030 | health.gov. Healthy People 2030. Accessed May 12, 2023. https://health.gov/healthypeople/priority-areas/social-determinants-health

35. Artiga S, Hinton E. Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity. KFF. May 10, 2018. Accessed December 26, 2024. https://www.kff.org/racial-equity-and-health-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/

36. Activate Care. What are the 5 main domains of social determinants of health? Accessed December 26, 2024. https://blog.activatecare.com/what-are-the-5-main-social-determinants-of-health

37. Bellido-González M, Robles-Ortega H, Castelar-Ríos MJ, et al. Psychological distress and resilience of mothers and fathers with respect to the neurobehavioral performance of small-for-gestational-age newborns. *Health Qual Life Outcomes*. 2019;17(1):54. https://doi.org/10.1186/s12955-019-1119-8

38. Ozbay F, Fitterling H, Charney D, Southwick S. Social support and resilience to stress across the life span: a neurobiologic framework. *Curr Psychiatry Rep*. 2008;10(4):304-310. https://doi.org/10.1007/s11920-008-0049-7

39. Al-Mutawtah M, Campbell E, Kubis HP, Erjavec M. Women's experiences of social support during pregnancy: a qualitative systematic review. *BMC Pregnancy Childbirth*. 2023;23(1):782. https://doi.org/10.1186/s12884-023-06089-0

40. Snyder CR, Irving LM, Anderson JR. Hope and health. In: Snyder CR, Forsyth DR, eds. *Handbook of Social and Clinical Psychology: The Health Perspective*. Pergamon Press; 1991:285-305.

41. Cohen K, Capponi S, Nyamukapa M, Baxter J, Crawford A, Worly B. Partner involvement during pregnancy and maternal health behaviors. *Matern Child Health J*. 2016;20(11):2291-2298. https://doi.org/10.1007/s10995-016-2048-3

42. Stapleton LRT, Schetter CD, Westling E, et al. Perceived partner support in pregnancy predicts lower maternal and infant distress. *J Fam Psychol*. 2012;26(3):453-463. https://doi.org/10.1037/a0028332

43. Battle S, Clarke P. Inequities in exposure to neighborhood vulnerability over time: findings from a national sample of US adults. *Race Soc Probl*. 2022;14(1):53-68. https://doi.org/10.1007/s12552-021-09343-2

44. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-381. https://doi.org/10.1016/j.jbi.2008.08.010

45. BOLD Beginning! Accessed December 26, 2024. https://boldbeginning.org/

46. 2024 Commitment to Policy Action | ACOG. Accessed December 26, 2024. https://www.acog.org/advocacy/policy-priorities/commitment-to-policy-action

47. Vieten C, Astin J. Effects of a mindfulness-based intervention during pregnancy on prenatal stress and mood: results of a pilot study. *Arch Womens Ment Health*. 2008;11(1):67-74. https://doi.org/10.1007/s00737-008-0214-3

48. Traylor CS, Johnson JD, Kimmel MC, Manuck TA. Effects of psychological stress on adverse pregnancy outcomes and nonpharmacologic approaches for reduction: an expert review. *Am J Obstet Gynecol MFM*. 2020;2(4):100229. https://doi.org/10.1016/j.ajogmf.2020.100229

49. Nagandla K, Nalliah S, Yin LK, et al. Prevalence and associated risk factors of depression, anxiety and stress in pregnancy. *Int J Reprod Contracep Obstet Gynecol*. 2016;5(7):2380-2389. https://doi.org/10.18203/2320-1770.ijrcog20162132

50. Tiran D, Chummun H. Complementary therapies to reduce physiological stress in pregnancy. *Complement Ther Nurs Midwifery*. 2004;10 (3):162-167. https://doi.org/10.1016/j.ctnm.2004.03.006