



# Social Determinant of Housing Instability and Adverse Pregnancy Outcomes

## *A Scoping Review*

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### ABSTRACT

**Background:** We conducted a scoping review to examine the literature regarding pregnancy-related morbidities among birthing individuals and infants experiencing housing instability (HI). **Methods:** Articles were identified through electronic database searches, using numerous search terms related to pregnancy and housing. US studies published in English between 1991 and 2019 were included. Peer-reviewed qualitative and quantitative articles were synthesized and critically appraised by 2 reviewers using quality appraisal tools from the Joanna Briggs Institute.

**Results:** Inconsistent definitions for HI weakened the rigor of aggregate findings, and birthing individual outcomes were underreported compared with infant outcomes ( $n = 9\,095\,499$  women, 11 articles). Many studies reported mental health-related outcomes among birthing individuals with HI. **Discussion:** Study sampling approaches and lack of a standard definition of HI limit review findings, but examining this relationship is critical to understanding the effect of social determinants on birthing individual health. Future

research should address the nescience regarding birthing individual outcomes in this population. Policy-level advocacy addressing social determinants must also refine policy impacting community-based prenatal programs and services for the birthing individual with HI.

**Key Words:** childbearing, homelessness, housing instability, maternal health, pregnancy

### Highlights

In the United States:

- Birthing individual health is an essential but understudied factor among those experiencing housing instability.
- Research on housing instability and pregnancy outcomes in the United States overwhelmingly reports the newborn infant's health and well-being and underexplores birthing individual health and well-being.
- There are discrepancies in how housing instability is defined, potentially limiting research and intervention development for birthing individuals experiencing housing instability.

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In 2020, over half a million people reported experiencing some form of housing instability (HI), with a steady rise in this number over the last 4 years.<sup>1</sup> Just under 3 in 10 individuals were cisgender women (29%), and 1% of individuals were transgender or gender nonconforming.<sup>1</sup> In contrast, 6 in 10 people experiencing HI in families with children were women

(60%), and less than 1% of this group identified as transgender.<sup>1</sup> People identifying as Black or African American were overrepresented, accounting for 39% of all people experiencing HI and 53% of people experiencing HI as members of families with children but are 12% of the US population. In contrast, 48% of all people experiencing HI were White compared with 74% of the US population.

Extensively documented is the relationship between HI and poor health outcomes, with people experiencing HI more severely impacted by social determinants of health than similar housed peers.<sup>2–5</sup> There is increased all-cause mortality and morbidity related to chronic health conditions, mental illness, substance use, and risky health behaviors.<sup>2–5</sup> Recent literature reports birthing individuals with HI experienced preterm labor and higher delivery-associated costs than housed individuals.<sup>6</sup> Still, limited data exist regarding the impact of HI on birthing individual outcomes in the United States. Understanding the relationship and influence of HI during pregnancy is critical in guiding current efforts to decrease pregnancy morbidity (PM) and subsequent mortality in the United States.

HI, in general, is associated with increased psychosocial and physiological stress,<sup>3,4,7</sup> worsened chronic medical conditions, development of new health challenges, and overall poorer health outcomes.<sup>8–12</sup> Job loss worsens the association between HI and poor health.<sup>3</sup> Additionally, shelter or street living increases the risk of exposure to infectious diseases and violence of all types.<sup>13</sup> Chronic illness recurs in this population with increased asthma, anemia, chronic bronchitis, hypertension, and ulcers.<sup>14</sup> Barriers to healthcare access exacerbate chronic illness, leading to worsened health outcomes.<sup>3,4,7</sup>

HI among people of reproductive age is a growing public health concern in the United States.<sup>15–18</sup> People experiencing HI are often reproductive age, between 16 and 49 years old,<sup>19–21</sup> and may have a higher pregnancy prevalence than those living in low-income housing.<sup>19</sup> Of great concern is the risk of PM (ie, maternal morbidity)<sup>\*</sup> among those unstably housed.<sup>14,19–22</sup> Pregnancy morbidity refers to physical and mental illness or disability directly related to pregnancy and childbirth and harms the birthing individual's well-being and functioning.<sup>23,24</sup> Such morbidities can range from mild and annoying discomforts such as acid reflux and

morning sickness to severe, sometimes life-threatening cardiovascular conditions, preexisting medical conditions leading to illness, infection, hemorrhage, and cardiomyopathy.<sup>25,26</sup> The physical, financial, and emotional burden associated with PM negatively impacts birthing individuals and infants.<sup>27</sup> These morbidities are frequently related to pregnancy-related deaths in the United States. These deaths steadily increased from 7.2 deaths per 100 000 live births in 1987 to 18.0 deaths per 100 000 live births in 2014,<sup>28,29</sup> with non-Hispanic Black women having 3.4 times higher mortality ratio than non-Hispanic White women.<sup>26,30</sup>

While the reported increase in PM and mortality is partially due to increased surveillance,<sup>31</sup> it is hypothesized that this finding is also plausibly associated with HI. These troubling statistics underscore the need to understand better the drivers of the relationship between HI and pregnancy morbidities, thus guiding the focus of this scoping review.

## PURPOSE

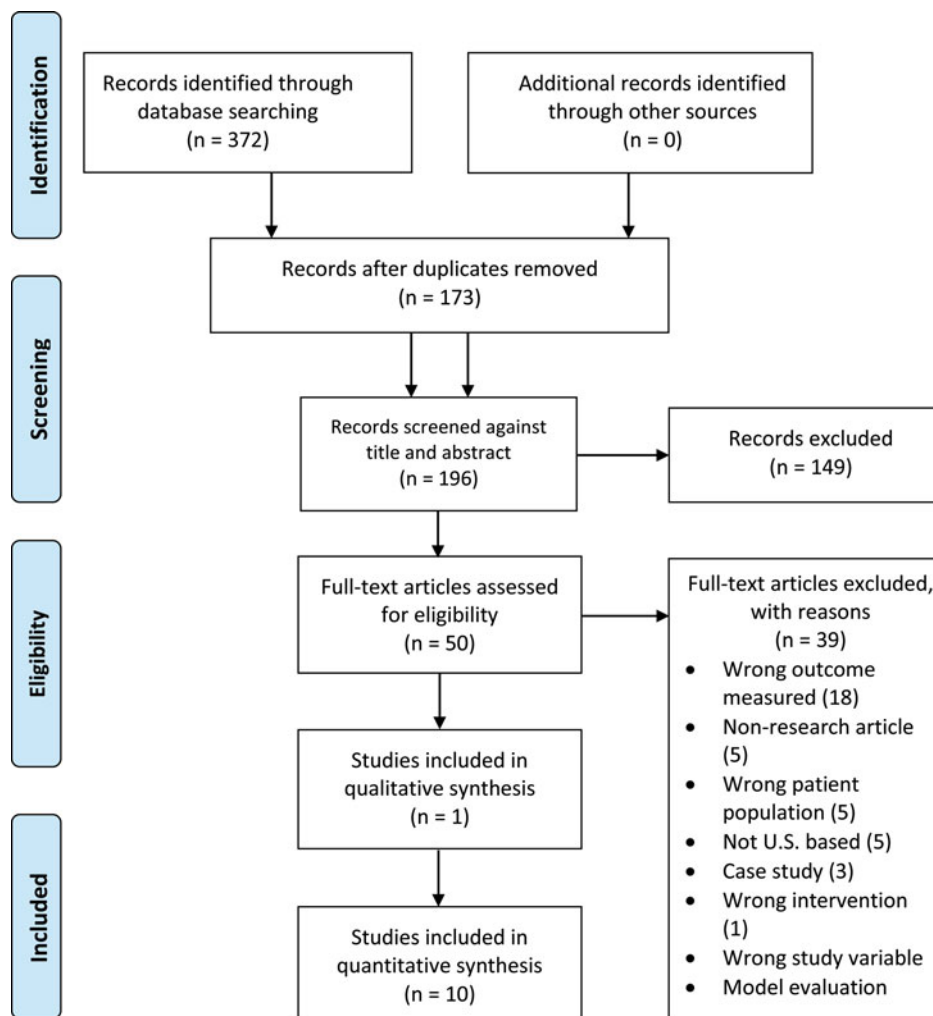
This scoping review aims to identify, synthesize, and critically appraise the literature regarding pregnancy-related morbidities among birthing individuals and infants experiencing HI. The findings and recommendations from this review will guide (A) future research aimed at improving perinatal outcomes for birthing individuals, (B) future intervention development, and (C) policy-level approaches to mitigate disparities among birthing individuals experiencing HI.

## METHODS

### Pertinent terminology

The exposure variable of interest is HI. HI encompasses a spectrum of situations in which one is without a permanent place to live and includes individuals who are couch surfing or living double up, sheltered, and unsheltered individuals, as well as incarcerated people without housing. The outcome variable is pregnancy outcome. Pregnancy and birth outcomes are used interchangeably in the literature (ie, outcomes resulting from a fertilization event and include live birth [full or preterm], stillbirth, spontaneous abortion, and induced abortion).<sup>32</sup> For this review, pregnancy outcome is used as an umbrella term to include 2 domains: (1) birthing individual outcomes and (2) neonatal/infant outcomes. Pregnancy morbidity (also known as maternal morbidity) is the pregnancy-related illness and subsequent adverse outcome for birthing individuals, which may or may not affect the infant at birth.<sup>28</sup>

\*Acknowledging that birthing individuals can include cisgender women, transgender men, and gender diverse people assigned female at birth, this article uses gender neutral language, such as the term “birthing individual” in place of “maternal,” “mother,” or “woman” where appropriate.



**Figure 1.** PRISMA flow diagram. From Moher et al.<sup>33</sup> This figure is available in color online ([www.jpnnjournal.com](http://www.jpnnjournal.com)).

### Search strategy and selection of articles

The first author developed and executed the search strategy with guidance from the academic information specialist. Eligibility criteria included relevant qualitative or quantitative research studies that explored relationships between HI during pregnancy and pregnancy outcomes. Since published literature is limited in this area, the research team searched for any English-written, peer-reviewed between 1991 and 2019. Non-US-based studies were excluded due to differences in political and social welfare systems related to housing and healthcare for birthing individuals in those countries. Also excluded were studies that measured pregnancy outcomes among low-income people without directly identifying HI. Although people with unstable housing often have low incomes, studies including low income as a predictor of adverse pregnancy outcomes do not focus on the direct impact of

poor housing on this outcome. Articles were identified through electronic searches of databases, including CINAHL, PubMed, Web of Science, Scopus, Embase, and Psych-INFO using numerous terms related to the following broad categories: housing (eg, unstable housing, HI, and homeless\*), pregnancy (eg, pregnant\*, prenatal, mother, birthing, and childbearing), and outcomes (eg, maternal outcomes, infant outcomes, birth outcomes, and pregnancy outcomes). The research team set intentions to cast a wide net to see what morbidities exist among the population. Two reviewers imported for screening 371 references and removed 173 duplicates, leaving 198 studies to screen for title and abstract, as noted in Figure 1.<sup>33</sup>

The reviewers identified 50 articles for full-text review, of which 11 articles met inclusion criteria. Next, the reviewers evaluated article quality appraisal using 4 critical appraisal tools that independently evaluate

the rigor of qualitative, cross-sectional quantitative, randomized control trials, and longitudinal research from the Joanna Briggs Institute.<sup>34</sup> Quality appraisal scores are included in Table 1, denoting whether the studies adhered to traditional methods to reduce the risk of bias (higher scores indicate higher quality articles with less risk of bias). Quality appraisal scores may not be as informative as the detailed quality appraisal analysis; thus, the research team completed a detailed quality appraisal for each article. Two reviewers appraised each paper independently, and all discrepancies were discussed and resolved.

## RESULTS

### Description of the studies

With 11 studies, 1 was qualitative and 11 were quantitative. Among the 10 quantitative articles, 6 were secondary data analyses of original data.<sup>9,35–39</sup> Three of these used cross-sectional data,<sup>36–38</sup> 1 used longitudinal data from a prospective cohort,<sup>9</sup> 1 used previously collected retrospective cohort data,<sup>39</sup> and another used case-control.<sup>35</sup> Of the remaining 4 quantitative studies, 3 were cross-sectional<sup>2,40,41</sup> and 1 was a cluster randomized controlled trial.<sup>42</sup> The 1 qualitative study included was a 3-year ethnographic study of 15 homeless women.<sup>21</sup> Aggregate data extraction revealed across the studies there were 9 095 499 women (weighted sampling included), with an age range of 15 to 44 (mean = 24.3 years old).<sup>2,9,21,35–39,40–42</sup> Five of the 11 studies had samples drawn from national databases.<sup>2,9,36–38</sup> The other studies used samples drawn from New York,<sup>42</sup> Los Angeles,<sup>40</sup> Massachusetts,<sup>35</sup> and North Carolina.<sup>39</sup> Women of African descent (African, African American), Hispanic/Latina, and non-Hispanic White cisgender women ( $n = 8\,220\,262$ ) mainly comprised collective sample demographics across the included articles. The remaining participants identified as other or as unknown ( $n = 875\,237$ ). Two articles failed to report aggregated race and ethnicity data.<sup>21,39</sup> None of the articles used the 2-step method to identify sex assignment at birth and gender identity, nor did they explicitly include or sample gender expansive people. Thus, the samples from the included studies are assumed to be cisgender women (ie, women who were assigned female at birth), which the authors refer to as “women” going forward.<sup>43,44</sup>

### Conceptualization and operationalization of HI

The review articles revealed inconsistencies in the conceptualization and operationalization of HI. Merrill and colleagues<sup>37</sup> conducted a series of secondary data

analyses using the Pregnancy Risk Assessment Monitoring System (PRAMS) database—ongoing state-specific surveillance that collects information on birthing individual peripartum health practices and outcomes in 31 states.<sup>45</sup> In the PRAMS survey, HI was defined as homelessness. The Merrill and colleague studies<sup>37</sup> operationalized homelessness as a dichotomous variable based on a participant’s response to the question, “Were you homeless in the 12 months before delivery?”<sup>45</sup> Thus, the definition of homelessness in those studies was left to the participants’ interpretation.<sup>38</sup> While this captured women who may have been homeless during that time, this measure may have inadvertently and inaccurately excluded people who believed themselves to be housed even if they were living in some form of temporary shelter, doubled up, or couch surfing. While study investigators used stratification and oversampling of underrepresented participants to decrease threats to validity caused by internal selection, this stratification process was not used throughout individual states,<sup>46</sup> thus increasing the risk of bias. Lastly, the PRAMS survey only sends surveys to “females” with an address, affecting the selection of participants by leaving out people who may be currently homeless and people who have had sex or gender designation changed on legal documentation. This survey selection underestimates the number of people who should be included in the sample.

Cutts et al<sup>2</sup> offered a more comprehensive conceptualization of HI as homelessness, which included living in a shelter, motel, transitional housing, or no steady place to sleep at night. The researchers operationalized homelessness as a dichotomous variable based on participant responses to the question “Were you ever homeless or did you live in a shelter when you were pregnant with this child” and “Since your child was born, has s/he ever been homeless or lived in a shelter?”<sup>2</sup> Stein and colleagues<sup>41</sup> also offered a comprehensive conceptualization of HI by describing homelessness as spending any of the past 30 nights in homeless-related housing. Homeless-related housing included (a) in a mission, homeless shelter, or transitional shelter, a hotel paid for by a voucher, a church or chapel, an all-night theater or other indoor public places, an abandoned building, a vehicle, the street or other outdoor public place or (b) in a rehabilitation program for homeless people and also stayed in one of the settings mentioned in (a) during any of the 30 nights before entering the program.<sup>41</sup> This conceptualization provides a clearer understanding of the meaning of HI, but just as the studies from Richards and colleagues,<sup>38</sup> the outcome response is dichotomous, making it difficult to parse out differences in outcomes across the HI spectrum.<sup>36,37,41</sup>

Table 1 . Include article characteristics and findings

	<i>N</i> ; setting (year)	Quality score	Inclusion/exclusion	Operationalization of housing instability	Findings
Infant outcomes Cutts et al, <sup>2</sup> cross-sectional	<i>N</i> = 9995; emergency departments and public clinics in Baltimore, Boston, Little Rock, Minneapolis, and Philadelphia ERs and PCCs (2009-2011)	7/8	Included: Mothers of children <48 y old, English, Spanish, and (Minneapolis only) Somali speakers; state residency, and knowledge of the child's household. Excluded: Caregivers of critically ill or injured children and those who had been interviewed previously.	"Were you ever homeless or did you live in shelter when you were pregnant with this child?" and "'since your child was born has s/he ever been homeless or lived in a shelter?'" Measured as <i>consistently housed</i> (reference group); <i>homeless during pregnancy with first child</i> ; <i>homeless after delivery with first child</i>	Prenatal homelessness associated with higher odds of low birth weight (LBW) compared with those who are housed. Marginally increased odds of preterm birth (PTB) among prenatal homelessness women.
Carrion et al, <sup>42</sup> cluster RCT	<i>N</i> = 1856; 14 community hospitals and community health centers in New York	7/8	Included: 14-21 y old, <24-wk pregnant at entry to PNC, speak English or Spanish, have no medical problems requiring care as a high-risk pregnancy, and willing to receive group or individual prenatal care	Dichotomous "two or more moves within the past year"	Those unstably housed were less likely to be enrolled in school, have parents as main source of financial support, live in a single-family home or apartment, or be food secure; more likely to smoke ( <i>P</i> = .05). Housing instability still a significant predictor of lower birth weight ( <i>B</i> (SE) = -83.96 (35.47), <i>P</i> = .018).
Merrill et al, <sup>37</sup> cross-sectional	<i>N</i> = 268 876; secondary data analysis (PRAMS dataset)/national survey 31 US cities (2000-2007)	6/8	Included: Women in the PRAMS dataset (live birth within the last 3 y)	Question from PRAMS data asks, "This question is about things that may have happened during the 12 months before your new baby was born ... I was homeless."	Those experiencing homelessness were significantly more likely to experience stressful life events, abusive situations, and poor health than nonhomeless. Birth weight among infants of homeless people was 17.4 g lighter than for infants of nonhomeless.

(continues)

Table 1 . Include article characteristics and findings (*Continued*)

	<i>N</i> ; setting (year)	Quality score	Inclusion/exclusion	Operationalization of housing instability	Findings
Richards et al, <sup>36</sup> cross-sectional	<i>N</i> = 128 365; secondary data analysis; national (2000–2007)	7/8	Women in PRAMS dataset who answered yes to the question, “Were you homeless during the 12 mo before your baby was born?” Also included if answered yes to the question regarding use of WIC services during pregnancy.	Dichotomous “This question is about things that may have happened during the 12 months before your new infant was born ... you were homeless.”	Unstably housed participants were older, less educated, less likely to have private health insurance, and more likely to receive government assistance. Better maternal/infant outcomes when WIC used significantly more likely to have a higher body mass index, to initiate breastfeeding after delivery, have prenatal care visits, have a longer gestational age, and have a greater infant birth weight.
Richards et al, <sup>38</sup> cross-sectional	Weighted number of nonhomeless women was 10 229 730, and of homeless women was 441 528; PRAMS data analysis/ <sup>31</sup> participating states (2001–2007)	7/8	Included: Mothers in PRAMS data set without missing information on homeless status	Dichotomous “This question is about things that may have happened during the 12 months before your new infant was born ... you were homeless.”	Those experiencing homelessness were younger, unmarried, uninsured, less educated, less likely to start/maintain breastfeeding, and had less PNC and well-visits. Also, more likely to be Black, Hispanic, smoke cigarettes, be underweight or have class III obesity, and not take prenatal vitamins. Infants had lower BW, longer hospital stay, and more likely to receive neonatal intensive care. Greater homelessness severity/chronic homelessness strong predictor of worse birth outcomes (lower birth weight and PTB compared with national averages). Within the homeless sample, African American women 4 times more likely to deliver LBW infants, nearly 3 times more likely to have a PTB compared with White women.
Stein et al, <sup>41</sup> cross-sectional	<i>N</i> = 237; homeless women/LA shelters and meal programs (1997)	8/8	Ages 15–44; convenience sample; homeless according to study definition; live birth within the last 3 y	The degree of severity-latent variable consisting of the percentage of their life spent homeless, whether they were homeless and pregnant, and number of homeless episodes.	Unsafe or unstable housing associated with increased risk of PTB among NHW (OR 1.46, 95% CI 1.06–2.02) but not NHB women. Higher PTB for women with unsafe or unstable housing situation (and other psychosocial characteristics). 17% had chronic condition (diabetes, HTN, asthma, renal disease, thyroid disease, and anemia) associated with PTB—unknown percentage were with unstable housing.
Tucker et al, <sup>39</sup> retrospective cohort	<i>N</i> = 15 428; secondary data analysis of CCNC Pregnancy Medical Home case management information system (2011–2012)	7/8	Pregnant Medicaid patients	Unsafe or unstable housing—homelessness, inadequate housing, IPV, sexual abuse	(continues)



Table 1 . Include article characteristics and findings (*Continued*)

	N; setting (year)	Quality score	Inclusion/exclusion	Operationalization of housing instability	Findings
Birthing individual outcomes Clark et al, <sup>35</sup> case-control	N = 17 881; secondary data analysis/Medicaid claims data in Massachusetts (2008-2015)	7/8	Pregnant women with Medicaid claims who stayed in shelter	Homeless refers to women who were in emergency shelters (received emergency assistance—EA) and compared with those who did not receive EA	Those in homeless shelter 2 times likely to experience a problem affecting their health during birth (aOR: 2.6), almost twice the odds of PTL or hemorrhage during pregnancy (aOR: 1.9), controlling for alcohol, opioid, adjustment anxiety, and depressive disorder.
Killion, <sup>21</sup> ethnographic study	N = 15; African American, Latina, White in California.	6/10	Pregnant women living in homeless shelters. Ages 18-39	Living in a shelter	Difficulty maintaining good vaginal health, managing morning sickness leading to dehydration, dealing with the effects of substance abuse in pregnancy including undernourishment, and frequent urinary tract infections during pregnancy
Park et al, <sup>9</sup> longitudinal prospective study	N = 2631 families; secondary data. Fragile Families Study (1998-2000)	7/8	Included: homeless, doubled up, or in low-income housing (control) during any of 3 follow-up periods	Homeless and doubled up both considered unstable housing	Black mothers more likely to be in homeless group than in low-income housed group. Compared with low-income housed group (LIHG), mothers in ever homeless group more likely to report US born, unmarried, living with father of baby, non-Hispanic, and have fewer children. Ever homeless with higher rates of domestic violence, less family support. Self-related health not different among the 3 groups. Mental illness and substance use pre-pregnancy much higher in ever homeless group. 2 times higher than in LIHG. All mental illness measures higher after reporting episode of homelessness
Pennbridge et al, <sup>40</sup> cross-sectional	N = 140, convenience sample/Los Angeles free clinic/July 1, 88 to Jun 30, 89	1/8	Included: pregnant youth and adolescents seen at LA county free hi-risk clinic	Can only be deduced from reading—those who do not live with their family are considered homeless vs those that do live with their family	Homeless pregnant youth were younger (46% under 16), 41 % White, 2 times likely to have major mental illness. Homeless youth reported involvement in survival sex; higher percentage of drug abusers (48%). STIs in 46.4% of full sample

Abbreviations: aOR, adjusted odds ratio; BW, birth weight; CI, confidence interval; ER, emergency room; HTN, hypertension; IPV, intimate partner violence; LA, Los Angeles; LBW, low birth weight; NHB, non-Hispanic Black; NHW, non-Hispanic White; OR, odds ratio; PCC, primary care clinic; PNC, prenatal care; PRAMS, Pregnancy Risk Assessment Monitoring System; PTL, preterm labor; STI, sexually transmitted infection; WIC, Women, Infants, and Children.

Rather than offering a detailed conceptualization for HI/homelessness, Pennbridge et al<sup>40</sup> identified eligible unstably housed study participants as pregnant adolescents who use pregnancy services at local high-risk clinics living with or not living with family. The Clark et al<sup>35</sup> study used HI and homelessness interchangeably and defined homelessness as being without housing due to specific causes, such as fire, flood, domestic violence, no-fault eviction, or substantial health and safety risk for a child. Generally, operationalization and conceptualization of HI varied widely among the included studies. Additionally, variation in *periods* of HI was inconsistent, ranging from 30 days to 1 year.

### Pregnancy outcomes

Collecting data in real time from birthing individuals experiencing HI is limited by concerns of participant vulnerability in conducting research studies and the challenge of feasibly obtaining large enough sample sizes. This challenge leads researchers to rely on previously collected national healthcare or health statistics data.<sup>48</sup> As a result, many included studies relied on predictive modeling using large datasets to infer outcomes.<sup>2,9,36–39,41,42</sup> From the 11 studies reviewed, 4 reported birthing individual outcomes,<sup>9,21,35,40</sup> and the remaining 7 reported infant health outcomes. Findings will be described in those 2 domains as previously defined under the umbrella of pregnancy outcomes.

### Birthing individual outcomes

The 4 studies (1 qualitative and 3 quantitative studies) reporting birthing individual outcomes emphasized behavioral health conditions such as smoking, substance use, and mental health while unstably housed and pregnant.<sup>9,21,35,40</sup> In the ethnographic study, 15 women reported that normal physiological changes of pregnancy often became pathological, signs of potential complications went unnoticed or unattended, and the woman's environment exacerbated minor discomforts of pregnancy.<sup>21</sup> Participants reported challenges in maintaining good vaginal health, managing morning sickness (which ultimately resulted in dehydration), dealing with the effects of substance abuse in pregnancy, including undernourishment and frequent urinary tract infections during pregnancy.<sup>21</sup>

The Pennbridge et al<sup>40</sup> study attempted to elucidate the risk profile of homeless pregnant adolescents by analyzing primary healthcare data collected during visits to a high-risk youth clinic in Los Angeles. This small ( $n = 55$  homeless vs 85 housed), comparative descriptive study provided early data on what birthing individual health issues pregnant youth face and examined major mental illness (ie, schizophrenia, suicidal ideation),

substance use disorder, and severe medical problems such as hepatitis, anemia, and seizures.<sup>40</sup> They found homeless pregnant youth were younger (46% <16), 41% White, and twice as likely to have a major mental illness than housed pregnant youth.<sup>40</sup> Sexually transmitted infections were also diagnosed in almost half of the homeless pregnant adolescents compared with less than one-quarter of those who were housed (46% and 16.5%, respectively).<sup>40</sup>

The longitudinal Fragile Families and Child Wellbeing Study examined differences in self-reported birthing individual health outcomes and health behaviors for mothers who lived in doubled-up settings (temporarily staying with family/friends), low-income housing settings, and those who were homeless.<sup>9</sup> One valuable aspect of this study was its examination of the influence of the birthing individuals' housing status on personal health over time.<sup>9</sup> Birthing individual health outcomes and health behaviors were analyzed together using generalized estimating equation models.<sup>9</sup> Researchers found the adjusted odds of depression and drug or alcohol problems were 2 times higher among homeless pregnant participants than those in low-income housing settings (adjusted odds ratio [aOR] = 2.05,  $P < .001$ ; 2.37,  $P < .05$ ).<sup>9</sup> Pregnant participants in doubled-up settings had 55% higher odds of depression and 86% higher odds of having a drug or alcohol problem than those in low-income housing settings (aOR = 1.55,  $P < .001$ ; 1.86,  $P < .05$ ).<sup>9</sup>

One study examined the influence of social determinants of health by linking Massachusetts emergency shelter data with Medicaid claims records.<sup>35</sup> Researchers matched 9124 cisgender women on age, risk score, and eligibility category with 8757 peers who were pregnant simultaneously but not receiving emergency shelter assistance to determine behavioral health and pregnancy-related conditions.<sup>35</sup> Participants using the shelters had significantly higher rates of substance use disorder and mental health disorder in the year before conception.<sup>35</sup> The adjusted odds of having specific pregnancy-related morbidities were also higher for the shelter group.<sup>35</sup> Specific complications (adjusting for age, year of pregnancy, non-White race, unknown race, region, all substance use disorders, anxiety, and depression) were significantly higher ( $P < .001$ ) in pregnant participants with unstable housing (sheltered vs unsheltered) included (with 95% confidence interval [CI]): (1) hypertension complicating pregnancy aOR 1.5 (1.3–1.6); (2) prolonged pregnancy aOR 1.7 (1.6–1.9); (3) deficiency and other anemia aOR 1.3 (1.2–1.4); polyhydramnios and other problems of the amniotic cavity aOR 1.7 (1.6–1.9); (4) obstetric-related trauma to perineum and vulva aOR 1.6 (1.4–1.7); (5) nausea and vomiting aOR 1.3 (1.2–1.4); (6) hemorrhage during



pregnancy, abruption, or placenta previa aOR 1.9 (1.7-2.0); and (7) other complications of birth affecting management of the birthing individual aOR 2.6 (2.4-2.8).<sup>35</sup> One article measured infant and birthing individual outcomes, which we review next.<sup>37</sup>

### *Infant outcomes*

The remaining 7 studies measured infant health outcomes based on birthing individual HI and included specific outcomes such as preterm labor, preterm birth (PTB), low birth weight (LBW), breastfeeding duration, extended hospital stay, and neonatal intensive care unit admissions, with one of these studies examining both infant and birthing individual outcomes.<sup>2,36-39,41,42</sup> In these studies, the authors provide solid evidence of how birthing individual behavior and HI increased the risk of poor infant outcomes. Cutts and colleagues<sup>2</sup> reported a significantly higher odds of LBW association with prenatal homelessness than housed birthing individuals (aOR 1.43, 95% CI 1.14-1.80,  $P < .01$ ) but noted that other factors might be responsible for these gestational effects not measured in the study. They also acknowledged important study limitations such as retrospective, self-reported birth weights, increasing the potential risk of recall bias, and noted the variation in housing quality/status may impact results as well. Like Cutts and colleagues,<sup>2</sup> Merrill and colleagues<sup>37</sup> reported LBW among unstably housed birthing individuals and PTB. However, they also reported birthing individual adverse outcomes, including vaginal bleeding, nausea, and kidney/bladder infection.<sup>37</sup> In contrast to the LBW finding among unhoused birthing individuals, Richards and colleagues<sup>38</sup> examined maternal health behaviors and subsequent infant outcomes among those using Women, Infants, and Children (WIC). Researchers found that unstably housed birthing individuals who used WIC had longer gestational periods, higher birth weights, breastfed their children, and practiced safe infant sleeping—suggesting that WIC access during pregnancy is associated with positive birthing individual health behaviors, leading to better neonatal/infant outcomes.

A retrospective cohort analysis of Medicaid claims data in the Pregnancy Medical Home program in North Carolina found that an unsafe living environment, measured as homelessness or unstable housing, was a risk factor for PTB.<sup>39</sup> While that study examined birthing individual health conditions in pregnancy such as hypertension, asthma, and diabetes, they were only measured in this study as a predictor of poor infant health outcomes, not as a primary outcome themselves.<sup>39</sup> All of these studies were similar in findings of a greater likelihood of having poor infant

outcomes and found worse outcomes among African American/Black birthing individuals when compared with Whites.<sup>36,41</sup>

## **DISCUSSION**

From this review, 4 key findings emerge: (1) there is an inconsistency in the terminology used to define homelessness and HI in research; (2) among the limited knowledge regarding birthing individual outcomes, mental health has been the focus; and (3) pregnancy outcomes affecting the infant based on birthing individual HI included specific outcomes such as preterm labor, PTB, LBW, and breastfeeding duration. These articles revealed considerable variation in the definition of homelessness versus HI across studies. In addition to inconsistency in defining HI, the descriptions were not comprehensive, overlooking the variation in HI; survey response data were dichotomized (eg, yes, or no), leading to a diminished understanding of complex HI.<sup>2,9,21,35-39,40-42</sup> These differences continue to present a challenge when estimating the extent of HI among birthing individual and translating research findings into practice. Although rendering such generalizability is a challenge, standardizing this definition is essential in quantitative research to increase the validity and reliability of results across studies. Conducting more qualitative research is needed to understand better what unstable housing means to those who experience it. These studies are imperative, as the narrative of HI continues to evolve.

Extant literature has examined the relationship between HI and mental health across communities. The incidence and prevalence of diagnosed psychoses, personality disorders, and other severe mental illnesses is a well-documented health disparity that has persisted as a significant public health problem.<sup>47</sup> Deinstitutionalization of mental health facilities, increases in drug and alcohol access, and a lack of appropriate clinical services have further fueled this relationship. Those without necessary care have found themselves experiencing some degree of HI.<sup>12,48</sup> Depression, one of the most well-understood mental health disorders, can significantly interfere with obtaining housing and services that families need. Its prevention and treatment must be part of any effective solution to HI.<sup>47</sup> Park and colleagues<sup>9</sup> reported that women using the shelter had significantly higher rates of substance use disorder and mental health disorders during pregnancy than those not using the shelter. Although mental health services are imperative, nurses and other health professionals must provide holistic person-centered care for all birthing individuals regardless of housing status. One possible approach to addressing this issue is building

and strengthening programs and resources frequented by pregnant unstably housed people with integrated healthcare and social service access.

Many of the studies in this review exclusively focus on infant health outcomes among birthing individuals experiencing HI; however, pregnancy involves both the birthing individual and the infant. Understanding the impact of any degree of HI is critical to improving perinatal outcomes and is an ethically necessary step toward improving the long-term care and health of the birthing individual. The growing segment of reproductive-aged people with HI warrants the expansion of research to find more effective ways to identify and care for this vulnerable population. Efforts of researchers in the Clark and colleagues study<sup>35</sup> appear to be the beginning of research in the United States, leading to an understanding of the impact of HI on pregnancy-related health outcomes. Additionally, the studies' consistent findings of racial/ethnic disparities in birthing individual and infant outcomes among those experiencing HI continue to appear in research and practice today.<sup>22,30,49,50</sup> These results further support the need to increase efforts in research and practice that penetrate longstanding institutional practices and policies negatively impacting the health and well-being of African American birthing individuals.<sup>22,49</sup> Acknowledging and eliminating systemic racism in healthcare must be part of the solution to decreasing birthing individual and infant morbidity and mortality in the United States.

### Implications for clinicians and future research

Findings from this review reveal the need to increase nurse/clinician knowledge and support about HI during pregnancy and provide appropriate referrals for birthing individuals experiencing HI. Nursing professionals and others providing care to birthing individuals must ask clients during intake and subsequent visits about housing status and explore the role that external issues such as violence may impact housing. Nurses and other providers must inquire about the barriers to accessing consistent prenatal care and offer solid strategies that address these barriers. Also, there is the need to be sensitive, nonjudgmental, and supportive in clinical approaches and responses and consider the social determinants impacting health, client knowledge, and access in rendering nursing care. Azarmehr and colleagues<sup>51</sup> published a cogent article listing strategies and examples of upstream solutions needed to support individuals at the intersection of HI and pregnancy successfully. These strategies include the need for effective communication, comprehensive and appropriate prenatal screenings and assessments, and an increase in the availability of wraparound services.<sup>51</sup>

Review findings confirm a paucity of literature addressing the health of birthing individuals with HI and subsequent pregnancy outcomes. US research on pregnancy-related outcomes has mainly focused on the health of infants born to cisgender women with HI. However, future research for birthing individuals experiencing HI will expand the current understanding of associated pregnancy-related outcomes. Improvement in result validity occurs with standardization in how researchers define HI in the field. Also needed is a shift in the current narrative of those experiencing HI, attainable by first listening to participants' voices in qualitative research to deepen understanding of the impact of HI on birthing individuals' health and well-being. Although mental health and substance use are common occurrences among birthing individuals experiencing HI, this is not the full extent of adverse pregnancy outcomes. Research agendas should include other relevant aspects of poor health in this population, including the effects of social determinants and racism on pregnancy-related morbidities and the long-term health of those morbidities following pregnancy. Moreover, transgender and gender diverse people experience higher HI rates than cisgender people and should be included in future research efforts examining the intersection of HI and PM.<sup>52</sup>

Policy-level advocacy addressing social determinants of health within the healthcare delivery system has gained momentum. Still, more policy changes are needed to improve the response to perinatal care for support of birthing individuals with HI.<sup>5,53</sup> This includes taking a holistic approach to providing services and building community-based partnerships. Providing additional funds that support and incentivize community-based health programs and increasing partnerships with housing-related services and organizations are ways that Medicaid programs promote policy change.<sup>5</sup> Moreover, equitable housing opportunities, increased federal housing assistance, and housing affordability are critical in mitigating the challenges facing birthing individuals with HI.<sup>5,53,54</sup>

### Limitations

While this is a novel review addressing pregnancy outcomes among birthing individuals experiencing HI, there are some limitations related to the articles selected as well as the review itself. The attempt to capture all the research examining this relationship likely overlooked studies due to ambiguous definitions of HI. This variation in the description of HI limits researchers' ability to generalize study findings to the full spectrum of the unstably housed target population. Additionally, results from the reviewed studies may be compromised by either small sample sizes reducing generalizability<sup>21</sup>

or secondary analysis of larger samples using incomplete measures of HI leading to an increase in potential confounding.<sup>9,35–39</sup> Participants were selected based on previously collected data from records or those living in shelters using convenience sampling methods.<sup>21,39,40–42</sup> Although sampling methods are relevant, given the difficulty in accessing large numbers of unstably housed birthing individuals, sampling bias in the reviewed articles decreases the ability to generalize findings to the target population and fails to include gender expansive people. For the studies examining birthing individual health outcomes, self-report was the standard data collection method in many studies, increasing bias and error. However, literature has shown that the data collected from unstably housed people are no less likely to be accurate than housed people.<sup>55–57</sup>

Pregnancy-related research in the United States does not often accurately identify sex assigned at birth and gender identity of the birthing individual, which limits the interpretability of findings and analysis discussed in this review. Sampling approaches and research language also should be updated and standardized to be more gender inclusive to address these demographic inaccuracies.<sup>58</sup> Overall, this review offers a lens of pregnancy outcomes that have yet to be appraised and raises the awareness of the need to expand the research to examine birthing individual health outcomes in this population.

## CONCLUSION

Health professionals and researchers can use the knowledge gained in this scoping review to help standardize definitions of HI and further guide the development of effective and relevant health interventions. This review supports the need to expand research to elucidate the role of HI as a social determinant in birthing individual health and explore how gender diversity and systematic racism further impact pregnancy-related health outcomes. The persistently high pregnancy-related mortality rates in the United States reinforce the need to provide nursing-appropriate nursing care and advocate for policy change that promotes improved long-term health of unstably housed birthing individuals.

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